

HISTORY AND ARCHAEOLOGY

1. History and Current Trends of Underwater Archaeology around East Asia

Chair: Prof Akifumi Iwabuchi (Tokyo University of Marine Science and Technology).
iwabuchi@kaiyodai.ac.jp

Co-chair: Dr Kotaro Yamafune (Apparatus, LLC)

East Asia or the Far East, which consists of six states, viz. China, Taiwan, North Korea, South Korea, Russia, and Japan, is extremely rich in underwater cultural heritage, such as conventional shipwrecks under the sea, submerged settlement sites on the bottoms of inland lakes and rivers, or prehistoric shell mounds and stone tidal weirs along coastal zones, as well as in traditional ecological knowledge around underwater cultural heritage. Many shipwrecks or their cargos have been discovered by underwater archaeologists one after another in East Asian waters, and each nation has moved forward with its own underwater archaeological policy and numerous underwater projects both on governmental and grassroots levels. On the other hand, no East Asian country has ratified the Convention on the Protection of the Underwater Cultural Heritage yet, and the contemporary ocean climate crisis has started casting a gloom over the safeguard of local underwater cultural heritage. In East Asian cultural zones where Chinese characters are used, the document-based historical study or terrestrial archaeology has a long tradition, which has had a noteworthy impact upon underwater archaeology and its methodology. Recently, in addition, the technological advancement in underwater survey has remarkably been made; using remote-sensing with satellites, robotics for ROVs or AUVs, or 3D photogrammetry by PC software mitigates or cancels the limitations regarding accessibility and working time caused by underwater environment. The tie between such modern technologies and traditional archaeology or history has minted new applications and perspectives of underwater cultural heritage study. The multi-disciplinary or holistic approaches are increasingly more and more necessary among many researchers who are interested in underwater archaeology around East Asia.

1. Stone Tidal Weirs in Hainan Island, PRC

Yishi Wang

Around Danzhou city at the northern coast of Hainan Island, PRC, stone tidal weirs are widely observed. Local history says that immigrants from the southern part of Fujian Province in mainland China came to this area to build many stone tidal weirs during the Ming Dynasty. Each patrilineal lineage composed the construction unit of them. One stone tidal weir at the village of Wangzhai has the semi-circled catching trap at the tip of the stone wall. On the other hand, some stone tidal weirs at the village of Shenchong have openings between stone walls, which are usually closed by wooden sluice gates; when the openings are opened on the ebb, people set fishing nets just outside of the opened gates in order to catch fish. Before the tide is out of stone tidal weirs completely, fishing nets are also used inside them. At night, fishermen light a fire on floats of fishing nets with coconut oil in order to drive fish into the nets. Although one stone tidal weir at the village of Changsha has been designated as a Historical and Cultural Site Protected at the Provincial Level by the Hainan Provincial People's Government, most stone tidal weirs in Hainan island have not been safeguarded properly by local people as well as by the local or central governments; some have just been left abandoned, and others have been transformed into fishing ports. As for the intangible aspect, villagers still remember 'Tide Song' in Hainanese, which narrates the dates of the spring tides and the commencement times of high tides according to lunar calendar. In former days, moreover, some families used to hold special rituals during high tides so that a haul at stone tidal weirs might be good, but this custom has little currency these days.

2. When History Meets Technology: Preliminary Survey on the Historical Documents of Underwater Cultural Heritage

Chiung-Hui Fu, Yu-Chuan Tseng, Shao-Jung Chung

Underwater cultural heritage is a newly developed interdisciplinary field in which historical research is indispensable. According to the UNESCO UCH Convention, the desk-based study of historical, archaeological, geological, and environmental data is necessary for the preliminary work of inventory. Then researchers conjecture sensitive areas after analyzing and integrating the above information.

The Taijiang Inner Sea and Tayouan are important historical sites for the political activities of the Dutch East India Company and the Siege of Fort Zeelandia in the 17th century. According to preliminary conclusions from the historical documents, Dutch shipwrecks may have been buried in the shoals and wetlands around the mouths of the Zengwen to Yanshui River or the land area of Anping District, Tainan City. If there are discoveries, they will be significant material evidence of Taiwan's history in the Age of Discovery.

However, the Taijiang Inner Sea has undergone 400 years of geographical and environmental changes, including river channel migration, sandbars, lagoons, land expansion, and urban development. Many of the hydrological regions of the period are gone. Therefore, planning shipwreck survey strategies that compare historical documents and map data with current geographical locations is more complex than surveying the sea.

This study attempts to collect domestic and foreign maps of the Taijiang Inner Sea and Tayouan area and documents related to Dutch East Indies shipwrecks. After inductive analysis, a geographic information system overlays the maps and data. Authors estimate the possible location range of sunken ships as a reference for underwater cultural heritage survey planning and target object comparison. Finally, integrate the suspected targets discovered by the scientific instrument survey to examine the relationship between historical documents and scientific survey data.

3. Jōmon Sea: Navigation in the Origins of Japan

Daniele Petrella

The topic of this abstract fits best into the Session "History and Current Trends of Underwater Archaeology around East Asia" because it aims to address the study of the relationships between different Jōmon communities and between them and continental populations, through the key of maritime and river movements.

New archaeological investigations will be carried out at specific underwater and coastal sites with the use of sonar, magnetometers and new technologies for satellite surveys.

Southern Japan and its relationship with Korean cultures will be considered. The case studies of this first phase are the Ongaura and Meotoishimae sites located on the northwest coast of Tsushima Island (Nagasaki Prefecture) facing the Korean coast. Past surveys have confirmed archaeological evidence of a strong Korean presence at these sites.

In order to obtain as much data as possible, a large multidisciplinary and international team is being organised, involving IRIAE and the Tōkyō University for Marine Science and Technology, with the support of local institutions, the Italian Ministry of Foreign Affairs and International Cooperation, and the Italian Embassy in Tōkyō.

In summary, the project aims to answer the following questions: what was the role of the sea in the life of the Jōmon communities? How did the peculiarities of the Japanese territory influence the development of these communities? What vessels did they use for navigation on the high seas and how did they choose their landing points? What were and how did deep-sea fishing techniques develop? What were kaizuka actually and what was their significance?

The project awaits the identification of landing points/coastal settlements that may provide new data for understanding the dynamics underlying the relationships between local and mainland populations.

4. Variable Longline fishing -- The history and sustainable innovation of a traditional marine ecological knowledge

Xu Lu & Yu LongFa

Amoy variable longline fishing is an efficient, accurate and controllable traditional fishing technique created by Amoy fisherman, which has been popular in the Taiwan Strait and Zhoushan fisheries for hundreds of years. It has been replaced by seine and trawl since 1970s and continue to exist as inshore small-scale fisheries. It is a fishing method based on traditional marine ecological knowledge such as seabed topography, current and fish migration that evolved with environmental conditions, and a living marine cultural heritage.

In the past ten years, we have conducted a series of experimental archaeological studies on traditional shipbuilding, traditional navigation and traditional longline fishing. The studies undertook are to expand the boundary of its marine ecological knowledge, and introducing its special perspective facing the effects of climate change in marine ecology and other external conditions in its long history, to explore feasible ways to coexist with underwater cultural heritage and maritime cultural heritage in the uncertain future, play the role of its innovative precision fishing technology, and explore feasible ways to co-exist and protect marine cultural heritage under uncertainty, such as teaching local communities to use traditional methods to carry out non-destructive, accurate and efficient productive fishing in the complex environment of underwater sites. We expect to promote the variable longline fishing on the list of intangible cultural heritage in need of urgent safeguarding.

5. Development of methods for underwater cultural heritage exploration. —The case of the destroyer Warabi, which sank in the Mihonoseki Incident—

Masami Sannoh

The topic of this abstract fits best within this Session 1 because the aim is to preserve and utilise underwater cultural heritage in East Asia (Japan).

The case study will be based on the discovery and digital recording of the destroyer Warabi, which sank in 1927 off the Sea of Japan and has since been lost, using state-of-the-art technology at depths of between 95m and 180m.

The resources available to conduct the work include multibeam acoustic sounding and photography using ROV and 3D photogrammetry using PC software.

The research questions are that the identification and condition of underwater cultural heritage at great depths is difficult and has not been well documented or conserved.

Results are contributed significantly to the development of research methods in underwater archaeology.

6. Ancient sea scape of Japan: Burial mounds as navigation points

Tomo Ishimura

Research of landscape using GIS is progressing in archaeology in recent years, and the significance of the research of landscape from the sea or “sea scape” is also being stressed. Sea scape research has important implications for understanding how people perceive the sea and adapt to the sea environment and may contribute to the development of maritime archaeology. This study applies landscape research to Japanese archeology, so it fit in the session of “History and Current Trends of Underwater Archaeology around East Asia”.

This paper examines the sea scape of the Kofun period, from the third to sixth centuries, from the viewpoint of the location of the burial mounds and shows the possibility that some burial mounds were built as navigation points.

GIS analysis and field surveys were conducted to investigate how the burial mounds located near the coast look from the sea and indicate that the burial mounds with good

visibility from the sea were located at strategic points of marine routes, such as lagoons and straits. The survey also revealed that the most of these burial mounds were built in the specific period from the first to third quarters in the fourth century. This paper proposes that these burial mounds were built as navigation points to reflect the intention of the Yamato dynasty to control maritime traffics.

7. New harvest of The Shengbeiyu wreck

Liang Guoqing

Shengbeiyu shipwreck site is located in the sea area of Shengbei Island on the east side of Gulei Peninsula in the southeast of Gulei Port Economic Development Zone, Zhangzhou City, Fujian Province, China. The water depth is about 27-31 meters. Underwater archaeological discoveries are mainly porcelain and wooden hull. Porcelain is scattered around the shipwreck, with an area of no less than 300 square meters. The main types of wares come from Longquan celadon, include bowls, plates, cups, censers and goblets. The investigation and excavation of the sunken site of Shengbei Island will provide new research materials for exploring the overseas trade, shipbuilding and navigation history of the Yuan Dynasty.

190. Japanese piracy as a vector of knowledge transfers and technical innovation

Damien Peladan

Over the past century, the phenomenon of Japanese piracy in Korea and China in the late 14th and early 15th centuries has been the focus of much scholarship. These studies ranged over a variety of topics, such as the ethnic and geographic origins of the pirate crews, the implication of Japanese feudal lords and continental powers, the economic impact of the destructions they caused, the diplomatic consequences of their activities, etc. On the other hand, only a handful of studies have dealt with one of the main tools which enabled piracy in the first place: their ships. Yet, the first wave of Japanese piracy in East Asia, between 1350 and 1419, correlates with the introduction and spreading of new ship types throughout Japan. While until the mid-14th century, Japanese seagoing crafts were nothing more than improved dugouts with added rows of strakes, cabin and mast for improved seaworthiness, new ships designs which emerged in the early 15th century at the latest were entirely made out of individual planks and had triple, or even quadruple the capacity of the improved dugouts of old. Given the chronological coincidence between the development of these new types of ships and the peak of pirate activity on the continent, one wonders if these two phenomena were not connected.

This papers thus aims at understanding, within the scope of the available textual and archaeological sources, the factors which led to this sudden nautical evolution. As we shall argue, not only was regional piracy the main drive behind this evolution, but their shipwrights also incorporated many Chinese and, above all, Korean techniques into their new designs.

2. The maritime landscapes and underwater cultural heritage of Korea

Chair: Yang Soon-seok (National Research Institute of Maritime Cultural Heritage)
nrimch.apconf5@gmail.com

The central region of the Western Sea in Korea involves the waters of Chungcheong, Gyeonggi and Incheon. These areas are not only the breadbasket of Korea but also the inevitable route heading from Gangjin and Haenam, the most productive areas of Goryeo Celadon, to Gaegyeong, the capital city of Goryeo dynasty, and Hanyang, the capital of Joseon dynasty. This area shows, consequently, intensively-buried underwater cultural heritage, including eight ancient shipwrecks and 35 thousand relevant artifacts. Also, recently, the range of underwater cultural heritage discovered is not just limited to porcelains or shipwrecks, but also to the royal decorative tiles of

the early period of the Joseon Dynasty found in these areas. In the meanwhile, a myriad of underwater cultural heritage was found in the waters of Jeolla, the southern side of the central region of the Western Sea. Foreign shipwrecks represented by Sinan shipwrecks and ceramics and seals in the Song dynasty recovered from Sinchang-ri, Jeju proved active interactions through sea route, in not only the central waters but also the southern side of the Western Sea.

The session expects papers to discuss the matters and to find effective solutions to share this heritage with the public. Topics of interest for this session could be:

- Archaeology and History of Underwater Cultural Heritage in the Central Region of Western Sea, Korea
- Conservation Treatment of Underwater Cultural Heritage in the Central Region of Western Sea, Korea
- Folkloric View of Underwater Cultural Heritage in the Central Region of Western Sea, Korea
- Effective Ways of Usage of Underwater Cultural Heritage in the Central Region of Western Sea, Korea
- Drone Survey on the Intertidal Zone
- Archaeological Survey of Maritime Cultural Heritage through Sinan Shipwreck
- Suggestion of Survey Methods Using High-tech Devices to Overcome Obstacles of Underwater Survey

10. Analysis on Anchor Stones Recovered from Western and Southern Coasts of Korea

Park Seung Min

Relevant Session: The paper fits in Session 2, as it tries to classify types of 228 pieces of Korean and Chinese style anchor stones recovered from western and southern coasts of Korea, as well as suggest sea routes and ports of call.

Research subject: The research tries to classify types of 228 pieces of Korean and Chinese style anchor stones recovered from western and southern coasts of Korea, as well as suggest sea routes and ports of call by analyzing the way they are combined and locations of their recovery.

Out of primitive classification only focusing on the shape of anchor stones conducted so far, weight, shape, and fineness ratio of anchor stones were analyzed for detailed classification. For that, size, shape, and coordination of anchor stones were made statical by REX program, as well as ancient documents and interview with workers on board and locals were used to guess the way anchors are combined, sea routes, and ports of call. The problematic part of research is it is hard to date anchor stones, and shape of them could be interpreted in different ways by researchers.

Using REX program, weight, thickness, width, length, shape, and fineness ratio of anchor stones were digitalized and made statistical, which resulted in classification of anchor stones in 17 types based on correlation of their details. In addition, ancient documents and interview with workers on board and locals were used to guess the way anchors are combined, sea routes, and ports of call. In order to improve accuracy, coordinate conversion program, the Google Earth, nautical charts, Haerod system were used.

The research is expected to suggest clearer criteria for the classification, which can cause the anchor stones that will be recovered in the future to be classified in more details, and give trustworthy guess about the sea routes, international trade routes and ports of call.

11. Documentation of Underwater Excavations Using Geophysical Equipment

Lee Young-hyun

The research fits in session 2, as it focuses on methods of survey and documentation used in surveying underwater cultural heritage.

The eager to record the procedure of underwater excavations as objectively as possible using maritime geophysical equipment caused the research.

As bad visibility makes it difficult to conduct drawings and plans at the underwater excavations, it prevents us from documenting records as precise as possible. Thus, we try

to figure out how to survey at the excavation site with bad visibilities, using geophysical equipment, such as Multi-beam Echo Sound and Scanning Sonar, etc., which are used for underwater cultural heritage.

Through the experiments using a variety of geophysical equipment at the excavation sites, we study suitability and efficiency of geophysical exploration at site, and compare pros and cons of it based on the data obtained from experiments.

The research hopefully helps to record objectively at the excavation sites with bad underwater conditions.

12. Restoration of Shipboard Life in the Goryeo Period

Jeong Heon

While researches on history of shipwreck, pottery, and maritime trade, which is derived from Korea underwater archaeology, has been fruitfully carried out, less interest was paid to the archaeological research on shipboard life. Even though the importance of study comparing with contemporary land sites was highlighted in past internationally and domestically, the research couldn't be developed further, because of lack of the archaeological materials.

Recently, as the quantity of archaeological excavations on land and underwater in the Goryeo period is increasing, however, unlike terrestrial sites, underwater sites have less artifacts but survive in good conditions. Furthermore, artifacts relevant to shipboard life, not including cargos, show necessary cultural materials at the narrow places of vessel. Thus, as it is essential to study restoration of shipboard life in the Goryeo period, it fits in session 2.

First of all, the paper reviews the contexts of recovery according to stratigraphy, and locations, based on artifacts of shipboard life in the Goryeo period. The underwater sites are limited, however, to have less subjects to be analyzed. Thus, the paper builds the foundation of living spaces on board, comparing to the vessels in the later periods, and proves it by the documents and illustrations. Furthermore, it tries to arrange the basic materials about complementary reasons about living artifacts at that time on board and on land, and study on the shipboard life in the Goryeo period, by comparing cooking spaces and artifacts found on land at that time.

13. Underwater Excavations of Waters of Gogunsan Islands, Gunsan

Sangjun Park

The paper fits in session 2, as dealing with the contents and results of survey on the waters of Gogunsan Islands, Gunsan.

Gogunsan Islands, Gunsan where the exploration and underwater excavations have been carried out by the National Research Institute of Maritime Cultural Heritage since 2021, produced around 570 pieces of artifacts. This research introduces overall progress and methods of survey, trying to suggest overall explanation of waters of Gogunsan Islands, Gunsan by recovered artifacts.

First of all, it argues the limitations and challenges according to progress and survey methods in the whole research area, based on the process of exploration in 2021 and excavation in 2022. In addition, by analyzing ancient documents, and arrangement, type, period, etc. of recovered artifacts, it implies the period and characteristics of the site and gives insights of direction of upcoming survey.

It should be considered that further survey will affect the results of this research, as most of sites where artifacts are expected to be covered couldn't be included. Lots of potteries, timbers used for vessel, and daily goods on shipboard were recovered from this area where many vessels have been passed by from the past. It suggests that, especially, artifacts from various periods, from the period of the Three States to Joseon period, were resulted from at least two vessels sunken in the waters. Currently, only 1% of survey area

was dredged. If consistent survey is carried out and exposes shipwrecks, traces of maritime trades based on waters of Gogunsan Islands can be more clarified.

14. Research Methodology for Intertidal Zone: Utilization of Drone

Choi Dong-won

The paper fits in session 2, because aiming to suggest new methodology to discover shipwrecks and artifacts at the intertidal zone by drone.

From 1978 to 2020, twenty-seven intertidal zones were reported to involve artifacts. Some reported areas, however, are too shallow to survey with equipment, and, in low water, are not easily accessible to conduct surface survey. Recently, drone was operated in order to relieve these problems. Drone is nondestructive device, which is not restricted by time and place, despite of being operated by people.

First of all, the experiment figuring out whether survey using drone is appropriate is conducted. Proper overlapped ratio of the altitudes and pictures to observe cultural heritage is set for the aerial photos. Based on the results of experiment, orthomosaics from three intertidal zones are produced, which can distinguish cultural heritage.

It has been undergoing trial and error, including technical and physical challenges, because the research with drone has just started. The research hopefully suggests drone as an alternative way for the survey at intertidal zone conducted with trouble so far. In the future, drone with a variety of sensors, including LiDAR, will be used in various survey, which can produce much data.

15. Research on Artifacts of the Three Kingdoms Period of Korea Recovered from the Western Sea

Yang Ki-hong

The paper fits in this session, as dealing with artifacts of the Three Kingdoms period of Korea, such as pottery and roof tile, recovered from the Western Sea.

It has been known that the Western Sea was the way to the capital cities, Gaegyeong and Hanyang, for various vessels loaded with pottery and grain, which can be deduced from around ten shipwrecks of the Goryeo to Joseon periods, and ten thousands artifacts, including Goryeo celadon, Joseon grayish-blue-powdered celadon, Joseon white porcelain, etc., recovered from underwater. Even few artifacts of the Three Kingdoms period, recovered from waters off Mado, Tae-an, and Myeongnyangdaecheop-ro, Jindo, can support the potential to have shipwrecks from the Three Kingdoms period.

The methodology to conduct the research is to organize the artifacts of Three Kingdoms period recovered from Western Sea, compare with the ones produced and consumed on land, arrange the periods of them, and argue the relationship between them.

In order to compare artifacts recovered from underwater, ones found on nearby land sites should be confirmed that they have same properties and shapes. Also, divisions of production sites and consuming places are necessary.

The research result is to spread that not only are artifacts of the Goryeo to Joseon periods in the eleventh to eighteenth centuries recovered, but ones of the Three Kingdoms period in the fifth to seventh centuries, from underwater. Furthermore, it compared with nearby kiln sites and settlements, dating and identifying the production sites are possible. If distribution patterns of artifacts in the same period can be identified, it is expected to discover shipwrecks of the Three Kingdoms period.

16. Excavation Methods and Results of the Underwater Cultural Heritage in Korea

Whan Suk Moon

The paper fits in session 2, as discussing results and methods of underwater excavations in Korea. Korea underwater excavation of underwater cultural heritage is largely divided into surface survey and excavation, and its investigation is being conducted with the

permission of the Cultural Heritage Administration. Currently, the surface survey of underwater cultural heritage is conducted before the marine development projects, and after the exploration and investigation of the sea area where the underwater cultural heritage is found, and the excavation is conducted when the area where artifacts are buried is found, which is totally in charge of the NRMCH (National Research Institute of Maritime Cultural Heritage).

In order to argue how Korea underwater excavations have been progressed, the conducted excavations are subjected to the research. Relevant excavation reports published by the NRMCH are analyzed to show the excavation equipment and their results. The subjected materials include the followings.

Academic excavation and investigation of underwater cultural heritage in Korea can be said to have begun with Shinan Ship's excavation (1976-1984). The discovery of six pieces of Chinese pottery that had been caught in a fishing net served as an opportunity for investigation, but there was no professional divers, technology and equipment, so it was entirely dependent on the support of the Navy (SSU), until the underwater excavation of the Biando, Gunsan (2002). However, after the second season of Biando excavation when support from the navy became difficult, an investigation team was formed within the NRMCH to acquire underwater investigation techniques and establish a specialized investigation system. Now, underwater excavations are highly improved, by operating exclusive vessels for underwater excavation, studying exploration techniques according subjected environments, and establishing systems of underwater excavation, conservation, and exhibition in Taean. In addition, much academic interest is attracted because of new facts related to the sea that were not known in history books is revealed by underwater excavations.

As seen in the Shinan Ship's excavation, it has gone beyond the stage of relying entirely on the navy due to the difficulties of diving investigation. Now, the NRMCH has established its status as the only domestic institution specializing in research of underwater cultural heritage that is envied by other countries. The paper shows how the progress of establishing its status was and hopefully inspire other institutes for safer and systemic investigation of underwater cultural heritage.

17. 3D Recording of Underwater Sites: The Case of Shinchang-ri, Jeju-do

Lee Jeonghee

The paper fits in session 2, as focusing on the survey of underwater cultural heritage at Jeju-do in Korea.

The underwater site of Shinchang-ri, Jeju-do was reported by Haenyeo for golden artifacts in 1980s, and, further survey recovered Chinese celadon printed with '河濱遺范', '金玉滿堂' in 1990s. However, it was not until 2018 that consistent investigations were begun by the National Research Institute of Maritime Cultural Heritage.

Exploration is to search artifacts exposed on the bottom surface without any dredging, which is necessary for understanding distribution of artifacts under the surface. With targeting the area which could include as many artifacts as possible to be dredged, actual excavations were conducted for three seasons from 2019 to 2021.

The objective of underwater investigation is to find the area of intensive distribution of artifacts and understand their contents. Then, how the environment of underwater sites can be documented by areas?

Waters off Shinchang-ri, Jeju-do have relatively fine visibility, comparing to other sites in Korea. Thus, for the first time, attempts to document the targeted area in the 3D model with pictures, which is assumed to suggest more accurate timelines and coordinates than plans, were conducted.

Recording process is begun with taking pictures which is also the starting point of traditional investigation. Accuracy is the most emphasized. Methashape of Agisoft is

used. Not only are topography of underwater but exact coordinates of hundreds of artifacts identified.

Environment limitation for underwater excavation in Western coasts in Korea exists, such as strong currents and bad visibility. 3D documentation should be consistently tried, however, as one of the most important things in archaeological excavation is to locate the shipwrecks and artifacts and document them.

18. The Archaeological Type of Sambyeolcho and Maritime route of Korean peninsula in Goryeo
Yun Hyeung-won

Subject : This subject is proceeding for long time on archeological excavation and historical reserch in Korea.

Question : What is a real shape of Goryeo, according to interpretate Sambyeolcho and Maritime route of Korean peninsula.

Method : Anaysis archaeological artifacts and historical records. Synthesis archaeological-historical perspective.

Result : This research is nassary that it reveal hidden Goryeo culture and new medieval Korean Maritime route. And it is related with Mongol-Goryeo-Japan military force. (The End)

3. Decade of Action, the call for Oceans' Past to Bridge our Communities

Chair: Dr Abhirada Komoot (Suvarnabhumi Studies Centre and Thammasat University).
Abhirada.k@gmail.com

Sustainable Development Goals are big ideas for collective global planning. The ocean is emphasised as an important part of that and recognised as a fast-growing field concerning the challenging of global climate change and harnessing of marine resources. The social aspects of the ocean, though, is not yet a common conversation among maritime scholars in the Asia-Pacific region. The core focus of this session, thus, is how the study of the oceans' social and economic complex entanglement and history can be related to the improvement of ocean literacy and how maritime knowledge can help make a wider impact.

This session invites scholars and experts to share their hands-on research experience and forward their thinking on the fundamental interactions between humans and the seas, including the non-coastal community. It is to understand how “the oceans have influenced us, and how we have influences on the oceans” in our engaging ways of living with the oceans. To succeed, we need inclusive action from across fields to explore diverse dimensions of what it means to live with the oceans from the past, in the present and carrying on to the future.

This session encourages those who are interested in excavating the knowledge of the Asia-Pacific maritime past and bringing together the academic-driven conversation on the roles of the Asia-Pacific region in maritime connections. Ultimately, it is to ensure that Asia-Pacific maritime heritage is visualised in the global initiative.

19. We Need to Listen and Watch! Indigenous Knowledge of Living in Concert with the Sea
Abhirada Pook Komoot

In light of the ‘Ocean Decade’, this paper is to realise the potential of indigenous knowledge as an opportunity for ocean literacy and to identify some issues revolving around the risk of losing such knowledge. There is a wealth of indigenous knowledge we can benefit from but first, we need to listen and watch. For a long time, western principles of science dominate modern society and policy. A question is therefore asked: how does indigenous knowledge help to create the ocean we want? The paper hopes to anticipate the integration of traditions and sciences to ensure the tangible and intangible cultural heritage of the sea in the sustainable development dialogue now and in the future.

This research is a result of extensive observation of the indigenous people living harmoniously with nature in coastal villages of Thailand and Southeast Asian counterparts including Indonesia, the Philippines and Vietnam. After the Tsunami hit the coast of the Indian Ocean in 2004, indigenous knowledge about disastrous warnings at sea became visible in modern experience. Sea nomads like Moken and Urak Lawoi dwelling in the Andaman Seas were among the Tsunami survivors due to their ability to observe and understand the unusuality of the natural phenomenon. The deep-time story of the monstrous waves has been handed down from generation to generation. In minimising risks from the loss in natural disasters, there are many examples that demonstrate the resourcefulness of the indigenous people, such as the moving of surface waves, a floating pattern of mangrove hypocotyl (seeding stem) or debris flows and changing the behaviour of fish schooling near shore.

Yet, living in concert with the sea requires sophisticated and advanced skills to decode and be able to read nature. Ultimately, the indigenous learnt from their ancestors to produce devices for a modest living. A variety of fishing gear is being used on the coast for small-scale fishing activities. The technological diversity of boatbuilding demonstrates the dedication to sea voyages which is the core of the indigenous economy back thousands of years ago.

The current international ambition for sustainable marine resource development and improving coastal living quality has unavoidable effects on the indigenous way of living. Traditional knowledge has been proven on several occasions to be efficient for friendly living with nature and risk reduction. It is, however, at blink of being faded away due to external forces (i.e. mass tourism, laws prohibiting the harvesting of forest resources, and an unsupported educational system). No one knows the sea better than the people who have lived with it and relied upon it.

20. Rethinking the Relations between the Sea and Humans through an Anthropological Study of Wooden Boatbuilding in Indonesia

Tsukiko Myojo

The topic of this abstract fits best within this Session 3 because the topic, which is the anthropological study of wooden boatbuilding today, will provide specific ethnographic cases to reconsider the relationship between the seas and humans in a contemporary regional context. The case study under consideration is the wooden boatbuilding in the Konjo region of South Sulawesi, Indonesia. It has produced wooden boats sufficiently for centuries and maintained its technical and philosophical characteristics until today. This study mainly employs data collection based on anthropological fieldwork done by the presenter since 2019, including participant observations and interviews in the shipwright community in the Konjo region. In addition, for more general discussions, I will use ethnographies from Southeast Asia, including Indonesia and the Pacific region, to examine the common features of the lives of people and communities along the coast.

From the perspective of how the sea shapes human society, this research explores how the skills and knowledge of people, as well as their philosophy and customs, are formed through the practice of boatbuilding that is directly related to the sea. The case of Konjo's wooden boatbuilding shows that it would not be just an economic activity. Boatbuilding is shaping the identity and craftsmanship that the boatbuilder flexibly adjusts to the various conditions, such as material, workshop, and order needs. Besides, the particular philosophy of boat, in which the Konjo people regards boatbuilding as human birth, has also formed ritual practices and harmonious collective work. Thus, various ethnographic cases, including Konjo boatbuilding, indicate that a boat is not just a tool for transportation. Rather, it is an agency that relates the sea and humans technically and philosophically. This study will contribute to the discussion of Session 3 to reconsider the relationship from the local context.

21. A Phenomenology of Oceanscape: Aquatic Lifeworlds and Sustainability

Anja Krieger

The topic of this abstract fits best within Session 3. Decade of Action, the call for Oceans' Past to Bridge our Communities, because it addresses the encounter with and experience and understanding of humans and their aquatic surroundings - a phenomenology of oceanscape which is defined here as the human perception and experience of the ocean itself, including both tangible and intangible events and encounters. The notion of the sea as a blank, formless and featureless space has often been evoked in scholarly writings about the ocean. Recently, however, researchers have made compelling arguments against this point of view by recognizing the materiality and temporality of the sea itself. Even though the ocean as a fluid space lacks the firm surface of the land, it is not without recognizable structures in various forms. After presenting and discussing a theoretical framework of phenomenology of oceanscape, derived from landscape studies, and what it means to encounter a vast body of water as a human, this paper uses the analysis of (contemporary) human interactions with the ocean that are firmly rooted in the past to address sustainable concepts of human-ocean interaction in the present. The Haenyeo in South Korea and the Ama in Japan, both representatives of invaluable and intangible East Asian maritime heritage, exist in the space between the past and the present and between the land and the water. Based on centuries-old tradition and knowledge, their present understanding of their maritime environment can contribute to a better understanding of social and mutual human-ocean entanglements and thus contribute to ocean literacy as defined by UNESCO.

22. Hoa Lu - The 10th Century Capital of Vietnam - An Abandoned City by the Sea
Vo Thi Phuong Thuy

The topic of this abstract fits best within the Session 3: Decade of Action, the call for Oceans' Past to Bridge our Communities because by setting the Hoa Lu site in the context of coastal cities, the research could help to understand how the sea receding affected to the rise and fall of the city during the 10th and 11th century. This coastal character of the Hoa Lu city was not mentioned by previous research.

The case study under consideration is the Hoa Lu site, the 10th century capital of the Viet people. The Hoa Lu city is now the core zone of the UNESCO World Heritage: Trang An Landscape Complex which is 92km southward of Hanoi. The capital city was only used for 42 years (968-1010), then was moved to Thang Long (Hanoi now). The city has been almost abandoned since then. We believe that one of the important reasons was the sea receding.

The resources available to conduct the work include historical documents (Chinese and Vietnamese historical records about Hoa Lu, folk stories), landscape surveys with old maps and Lidar images, mapping historical sites, surface ceramic collections, and archaeological excavations.

The research questions: How did the sea and the sea receding affect the landscape, plan, economic activities, the rise and fall of the city?

The results are a more detailed view of the landscape of the region with ancient shorelines at the south of the city; the sea receding could be the reason why the 10th century sea port of Hoa Lu was abandoned and this could be a reason why the capital was moved to Thang Long. Although we have had some potential results, the project needs further research and more collaborations with international researchers from multiple disciplines.

23. Maritime and underwater cultural heritage's contribution to a sustainable UN Ocean Decade
Athena Trakadas

The paper will highlight the essential role of maritime and underwater cultural heritage (MUCH) in delivering sustainable development in our seas and oceans, noting in particular the relevance to the UN Decade of Ocean Science for Sustainable Development

(2021-2030) and UNESCO's Thematic Indicators for Culture in the 2030 Agenda – key themes of this session. By presenting several examples of human interaction with the historic environment – embodied in intangible as well as tangible heritage and traditional knowledge – this paper will argue that the knowledge generated from cultural heritage data about past materials and societies' interaction with the sea can help gauge future patterns regarding pollution, impacts of climate change, and other hazards. MUCH will therefore play a significant role in delivering SDG 14 and Ocean Decade Societal Outcomes. The activities of various stakeholder groups, such as the Ocean Decade Heritage Network, are working to address these challenges in order to make a wider impact in the Asia-Pacific region and globally.

24. Identifying Singapore's Maritime Cultural Landscape

Michael Ng Jian Cheng

The paper examines Singapore's maritime cultural landscape and how it can help further our thinking on the interactions between humans and seas in a micro maritime cultural landscape.

The Maritime Silk Road is a recent concept that examines the maritime connections between the Persian Gulf, Red Sea, Indian Ocean and South China sea at various periods since the 5th century BCE. Through archaeological and historical evidence, Singapore's associations with the Maritime Silk Road can be traced from the fourteenth century. The Maritime Silk Road notion focused on the macro implications of global geopolitical trends and trade. It emphasises the trade and exchange that occurred during the various periods, effectively highlighting the importance of the road in a global context. Singapore's historical narrative has been explored within the Maritime Silk Road concept. This approach has helped further the understanding of Singapore's historical role within this trade route, but it cannot illuminate the other aspects of maritime society. This paper proposes to build upon the current emerging notions of the Maritime Silk Road by incorporating the study of the maritime cultural landscape to observe the micro connections and perhaps a closer examination of the social activities around Singapore. The case studies under consideration include historical sources on maritime activity around Singapore, the current historical narrative on Singapore, and recent maritime cultural landscape studies. These case studies are analysed to identify the various elements that makeup Singapore's maritime cultural landscape. In addition, this paper seeks to identify Singapore's maritime cultural landscape within the premise of the maritime cultural landscape approach proposed by Christer Westerdahl. The expected results are to take on a different perspective in considering Singapore's maritime past as an island and coastal settlement. It hoped to further the understanding of the island's maritime past beyond the predominant trade narrative. Ultimately, it hopes to allow stakeholders in Singapore to recognise the various type of maritime cultural heritage which may reside around Singapore's coast and waters.

4. Underwater Cultural Heritage of World War II in the Asia-Pacific Region: Discoveries, Opportunities & Challenges

Chair: Dr Alexis Catsambis (Underwater Archaeology Branch, Naval History and Heritage Command, U.S. Navy) alexis.catsambis.civ@us.navy.mil

Maritime heritage resources associated with the Second World War remain ever-present across the Asia-Pacific Region. Recent surveys and investigations have led to a series of prominent discoveries, whereas advanced archaeological documentation efforts have contributed to renewed interpretations of events and engagements. World War II era underwater cultural heritage resources have often grown to also inhabit the space of natural resources, and are at times threatened by environmental and human impacts. Concurrently, extant environmental hazards or

unexploded ordnance associated with these resources can in turn make them a threat to their immediate environments or to public safety. Weaved through this narrative is a complex legal, cultural, value, and identity framework, within which heritage managers attempt to preserve the past, while responding to the needs of the present. This session aims to put forward a series of case studies that delve into these discoveries, opportunities, and challenges, while highlighting and advancing regional shared approaches to underwater heritage management and interpretation.

25. Archaeology and Anthropology of World War II Japanese Aircraft in Australia: The Case Study of Hajime Toyoshima's Zero

Hiroshi Ishii

During World War II, the Imperial Japanese Navy (IJN) and Army carried out a series of air raids on the northern part of Australia. The Bombing of Darwin by the IJN on 19 February 1942 was the largest foreign attack in mainland Australia since the colonization of Australia by the British Empire. One of the IJN Zero fighters flown by a petty officer, Hajime Toyoshima, was force-landed on Melville Island, north of Darwin. Later, he was captured by an Indigenous man, Matthias Ulungura, and became the first Japanese prisoner of war on Australian soil. This study examines historical records and remains of Toyoshima's Zero and related materials currently displayed in several museums around Darwin to answer the research question of why and how the utilization of the wreckage of Toyoshima's Zero and related materials has changed over time. Close examination with 3D photogrammetry recording of the wreckage shows characteristics of the early model of Mitsubishi M6A2b Type 0 Model 21 carrier fighter and evidence of utilization of this wreckage. Furthermore, examinations of related materials indicate debatable authenticities. Despite the questionable legitimacies of those related materials, exhibitions of museums attempt to recreate the past event. Furthermore, those materials reflect the social value shifts that those items went through. Therefore, this research fits best within this Session 4. Underwater Cultural Heritage of World War II in the Asia-Pacific Region because this study focuses on interactions between Australians, which includes the Indigenous people, and the IJN technology.

26. The Jaluit Atoll TBD-1 Devastators: Archaeological Analysis and Preservation Assessment of a WWII Site.

Peter D. Fix, PhD and Russell E. Matthews

The topic of the paper, entitled "The Jaluit Atoll TBD-1 Devastators: The Archaeological Analysis, and Preservation Assessment of a WWII Site," best fits within the session, Underwater Cultural Heritage of World War II in the Asia-Pacific Region: Discoveries, Opportunities & Challenges due to its context and subject matter. Before sunrise on February 1st, 1942, aircraft from the USS Yorktown (CV-5), sortied as part of Task Force-17's attack on the Japanese Mandated Islands of Jaluit and Milli, in present day Republic of the Marshall Islands, and Makin, the northern most island in the Gilbert Islands chain. During the raid, two TBD-1 Devastator torpedo bombers [BuNo. 0298 (5-T-7), and BuNo. 1515 (5-T-6) were forced to ditch in Jaluit Lagoon as each aircraft was low on fuel. The aircrews of both planes survived the water landing, were captured by Imperial Japanese Naval forces, and survived captivity in POW camps in Japan. Since 2004, a group of scientists, engineers and researchers have undertaken six expeditions to the resting place of the aircraft in a remote section of the lagoon to document and conduct analysis on aspects of the artifact's preservation. As part of the monitoring and assessment, plans have been generated to potentially recover one of the aircraft to archaeological and materials conservation standards.

27. Discovery of the USS Albacore (SS-218)

Ivor Mollema, Stephen Katona, David Johnston, and Dr. Tamaki Ura

The topic of this abstract fits best within this Session: 4. Underwater Cultural Heritage of World War II in the Asia-Pacific Region: Discoveries, Opportunities & Challenges because it covers the discovery of a World War II U.S. submarine off the coast of Japan and covers the challenges and investigative efforts required to discover and identify it.

The case study under consideration is the wreck of the USS Albacore off the coast of Japan.

The fieldwork has already been completed. This work relies on historical accounts, archaeological data (primarily ROV footage), and archival research.

The research questions/approach/problems are: What is the identity of the US shipwreck found off the coast of Japan? What information can we gather from it? Where do we go from here?

The results are the discovery/identify of the USS Albacore along with some discussion on future goals or objectives.

28. Submerged Battlefield: Examining the Status and Challenges of World War II Shipwreck Management in the Philippines

Rachelle Anne Geline P. Ureta and Bobby C. Orillaneda

Many sites in the Philippines had been battleground during the Second World War that resulted in substantial sinking of American and Japanese naval vessels. Advanced technology has significantly helped in locating these shipwrecks and documenting their current condition. However, many of these underwater cultural resources have not yet been subject to proper scientific examination. Navigea, Ltd., in collaboration with the Maritime and Underwater Cultural Heritage Division of the National Museum of the Philippines has located and photodocumented World War II (WWII) shipwrecks in Subic Bay, Surigao Strait, and Ormoc Bay which only comprise a small percentage of the total number of shipwrecks. These sunken vessels are considered war graves which are regarded with certain sanctity particularly for the nations they fought for. They possess intrinsic scientific, educational, monetary, and cultural values, thus should be extensively investigated to effectively plan for their protection against threats such as natural processes and human intervention. Archaeological studies of sunken warships can also provide insight on the events during the naval battle and clarify information from written sources. This paper presents a status update and results of research activities in the World War II (WWII) shipwrecks in the Philippines. It also outlines the challenges in managing these sites and proposes potential plans and measures for their long-term management and preservation.

29. Capacity Building in the Time of COVID-19: The case of HMAS Perth (I)

Dr Natali Pearson

The topic of this abstract best fits within Session 4, 'Underwater Cultural Heritage of World War II in the Asia-Pacific Region: Discoveries, Opportunities & Challenges' because of the latter's focus on World War II heritage in the Asia-Pacific. The case study under consideration in this paper is that of HMAS Perth (I), an Australian warship sunk in Indonesian waters in 1942. The focus of this paper is Australia's maritime capacity building initiative for the wreck of Perth, funded by the Australian Government, and the challenges and opportunities of advancing this project in the time of COVID-19. While some projects lent themselves to being conducted online, many others, including this one, were forced to re-evaluate their feasibility entirely. This paper situates this project within the broader context of the changes wrought by COVID-19 on conventional heritage capacity building and management models, and the extent to which these models still apply. As it proposes, the limitations posed by the pandemic on capacity building projects created space for more inclusive and enduring knowledge building approaches, which elevated local stakeholders and, arguably, contributed to more sustainable outcomes in the long-term.

30. Examining Underwater Cultural Heritage of World War II around Maui and Lanai through Photogrammetric Modeling

Jason T. Raupp, Dominic Bush, Justin Dunnivant

In October 2022, archaeologists from East Carolina University and the University of California at Los Angeles investigated underwater cultural heritage associated with World War II around the islands of Maui and Lanai in Hawaii. Working in partnership with the National Geographic Society and the Ocean Exploration Trust, the team surveyed the remains of lost or abandoned aircraft, amphibious assault vehicles, ships, and moorings associated with WWII training and staging exercises. In keeping with Session Four's (Underwater Cultural Heritage of World War II in the Asia-Pacific Region) focus on "discoveries, opportunities and challenges", the maritime heritage research centered on assessing the physical state of these World War II wreck sites to evaluate preservation threats, while also contributing to the creation of educational resources and outreach tools. A total of eight World War II-era sites were surveyed using photogrammetric recording methods; these include the wrecks of two US Navy aircraft, four amphibious landing craft, a mooring station, and a semi-submerged gasoline tanker. Project members used the collected imagery to produce 3-dimensional photo models. The models proved not only to be effective visual aids for showcasing some of Hawaii's rich submerged maritime heritage, but also provided archaeologists with detailed site maps made in a fraction of the time generally required. This paper examines the indelible impact left by the war on Maui and Lanai through the investigation of tangible remains of the island's wartime cultural landscape.

32. The Galloping Ghost of the Java Coast: Preserving the Story of WWII Era Heavy Cruiser USS Houston (CA-30)

Dr. Alexis Catsambis Dr. Jay Thomas

The topic of this abstract fits best within the Underwater Cultural Heritage of World War II in the Asia-Pacific Region: Discoveries, Opportunities & Challenges session of the conference as it is directly relevant to the session's theme. The paper presents a case study on the wreck site of USS Houston (CA-30), a heavy cruiser located in Banten Bay, Indonesia, sank in combat during the Battle of Sunda Strait in 1942. It is associated with one of the greatest losses of life tied to a single sinking event in U.S. Navy history. The wrecksite of USS Houston has been documented over the course of the last several years through the use of diving and remote-sensing based surveys. Collaborative management efforts between the Governments of Indonesia and the United States have recently focused on site preservation, a point of particular concern as nearby contemporary warships have suffered significantly at the hands of unauthorized salvage operations. The results presented will demonstrate what has been learned about the shipwreck over the course of the last decade, as well as highlight transnational approaches to the preservation of underwater cultural heritage sites.

33. Back from Oblivion - Deep Water Wrecks of World War II - Commemoration and Protection
M. Blair Atcheson and Mr. Frank Thompson

The topic of this abstract fits best within Session 4 Underwater Cultural Heritage of World War II in the Asia-Pacific Region: Discoveries, Opportunities & Challenges because the paper provides an overview of some of the high-profile deep-water World War II shipwreck discoveries over the last several years in the Pacific and studying the data collected to help inform our long-term management strategies, approaches to policy and protection, and commemorations.

The case studies under consideration are the Battle of Midway Japanese aircraft carriers, USS Juneau, and USS Indianapolis.

The resources available to conduct the work include surveys conducted by the R/V Petrel and data reviewed by the Naval History and Heritage Command as U.S. Navy's cultural resource managers for sunken military craft.

The research questions/approach/problems include the unique opportunity for research and scientific analysis that these deep-water sites provide of nearly undisturbed wreck and how to address, through policy or practice, the new challenges facing submerged cultural resource managers as depth becomes less of a protecting factor and with an increasing interest in deep water wreck site tourism and illicit salvage.

The results provide an overview of the information learned from reviewing the ROV footage of the wrecksites and how that informs our management approach for other and future deep water U.S. Navy wreck discoveries by third-party researchers.

34. The Power of Partnerships: Recent DPAA Partner Field Missions in the Asia-Pacific Region
Abigail Bleichner

The topic of this abstract fits best within the session "Underwater Cultural Heritage of World War II in the Asia-Pacific Region: Discoveries, Opportunities & Challenges" because the Defense POW/MIA Accounting Agency's Partnerships and Innovations Directorate works in partnership with NHHC and other Federal agencies to locate and document World War II US aircraft losses.

The case studies under consideration include DPAA Partner activities to locate and identify aircraft wreckage in Saipan, Palau, Vietnam, Guam, Australia, Vanuatu and other Pacific countries, with the ultimate goal of providing the fullest possible accounting for our missing personnel to their families and the nation.

The resources available to conduct the work include a broad, global Partner network comprised of archaeologists, historians, and researchers who drive missions to success, as well as internal DPAA subject matter experts and stakeholders.

The approach to each case is guided by DPAA's mission to account for missing US personnel, however, each site is unique and presents its own set of challenges and research questions.

The results from the partner activities vary on a case-by-case basis but include the investigation and archaeological documentation of US aircraft sites leading towards the excavation of forensic remains and evidence.

35. Discovery of the Japanese WWII Super Battleship IJN Musashi in the Sibuyan Sea, Philippines.

David L. Mearns

The topic of this abstract fits best within Session 4 because it involves the historical research and at-sea discovery of an important WWII Japanese warship sunk in the Asia-Pacific region.

The case study under consideration predominantly deals with the sinking of Musashi, however parallels will be drawn regarding the nature of the wreckage & debris fields of

other significant WWII warships such as HMS Hood, RN Roma and HMS Barham.

The resources available to conduct the work included specialist underwater search equipment and remotely operated vehicle (ROV) technology operated from a combination of offshore survey vessels and expeditions yachts.

The research questions/approach/problems include the precise location of the wreck of Musashi and which historical source of the sinking position was most correct, the optimum technical approach for searching such a geologically active seabed and an assessment of the battle damage inflicted on Musashi.

As the expedition to locate the wreck of Musashi was successful the results of the

expedition in the form of sonar images, still photographs and video of the wreckage will be presented, which allow a new interpretation of the engagement and sinking event.

36. The Montevideo Maru Project and the Australian Army's interest in underwater cultural heritage

Mick de Ruyter, Andrew Bernie¹, Adam Bourke¹, Terence Fitzmaurice¹, Alison Mountain

Unrecovered War Casualties – Army (UWC-A) is the agency within the Australian Defence Force responsible for the research, recovery and identification of the remains of Australian Army personnel from historical conflicts and is mirrored by similar units from Air Force and, to a lesser extent, Navy. Over 103,000 people have died in the service of Australian military units in conflicts or operations since the 1880s. More than 30,000 of these casualties remain unrecovered with no known grave. While UWC-A investigations typically involve terrestrial sites, the unit recently sponsored the investigation of the wreck site of Montevideo Maru, a Japanese prisoner of war transport ship sunk in 1942 with around 850 Australian servicemen aboard (predominantly Army), among other casualties. After initially proposing the search, Silentworld Foundation, supported by the international survey company Fugro, were contracted to conduct the field investigation. UWC-A staff and specialist reservists provided contract management, liaison with government agencies, technical review of search proposals and reports, and research on the list of casualties. The shipwreck represents the sovereign heritage of Japan in the coastal waters of the Philippines, but it is also a site in which Australia and several other countries have significant shared heritage interest. Although there was no intention of recovering remains or of otherwise interfering with the site, locating the wreck enabled Army to account for the last known location of 850 men killed in Australian military service, the most significant such loss in any single event at sea. Lessons drawn from this investigation will enable the collaborative examination and commemoration of other underwater cultural heritage sites worldwide that contain or represent the remains of Australian service personnel.

37. Interdisciplinary and Community Inclusive Approaches to Submerged WWII Heritage Research in the Pacific

Jennifer F. McKinnon, David Benavente, Toni Carrell, Erin Fields, Vicki Richards, Della Scott-Ireton, Mark Stephens, Aleck Tan, Kota Yamafune

As the abstract for this session outlines there are many opportunities, challenges, and competing interests related to the development of research on and preservation of submerged WWII Heritage in the Pacific. This paper outlines an interdisciplinary, community inclusive project which brings together historians, archaeologists, biologists, conservation scientists, photogrammetry specialists, GIS specialists, veterans and Pasifika people to focus on the archaeological and biological research of WWII UCH. The project leverages existing biophysical data products from bathymetric Lidar to conduct machine learning in identifying submerged heritage in waters up to 50m. Surveys of the located sites include a focus on the wrecks as habitats and Blue Economy sites in regional commercial and recreational fisheries and ecotourism industries. Samples of eDNA and corrosion data as well as 3D models using ROV technology will contribute to questions about the health of these sites, potential contamination, and their long term preservation. Collaboration with veterans for an adaptive rehabilitative event trains off- and on-island veterans in citizen science skills. Finally engagement with local Pasifika non-profits and schools provide opportunities for knowledge creation and exchange.

5. New Research Findings of Archaeological Ceramics from the Maritime Cultural Heritage of the Asia-Pacific Region

Chairs:

Prof Wong Wai-ye Sharon (Department of Anthropology, The Chinese University of Hong Kong)

Dr Bobby Orillaneda (National Museum of the Philippines)

This session discusses recent research findings in archaeological ceramics from the maritime cultural heritage of the Asia-Pacific region. Ceramics are a valuable means that embody the interconnections in maritime trading networks and social relations while negotiating transcultural forces. We invite papers that report new research findings on ceramic artefacts investigated or excavated from archaeological sites from the maritime cultural heritage within the Asia-Pacific region, as well as those that have been exchanged across long distances between neighbouring regions. We also encourage papers on ceramic topics, including issues in globalization, climate change, and human migration, interpreted through interdisciplinary methods and bring new understanding related to ceramic production, technological and economic dynamics, exchange, value, and reuse, among others.

38. Trading ceramics – the findings from the shipwrecks along the coast of Vietnam Hoang Anh Tuan

The overland ‘Silk Road’ has served as the main conduit for the exchange of goods and culture between China, Southeast Asia, and the West since the Han Dynasty. Its primary role has been diminished due to established of sea routes by the Tang Dynasty, thus Guangzhou (China) became one of the main gateways for maritime trade with Southeast Asia and the West.

Southeast Asia is strategically situated at the passage of the maritime trade route, connecting the East and the West. It has thus been known to be an area rich in precious metals, and luxury products such as pearls, rhino horn, tortoiseshells and spices since the ancient times. In addition, it is also used as an entrepôt complex on the maritime route between the East and the West.

With a particularly favorable geographical situation, Vietnam's waters play a particularly important role in the ‘Maritime Silk Road’ as mentioned above.

Over the past three decades, dozens of ancient shipwrecks have been discovered related to the ‘Silk Road of the Sea’ in Vietnam's territorial waters. Those shipwrecks are evidence of the ceramics trade, which may have taken place for centuries along the coasts of Vietnam.

This paper deals with the ceramic collections discovered on one of the shipwrecks in Vietnam's territorial waters, being housed at the History Museum in Ho Chi Minh City, from the 9th to 19th century; that may demonstrate the process of economic and cultural exchange from the East to the West at that time.

39. Study on the Production Sites of Pottery Excavated from Korean 11t-14th Shipwrecks Jong-Kuk Shin

So far, on the western and southern seas of Korea were found around a hundred thousand of artifacts and sixteen shipwrecks, the majority, more than 95%, of which were porcelain, causing researches of underwater cultural heritage dynamically focused on it. After the mid-2000s, four shipwrecks in the Goryeo period (10-14th Century) were discovered in a row, some of which contained more than a hundred of well-preserved pottery, along with porcelain. Even though sophisticated researches on pottery of shipwrecks are not in common, I have been interested in their production sites.

Pottery from the Korean cargo vessels in the 11-14th Century was used as either daily products of shipboard life, or containers for food or other cargos. Also, it is assumed that

pottery produced from various regions could have been shipped by its usage and how to operate the vessel, and it is actually proved by the cases that pottery showing different techniques and shapes are excavated in one vessel. Thus, if incoming routes of pottery could be identified, through distinguishing usage of pottery by the context of recovery and figuring out the production sites of pottery showing similar techniques and shapes, information relevant to the operation of vessel, such as ports of departure, ports of loading, and ports of call can be obtained.

In order to identify the production sites of pottery recovered from shipwreck in the Goryeo period; 1) they are classified by methods, shapes and so on, and those have specific characteristics that can be observed even in naked eyes are specified, 2) production sites are suggested, based on the recovery aspects of land sites relevant to pottery (production sites, consumption sites) using database of Goryeo pottery of the National Research Institute of Maritime Cultural Heritage, 3) based on the result of assuming production sites of pottery recovered from each vessel, it is expected to give new suggestions about operation of cargo vessels to compare the information of ports of departure and of loading to the one implied from wooden tablets and porcelain.

By exposing the usage and production sites of pottery recovered from shipwrecks which have been less studied, it is expected to provide new information about ports of departure, ports of loading, ports of call, etc.

40. The Important of the Heritage Impact Assessment (HIA) and The Chinese Trade Ceramics Found in Ancient Malacca Shipwreck – 15th Century to 18th Century

Asyaari Muhamad

This paper focuses on the Chinese trade ceramic found in ancient Malacca shipwreck from 15th century to 18th century. On the man-made island of Pulau Melaka, an old shipwreck was discovered around the end of the year 2020. The huge numbers of Chinese pottery were discovered as a result of salvage and excavation studies. Chinese-origin ceramics are one of the key pieces of evidence for the trade between China and the rest of the world. The distribution of these Chinese ceramics, which make up the majority of archaeological artifacts' findings not just in Southeast Asia but also in the West, provides evidence of this pace. This cascading distribution demonstrates how crucial a role these ceramics play in the political, social, and economic ties that once existed between ancient China and other nations. The discovery of Chinese ceramics at the island excavation site is discussed in this article. The discussion in this article includes some crucial details about the origin, age, qualities, and characteristics of decorative themes of the ceramic as well as comparisons between the Chinese ceramics recently discovered in Pulau Melaka with several past finds. The further discussions of the article also go into greater detail about a few related historical interpretation-related topics, such as the ceramic commerce activity and geopolitical relationships between China and other kingdoms. This paper also will discuss how important the heritage impact assessment (HIA) study implemented to the impact of the historical and heritage areas such as at the Malacca state before any new development has been implement.

41. Characteristics of Chinese Ceramics Excavated from Underwater of TaeAn Mado, Korea Hyung-Soon, Park

The topic of this abstract fits best within Session No.5, because it mainly deals with Chinese ceramics excavated from the west sea of Korea, and these are closely related to maritime trade in East Asia and trade goods of FuJian's merchants of China, during Song Dynasty.

An extensive survey of the sea around TaeAn Mado began officially in 2009, and reports were published four times (2011, 2013, 2017, 2021) so far. In particular, Song~Yuan period Chinese ceramics were intensively excavated in the second district of the Mado Site, and it was a very special case that many Chinese ceramics were excavated from a

single site except for the Sinan shipwreck. In the report, published in 2013, Li Jian-An revealed that most of the Chinese ceramics were produced in the kilns of Fujian, China, such as MinQing and QuanZhou kilns, and Tanaka Katsuko examined the similarity between the relics of Mado and Hakada.

Related to Chinese ceramics excavated from the Mado site, Lee Myung-Ok's thesis (2012) is almost the only one, who participated in the publication of the report (2013). She has examined the production areas and distribution period of relics of the Mado site, compared to the relics of kilns and tombs in southern China and sites in Kyushu, Japan. Except for the studies that briefly mentioned the relics of Mado site, no other studies have been conducted, so the importance of Chinese ceramics excavated in the Mado Sea area is not well highlighted.

This paper introduces the current status of Chinese ceramics excavated in the Mado site, based on reports published after Lee Myung-ok's 2012 study, and introduces domestic museum collections, relics of archeological site, historical records, and comparison with relics of the NanHai No. 1. And the purpose is to examine the circumstances in which Chinese ceramics were distributed and influenced GoRyeo society.

The TaeAn area is well known to have been used as an important maritime route to China since the Three Kingdoms (B.C. 57~ A.D. 668) period. Seo Geung, envoy of North Song, mentioned in detail about the rough sea around the Mado and Anheungjeong where envoys stayed. In the GoRyeoSa, History of GoRyeo Dynasty, there are many records of Song's merchants who traveled between Goryeo and China from the 11th century to the 14th century, and particularly there are many references to the QuanZhou merchants. Chinese ceramics excavated from the Mado site are material goods proving that Fujian merchants, including QuanZhou, who traded internationally during the Song and Yuan periods, frequently traded with GoRyeo too, and it is expected to be used as important relics to reveal the aspect of East Asian maritime trade.

42. Medicine, Poison and Human Migration: Archaeological Ceramic Tobacco Pipes, Opium Utensils and Hookah Jars from the Coastal Sites and Shipwrecks along the South China Sea
Sharon Wong Wai-yee

This paper discusses how transcultural forces transformed the tobacco and opium trade and the social practices of humans through archaeological ceramic findings from the coastal sites and shipwrecks along the South China Sea. This study applied the multi-perspective approach to examine the tobacco pipes, opium utensils (opium pot and opium bowl), and hookah jars from the coastal sites of South China (Hong Kong, Macau and Pearl River Delta of Guangdong) and shipwrecks along the South China Sea during the mid-17th to mid-20th century. In South China, Hong Kong and Macau played an essential role in the coastal defenses, the Opium Wars and the prepared opium processing, consumption, and smuggling centres until the mid-twentieth century. In the mid-16th to early 17th Century, Macau was developed as a major European settlement in South China after the Portuguese arrived in the 16th century until the trading centre shifted to Hong Kong in the mid-19th century. This research uses fieldwork and museum collection data, recent archaeological reports and historical pictures in South China and shipwreck reports along the South China Sea (1) to introduce the type, provenance, and transformation of ceramic artifacts of tobacco, opium and hookah; (2) to study how various social classes of migrants and locals connected in the context of social practices (medicine, evil drug or social smoking) and mutual dependence (maritime trading network and geopolitical power). This paper will shed light on the understudied topics of human and ceramic objects on medicine, addictive drug and human migration issues in Asia-Pacific Region.

43. Angkorian Stoneware A Lost Site Ceramic Industry Of Cheung Ek, The Angkor Stoneware Kilns Complex.
MUONG Chanraksmeay

The topic of this abstract fits best within this Session 5 because the paper will withdraw a lost of archaeological site, which would emphasize an understanding of the unhinges of ceramic industries during the Angkorian period. The case study under consideration is the following the structure of the kilns that have been well excavated and studied. The resources available to conduct the work include kiln's structure and typology of the production where this is one the stoneware industries dated back to the Angkorian Period. It revealed a chronology spanning from the late 7th to the early 13th century, which has similarity with the Grater Angkor region kilns. Many kilns were found in the Greater Angkor region, along the ancient roads connecting the Angkor to its former provinces, and at the southern of Angkor (CEK). Most of those excavated kilns provided better understanding about kiln structures and ceramic production which dating from the early to post-Angkorian period. CEK production center is located far from the Angkor region, south of Phnom Penh city. According to the dating of Khmer Stoneware ceramic, the CEK dating is similar to the Greater Angkor region kilns. The ceramics production at CEK is characterized by a unique typology and kiln technologies, decoration distinguishing it from the ceramics produced at the Angkor region. This case study will review at similarities and differences of the various manufacturing technologies and typologies as well as kiln structures from Cheung Ek and the Angkor region, where most of the kiln sites in the region are recently not able to be understood due to the fast wave of urban development and extension of the capital. This presentation would share within the conference in particular for the contribution of any relevant topics for Maritime Archaeology from a uniqueness of a ceramic industry, which is no longer existed on its origin.

44. Sukhothai's ceramic figurines from Klang Aow shipwreck, Thailand; Ideas, functions and its' roles

Khongkamon Rattapat

Amongst the most remarkable commodities of Thailand during 14th -17th c. was Thais' potteries so called Sangkhalok; the pottery characterises by green or brown glazes stoneware. They were built in various shape, for example, bowl, jar, plate and the iconic animals figurine. A vast number of potteries can be found from shipwrecks discovered in Thai waters. This type of pottery originates from kilns within Sukhothai province, for instance, Turiang(Sukhothai), Payang(Sri-satchanalai), Koh Noi(Sri-satchanalai), where, people made use of local materials as well as applied local wisdoms and craft skills to these ceramics. Turning to shipwreck, as mentioned before Sangkhalok ware can be found from shipwrecks, one of the most iconic shipwrecks in Thai waters is called Klang Aow. Despite this wreckage was exploited by treasure hunters, Thai task force intercepted them and acquired all artefact back to Thailand. The chronology of Sangkhalok ware and shipwreck came from AMS dating of small bamboo fragment stuck at the body of pottery illustrated that these commodities and vessel came from 1305 – 1420 CE. This paper aims to find out what is the manufacture purpose of these ceramic figurine? As same as identify a major role of this type of ceramic in the maritime trade community within the Southeast Asian and East Asian waters especially in 14th century. The study comprises of an examining on 80 animal ceramic figurines discovered at Klang Aow wreck that considered made from kilns in Sukhothai and Sri-satchanalai, Thailand. As a result, this research points out that these figurines were created not only for belief, religion, house-hold decoration but also folk play.

6. Lashed-lug boats: Emerging research from Southeast Asia and the Pacific

Chair: Prof Ligaya Lacsina (University of the Philippines) llacsina@up.edu.ph

Co-chairs: Agni Mochtar (University of Naples) and Prof Pierre-Yves Manguin (Ecole française d'Extrême-Orient)

There is currently a growing body of research related to lashed-lug boat construction in Southeast Asia and the Pacific and is a welcome trend in a region where nautical studies have lagged. Though material evidence suggests that the persistence of the lashed-lug boatbuilding tradition extends back to at least 1,500 years, researchers are beginning to appreciate the unique qualities of each example within this distinctive tradition, which has managed to survive to this day albeit in greatly diminished numbers. The time-consuming process of lashed-lug boat construction in which no metal fastenings are used involves considerable wastage and requires a mastery of skills gained over many years likely passed through generations. Yet the practice has until recently escaped the level of scrutiny directed at the production of other artifact types, even other watercraft construction techniques, despite the availability of material evidence. As interest grows and new studies of this particular regional tradition arise, the opportunity to gather new insights in this developing field of study cannot be ignored.

This session aims to link research from across the region that can highlight aspects of lashed-lug boats that are still poorly understood. Apart from the obvious construction feature for which it is named, the oft described perforated lugs carved from planks to which ligatures secure frames and other boat parts, it is worth comparing plank fastening techniques, lashing patterns, tree species used, bow and stern structures, and other observable qualities that can help inform us about similarities and variations in this tradition. We welcome papers that discuss the latest findings related to lashed-lug boats and their construction, which advance our knowledge and help map future directions in the study of boatbuilding traditions as a significant part of maritime heritage.

45. Discussion on the Traces of an Early Phase Lashed-Lug Boats of Southeast Asia

Napat Piromrak

Lashed-lug boat-building techniques played a significant role in Southeast Asian trading networks. The previous studies reported that approximately 20 boats in this category have been found. Indeed, an archaeological survey in Thailand during the 1990s had reported the existence of several boats of this type, but the information was scarce and no excavation had been conducted. Not until 2019, a team of Thai underwater archaeologists carried out a survey along the Andaman Coast, the resources available to conduct the work include the discovery of boat remnants which were assumed to be lashed-lug type. The first was a boat plank found at Khlong Thom, the early port site in Krabi province, likely dating back to c. 1st – 5th century CE. The second was a boat plank found at Pak-Klong Kluai beach, Ranong province, located in the area of Phukao-Thong archaeological site. Therefore, research on the boat planks is needed in order to find out the technique of the boat-building and its age. The main purpose of the research is to present an insightful analysis of the boat remnants. The analysis of boat-building techniques, a sample collection for AMS dating, and a comparative study were carried on. The result of the study reveals a significant aspect of an early phase lashed-lug boats: planks were carved into protruding lugs with hollowed holes, the hull was secured using a palm rope and wooden wedge, and no trace of a dowel hole are found. The AMS dating of a wooden sample from both sites provided a date of $1,856 \pm 25$ BP and $2,303 \pm 29$ BP. Comparatively, the boat structure is similar to the lashed-lug boat of Pontian (3rd – 5th century CE). However, the hull of these boats bears a different technique of making from other boats (e.g. Butuan and Ban Khlong Yuan boats, 9th century CE). The discovery of the boat remnants in Thailand has shed new light on the early technique of constructing lashed-lug boats in Southeast Asia, confirmed by the AMS dating. Furthermore, information on boat-building development is provided.

46. Regional identity and local variety: Plank Fastening Techniques in Lashed-lug Boatbuilding of Southeast Asia

Ligaya Lacsina and Abhirada Pook Komoot

The plank fastening technique is often a prominent feature of ship typology. In previous studies, the fastening method of the lashed-lug vessel was subject for hypothesising

technological development based on the utilisation of dowelling and disappearance of stitching. According to one hypothesis, early lashed-lug plank assembling is thought to have started by applying individual plank stitching with no use of dowels, though the stitching pattern was not visible outboard. Boatbuilders later incorporated dowels to supplement stitching. The further stage was eliminating stitching completely, using only closely-spaced dowels. It is not known for certain why shipwrights began to use different methods and whether it was for the purpose of development. However, this hypothesis is being reviewed by current research.

In closely observing lashed-lug boats, currently known examples demonstrate technical variety. This paper shares the results of a preliminary comparison of the lashed-lug plank fastening method in Southeast Asia. Our investigation intends to reveal the elements of hull construction, some not previously noted, to scrutinise their characteristics, and, if possible, to understand the efficiency and effectiveness of each technique. It aims to tackle the questions of to what extent the Southeast Asian lashed-lug fastening methods are varied and how the technical variety contributes to the understanding of technological development.

Lashed-lug building is a unique nautical technology developed in ancient times that facilitated regional networks. The remains of lashed-lug vessels have been distributed over the coastal areas linking mainland and island subregions. This paper hopes to highlight the techno-cultural diversity and linkage to realise the complexity that shapes the way of our region is today.

47. The experimental reconstructions of the Punjulharjo boat: New insights for understanding the lashed-lug boatbuilding techniques.

Chiara Zazzaro, Agni Mochtar and Luigi Ombrato

The topic of the abstract fits best within the Session 6. Lashed-lug boats: Emerging research from Southeast Asia and the Pacific, because it presents the results of the experimental reconstructions of the Punjulharjo boat which brought to a better understanding of the boat and of the lashed-lug system.

The case study under consideration is the Punjulharjo boat, the most complete Southeast Asian lashed-lug boat found to date.

The resources available to conduct the work include archaeological data, ethnography, and iconography. Archaeology data was gathered through direct observation of the Punjulharjo boat remain displayed on the original finding location and examination of photos taken during the excavation.

The research approach is engineering and experimental, consisted of producing hypothetical representations, digital, virtual and 3D print reconstructions of the Punjulharjo boat.

The result is that the team identified different lashing systems, hypothesized diverse uses of the lugs within the planking joinery and vertical structures, illustrated the complexity of the planking pattern and hypothesized the aspect and location (or relocation) of the beams, rudders, mast and other superstructures.

48. Lashing the loose planks: Making sense of the understudied “new” lashed-lug sites in Sumatra, Indonesia.

Agni Mochtar

The topic of this abstract fits best within this Session 6 Lashed-lug boats: Emerging research from Southeast Asia and the Pacific because it presents new information about the understudied and/or unpublished lashed-lug boats/ships found within the last decade in the island of Sumatra, Indonesia. The case studies under consideration are the lashed-lug boat remains from sites in the provinces of North Sumatra, South Sumatra, and Jambi. The resources available to conduct the work include boat/ship timbers consisted of hull planks, wing ends, and other hull component, as well as rudders, kept on artefact storage

near the sites and museums. The research questions of this project are what new information can be obtained from a close examination of the boat/ship planks and other timbers, and how such information would contribute to the advancement of the knowledge about the lashed-lug boatbuilding technology. The result of the detailed documentation of the boat/ship remains is a comprehensive dataset which covers many variables including ones overlooked in previous research. This project is a part of the author's doctoral research which expected result is the insights of technical variations within this particular technology.

49. The Early Ninth-Century 'Ban Khlong Yuan' Lashed-Lug Boat of Chaiya, Peninsular Thailand: comparisons, contrasts and capabilities
Wongsakorn Rahothan

The lashed-lug boat type is academically regarded as archetypical Southeast Asian boatbuilding. Current understandings regarding the evolution and capabilities of lashed-lug boats are, however, limited. Despite the fact that lashed-lug boats were reported in Thailand, comprehensive archaeological detail is not available. Therefore, the Underwater Archaeology Division of Thailand conducted an archaeological expedition in 2019 to trace the wreck sites in the southern peninsula. As a result, two wrecks were found, one at Khlong Thom on the Andaman coast and another, the Ban Khlong Yuan boat (BKY) was found in the District of Chaiya in Surat Thani Province, on the coast of the Gulf of Thailand. The area is thought to support an urban town and a seaport of the Srivijaya Kingdom between the seventh and twelfth centuries. The case studies under consideration are the BKY boat and published information on the Punjulharjo, Butuan, Chau Tan and Cirebon lashed-lug vessels. The remains of the BKY Khlong boat were recently re-articulated. The focus of this paper is to present a brief overview of the reconstruction process, highlight analytical materials found in the wreck, and make comparisons of the BKY boat with other lashed-lug vessels of the region. A lines plan will be derived from the reconstruction of the BKY boat and the basic naval architectural data presented. AMS dating and identification of shipbuilding materials demonstrate that the BKY boat is an early ninth-century lashed-lug boat built of genus *Hopea* timber, with boatbuilding techniques comparable to the Punjulharjo boat (Central Java, Indonesia), the Chau Tan boat (Quang Ngai Province, Central Vietnam), and the Butuan boats (Northern Mindanao, Philippines). Comparisons of lashed-lug designs and boatbuilding techniques among these vessels will be explored. The sophisticated boat represents a boatwright's intellect of indigenous people in Peninsular Thailand during the ninth century. The widespread lashed-lug boats found across Southeast Asian waters reflect skilled local boat-builders, mariners and middlemen who effectively engaged in transoceanic trade between the east and west at the ports of the dominant polity.

50. A lashed-lug vessel from the Solomon Islands in the collection of the Canterbury Museum, Christchurch, New Zealand.
Paul Clark

This paper presents an acquisition history of a 24 foot (7.3 metre) six-frame canoe from Sasamunga, Choiseul Island, collected by the Canterbury Museum in 1968. Purpose built for the museum by craftsmen in 1967–1968, the vessel presents the observer with a wealth of information on the methods and technology of 'plank-built lashed-lug' canoe building from the north-western region of the Solomon Islands. As well as interpreting information supplied by the master builder at the time of procurement, this paper also discusses some of the structural components and patterns of frame and plank attachment that embrace this finely crafted maritime artefact. Apart from documenting the canoe's description for the public record, this paper also suggests a possible method for classifying similar lashed-lug watercraft found in the region.

51. The Chau Tan Shipwrecks Lashings and Knots
Ian McCann

The Chau Tan shipwreck is the oldest ocean-going cargo vessel found in Vietnam. It dates from around the 8th-9th century CE and provides a unique opportunity to study the construction methods of a lash lugged ship from that period. Over 40 of the ship's timbers were retrieved; however, unfortunately, all the lashings connecting the lugs were severed during the salvage and no record was taken of this process. On the positive side there's small enough in situ ropes to start to build a list of the number of ropes used in the lashings and the types of simple knots and complicated flat braided lashings that were used in its construction. Some of the knots and one of the braided lashings were replicated and tested for strength with surprising results.

Common sailing knots that were tied with natural fibre ropes have also been tested for their strength. The fibres would have been available to the boatbuilders at the time the Chau Tan ship was built. The results of these tests will be presented and can be used as a template for further investigation into the strength, versatility and weaknesses of the lashings used to build lash lugged vessels. Additional information regarding the methods possibly used to make the ropes and why we may need to revise our thinking on the types of fibres used to make the lashings and other ropes used onboard vessels sailing in the Indo-Pacific region.

52. "Winged" stem and stern in Southeast Asian lashed-lug vessels: from ethnography to archaeology
Pierre-Yves Manguin

So-called "winged" bows were among the first boat characteristics that were used to identify the expansion of shipping technologies of the Austronesian speaking people across both the Pacific and the Indian Ocean. Pioneers Haddon and Hornell were the first to recognize that small outrigger dugouts observed in East Africa shared a "winged" stem (and stern) construction with comparable boats from Insular Southeast Asia. Starting with the Butuan archaeological excavations in the 1980s, a number of much larger plank-built vessels of the first and second millennia CE have been brought to light in Southeast Asian waters that clearly belong to this "winged" technical tradition. They all belong to the lashed-lug shipbuilding tradition which is specific to Southeast Asia. This presentation will bring together the presently available evidence on such matters, with detailed observations, and a first attempt at building up a typology of such vessels.

7. Trade goods in shipwrecks - sources, routes and markets, including glass on the Maritime Silk Road

Chairs:

Arsenio Nicolas (College of Music, Mahasarakham University, Thailand)
sennicolas@gmail.com

Seongsil Kim (Peking University, Seoul Museum of History) nadiakim0789@gmail.com

The variety of objects excavated in the hundreds of shipwrecks in maritime Asia consists of, among others, ceramics and tradeware, currency, elephant tusks, resin, figurines, ritual vessels, stupika and votive tablet moulds, mirrors, stone implements, ceramic moulds, gold artefacts, beads, alloys, tin, lead, bronze and silver ingots, ironware, glassware, organic materials, ritual implements such as vajra sceptre, ghanta and other bells, khakkhara, conch shells, pellet bells, and musical instruments such as gongs and cymbals. In the many studies and descriptions of shipwrecks, the sources, routes and markets of these artefacts, trade goods, or commodities have been identified and yet there are still lacunae in some of the trajectories of their final destination at the time of their discharge from the ships and ports. Documents contemporaneous with the ship's dated wreck are possible sources of how these artefacts have found their way to the first

users, and possibly, subsequent users. While these documents may be scanty and rare, one final destination of these objects is today, in the hands of collectors and museums. This session invites paper proposals that describe and trace the routes of movements of shipwreck artefacts from the port to their users, not limited to the date of the wreck and but continues on to the path from one user to another over time, even towards the contemporary period. Some examples that can be explored are big glazed jars that are used for rice wine storage, plates and bowls that are used as grave paraphernalia, and ritual implements that are today part of religious rites. The session will also have a special focus on various glass relics have been discovered as many countries have actively excavated and investigated important urban remains related to the maritime Silk Road.

53. Trading with an Agent: Shippers, Carriers and Investors involved in the trade of Shinan ship
Jinwook Jo

Shinan Ship Wreck has been studied in various fields, relics, routes, and trade historical significance. Immediately after the excavation, the study focused on individual artifacts. With the accumulation of these research results and the interest of Chinese and Japanese scholars, the scope is expanding to research on the meaning of routes and trade activities. Question about research: This study aimed to clarify whether the underwater archaeological excavation data of the sunken ship could be interpreted as an archaeological methodology to identify routes and trade models.

Research Method: The first step in the research method of the study is to organize which artifacts are found in the hull of the Sinan wreck. Secondly, how does this data correlate with the wooden tablet found in the area? We also reviewed how to interpret it.

Research Results: The first result expected from this study is how the cargo on the Shinan Ship Wreck was shipped. The second is to figure out the route and trade model of the Sinan Ship Wreck through it.

54. Iron materials from Shipwrecks —the iron as traded goods of Song-Yuan period in China
Ishiguro Hisako

The case studies under consideration are the following that consider Nanhai I's iron materials and the iron as traded goods of Song-Yuan period in China.

The resources available to conduct the work include Nanhai I's iron materials, Iron bars and iron pots which discovered from Shipwrecks and Iron bars which appeared from the site in the Middle Ages of Japan.

The research questions/approach/problems are the reasons why Most of Iron material of Shipwrecks are bar shaped materials and pots.

The [expected] results are that Iron bars for Shipwrecks were the result of the iron export policy of the Song dynasty in China, and they were exported in the form of bars as raw materials for processing.

55. The Archaeobotanical Analysis of Flora Samples from the Phanom Surin Shipwreck Site,
Central Thailand
Pnuch Jumprom

The topic of this abstract fits best within this Session 7 Trade goods in shipwrecks – sources, routes and markets, including glass on the Maritime Silk Road because this paper is about the analysis of the archaeological evidences, especially the flora remains from the Phanom Surin shipwreck site, Lower Central of Thailand.

The 2013-2015 and 2021 excavations at Phanom Surin Shipwreck at Phanthainorasing Sub-district in Samut Sakhon Province revealed a number of archaeological finds in the Arab-style ship dating back to 9th century CE. The organic matters were dominantly counted. This paper aims to give an interpretation on flora found in the ship by archaeobotanical classification and identification methods. Some specimens of flora artefacts, woods, ropes, and seeds were sent to a laboratory for doing scientific tests. The

plant seeds were found in the stern. The analysis suggests that most commons are betel nuts and lucky bean seeds which were trade items. Rare items include rice grains, coriander, calabash (bottle gourd) and jujube. Some seeds are not clear to be identified. The macrobotanical remains were likely consumed by ship's crews; i.e. nourishment, medicine, ship repairing and sailing. Some species have been known to the Arab manuscripts dating back to 9th century CE. The analyses provide further information of tools made of domestic plants that were applied for ship building, sailing, and using on board that facilitate seafarers' way of life during their journey across the ocean. The significant finds show the relationship between the locals and the overseas seafarers.

56. The History of Gold Foil Glass and the Maritime Silk Road
Seongsil Kim

"Gold foil glass" is an artifact that combines the colorful gold with the colorless and transparent glass to reach the peak of beauty. If you look closely at the gold leaf glass containers in the British Museum, you can see that gold made thinner than paper was inserted into a colorless, transparent glass, this is important evidence that metal and glassmaking techniques were highly developed.

We often think that is very easy to make transparent glass, but in fact, making transparent glass requires a high level of skills. In addition, it is not easy to make thin glass or to express colorful patterns on glass.

The gold foil glass technique was not only used to make glass containers, but also for glass beads or jewelry. The gold leaf glass containers may have been used as a daily objects, but they may have been used as decorative containers. In the case of gold leaf glass beads, they were found in various tombs during the Three Kingdoms Period of Korea, and since the status of the tomb owner was high, it can be confirmed that this gold leaf glass bead was a very precious relic at the time.

A lot of glassware made with the gold leaf glass technique have been excavated through recent excavation campaigns. Among them, as many as 43 gold leaf glass beads were excavated from the "Pangkung Paruk Ruins in Bali, Indonesia," attracting the attention of many scholars. This is an important clue that considered together with the 19 gold leaf glass beads excavated from Vietnam's "OcEo Ruins" suggests that the gold leaf glass beads excavated from Korea were introduced through the maritime silk road.

In this conference, I will speak about the production technique of gold leaf glass, new cases of excavation, and the connection with the maritime silk road.

57. The ceramic and porcelain collections on shipwreck in Vietnam Sea at History Museum in Ho Chi Minh City (Vietnam): History, Preservation and Promotion.

Nguyen Thi Huynh Nhu

The resources available to conduct the work include: UCH historical values, cultural values, preservation and promotion at History Museum in Ho Chi Minh city and the plans on cooperation for the future.

In Vietnam, underwater cultural heritage is a quite new field which are compared to the world and has only developed in the late 20th century until now. Interest in this field has begun with the discovery of shipwrecks in Vietnamese waters in the 1990s. Though the international cooperation as well as the support of modern equipment, Vietnam has approached and explored to ancient shipwrecks in Hon Dam (Phu Quoc), Hon Cau (Con Dao), Ca Mau, Cu Lao Cham (Quang Nam), and in recent years, the ancient shipwrecks Chau Thuan Bien in Quang Ngai...

From 1993 to 2000, the Ho Chi Minh City Museum of History received more than 6000 artifacts which were excavated from shipwrecks in Ca Mau, Phu Quoc, Quang Nam, etc., assigned by the Ministry of Culture and Sports of Vietnam. The main types are Chinese ceramics dating from the Ming to Qing Dynasties, Thai ceramic's Sawankhalok, Sukhothai... dating from the 15th century, and Vietnamese Chu Dau ceramics dating

from the 15th century. We would like to give a brief introduction about these collections: historical values, cultural values, preservation and promotion at History Museum in Ho Chi Minh city and the plans on cooperation for the future. With the brief presentations, we hope to be able to give some information, materials to The National Research Institute of Maritime Cultural Heritage (NRIMCH), Cultural Heritage Administration in clarifying the values and the role of underwater cultural heritage in the Asia-Pacific region as well as focusing on the topic of the decade of Science oceans for sustainable development 2021-2030.

8. Nodes, Networks and Processes: cultural interactions and archaeological perspectives in the Asia-Pacific region

Chair: Dr Wijerathne Bohingamuwa (Department of History and Archaeology, University of Ruhuna, Matara, Sri Lanka) bohingamuwa69@gmail.com

Co-Chairs:

Dr V. Selvakumar (Department of Archaeology, History, Prehistory and Maritime Archaeology, Tamil University, Tanjore, India).

Prof Kaushik Gangopadhy (Department of archaeology, University of Calcutta, West Bengal, India)

Dr Bobby Orillaneda (Maritime and Underwater Cultural Heritage Division, National Museum of the Philippines)

Interactions between the cultures of Asia and the Pacific may have begun as early as the prehistoric period. These regions were connected by both land and maritime routes. Cultural interactions became intense beginning in the late first millennium BCE as ideologies, traders, commodities, and material culture moved across the region. These interactions had a significant and lasting impact on culture-historical developments in the region. Ports and urban centres became the nodes connecting the networks of settlements across this region. A number of ports as well as coastal and interior urban centres in the region have revealed the material culture and evidence of ideological interactions to the west and east of the Indian Ocean. This session examines the cultural interactions between Asia and the Pacific from prehistoric times to 1900 CE. The cultural and commercial nodes acted as markets, production centres, ports, religious centres that linked the hinterland and foreland networks. Papers focusing on the settlement nodes, networks, processes, material cultural studies, navigation, and ideological interactions within the period mentioned above are welcome.

58. Uncovering the Luso-Asian Sandalwood trade conducted by the Larantuqueiros of Flores Island 1500-1860.

Clifford J Pereira

The elongated island of Flores in Indonesia stands at geological, zoological, cultural and ethnic boundaries. But the area is also predominately Christian in the most populace Muslim country in the world reflecting that this part of Indonesia was officially part of the Portuguese Empire until 1859. This presentation attempts to explore the connection between the Luso-Portuguese Larantuqueiro community and the Sandalwood trade between 1500 and 1860. The trade essentially between the island of Timor and China has shaped the political geography of the region during the colonial period resulting in the present curious exclave of Oecusse and the minor islands that are part of Timor Leste.

59. Maritime ritual ruins of Korea

Tahk Kyung Baek

Since ancient times, marine-related rituals have been performed in areas of maritime activities. People engaged in maritime activities wanted to overcome danger by praying for the safety, and for a good catch of fish in ocean.

In Korea, many maritime ritual ruins have been confirmed along the coast. There are diverse forms of ritual faith. For example, the iron-horse faith is related to the ancient nation, the Yongwang(The King of ocean in east-south Asia) faith involves devoting one's self to Yongwang, and the Kannon faith is spread widely after Buddhism was introduced. In particular, there are some ruins along the southwest coast close to China. The ruins of Buan Jukmak-dong, Yongdam-dong in Jeju-do, and Sangdea-po in Yeongam are a few that are represented as maritime ritual ruins,

Archaeological excavation of the ruins of Buan Jukmak-dong revealed ritual ceremonies that had been performed from the second half of the 3rd century to the present. Those who participated in the ritual ceremony prepared cattle or pig or horse as main sacrifices and prepared fruits, rice cakes, souvenirs for ritual ceremony. The vessels used for the ritual are scattered as broken at the place where the ritual was held. In addition, not only Korean artifacts but also Chinese and Japanese artifacts were evident, and it could be seen that maritime ritual ceremonies were being performed by all maritime people moving in this area and not just one country at that time. These ritual ceremonies are generally a form of praying for safety and richness in the form of folk religions.

For these ceremonies, it was necessary to construct a sacred building; where the ritual ceremonies were held and where the god was believed to have settled. It was built in close proximity to where ritual ceremonies were held. In general, two types were adopted for the sacred buildings: one is one-building type, the other is two-buildings type. These systems were found within the ruins of Buan Jukmak-dong, Ohryong shrine in Gunsan-island, Sangdea-po in Yeongam, Cheonghaejin(a navy camp in the unified Silla) in Wando, and Tangsan ruins in Heuksan-island. The elevation of the building involved three fronts, with mostly one or two sides. It was the minimal size compared to other traditional Korean architectural buildings. However, the space of influence is extended towards the sea in addition to the space where the ritual ceremony is carried out, and it appears as a sacred space with considerable dominance. Therefore, a sacred building is an important role in maritime ritual ruins and can be considered as the center of maritime ritual heritage.

60. Textile manufacture and Trade on the Coromandel Coast

SB Darsana, V. Selvakumar and S. Gowrishankar

This paper is suitable in the session 8. Nodes, Networks and Processes: cultural interactions and archaeological perspectives in the Asia-Pacific region, as it concerns with Bay of Bengal and Indian Ocean region. Textile as an important commodity produced from the early historic period in Southern India. In the early historic period, different types of textiles were produced in Southern India as revealed by the textual sources. In archaeological context, a few excavated brick structures at Arikamedu have been identified as dying vat and evidence of terracotta spindle whorls have been recovered from the early historic context. As far as medieval period is concerned, literature, paintings and inscriptions offer valuable information on the textile production. The communities of weavers known as Kaikkolars, Pattasalins and Saurashtra are referred to the medieval inscriptions. In the later medieval period, weavers from saurashtra in Gujarat and other parts of India moved towards to the Coromandel coast. The colonial period documents record the textile trade of the Coromandel coast. The weaver communities thrive in certain parts of South India even today indicating historical continuity. Clear evidence for long distance trade in textile is found in the colonial sources. The paper presents on the research problem related to the history of textile manufacture and the craftgroups, long distance trade in textile in the Indian Ocean Region, in the context of the Coromandel coast using diverse sources.

61. Dimensions of interactions: Bay of Bengal in the wider Asia-Pacific region: Archaeological and historical records from the earliest period till 1500 CE.

Kaushik Gangopadhyay

The topic of this abstract fits into this session because the main idea of this session is to look into the connections between Indian Ocean and the Pacific region by largely emphasizing on archaeological sites, artefacts and historical sources between Indian Ocean region and the westerly regions. In this paper the author attempts to collate data from the Bay of Bengal region, particularly from the Bengal and the east coast of India and provide a perspective on connections between Asia-Pacific and the Indian Ocean interaction spheres. Two case studies could be used to chart these interactions; first, the early historic port of Tamralipti and second the medieval ports and cities of medieval Bengal specifically Satgaon and Gaur. The work is part of an ongoing project of the author to investigate pre-colonial maritime landscape of Bengal. The research question in this paper is to understand the degrees of interactions within and outside the maritime landscape of Bay of Bengal where Bengal's ports and urban centers must have played an important role. The paper will collate the available data and is expected to provide future research perspectives.

62. Goods and Texts: Creating an archaeological and historical narrative of Sri Lanka's connectivity with Southeast Asia, China, and beyond

Wijerathne Bohingamuwa

Due to Sri Lanka's central location, its cultural and historical developments have always been influenced by those in the Indian Ocean. Material remains, backed by historical data, provide the best evidence for reconstructing Sri Lanka's external connectivity during premodern times. Consequently, this paper is based on archaeological material unearthed from the coastal port-urban centers of Mantai, Kantharodai, and Kirinda. The primary materials discussed here are ceramics, beads, and coins. This data is supplemented by that from Anuradhapura and Thissamaharama for comparison. Material analysis results are compared against textual data. The key research question addressed here is: what different patterns of Sri Lanka's connectivity with the eastern segment of the Indian Ocean might emerge through the analysis of material and textual evidence? Research reveals that the nature and patterns of Sri Lanka's connections with different regions of the Indian Ocean were neither similar nor static. They were in tune with the changing dynamics of the Indian Ocean in terms of navigation, trade, and geopolitics. Cultural and political connections seem to predate commercial relations with the eastern Indian Ocean region. These connections seem to date from the closing centuries of BCE; they were regularized and intensified after the 5th and 7th centuries AD, respectively, and lasted until about the middle of the 13th century AD.

63. Prehistoric community, Maritime Interaction, and the development of Southeast Asian shipbuilding: Case study from material cultures discovered in Thailand

Sira Ploymukda

Southeast Asian people have involved in maritime interaction since prehistoric time. The earliest acceptable chronology came from neither material cultures nor people but languages, as can be seen from an incoming of Austro-Asiatic and Austronesian languages to the region during the neolithic period. Simultaneously, the diffusion of agriculture culture from China to the Southeast Asia occurred within 5,000 BP. Various researches on neolithic sites in mainland Southeast Asia revealed that neolithic people might sail to open-sea in order to gather marine resources, for instance, dolphins, sharks, rays. While, In Bronze-Iron age of Southeast Asia, it was remarked by a distinctive feature of Dong-son bronze drums depict people on board a boat. The crucible from Nong Nong Hor, Thailand pointed out that some types of Dong Son drums were made within

the region. This can be roughly summarised that metal-age people in Southeast Asia may have insight either boating or bronze production. Turning to dugout log coffin and boat burial in the region, it can be seen prominently that preserved tools marks and iron implement discovered inside the coffin in the region illustrated that Southeast Asian people made use of metal implements for their carpenter work.

This research is designed to provide supported evidences regard to the approach that apart from an intensive cross-continent maritime interaction in the proto-history, Southeast Asian prehistoric communities played important role to a development of the Southeast Asian shipbuilding in the historical period. To achieve the research question, boats, boat burial, dugout coffin, bronze-iron tools, material culture from bronze-iron production sites in Southeast Asia will be accounted. As a result, the study confirms not only existence of prehistorical craft specialisation but yield to an understanding in relevant factors of culture development within the Southeast Asian waters from prehistorical to historical time.

64. Gandara, a newly discovered ancient port site on the Southern Coast of Sri Lanka
Mahinda KarunaratnaPalitha Weerasinghe, Kasun Weerasekara, WM Chandrarathne, Rukshan Priyandana, Lakmal Samarasinghe, Ruwan Jayantha

This paper deals with Gandara sea port, located on the southern coast of Sri Lanka. In March and April 2022, an underwater archaeological impact assessment (UAIA) was undertaken by the Underwater Archaeology Unit (UAU) of the Department of Archaeology and the Maritime Archaeology Unit (MAU) of the Central Cultural Fund as the Ministry of Fisheries of Sri Lanka proposed to begin the Gandara Fisheries Harbor Development Project (GHDP) for developing this natural port site at Gandara. The antiquity laws in the country require such AIAs. During the UAIA, the survey team prepared a virtual grid (50m x 50) for the port area by using Arc GIS and Google Earth and established the buoys in the main points of the grid for identifying the survey area. All grids in the port site have been surveyed by using the line, secular, and toward underwater searching methods. Six circular and square stone anchors that contain inner circular or square holes and one cannon were uncovered through the surveys in the inner and outer areas of the port. Similar stone anchors have been found at ancient Godavaya and Galle ports on the southern coast of Sri Lanka and in the Andhra, Odisha, and West Bengal areas of the Indian subcontinent. These stone anchors and metal artifacts discovered from the port site indicate Gandara as an ancient seaport that had connections with the external world during the historical period of Sri Lanka.

65. Piecing together the bricks: Building features of the Early Historic port centre Muziris (Pattanam) in the Southwest Coast of India
Jaseera C.M, Sreelatha Damodaranand Sarath Chandrababu

The topic of this abstract fits best within this Session 8- Nodes, Networks and Processes: cultural interactions and archaeological perspectives in the Asia-Pacific region because the paper discusses the building features of the site Pattanam/Muziris, which had been an important port center in the Indian Ocean trade network. The several seasons of excavation at the site has brought new material cultural evidence in the history of archaeology of Kerala, an Indian state where the site is situated. The ceramic evidence in the form of amphorae, terra sigillata, torpedo, ovoid jar and turquoise glazed pottery affirms that the site had been witnessed the long distance interaction with Indian Ocean world during the Early Historic period. In addition to that the excavation has yielded stone beads like carnelian, quartz, agate, amethyst and garnet, Indo-Pacific glass beads, rouletted ware, Chera coins. The presence of these artefacts gives strong hints to the interaction network connecting the contemporary Indian Ocean sites as well as the inland sites. A few studies have available on the artefacts unearthed from the site Pattanam. However, the architectural remains unearthed from the site need a scholarly attention.

The case studies under consideration are the following; primarily focusing on various building features unearthed from the site Pattanam which includes brick structures, mud platforms, floor, ring wells and soakage jars. The paper discusses the spatial distribution pattern of these features, its function and interrelation to reconstruct the architectural design of the port center during the Early Historic period. The resources available to conduct the work include excavated materials, excavation reports and ancient literature. The research problem is to enquire the spatial organization of the port center through the architectural remains. The expected results are to reconstruct the settlement pattern and how the inhabitants negotiated with the landscape to construct buildings in the site Pattanam.

66. Sri Lankan maritime trade relations towards the East

Rasika Muthucumarana, T.D.C. Pushpakumara Mamp; Thilina Pallethanna

One of the main aspects showing the strength of the cultural, political and trade relationship between China and Sri Lanka is the amount of Chinese pottery found from the archaeological excavation sites in Sri Lanka. Mantai the main port city of Anuradhapura kingdom (spans from 4th century BCE to 11th century CE) was the connection centre for the ships from the Indian subcontinent, from the East to China and from the West to Rome. Blue, White and Green coloured earthenware and storage jars belonging to the Tang Dynasty (7th century) are some of the earliest archaeological evidence found in Sri Lanka. But the historical evidence goes far beyond that era, even to the Han Dynasty. Old port sites such as Jaffna, Trincomalee, Kirinda and Godawaya were gone through long term excavation project and brought up new evidence of international trade affairs. More of our interactions with Southeast Asia can be seen after the 12th century. Yet there are more undiscovered regions along the east coast.

The topic of this abstract fits best within the Session 08 - Nodes, Networks and Processes: cultural interactions and archaeological perspectives in the Asia-Pacific region. This paper deals with the research and archaeological excavations that have been done during the last decade by Marine archaeologists, especially along the east coast. The newly discovered port sites and possible port sites show more results of stabilized maritime trade and cultural connections to the east. Nilaweli, Lanka Patuna, Kayankerny and Shasthravella are some of the port sites and settlement sites with evidence of international trade. The evidence from the Kayankerny port site and settlement mound can be traced back to the 3rd century BCE. The longest stone bridge found in Sri Lanka was connecting the capital city of Polonnaruwa to a seaport via an old trade route.

9. Underwater cultural heritage of the Indian Ocean Region

Chair: Sila Tripathi (Technical Officer Marine Archaeology) sila@nio.org

Indian Ocean Region has several distinctive characteristics, which are known from archaeological and other records, and served as a corridor for migration of cultural contacts between the Indian Ocean people and neighbour regions. In order to understand the ancient times interactions between the people of this region many institutes and organisations undertaking research and the outcome is very crucial. The underwater cultural heritage of mankind such as shipwrecks, submerged ports, habitation, landscape, aircrafts, etc. is lying on the seabed which should be preserved for posterity. The theme entitled underwater cultural heritage of the Indian Ocean Region includes the contacts of the people of this region through the centuries. The session could include underwater findings such as shipwrecks, submerged ports and cultural landscapes, etc. With this background, the proposed session - Underwater and maritime archaeology in South Asia (The Indian Ocean Region) – intends to build cooperation among the Indian Ocean countries on research, protection and preservation of UCH, documentation of evidence of indigenous communities, capacity building activities in underwater and maritime archaeology of this region. In this session, it is proposed to invite presentations on the research carried out on

- (i) underwater and maritime archaeology of this region,
- (ii) problems, challenges and opportunities faced by the Indian Ocean Region on UCH
- (iii) collaboration on research and capacity building in this field.

68. Effects of Tectonic Activity and Sea Level Changes on the Viability of Ancient Sea Ports: Case Studies from East Coast, South India

Dr. K.P.Rao

The archaeological, literary and epigraphical evidence strongly suggest existence of several ports on the east coast of peninsular India. Recent visit to Kottapatnam and Motupally have yielded strong archaeological evidence of their maritime activities, but the traces of the existence of the port have almost completely disappeared. The transformation of the landscape is such that, it is difficult to even believe that the places were receiving vessels from far off lands like China. It appears that the reasons for the decline have to be sought in the geological phenomena. The study suggests that the reason for the decline of these ports was due to the eustatic and isostatic changes occurring on the east coast due to latent tectonic activity. The satellite imageries clearly suggest that, in the past both these regions were covered by large aquatic features, which facilitated maritime activities. But in course of time due to various reasons like 1. Gradual upward shift of the east coast resulting in withdrawal of the sea; 2. The lowering of the sea level; and 3. Expansion of the land due to deltaic propagation, have adverse effect on the viability of the ports at Kottapatnam and Motupally. For example, in 1916 the length of the lagoon at Kottapatnam was 2770 mt (toposheet 66B/4 prepared in 1916-17) whereas by 2006 (satellite image) it shrank to 2376 Mt. or near about half a kilometer in 90 years. This shrinkage seems to be the result of tectonic uplift of the region, resulting in the reduction of the depth in the lagoon, adversely affecting the port at this place. The present paper highlight the need to study the geological changes in a region to properly understand the maritime activity of a region.

69. Ports and Trade Networks of the Tamiraparani Delta of Tamil Nadu

V. Selvakumar

The deltas of Tamil Nadu in the southern part of India have several ports that acted as nodes of maritime networks. Evidence of prehistoric hunter-gatherers is found in the Tamiraparani delta in the red sand dunes of Teri in the form of microliths. In the Iron Age, the Tamiraparani region witnessed megalithic settlements with burial sites. The famous urn burial site of Adichanallur is located in this region. Evidence for early historic trade interaction is found at Korkai, which has been identified as the centre of the early Pandyan kings. The port of Korkai is discussed in the early Tamil literature and archaeological excavation has revealed evidence of urban activities. In the Medieval period, Kayal became an important port of trade and was referred to in medieval textual sources. It was a major centre for the horse trade and the temple of Tiruppudaimaradir in the Tamiraparani region has evidence of Arab horse traders in the form of mural paintings. The region is well connected with the Western Ghats and a trade route connected Kerala and Tamil Nadu region. The main research problem of the paper is to understand the nature, function and foreland and hinterland networks of the ports of Tamiraparani valley. The paper discusses the archaeological evidence of ports of the early historic and medieval periods (Korkai and Kayal) and the maritime networks that connected with these ports using textual and archaeological sources. The data sources are collected during fieldwork by the author, critical study of primary sources and collection of secondary literature.

70. Mauritius Maritime Heritage through GIS Mapping of Wrecks for Environmental Impact Assessment.

Stefania Manfio

The topic of this abstract fits best within this Session 9 [Underwater cultural heritage of the Indian Ocean Region] because it presents underwater and maritime archaeology conducted in Mauritius and its islands. Due to frequent naval battles and inclement weather conditions, Mauritius has been the site of an extensive number of shipwrecks. Research based on historical and archival sources carried out over more than thirty years seeks to record this extraordinary heritage resource, the number of shipwrecks is estimated at over 1200, demonstrating the great potential of the island's maritime context. Starting from this impressive database, a new GIS project, "Mauritius_shipwrecks_GIS", is mapping all these shipwrecks. The aim is to create varied mechanisms to visualize the potential of maritime heritage for Mauritius, serving as a concrete example for future development in this region, and the wider Indian Ocean. This endeavour is particularly relevant and timely, given that the Mauritian government has started promoting the development of an oceanic economy with the aim of making this sector one of the pillars of its economy. This initiative is replicated regionally. Therefore, the mapping of all wrecks in Mauritian waters, as a collaborative endeavour with the Department for Continental Shelf, Maritime Zones Administration and Exploration, had the potential to serve as a significant impetus for the formulation of a systematic approach that can guide the decision-making process not only for the protection of these wrecks, but also to mitigate potential impacts on the environment as might occur through unsympathetic development.

71. The vernacular boats and the indigenous communities in historical context on the Majuli Island, Assam

Debasish Dey, Bina Gandhi Deori

Boats are an integral part of Assam. The archaeological sources especially the inscriptions of the region mention the regular use of boats in the River Brahmaputra, the largest river of Assam. Some of the well-known boats found in Assam are *Hiloi chara nao*, *Magar chara nao*, *Aag lagi nao*, *Dukuria nao*, *mahangiri nao*, *mayurpankhi nao* etc. Majuli is the largest river made island in the world, located on the River Brahmaputra. Majuli is home to several indigenous communities who are traditional boatbuilders. Nearly 3000 families on this Island are dependent on the traditional craft of boat making which has been carried out through several generations. *Auniati* and *Kamalabari Satra* are important centres for boatbuilding and were famous for building strong and faster boats for the Ahom royal navy. Traditional boatbuilding technology in Majuli involves the use of traditional materials and technologies which is only found on the Island and not elsewhere. For example, a special kind of organic adhesive called *Ahom Atha* is used in the construction of boats of Majuli. The speciality of this adhesive is that it does not dissolve in water. The tradition of boatbuilding is still prevalent among families of certain communities in Salmara, Borgayon and Nawsali village of Majuli. However, due to the global effect of urbanization, the lifestyle of people is also undergoing a huge transformation. This paper aims to explore how far modern influences have managed to affect the life of traditional boatbuilders, and how this has affected the tradition of the vernacular boat in the region.

73. Underwater cultural heritage of India, status quo and prospects

Sila Tripati

The role played by India in the maritime history of the Indian Ocean Region was very significant from the third millennium BCE onwards. Similarly, the mariners of India were the first users of monsoon winds in the maritime trade. Not only the literary sources but also the excavation findings embody the fact. Over the centuries, several ports along the east and west coasts of India came to the limelight and disappeared, similarly numerous ships of different periods of history have wrecked in the waters of the Indian subcontinent.

The unknown underwater cultural heritage of India; was unearthed by undertaking maritime and underwater archaeological investigations from 1981 by several institutes and universities. Many submerged ports, shipwrecks and habitational sites, traditional boatbuilding technology and numerous stone anchors, etc. have been discovered and studied. The maritime archaeological findings enumerate India's contacts with Mesopotamia, Oman and Bahrain, the African coast, the Red Sea coast and Southeast Asian countries from the Bronze Age civilisation onwards. Though the maritime and underwater archaeological investigations have made nascent advancements, there are certain challenges, which hinder growth and development, therefore, collaboration on research and capacity building in this field is essential. This paper details the underwater archaeological findings along the Indian coast, the present status quo and prospects.

74. Integrating Marine Cultural Heritage into Marine Spatial Planning for SIDS: an Indian Ocean case focused on Mauritius

Krish Seetah, Stefania Manfio, Yann von Armin, Hemanaden Runghen, Rezah Badal

The topic of this abstract fits best within Session 9 because it deals with the utility, valorization, and sustainable development of underwater cultural heritage in the Indian Ocean region. We outline how the process of valorizing underwater cultural heritage has been undertaken in this specific context, and how this important resource is being integrated into the Marine Spatial Plan of the island.

The case study under consideration focuses on Mauritius, located in the Southwestern Indian Ocean, with a rich maritime heritage and associated repository of wrecks.

The resources available to conduct the work include human capacity both locally and internationally, built through local partnerships. Financial, logistical, and equipment needs have also been sourced locally and internationally, all of which is outlined in the presentation.

The research presented tackles the question of how to sympathetically integrate a sustainable program to capitalize and protect a nation's maritime legacy, a subject often complicated by the needs for growth and development.

The [expected] results focus on the applicability for other AIMS SIDS, and perhaps SIDS more broadly, illustrating ways to use maritime heritage as a route for building resilience at the local level for communities heavily dependent on coastal lagoon waters.

75. Ships which were sunken in east coast during British era.

Jinali Ekanayake, Indika U. Hevage, Rasika Muthucumarana, M.D.I.S. Jayathilaka

The eastern coast of Sri Lanka is considered to be the coastal region from the Kokilai lagoon in the north to Panama in the south. The coastal region has been used for various activities with various marine relations since the BC period. The activities of the Portuguese, Dutch and English in this coastal region during the period of colonial rule were continued. This can be confirmed by reference to archaeological and literary sources.

Due to the uniqueness of Trincomalee natural harbor in the world, this area can be recognized as an area that has been controlled as a colony by various foreign nationalities since the past. This Paper outlines the information about the sunken ships in the naval activities of the British rule in the east coast region of Sri Lanka. There are many ships that have sunk due to natural disasters, industrial errors and human activities. and the most notable are the ships sunk due to attacks during the Second World War. The number of ships that have been there are about twenty-one. Of these, about eight ships that sank during period of Second World War have been found.

In addition to discussing information about the ships SS Ava, HMS Diamode, SS British Sergeant, another uniqueness of this research paper is the grave yard of Pasikuda area, which has been introduced by Mr. Darshana Jayawardena, who is engaged in diving research in the sea Coastal around Sri Lanka, in the book called Ghost of the deep.

Discussing the identification of the four sunken ships at the place called shipwrecks with the intervention of the Maritime Archeology Unit. Accordingly, it is hoped to identify the cultural heritage related to the water created by sunken ships in the eastern sea region, which is a special sea region, and to discuss related activities.

76. Ancient Mediterranean, Red Sea and Afro-Asia links across the Western Indian Seaboard: Recent Underwater Discoveries in Mafia Archipelago, Central coast of Tanzania
Caesar Bitá

Coastal communities of the East African coast have for millennia, traded with India, the Far East, the Mediterranean Region and the Red Sea going back to at least the first millennium BCE or slightly earlier. These trade links across the Indian Ocean seaboard reached lands as far as China and the Americas. During the first millennium BCE, the Romans visited the East African seaboard and reported about this territory and its settlements as Azania. Terrestrial archaeological studies along this coast have shown the existence of trade routes connecting the coast with the hinterland of Africa where some merchandise for international commerce was collected. Recently underwater archaeological surveys have recovered materials that indicate ancient global maritime trade connections extending back to the Graeco-Roman period. That the east African coast was a major player in the ancient international maritime trade makes it an important area for maritime archaeological studies. This paper reports on findings from the recent underwater archaeological survey in the Mafia archipelago on the central coast of Tanzania. The findings confirm the existence of ancient international maritime connectivity between the East African coast and the Mediterranean region, the Red Sea, India and the Far East.

77. Revisiting the Gulf of Khambhat, west coast of India
Mukesh Sharma and Dipanjali Devi

The Gulf of Khambhat (Gulf of Cambay) is the cradle of maritime activities on the west coast of India, famous for its high tides, with an average tidal range is 10 m. Periplus of the Erythrean Sea and other Indian texts refer to the Gulf of Cambay. Several major rivers including the Narmada, Tapi, and Sabarmati drain into it. The Gulf of Cambay was also the home of the oldest civilisations of the world i.e., the Harappan Civilisation. The prominent Harappan sites are Lothal, Padri (Kerela no dhoro), Hanuman no timbo, and Budhel, and the historical sites are Hathab, Gogha, Gopnath, Kodinar, Nish Kalank Mahadev and many more. Besides the Harappan affinities in Lothal namely the town planning, seals and sealings, pottery, terracotta figurines, beads, metal works and of course the dockyard. The other unique feature of Lothal was the sacred structure of the Sea Goddess associated with the maritime journey which was located over the mound of the warehouse overlooking the dock. This paper aims to emphasise the importance of the sacred Sea Goddess and its affinity to the community Khambhat region. Besides, the recently discovered stone anchors, the history of the traditional bead making industry, and the prevailing maritime traditions of 5000 years of the region are discussed.

78. Exploring Maritime Silk Route: A study on the east coast of India
Sunil Kumar Patnaik

Recent excavations and explorations have brought to light many ports and early historic settlement sites along the east coast more precisely between the Rivers of the Ganges and the Godavari covering the ancient landscape of Kalinga and Andhra. The folklore, Buddhist literature, and Greco-Bactrian account reveal flourishing trade, between 500 BCE and 350 CE with Southeast Asia, which underwent the most profound transformation. The engagements between the Indic world and the Southeast Asian realm are critical to understanding the formation of the Bay of Bengal Interaction Sphere

(BBIS). The BBIS comprises the eastern part of the Indian Subcontinent (Sri Lanka, Tamil Nadu, Andhra Pradesh, Odisha, West Bengal on the east coast of India and Bangladesh) and the western part of Southeast Asia (Myanmar, coastal Thailand, coastal Malaysia, and the Indonesian Island of Sumatra adjoining the Andaman Sea). The Andaman and Nicobar island chains, which are spread in a north-south axis in the Bay of Bengal, overlook the passage through the Malacca Straits to the South China Sea.

The recent studies brought to light many ancient Buddhist settlements and port sites along the Odisha and Andhra Pradesh coast of the Bay of Bengal. It is a fact that Buddhism is the religion that travelled in the Silk Routes connecting China and Central Asia in Pamir, Hindukush and beyond by Sea through the ports of Eastern India to Southeast Asia from the beginning of the historical period and the material remains come from every part of Indo-China and Indo-Asia. Buddhism played a vital role up to the 10th century CE in connecting cultures and there was an intimate encounter, which brought to the limelight in our recent exploration and documentation of a series of Buddhist settlement sites along the east coast. An exploratory study of field research of recent times on the east coast of India is to be discussed.

79. Research on maritime trade between Iran and China: a case study
the historical port of Najiroum, the northern shores of the Persian Gulf
Hossein Tofighian

From the first century BCE, trade between the East and West began through the Silk Road, and trade goods, traditions, culture and religious beliefs were exchanged between the civilizations of ancient China, the eastern Mediterranean lands, and the Iranian Plateau. This acted as a bridge between Eastern and Western civilizations in this world trade. Subsequently, the Silk Road became insecure, the water routes replaced and the Persian Gulf became the connecting link between ancient Chinese markets and western lands. Meanwhile, the historical ports of the Persian Gulf, especially the unknown port of Najiroum played an important role. Najiroum port, located sixty km west of the historical port of Siraf and ten km from the port city of Dayer, had played an important role in maritime trade between Iran and China from the Sassanid period to the middle Islamic centuries. During the geo-archaeological studies in the winter of 2016 and archaeological explorations of Najiroum port in the spring of 2018 several scattered cultural materials including pieces of turquoise pottery, torpedoes, and sgraffito, including remains architectural pieces spread over three km parallel to the coast suggesting existence of a large population, industrial and commercial centre. The findings include several pieces of Chinese pottery, such as celadon, Changsha, and white blue, and Chinese coins, and coins from the Tang, Southern Song, Jin, Yuan, and machine coins from the Qing Dynasty. These remains suggest the story of the extensive commercial relations of Iranians with ancient China from the Sassanid period to the middle of the Islamic period. In this research, the cultural materials belonging to the ancient Chinese Dynasties in the historical port of Najiroum, and the position of this port in the maritime Silk Road have been highlighted.

10. Comprehension of Traditional Ships in East Asia

Chair: Hong Sun Jae (National Research Institute of Maritime Cultural Heritage)
nrimch.apconf5@gmail.com

Archaeological materials, including shipwrecks and their components of various periods, have been recovered around oceans, rivers, lakes and seas. However, they are limited and not to be able to share the information of original shapes, because be documented as a form of reports split into various research institutes. In addition, in the case of being recovered with a variety of artifacts, they have been processed in conservation treatments for a long time, which takes ten to twenty years. For that long period of time, the shipwrecks are not to be displayed to the public. While the

consistent research subjects to the potteries recovered from shipwrecks and the conservation treatments, the research about shipwrecks is lack of research, which resulted from the lack of experts.

So far, besides the fact that the value of archaeological materials recovered and excavated in Korea is not shared well, traces of the maritime silk road in Asia including China, Japan, Vietnam, Malaysia, etc. is not well contributed, due to diplomatic issues, sociocultural academic atmosphere and so on. A basic study and its outcomes will be needed to relieve these issues. The session aims to share the fruits of research of institutes or individuals around the world, furthermore, and to strengthen the exchange of human resources.

The session aims to spread the fruits of progressed research and share the ideas with researchers from Asia and Pacific regions:

- Designing the Reconstruction of the Shipwreck of Goryeo Dynasty and Its Analysis in a Shipbuilding Engineering Way
- Study of Panok ship, the Warship of Joseon Dynasty
- Comparison with Traditional Ships of East Asia
- Research Cases of Ancient Shipwrecks with Recovery of Artifacts

80. Research on the Restoration of Original Shapes of Shipwrecks in the Early Part of Goryeo Period

Kang Won-Chun

Totally sixteen ancient shipwrecks, from the Shinan shipwreck to, recently, Daebudo shipwreck No. 2, have been recovered, since 1976 when the underwater excavation was conducted on underwater artifacts in Shinan, Korea. As ten of those are dated to the Goryeo period, cargos such as pottery including celadon, grains, and salted seafood and daily products of shipboard life such as coals and chopsticks are discovered.

While researches on pottery have been conducted in various ways, focusing on typology and distribution process, original shapes of shipwrecks playing an important role in their distribution have not extensively studied. It is because of not only remains concentrated on the bottom parts of vessels resulted from exposure to the underwater environment, which makes hard to assume their original shapes, but lack of ancient documents relevant to the vessels.

As the Goryeo period when maritime activities were dynamically active, based on Byeokrando, Sibidongpado and Wando shipwrecks can show them. The facts that accompanying artifacts are mostly concentrated on celadon produced from Haenam region and curved stringer was observed at the structures of vessel are highlighted.

As mentioned above, it is not easy to assume the whole dimensions of Sibidongpado and Wando shipwrecks, only by leftover planks. To complement the gap, feature variables are defined, which is necessary for assuming their original shapes, and their shapes and structures are reviewed by shipbuilding-engineeringly.

First of all, remains of these vessels, including bottom planks, curved stringer, and shell plating, are subjected to 3D scanning, which calculates nineteen feature variables for restoring original shapes. Next, data obtained from each part of ancient shipwreck in the similar periods is organized statistically, and calculated feature variable is defined, by applying either geometrical dimension ratios or modeling data. It is tried to restore original shapes from the shipbuilding-engineering perspective, and to deduce displacement and stability of vessels, based on defined feature variables. Finally, data from excavated ancient shipwrecks are based to produce 3D models of each structure.

Limited remains of planks and ancient documents prevent from restoring their original shapes. Shipwrecks, which is the necessity of assuming maritime activities at that time, should be consistently studied. As lots of waters are excavated still, further fruits of research are expected.

81. Types and Features of Vessels in the Goryeo Period

Jeong Hongil

Research Objectives. The Goryeo period was full of maritime activities, as its foundation was based on dynamic navy activities with the Later Baekje in Later Three Kingdoms period. At the early stage of its foundation, transportation system, which is transporting taxes to the capital through maritime routes, was established, in the eleventh and twelfth centuries, trades with China were active, favoring Song, and in the latter part of the thirteenth century, diverse maritime activities, including the expedition to Japan, together with Yuan, were carried out.

Various vessels appeared depending on its usage, such as huge warship of Wang Geon, Taejo of Goryeo, Choma ship for transporting taxes, merchant vessels used for trading with China, Gua ship defeating pirates of Jurchen, warships joined in the expedition to Japan, coastal transporting ship discovered underwater, etc. were found.

The paper historically and archaeologically reviews changing aspects and reasons of dimensions and structures of vessels in the Goryeo period depending on internal and external impacts.

Research Process. Reviewing researches on the vessels of Goryeo period and analyzing their usage imply that vessels of various types and dimensions were extent at that time. The outstanding part in historical and archaeological reviews is that their dimensions and structures are changing by internal and external reasons. While the diversification of types and increase of role of huge vessels in the navy activities happened, the number of operated vessels was increased along with shrinkage and structural development of transporting vessels. What affected these changes were resulted from frequent navy activities. For the former, change of navy was based on both external impacts of appearance of Yuan and Japanese raiders and internal of maintenance and reinforcement of navy and development of shipbuilding techniques. The latter was also based on both of external reason of looting by Japanese raiders and internal of corruption such as private usage of Joun ship, appearance of small-sized transporting vessels, and usage of private vessels, along with social changes.

Research Result. The research shows various usage of vessels in the Goryeo period. Types and changes of the vessels in Goryeo period by time is reviewed through the historical sources, which can imply social-economical changes. Military vessels operated by navy in the Goryeo period rarely appeared in the early period, with less usage. In the latter period, however, usage and shapes of vessels operated by navy became diverse.

Except for it, various vessels such as transporting vessel, including Joun ship which is not for military purpose, private vessel, etc. appeared. Types, dimensions, structures, etc. of vessels changing by time is expected to reveal social-economic changes at that time.

82. Study on the Structure of Shinan Shipwreck, the Chinese Merchant Ship in the 14 th Century

Hong, Sun Jae

The study on Shinan shipwreck was begun by Jaeguen Kim, with defining its structure of hull, suggesting scantling list, and reviewing structure of hull by reconstructing small-sized replica, by comparing vessels in the Goryeo and China. In 1989, construction process of its small-sized replica for reconstructing original shape and its meaning were studied by Cheolhan Kim et al. In 2004, in order to define original shape and criterion for reconstruction, Yonghan Kim sorted out its planks, studied structural features, and compared historical sources and materials of Chinese ancient vessels. In 2004, Hangsoon Choi tried to analyze the displacement, light displacement, dead weight, resistance ability, structural strength, etc. of Shinan shipwreck in the shipbuilding-engineering way, suggesting relevant scantling list. In 2004, the National Maritime Museum published the report mentioning its conservation process and reconstruction of remains. In 2018, the National Research Institute of Maritime Cultural Heritage conducted a pilot research on defining its original shape and publishing reports, by the measurement in details of

reconstructed 3D model, reconstruction experiment by 3D printing, foundation, detailed design, analysis in the shipbuilding- engineering way, experiment of reconstructing replica based on assumed original shape, experiment of reconstructing replica by 3D printing for essential structure, etc.

Despite of these pilot researches, however, questions of its structure suggested by researchers are not clarified. Those questions are mentioned in The Conservation and Restoration Report of Shinan Ship written by Prof. Cheolhan Lee and Prof. Chang-Eok Lee which was published to celebrate the tenth anniversary of the National Maritime Museum in 2004, and in new version of The Shinan Shipwreck republished for the thirtieth anniversary of underwater excavation of Shinan shipwreck in 2006. They are not contradicted each other. Those in commonly mentioned are the following: 1) the structural understanding of curved shape of square-shaped keel planks, 2) combined structure and angle of square-shaped keel and flat, 3) possibility of additional shell plating and other important criterions of hull, including ship's depth, 4) whether to consider the structure of deck edges as the way it have been assumed, 5) consideration of cross section of central hull, when all the questions are clarified, 6) whether the rudders were present or not, 8) questions of other mast steps and liquid tanks.

Fundamental data was established, with pilot researches mentioned above, which resulted in various studies. Nonetheless, questions suggested by pilot researchers could not be clarified. Thus, in order to solve all the questions, wrong terms used in the structure of Shinan shipwreck should be arranged by following its structure, and questions and challenges should be considered by analyzing its structure. For the research methodology, questions, based on the main structure mentioned in The Shinan Wreck, reports of conservation, restoration, and assumption of original shape, in addition to structures which was not mentioned in previous reports, are suggested in a shipbuilding-engineering way.

The paper is expected to become a complex research including utilization of fundamental data of ancient shipwrecks in East Asia, comparison of structures of ancient shipwrecks in Korea, China and Japan, research of their development history by periods, by defining the merchant ship which was built by the best techniques in East Asia in the fourteenth century.

83. Vessels in the Middle Ages of East Asia Illustrated in Goryeo Dogyeong Jin Ho Sin.

Seonhwa Bongsu Goryeo Dogyeong illustrates the early period of Goryeo that is lack of historical records. Thus, the book contains lots of information of official vessels that envoys took and private vessels in Song dynasty, such as shapes, weights, lengths, capacity of passengers, and attachments of vessels. While various Goryeo vessels are illustrated, including a patrol vessel, official vessel, Songbang, Mak ship, Chae ship, etc., according to the regions and usages, their shapes are all based on Korean ship.

The study is carried out by analyzing features of official and private vessels represented in Goryeo Dogyeong, comparing them to features of Chinese vessels and their attachments recovered from underwater, and figuring out their scantling lists. Also, usages and measurements of vessels in the Goryeo period represented in the historical records, such as Songbang and Mak ship, were compared with shipwrecks discovered underwater.

The research on vessels in the Middle Ages of East Asia is expected to flourish information of vessels in the early Goryeo period as well as vessels in Song dynasty.

Similarities and differences are in the vessels of the Middle Ages discovered from underwater of East Asia. The research is focused on analyzing types and features of vessels used at that period, according to the countries and regions, based on Goryeo Dogyeong.

11. Sticks, Stones, & Old Fish Bones: The Role and Cultural Heritage of Fish Weir Traditions in the Asia-Pacific Region

Chair: Prof Bill Jeffery (University of Guam)

Fish Weirs represent one of the most enduring and consistently occurring tools of capture across the spectrum of human activity within across the globe and particularly the Asia Pacific region. Fish Weirs appear in a range of forms adapted to the local marine ecology and shaped by human interaction with the natural world. Within this story, built in both stone and wood, they have appeared in the archaeological record of nearly every coastal community around the globe as part of their wider subsistence and resilient approach to living in balance and harmony with the natural and spiritual world. Their historical importance is not just as a tool of capture for the acquisition of protein, but they have played an important social and cultural function for indigenous communities.

This session invites researchers and scholars interested in both the complex cultural heritage and context of fishing and fish weirs to share their perspectives on its place within the local maritime and cultural landscape. The session will bring to the fore the intrinsic commonalities and the emerging climate change driven challenges to communities across the Asia Pacific region. It will provide a venue for debate of their intrinsic value to modern science as well as a repository of cultural traditions which interwoven with the history communities and local ecology through this activity. This session will attempt to bring aspects of both indigenous folklore, archaeological and historical evidence for this activity within the Asia Pacific region as well as encourage a fusion of non-indigenous evidence in the form of art, cartography and European exploration narratives which recorded many of these traditions in their first interaction with the indigenous community of the region.

84. How atob came to be - the evolution of stone tidal weirs in the Philippines

Cynthia Neri Zayas, Ph. D

Stone tidal weirs suggest evolutionary stages of how the human-natural world interacts. From it, “commons” is reflected in the social and cultural milieus among indigenous/local communities. In the Philippines, an atob is a stone tidal weir built on a gradually sloping reef by filing up stones as a barrier to sift sea creatures carried by a receding tide. This presentation is based on three data sets that will explain how atob came to be. The first set consists of the atob itself. The second set is a simpler weir namely atob-atob1, a fish aggregating device (FAD) of stone where fish are caught by hand. Another is panihod, like atob-atob except that fish is caught thru a basket. Then, atob-atob2 is not exactly a trap but an enclosure like a pool to stock live fish for later use. Lastly, the mirakolol (miracle hole) is a dug-up hole like a basin. The third set is the panapok or pangatob, built under shallow water that combines FAD with an encircling net dropped from the boat. The word panapok is derived from the instrumental affix pang- +the root word tapok (to pile up) while pangatob is from pang- + the root atob (to trap). Panapok or pangatob is the missing link to the evolution of an atob. Two methods of analysis are utilized - a comparative study of material culture, and a semantic analysis of the terms used in naming and describing the weirs. In archaeology, the simplest artifact is often identified as the oldest. I ask, “Could these weirs with the same features - stone structure, reliance on the tide, and an enclosure- be one and the same but only differ in the stages of their development as trappers reckon their natural world? My data came from field research between 1990 and 2010, historical materials, and ethnography.

85. The Barragup Munga – A site so well known that there's nothing left to learn?

Kevin Edwards and Ian McCann

The Barragup Munga (fish trap) has significant oral and written history available relating to the site. It appears to have been comprehensively investigated. Recurrent, closer examination has found evidence of archaeology that was thought to have disappeared.

The munga was an important site to local indigenous people for fishing and for social and ceremonial activities. Excess fish was also traded with the recently arrived Europeans, who used it for food or fertiliser.

Despite the seemingly good documentation, its exact location on the Serpentine River is still debated. New ethnohistorical data which includes Indigenous and European oral history, digitised early maps of the region, and extensive fieldwork, challenge the prevailing opinions about its location. In addition, it has raised the intriguing possibility of there being more than one munga at Barragup.

With low visibility and thick mud in part of the river, side scan sonar was a useful screening tool to help identify potential dive sites, including possible site formation processes. These processes may help us detect other fish traps in riverine environments. Further investigation is needed into this site, which will be discussed.

86. Stone Tidal Weir's Past, Present and Future Regeneration Opportunities Take Taiwan for Example

Janet, Tung Ying-Ying

There are Stone tidal weir (Shihu in Chinese pronunciation) all over the world. But, with the progress of science and technology, the economic benefits of Shihu are poor. However, Shihu was an important way of catching fish for seaside residents in the past. Shihu has a great influence on human beings in both tangible and intangible culture. Although there are not many "living" Shihu today, they are periodic exposure out of the sea, it is an underwater cultural heritage that people can see and touch without diving, so, it is the best material for promoting education on the protection of underwater cultural heritage.

Around Taiwan, especially in Penhu, there are many beautiful and numerous Shihu. The government has been deeply involved in subsidizing restoration, cultivating construction skill, research, and education promotion, hoping to preserve Taiwan's precious Shihu. There are many local people and groups in Taiwan, who are working hard to combine the local residents and tourists, take advantage of the characteristics of Shihu, create new opportunities for multiple reuse and promotion, to keep Shihu's shape and good current situation, and to pass Shihu's beauty and fishing culture to the next generation.

87. Indigenous People, Traditional Ecological Knowledge, and Climate Change: The Iconic Underwater Cultural Heritage of Stone Tidal Weirs

Bill Jeffery

From deep in human history, humans have always had a strong and complex relationship with the ocean and its diverse ecology. Within this story fish weirs both stone and wood have appeared in the archaeological record and significant tools being used by communities at every latitude as part of their wider subsistence approach for the past 40,000 years and are most likely much older. As a tool of mass capture an acquisition of protein for indigenous communities across the Asia Pacific from deep in prehistory. The paper aims to highlight the function and role of stonefish weir to the communities of the globally and in particular in the Asia Pacific and their intrinsic place in the cultural heritage of the indigenous communities who inhabit this environment. Investigating the modern use of these monuments by fishing communities and their implications for national policy and perceptions of coastal communities. Highlighting the depth of information contained in traditional ecological knowledge (TEK) and its use aid in our understanding, monitoring modern fisheries and the communities who depend upon them. Also, to hone this traditional knowledge of past fluctuations in fish populations and climate that had implications for indigenous communities around the world as a tool to understanding the ongoing climate change implications for our world's oceans on the communities who depend upon them. Enabling and encouraging them to invest and revive the use of stone-walled fish weirs as a way to revive, conserve and curate local ecological

knowledge and traditions in general as a tool for the wider world's conservation of marine ecological zones.

191. Status of events using Stone Tidal Weirs in Korean local governments

Heyony

In this presentation, we would like to investigate and report on the current status of events using Stone Tidal Weirs hosted by local governments in Korea.

88. GIS and hydrological surveys on stone tidal weirs in Xinwu, Taoyuan

Zhi-Cheng Huang

The topic of this abstract fits best within Session 12 (Sticks, Stones, & Old Fish Bones: The Role and Cultural Heritage of Fish Weir Traditions in the Asia-Pacific Region) because it presents the surveys on the stone tidal weirs. The case studies under consideration are GIS and hydrological surveys on stone tidal weirs in Xinwu, Taoyuan. Stone tidal Weirs (STWs) in Xinwu District, Taoyuan City, have been valued by the local government and community residents in recent years due to the sustainable development of marine culture and the environment. They were built by coastal inhabitants, which represent the historical, local and traditional fishery and marine culture in Taiwan. Xinwu STWs has been listed as a cultural heritage and restored and maintained since 2019. Studies focused on the construction techniques of the STWs, on how they connect to the development of villages, cultures, histories, and fishery and agricultural activities. Here, we reported surveys for the STWs and the related waves and currents in the coastal environment around the weirs. We used scientific instruments to survey the topography, tides, waves, and currents around the Xinwu STWs. High-resolution orthographic aerial images and a 3D digital surface model were carried out by a drone technique. We also analyzed the coastal hydrologic conditions and tried to connect them to the social development of the STWs. We explained possible reasons for how the STWs were constructed in the intertidal zones based on the analyses of the hydrological data. The results could explain the status of the development of local society at the time of the construction of STWs. The quantitative survey results of the GIS-based spatial distributions and sizes of the STWs help to infer the status of the coastal society at that time and how the ancestors built the STWs; the survey results also allow us to present how people observed the oceanic characteristics of the coast at that time and developed unique architectural techniques to make the STWs.

89. Poket Xinwu App game for promotion of the stone tidal weirs cultural heritage and collaboration with local communities in Taiwan

Lai, Chen-Min Tai, Yu-Hsin LI, Zen-FU Cheng, Tsung-Han

The topic of this abstract fits best within this Session 12 because the study aims to investigate the potential of digital technologies in promoting the cultural heritage of stone tidal weirs, also known as "Shih-Hu" in Taiwan. The stone tidal weirs are an integral part of Taiwan's history and culture, yet their significance is often overlooked.

This study aims to address this by utilizing digital technologies to raise awareness about stone tidal weirs and their cultural significance, as well as the ecological significance of the stone tidal weirs in near-shore ecosystems.

A mobile application, Poket Xinwu, was developed in collaboration with local communities and university groups to ensure the authenticity and accuracy of the information provided. The app features interactive content that allows users to learn about the stone tidal weirs and their surroundings in an engaging and intuitive way. Additionally, the app aims to raise awareness about the environmental issues surrounding stone tidal weirs and the importance of preserving the local ecosystems. The app also

serves as a tourism promotion tool, encouraging visitors to explore the stone tidal weirs and learn more about the marine culture.

The study found that the app game was successful in promoting the cultural heritage of stone tidal weirs and raising awareness about their significance. The app's interactive content and the collaboration with local communities were identified as key factors in its success. The study concludes that digital technologies can be effectively utilized to promote and preserve cultural heritage and can foster collaboration and understanding between local communities and visitors.

90. Fishing Weirs and Galo Mythologies from the foothills of the Eastern Himalayas

Bina Gandhi Deori

Traditional hunting and gathering way of life has existed as the main mode of subsistence for human since long and continue to be with some indigenous communities despite the onslaught of the urbanization. Arunachal Pradesh, the North-easternmost state of India that shares international borders with the Republic of China, Bhutan and Myanmar is home to a large number of indigenous communities who still continue to live in traditional way of life despite the changes brought by modernization.

Traditional and community fishing is still practiced by them and the use of various types of weirs is still common. The weirs come in various shapes and sizes and made by the community people themselves using bamboo splits and rattan. The making of the fishing weirs needs special skill as some take a longer period for the processing of the raw materials while some are made on the spot at the time of need, in both cases active participation to learn and develop the skill is necessary. What makes these fishing weirs special is the mythology behind it. The Galo indigenous community people hold these fishing weirs with utmost respect because of its importance in their mythology. The folk stories mention how the fishing weirs came to the human and the role played by the weirs in sustaining human life on this Earth. However, as the younger generation do not have much time to spent with their village/community elders, this tradition of making fishing weirs is not easily known to many and the myths behind it. Therefore, this papers aims to explore the different kinds of the fishing weirs and to bring out the importance of the related mythologies associated with them.

91. Bawean Stone-Walled Tidal Fish Weirs: An Archaeological and Dutch Colonial Archival Investigation in Java Sea

Dwi Kurnia Sandy

This article explains about the tradition of using fish weirs as a tool for food hunting in the shore area in Java sea, especially in Bawean Island, Indonesia. This makes me certain that this article fits session 12 which discusses about both the complex cultural heritage and context of fishing and fish weirs to share within the local maritime and cultural landscape. This research conducted mainly because of The founding of some stone-walled tidal fish weirs in The East of Bawean Island. The resources available to conduct the work include archaeological data, tidal cycle, community ethnology found on the area and also Dutch Colonial archival research which conducted to obtain as much information as possible about patterns of use of fish traps in historic times. There are two main problem in this research. Those are how did Bawean people used those fish weirs? And how did Bawean people caught and distributed their fish in Bawean Island? Which in the end it can be concluded are to determine the origins and uses of stones fish weirs structure in The East of Bawean Island. Futhermore, this article will describe the methods and utilization of stones fish traps in Bawean Island

93. The Technique Record of Repairing Penghu Stone Tidal Weirs

Fu-Tzu Yang; Yu-Chi Tseng

Our project is based at the location “Xin Hu” in the Angnata village of Huxi township, Penghu. We invite the professional team of stone tidal weirs masters to guide the repairment so that our team can practice, learn, do depth interviews, record audio dictations and systematically sort the sets of executable repair methods. Further, to develop the model of experiencing the repairmen for public. By the experiment, we look forward to achieve the purpose of discussion of stone tidal weirs preservation, ecological preservation, and possibilities of the youth returning which leads to the targets- inherit local experience and sustainable community development.

12. The Archaeology of the Manila Galleon at the APCONF: past, present and new interpretations.

Chairs:

Dr Jose L Casaban (Institute of Nautical Archaeology) jlcasaban@nauticalarch.org

Dr Roberto Junco (Instituto Nacional de Antropología e Historia) robjunco@mac.com

Co-chair: Dr Jun Kimura (Department of Maritime Civilizations at Tokai University)

The archaeology of the Manila galleons has been present at the APCONF since 2011. For over a decade, the APCONF has served as a platform for researchers of the Asia Pacific region to disseminate the results of their investigations regarding the archaeology and history of the Manila Galleon. In addition, several research projects have taken place since 2011, furthering our knowledge regarding the archaeology of Manila Galleon. The aim of this session is to examine the current state of the research on this topic and to reformulate traditional interpretations based on the latest advances in the archaeology and history of the Manila Galleon.

94. The Maritime Cultural Landscape of the Galleon Port of Ticao and the galleon shipwrecks in Ticao Pass

Catherine E. Villamor

During the Spanish colonial period, European explorers noted that Ticao Island in Central Philippines was the source of water, wood, and other provisions for the galleons. Hence, the Port of San Jacinto in Ticao was one of the last ports the galleons touched before they sailed to the Pacific. It was also one of the primary ports they anchored to as they entered the Philippines. More so, Ticao Pass serves as the graveyard of galleons, such as the Santo Cristo de Burgos (1726). Through the years, local histories have been written about this glorious past of Ticao as a galleon port. However, not much archaeology has been done on this subject. Thus, this study aims to report the current status of historical and archaeological research on Ticao’s role in the galleon trade. In this paper, relevant historical sites, i.e., potential archaeological sites, were charted for future reconnaissance. The resources available to conduct the work include ethnohistorical data, archival maps, maritime charts, archaeological reports, site discovery forms, and artefacts, which are ample to illustrate the maritime cultural landscape of the Port of San Jacinto, the underwater archaeology done to the galleon shipwrecks in Ticao Pass, and Ticao’s significance to the Manila-Acapulco Galleon Trade.

95. Unravelling the Impacts of the Manila Galleon Trade on the Landscapes and Cultures of the Philippines Using Zooarchaeology

Joan Quincy Lingao , Eduardo Corona, Grace Barretto-Tesoro , Patrick Roberts, Maricar Belarmino, Mary Jane Louise Bolunia, Bobby Orillaneda, Lee Anthony Neri, Victor Paz, Juan Rofes

After the discovery of the tornaviaje, or return trip to New Spain (Mexico), dozens of galleons sailed from the Philippines to Mexico and back again for nearly two and a half centuries. The Manila Galleon Trade played a major role in solidifying a maritime trade

network between East and Southeast Asia and the Americas during the Spanish colonial period, stimulating the introduction of plants and animals that went on to have major ramifications for the environments, economies, and societies of the Philippines. However, formal archaeological analyses of animal remains from the Spanish colonial period are very limited. Most studies related to the Manila Galleon Trade focus mostly on shipbuilding, tradeware ceramics, and plants. Historical accounts have provided clues as to the animals that may have been introduced to the Philippines during the Manila Galleon Trade (c. 1571–1815) and how they were integrated into the Philippine territory and society. Demonstrating those introductions archaeologically is nevertheless an ongoing effort. By undertaking zooarchaeological research (study of faunal materials from colonial sites and shipwrecks), coupled with biomolecular approaches (e.g., stable isotope analysis), we seek to improve the level of detail about the animals that arrived on Philippine shores during this time period. We argue that extending the study of the Manila Galleon Trade to explore its impact on the landscape and culture of the Philippines will yield novel insights to animal translocations, animal husbandry practices, land-use, and changes in dietary preferences during the Spanish colonial period.

96. Revisiting: The Archaeology of Manila Galleons a decade later
Roberto Junco

At the first Asia Pacific Regional Conference on Underwater Cultural Heritage, which took place in the city of Manila, Philippines, on November 2011, I had the opportunity to present a paper on the topic of the Archaeology of Manila Galleons. It was an attempt to summon the archaeological work undertaken on this research topic. Furthermore, lines of inquiry were presented to study Manila Galleons from an archaeological perspective. Since then, much has taken place, including several sessions at the different APCONF conferences. In this paper, I will discuss developments in the past decade related to Manila Galleon Archaeology. I will review the work carried out in several countries and look at some publications that have furthered our understanding and scope. This presentation is a state-of-the-art on the archaeological research of Manila Galleons and a refreshed look at where the topic can grow.

97. The Manila Galleons Historical and Archaeological Database Research Project (1565-1815)
Jose Casaban and Jun Kimura

This paper presents the preliminary results of the research conducted to develop the historical and archaeological database for the Manila Galleon. This research is supported by and contributes to the ERC AdG project TRANSPACIFIC which has received funding from the European Research Council (ERC) under the European Union's Horizon 2020 Research and Innovation Programme (Grant agreement No. 833143)." One of the aims of this project is to create a database including all the Spanish transpacific vessels known as Manila Galleons, which sailed across the Pacific Ocean between the 16th and 19th centuries as part of a global trade route that connected eastern Asia and western Europe via New Spain in the American continent. The database is based on the comparative analysis of primary and secondary sources, which has revealed discrepancies among the previously published lists of Manila galleons and wrecks. Archival research conducted at the General Archive of the Indies in Seville (Spain) has also provided essential information regarding the type of tons (toneladas) that the Manila Galleons used during the 17th century to measure their cargo volume. According to archival documents, these tons appear to be larger than those used for the ships of the Indies run in the Atlantic Ocean. The database also examines the archaeological data related to the hull remains of these vessels known to date, which is also extremely limited compared to the data available for the Atlantic Spanish vessels. However, the preliminary examination of hull timbers has already provided important information, such as the keel of Nra. Sra. de la Vida (1620). This research aims to gather

the basic data related to the evolution of the design and construction of the Manila galleons and to produce theoretical models of these vessels based on archaeological parallels, contemporary vessels of similar tonnages, and designs and hull ratios provided in contemporary shipbuilding treatises and ordinances.

CONSERVATION AND PROTECTION

13. Major Threats to Underwater Cultural Heritage and its environment

Chairs:

Ole Varmer (The Ocean Foundation) ole.varmer@gmail.com

Dr Elena Perez-Alvaro (Nelson Mandela University/UNIR)
elenaperezalvaro@gmail.com

A major focus of the 2001 Convention was to prevent the application of the Law of Finds and the Law of Salvage and control of activities directed at UCH through the Annex Rules and General Principles. Much progress has been made on that front. This session seeks to shine a light on the threats to underwater cultural heritage from Deep Seabed Mining, Bottom Trawling and other issues such as Climate Change that are major threats to our Ocean Heritage (natural and cultural).

98. Assessing Potentially Polluting Wrecks in US Waters

Michael L. Brennan

The topic of this abstract fits within this session on threats to underwater cultural heritage because of the environmental risk posed by shipwrecks with petroleum cargoes. While many wrecks from the World Wars are important parts of our cultural heritage, they also pose a significant threat to the marine and coastal environment as the steel hulls containing their cargoes continue to corrode. A vital limiting factor in addressing such pollution risks is that many of these wrecks lie in deep water and have yet to be located. Surveys to find these wrecks, followed by assessment and management are required to prevent or minimize the adverse impacts to our ocean heritage. Recent work using satellite detection of oil slicks has assisted in locating certain oil tanker shipwrecks in deep water.

100. Bottom Trawling and the Damage to Underwater Cultural Heritage: An Overview of the Destruction and Possible Steps Forward

Charlotte Jarvis

The topic discussed, how bottom trawling has for hundreds of years destroyed both the natural and cultural landscape of the seafloor, fits with Session 14: Major Threats to Underwater Cultural Heritage (UCH). Trawling has long been regarded as a damaging practice and marine ecologists have lobbied for restrictions. The damage to UCH has received less attention, though it is just as consequential. This paper will be made up, mostly of case studies about this damage to UCH, the impacts of losing heritage, and suggested steps forward. The case studies in the paper will include the damage to UCH across the ocean and in the Mediterranean and Black Seas. Resources are already available to the author accomplish this work from The Ocean Foundation and with contributors from the Lloyd's Register Foundation.

There is also a grant application for a book project, 'Threats to Our Ocean Heritage', discussing this issue, Deep Seabed Mining, and Potentially Polluting Wrecks. Through

this work, the author will access site reports and side-scan sonar data and consult with researchers in the field to bring the damage to light and suggest possible solutions and mitigation. The expected results include ocean literacy that increases awareness of the issue to a wider range of stakeholders including international organisations, States, and institutions with the authority to effectuate change.

101. Impact Assessment of Current and Future Sea-Level Rises on Coastal and Underwater Archaeological Sites in Indonesia

Ulung J. Wisna, Wisnu A. Gemilang, and Nia N. H. Ridwan

In this article, we will discuss the coastal vulnerability to current and future sea level trends where several significant areas developed for archaeological sites and marine conservation will be assessed. The case studies under consideration are the following:

- Sea level trend assessment in the archaeological sites in Indonesia based on Altimetry and tide gauge data.
- Modeling coastal vulnerability to sea level rise in the coastal area and its possible impacts on archaeological sites in Indonesia
- Predicting future challenges for preserving underwater the archaeological remains and site due to the increase in sea level.

The resources available to conduct the work include the following:

- Altimetry and Tide gauge data measuring sea level anomaly throughout Indonesia Archipelago retrieved from the Sea Level Explorer, webpage: <https://ccar.colorado.edu/altimetry/index.html>
- The Ministry of Marine Affairs and Fisheries of Indonesia provides shipwreck sites and marine conservation areas.

The research question/approach/problems are: - How will sea level change impact the coastal environment? - How significantly will the climate change-impacted sea level rise threaten the existence of shipwreck sites and marine conservation areas in Indonesia? - How to prepare the existing sites for future alteration and adaptation?

The expected results are:

General sea level trends in Indonesia show an upward state, whereby the significant sea level alteration will induce regional hydro-oceanographic conditions. Changes in coastal currents and sedimentation/erosion will directly affect coastal damages, threatening and reducing the value of archaeological sites in the coastal area. It is estimated that in 2100 more than a 50 cm increase in sea level will occur. Therefore, adaptation and preparedness are crucial to preserving the archaeological remains as an asset of maritime history.

102. Challenges to Underwater Cultural Heritage in Offshore Wind Energy Development Bert Ho

As the United States continues to work towards renewable energy goals and reduce reliance on fossil fuels, the development of clean energy must not be at the sake of our collective history and sacred places. Offshore wind energy presents several new challenges to preserving our underwater cultural heritage, but it also creates opportunities to fill gaps in our knowledge of archaeological resources within our oceans. The Bureau of Ocean Energy Management (BOEM), a federal agency within the U.S. Department of Interior, is tasked with preserving these underwater resources, while providing leasable areas for the development of energy and critical mineral assessments. There are conflicts not just from various ocean users and the many industries that rely on marine resources, but also for space on the seafloor with the vast array of sunken heritage, submerged landscapes, and sensitive ecosystems, many of which have yet to be discovered or studied. How do we move towards cleaner ocean energy sources while preserving and protecting these many non-renewable resources within the Pacific? This paper will present BOEM's approach to future archaeological research in the Pacific. An approach

that is holistic, interdisciplinary, and inclusive of Pacific Island communities that know and understand these resources best.

103. Decommissioning Offshore Structures and Large Ships: A Threat or an Underwater Cultural Heritage Opportunity

Elena Perez-Alvaro and James Delgado

This presentation focuses on the possibility of recycling, removing and leaving on-site offshore structures, such as wind turbines and oil platforms. It also looks at the environmental consequences of these structures recycling mostly carried out in southern Asian countries with limited work and environmental regulations. The construction of some of these offshore structures does not provide 'end-of-life' considerations, so, if left in situ they will become underwater cultural heritage in the future. This presentation will look at the benefits of a collaboration between offshore and maritime industries and underwater cultural heritage practitioners. It will also highlight the importance of including as underwater cultural heritage less "attractive" sites which may not be as popular, but can still be of importance. If forgotten, we may lose a significant part of humanity's history.

104. Threat to Underwater Cultural Heritage from Deep Seabed Mining

Maria Pena Ermida, Mariano Aznar and Ole Varmer

This paper proposes a view on deep-sea mining as a potential threat to UCH. To date, seabed mining has only occurred close to shore, mainly in the continental shelf of certain developing States, namely Papua New Guinea. However, there is a growing interest in moving this activity further away from shore into areas beyond national jurisdiction, aka the Area. In this Area, the Clarion-Clipperton mining zone and some others in the Pacific Ocean, the Indian Ocean, Mid Atlantic Ridge and the South Atlantic Ocean). Evidently, interest in exploiting minerals in the Area beyond the continental shelf of nations was a catalyst (and an obstacle) for the 1982 Law of the Sea Convention and the establishment of the International Seabed Authority which is still in the process of developing regulations. While there is much concern about the threat of Deep Seabed Mining to the natural marine environment, there has been little to no attention given to the potential impact of this on our underwater cultural heritage. Nevertheless, it is no surprise that the equipment used in mining the seabed causes significant harm and destruction to our ocean heritage, both natural and cultural, and thus the relevance of our work, which proposes to shine a light on the relevant aspects of this activity for UCH. This presentation and paper provide an overview over who is considering the exploration and exploitation of these minerals, what the minerals are, where it is being considered, how they will be mined, and under what regulations and controls to address concerns about the destruction and loss of our interrelated natural and cultural heritage. We have the resources available to develop this presentation and paper which will evolve into a book. This work has been supported by The Ocean Foundation (TOF) with contributors from the Lloyd's Register Foundation (LRF). TOF has submitted a grant application for the book project on this major threat to UCH from Deep Seabed Mining, Bottom Trawling and Potentially Polluting Wrecks. The expected results include ocean literacy that increases awareness of the issue to a wider range of stakeholders including international organizations, States and institutions with the authority to effectuate change.

105. Potential Climate Change Threats to Maritime Archaeological Resources

Sirine Saad El-Dine Ghiye

Climate change is a world topic discussed in nowadays. It has different impact on the planet life. The paper is looking for the impact on maritime sites, deep oceans, and coastal zone through a literature reference and depends on other case study. The presentation will

discuss the causes of climate change and the results of it, with focusing on the sea surface temperature (SST) and salinity changes in the Mediterranean Basin and the Pacific. This will be calculated and monitoring through the use of Landsat 8 which is equipped by two bands of thermal infrared sensor (TIRS), it's suitable for coastal zone monitoring due to its high resolution. The study depends on the use of Landsat 7 which carried the Enhanced Thematic Mapper Plus (ETM+) sensor. Both images are interpreted and analyzed on the QGIS to calculate the radiance and reflectance of each image to concluded the value of SST. The paper will finish by presenting the cycle factors which threaten the maritime archeology in the future which are the results of climate change. This paper is also looking for the relation between the change of climate and the maritime archeological sites, and how recently the maritime archeological site help researchers to understand the past of climate and the human past adaptation with climate change.

14. Conservation Treatment of Underwater Cultural Heritage

Chair: Bo-hyun Lee (First National Research Institute of Cultural Heritage)
nrimch.apconf5@gmail.com

A variety of artifacts have been recovered from underwater, including metal, pottery, stone, timber, etc., like what have been found on land. In 2013, the National Research Institute of Maritime Cultural Heritage(NRIMCH) published “Conservation Manual of Maritime Archaeological Objects in Korea”, noting conservation treatment on site and conservation manual according to the materials. “The Conservation of Ceramics Excavated from Underwater” and “The Conservation of Shipwrecks Excavated from Underwater” were published in 2020 and 2021, respectively, both of which are intensively dealing with cases of conservation treatment of underwater cultural heritage, based on its materials. In addition, outcomes of research have been shared with other domestic researchers, with publications of overall reports about experiment results on Sinan shipwreck project.

Despite of the fame of being the one and only institute dealing with underwater cultural heritage in Korea, however, the NRIMCH is lack of sharing and communication of international cooperation of research or cases of material-based conservation treatment. The session, therefore, hopes to be the place to share and compare the cases of conservation treatment of underwater cultural heritage around Asia-Pacific regions by various conservation experts.

106. Research on Corrosion Factors of Iron Artifacts Recovered from the Central Waters of Western Sea, Korea

Kim Taekjoon, Lee Hyunji, and Yoo Daeyoung

Iron artifacts recovered from underwater can show different corrosion aspects depending on where they were covered. Major elements affecting corrosion, the way to effectively remove them, or information for it should be obtained, in order to conserve them in an effective and stable way.

Underwater is where it contains plenty of water, oxygen, and salinity, which causes iron artifacts easily corroded. At underwater mud which supplies less oxygen, anaerobic corrosion can happen. As iron artifacts recovered from survey of underwater cultural heritage are usually buried deeply under the mud, which is highly likely corroded by sulfide, the research aims to gather information about it.

The sample used for research is corrosion products and desalination solution of iron artifacts recovered from Mado waters, Taean, Chungcheongnam-do and Seomoepbeol waters, Ongjin, Incheon Metropolitan City. They are analyzed by SEM-EDS(Scanning Electron Microscope-Energy Dispersive Spectroscopy), XRD(X-ray Diffraction) and IC(Ion Chromatography), in order to study major constituents and compositional status of corrosion products and anion of desalination solution.

The result shows Fe, S, and Ca are highlighted for the major constituents of corrosion products, and, as its relevant compound, Pyrite (FeS₂), Calcite (CaCO₃), and Siderite (FeCO₃) were identified. High degrees of Cl⁻ and SO₄²⁻ of desalination solution are observed. These kinds of result are expected to be utilized, as necessary materials for establishing effective and systematic conservation methods of iron artifacts recovered from underwater. The further research will be followed by simulations of corrosion and analysis of corrosion products of iron artifacts, with interdisciplinary cooperation in the relevant fields.

106. Research Status of Development of Conservation Treatment of Underwater Cultural Heritage in Korea

Bo-hyun

The research has been partially mentioned in “The Conservation of Shipwrecks Excavated from Underwater” published by the National Research Institute of Maritime Cultural Heritage (NRIMCH) in 2021. In this presentation, research status of conservation treatment of underwater cultural heritage in Korea is intensively argued from various perspectives, as well as ongoing research status and further challenges are shared.

Cultural heritage recovered from underwater is various, including iron, pottery, timber, stoneware, which requires different conservation methods. Korea already has a manual of conservation treatment depending on its materials, which leads specific conservation techniques, dividing cultural heritage on land and from underwater.

The NRMICH which is the one and only institute treating excavation, research, and treatment of underwater cultural heritage, is mainly focusing on conservation treatment of ancient shipwrecks and pottery.

Conservation treatment of ancient shipwrecks can be divided into two parts; enforcement of waterlogged timber with PEG, and neutralization treatment of deacidification found at ancient shipwrecks treated with PEG. European countries have been trying to solve deacidification, which is resulted from existence of iron compounds and exposed display for a long time.

Shinan shipwreck suffered same problem in 2010, the solutions of which have been conducted in various ways inside and outside of the laboratory.

Monitoring display conditions were conducted in where Shinan shipwreck is exhibited, in order to obtain basic data, and deterioration status was recorded in three-dimensional digital way with 3D scanning. Later, surface pollutants were removed by dry cleaning, and the map displaying deterioration was created to observe surface changes.

In the meanwhile, the report about Shinan shipwreck, including the results of neutralization experiments, was published.

The experiment, however, is only the result of samples in the laboratory, the application of which to treat the whole exhibition in 924 m² with chemicals is not appropriate.

Thus, the Heritage Science Team of NRIMCH is planning direct test on the Shinan shipwreck by spots, and expand its subject area.

In addition, the goal of research is how to open exhibition undergoing conservation treatment to the public in a safe way.

Thus, it is expected outstanding development of conservation science of underwater cultural heritage in Korea highly appreciated by international and domestic visitors, by lowering down the barrier of professional area, conservation treatment, and adjusting the explanation to each eye level.

108. Conserving Ropes from the Phanom-Surin Shipwreck in Thailand: Case Study on Storage and Exhibition at the National Museum of Thailand

Natchaya Pattanasuttirat, Kunthida Chimmaraskikadd

In 2013, Phanom – Surin shipwreck was found in Samut Sakhon province, Thailand. The

date of the shipwreck around the 9th century CE. This is the earliest shipwreck found in Thailand. Some part of the shipwreck such as wood and fiber ropes were severely rotten by natural degraded. Therefore, this study is aimed to select proper method and environment for conserve waterlogged object.

After excavation in underwater site, many ancient objects about organic and inorganic materials were found in this shipwreck. Among others, organic materials are fragile and fast deterioration. The process of preservation of archaeological objects consist of preliminary analysis, cleaning the object, desalination, consolidation, integration and drafting documentation after conducting restoration work. The cleaning process are removing wet soil and muddy by soft brushes dusting and use distilled water. The waterlogged object are often has soluble salts. Thereby, desalination is one of the essential process. Desalination process is soaked artefacts of waterlogged object in water baths until the electrical conductivity of water is measured value fall to the value for clean tap water. In case of pottery, after cleaning and desalination can be use Paraloid B72 for the surface and structure of an object are damaged. In addition, organic material can be more process such as impregnation and drying. In Thailand, relative humidity is very high up to 90%, this can be caused conservation problems. Therefore, this research has aimed to study the efficiency of using PEG and trehalose to enhance shape stability of organic materials with impregnation process. Result of this study, trehalose has low moisture absorption property and maintaining shape stability the structure of organic materials. After the process of impregnating has been completed, the last of conservation process is drying process. Drying process can be forced air drying by using electric fans for solidification of the trehalose on the surface and inside of the object. After conservation, restoration on treatment the artefacts, should be kept at a room temperature. In this conservation process is in desalting, treatment and finding more conservation method.

LANDSCAPE

15. The Archaeology of Submerged Landscapes and Inland Waters

Chair: Shinatria Adhityatama (School of Humanities, Languages and Social Science, Griffith University, Australia) shinatria.adhityatama@griffithuni.edu.au

The study of underwater archaeology at this time has developed rapidly into a separate study that is not necessarily always related to the study of maritime archaeology. Underwater archaeology is not constrained by periodization because it can be studied in a wide time span from prehistoric times to the modern era. The development of underwater archaeological research today is not only centered on shipwreck objects but on broader domains such as issues of geomorphology, climate change to natural disaster. One of the studies that is currently developing is the study of submerged landscapes, submerged indigenous sites and places where people once lived or visited that have been subsequently covered by water due to rising sea water levels caused by climate change, natural disasters, or other causes in an area that sink an archaeological site. The submerged landscape not only submerged archaeological sites on vast flat plains but also in sunken dwellers caves. Today, underwater archaeological archaeology is not only carried out in the sea but is often found of interesting and important archaeological sites for human history in the inland environment as in lakes, rivers, canals and cenotes. This session aims to explore and become a medium of sharing between researchers who study underwater archaeology at submerged landscape sites and also in the aquatic environment in inland for development and gaining the attention of the underwater archaeological community. In this session, the researchers were able to present their discoveries and experiences working in submerged landscape sites such as settlement sites, underwater caves, and so on to the archaeological sites in inland aquatic environment such as in lakes, rivers, canals, cenotes in Asia-Pacific region. Hopefully, this session can be a place for discussion, exploration and development of this archaeological study in the future.

110. Lessons from the Inland Seas: A Submerged Landscape Study in the Great Lakes
Ashley Lemke

The topic of this abstract fits best within this session because it is a case study of 9,000-year-old archaeological sites on a submerged landscape under a lake.

The case studies under consideration are the following 1) conducting prehistoric archaeology 30 meters below water, 2) studying a submerged landscape in an inland setting, in this case, a large freshwater lake, and 3) novel data preserved underwater in the Great Lakes challenges our previous ideas about hunter-gatherer societies.

The resources available to conduct the work include funding from the National Science Foundation and National Oceanic and Atmospheric Administration (both based in the United States) and methods include sonar surveys, remote operated vehicle investigations, photogrammetry, scuba diving, environmental sampling, and virtual reality computer modelling.

The research questions/approach/problems are 1) how can we conduct anthropologically relevant underwater archaeology, 2) how do you investigate sites 30 meters below water, and 3) what can submerged data tell us about prehistoric peoples?

The [expected] results are stone tools and debitage, stone constructed hunting features, and ancient peat deposits.

111. A preliminary study into the use of marine magnetometers for the identification of archaeological deposits on submerged landscapes.
Justine Buchler

The purpose of this paper is to present a preliminary methods-based study relating to the identification of submerged archaeological deposits on submerged landscapes currently being undertaken as PhD research at Flinders University, South Australia. The case studies under consideration are known, recorded, submerged archaeological deposits. The resources available to conduct the work include support from Flinders University, and Wessex Archaeology. The research problem addressed in this paper is the better identification of archaeological deposits on the landscape through the marine magnetometer. The expected result of this doctoral research is the positive identification of, and further understanding of, submerged archaeological deposits using marine magnetometer data.

112. Excavation, conservation, and preservation of the Mt Gambier underwater fossil deposits
Julien Louys

This paper will examine the history of underwater fossil research in the Mt Gambier region, focusing on ongoing efforts to study, conserve, and protect underwater resources found in the freshwater sinkholes and limestone caves of the region; as such, the topic of this abstract fits best within the session The Archaeology of Submerged Landscapes and Inland Waters because it is concerned with cave sites that have become flooded. I will consider the considerable past efforts that were undertaken to extract fossils from Green Waterhole, as well as recently successful efforts to have this site listed as a South Australian Heritage Listed site, ensuring legislated protection for the cave and its deposits into the future. In addition, a new research program funded by the Australian Research Council and in collaboration with the Cave Divers Association of Australia and the South Australian Museum will be presented. The new work includes efforts to successfully recover fossils with as much contextual information as possible, especially geochronological and environmental data. Using these data, we expect to determine the geological age of the extinct megafauna recovered from the sites and the environments they inhabited; data critical for determining the degree to which humans or environmental change contributed to their demise. We will also evaluate the impact of such research on

the preservation of the caves, ongoing efforts to conserve the geoheritage potential of the sites, and means of educating the public on the unique underwater resources they represent.

113. Searching for the evidence of disaster from the sunken village of Lake Hibara, Japan.

Randy Sasaki, Jun Kimura, Shintaro Yamasaki, Wataru Tanikawa, Yuhji Yamamoto

This case study is about the Hibara village, which submerged due to the dammed lake formed during the 1888 eruption of Mount Bandai, in today's Fukushima prefecture.

The resources available to conduct the work include remote sensing technology such as side scan sonar, sub-bottom profiler, and drones equipped with lasers, as well as soil coring and archaeological techniques.

The research study the event sequence of the disaster and the aftermath, the impact on people's lives, and developing methodologies for investigating submerged sites in inland lake settings.

The expected results are a deeper understanding of the local history and heritage, and would like to contribute to the study of submerged sites by proposing techniques and methodologies.

In 1888, the eruption of Mount Bandai in the Fukushima prefecture of northern Japan created a dammed lake, resulting in the submergence of the entire village of Hibara. A multi-disciplinary research team has been organized to extract both archaeological and historical information as well as environmental information. The focus of the research is not only on the material culture, but also on topics such as the process of submergence and how people's lives were affected. The study of the submerged village of Hibara is a unique opportunity to gain a deeper understanding of the impact of natural disasters on human settlements, which aligns well with the theme of session 18. To locate the periphery of the site, the team is using remote sensing technology such as side scan sonar, subbottom profiler, and drones equipped with lasers. Additionally, soil coring is being used to study the event sequence and the environment, and archaeological techniques are being used to record the material culture. This is one of the first studies of its kind, and the team aims to develop methodologies for investigating submerged sites, while also considering what information can be gleaned from the lake bed. Ultimately, this research will contribute to the study of local history and enhance our understanding of heritage.

114. Underwater Archaeological Remains in Matano Lake, South of Sulawesi, Indonesia: Evidence of Iron Age Civilization

Muslim Dimas Khoiru Dhony

Matano Lake is the deepest lake in South East Asia which has a depth of roughly 590 m as well a length of about 28 km and a width of 8 km. The first archaeological survey in Matano lake in 1998 found numbers of artifacts which are approximately between the 6th and 16th centuries on the land surrounding the lake. From 2016 to 2022 The National Research Centre of Archaeology Indonesia (now the National Research and Innovation Agency) conducted underwater observation. Based on the survey, there are five sites consisting of Sebengkuro, Sukoiyo, Pontada, Pulau Ampat, and Onetengka with various of human cultural remains such as iron tools, iron slag, pottery, tuyere, wooden pole, ore, charcoal, and fragments of the animal tooth which were laying on the bottom of the lake in 4 to 20 m. The result of the archaeological remains and geologist analysis reveals that each site has a different type and period.

The topic of this abstract fits best within this session because of the current existence of underwater archaeological sites in Matano Lake due to rising water level caused by natural disasters. It is proven with graben (Subsidence areas) in underwater with a depth of approximately 30 m at Onetengka Site as tectonic activity in the past. Moreover, the location of Matano Lake in the main Matano Fault which is still active today makes the environment around the lake becomes more dynamic.

115. Digital methods for understanding and sharing submerged archaeological landscapes

John McCarthy

The case studies under consideration will include Australia's first published submerged landscape sites in Murujuga, Western Australia, as well as virtual games which visualise lost landscapes in North-West Australia. A series of related case studies from Europe and other locations will also be included.

The resources available to conduct the work include computer animations, the game engine UE5 and Virtual Reality headsets.

The research questions/approach/problems are how to communicate the reality of archaeological landscapes 'lost' to sea-level rise, especially those far below the surface of the modern sea-level. How can scientific and cultural insights be shared with Traditional Owners and the wider public, to raise the profile of the existence of this archaeological heritage.

The results are the development of new survey approaches and new resources for communicating the existence of submerged landscapes to the public, through the creation of animations, spatially- accurate reconstructions, 360 video and interactive games.

116. Commercial Submerged Terrestrial Archaeology in Australia: Case Study from Dampier, WA

Connor McBrian

The topic of this abstract fits best within this session because it focuses on the application and assessment of submerged cultural landscapes, and how this field is treated within the context of commercial development within Australia.

The case study under consideration is an underwater excavation undertaken in November 2022 on a submerged cobble beach in northwest Australia. Excavation was coordinated by Cosmos Archaeology Pty Ltd as part of a cultural heritage assessment for the expansion of the Pilbara Ports Authority cargo wharf in Dampier (Murujuga), Western Australia.

Resources include geophysical survey data, excavation data, and the expertise of multiple experts in the fields of geoarchaeology, underwater archaeology, and Aboriginal archaeology. Excavation was funded by the Pilbara Ports Authority and included the services of Oceanic Offshore, a commercial diving company, Archae-Aus, a commercial heritage services company providing expert advice on Australian Aboriginal lithics, and Dr. Mick O'Leary of UWA, an expert geomorphologist.

The research question for this case study is to identify the presence, nature, and significance of any underwater cultural heritage values that may exist within the development project footprint.

The expected results are the identification of the presence of artefacts and the archaeological integrity of the context in which the artefact are found. Archaeological integrity here is defined as the degree to which artefacts have travelled from where they were deposited, both laterally and vertically. The conduct and findings of the excavation will have been presented to the Circle of Elders and the Murujuga Aboriginal Corporation for their review, input and advice, prior to paper submission.

117. A preliminary interpretation of the medieval defensive landscape of the Indus Delta in Sindh, Pakistan

Amer Bazl Khan and Heba Hashmi

This paper fits best this session because it highlights how the dynamic geomorphology of the Indus Delta in Sindh (Pakistan) had a lasting impact on the nature of conflict and trade within the region, especially during the medieval and early modern period (8th-17th centuries). In an attempt to understand the successive rise and fall of coastal defences and

fortified ports in the vast and historic delta of the Indus River, this paper will outline a comparative approach to studying surviving archaeological evidence of contested spaces in the Indus Delta, a landscape sheltered by both natural and political frontiers.

The case studies under consideration include five abandoned medieval forts in the Indus Delta region that illustrate unique structural and design features specific to early Islamic expansion in the region, some of which persisted well into the 17th century. These forts are Rattokot, Lahiri Bandar, Ranokot, Unerkot and an unnamed submerged fort near Mirpur Sakro, Sindh.

The resources available to conduct the work include remote sensing data and archaeological recording of sites in the Indus Delta and along the coastline of Sindh, carried out by the Maritime Archaeology and Heritage Institute (MAHI). This work was undertaken as part of the ongoing Inventory of Maritime Archaeology in Pakistan (IMAP) Project, funded by Arcadia, a charitable fund of Lisbet Rausing and Peter Baldwin. While the sites chosen for this study have been surveyed by the MAHI team, the comparative analysis will also include a review of legacy data and existing published archaeological research on these sites.

The research questions/approach/problems are as follows:

Research Questions: a comparative analysis of five fort-like structures of similar scale and alignment will be carried out in order to determine the contemporaneity of these structures. Given the evidence of local production and international trade through ceramic material found at these sites, a second question would be to understand if the function of these structures was in fact defensive. Finally, if there is demonstrable evidence that the forts were defensive, the location of these sites will be analysed to determine whether they collectively formed a frontier that defended access to the Indus river.

Approaches: Apparent similarities and differences in structure and alignment of these forts will be compared. Published literature on each site will be discussed to draw out similarities and differences in stratigraphy and archaeological assemblages. Structural elements will be compared to assess possible contemporaneity and a preliminary analysis of surface scatters on each site will be used to illustrate a possible chronology. Finally the sites will be collectively assessed to determine if they form a coordinated defensive frontier within the Indus Delta.

Problems: Changing toponyms of settlements within the poorly mapped extents of the Indus Delta have impeded attempts at a comprehensive historical understanding of the coastal ports and forts of the delta. Archaeological investigations, although limited in number, have provided the most effective means of furthering our understanding of the history of this region. However, regardless of apparent structural similarities, brick size and pottery assemblages, such comparisons have not been robust enough to confirm or deny the contemporaneity of deltaic settlements nor the rationale for successive abandonment events. Beyond the need for further archaeological work, it is apparent that accompanying systematic geomorphological investigations are needed to corroborate the archaeological findings to date.

The expected results of this study will illustrate how the development of historical coastal defences in the Indus Delta can be understood as adaptations to a dynamic riverine landscape - a landscape that is constantly redefining the natural, political and economic boundaries for the people of Sindh. This study will also attempt to shed light on the impact of these changing frontiers on linkages with similar contemporary ports in the Arabian Sea and the Western Indian Ocean region.

118. Recent developments from the submerged cultural landscape of Murujuga Sea Country, Northwest shelf (Dampier Archipelago), Western Australia

Jonathan Benjamin

In 2020 the Deep History of Sea Country project team published the discovery of two underwater archaeological sites in Murujuga Sea Country /the Dampier Archipelago, Western Australia. Further lab analysis and field-based observations have been since

undertaken, and these contribute to our understanding of the submerged sites within the broader setting within this rich cultural landscape. An update to our initial field observations will be provided. A brief discussion will be undertaken regarding heritage protection, as these sites represent a case study application for the protection of Indigenous underwater cultural heritage in the Asia Pacific Region. A discussion on site significance and future considerations for the archaeological prospection of submerged Indigenous sites and sites around the Asia Pacific will be included.

16. The significance of Maritime Cultural Landscapes, Seascapes, Islands and Living Heritage in Oceania

Chairs: Prof Bill Jeffery (University of Guam, Micronesia) billjeffery@gmail.com

Chair: Veronica Walker Vadillo (University of Helsinki) veronica.walker@helsinki.fi

Co-chairs: Dr Hans Van Tilburg (NOAA Office of National Marine Sanctuaries, Hawaii); Sunny Ngirmang, Bureau of Cultural and Historical Preservation, Palau)

Victoria Ramenzoni (Rutgers University)

Oceania covers the largest expanse of seawater on the planet. People living in the Pacific Ocean, quickly gained a reputation and identity as “sea people.” They developed an intimate and enduring connection with their islands and the marine world, much of which remains evident today in the maritime cultural landscapes and seascapes of the region. Many cultural practices and living heritage (intangible cultural heritage) developed in relationship with the marine environment, often inseparable from cultural identity for Pacific Islanders. Pacific cultural resources, practices, and heritage have been subject to modernizing influences, development, wartime impacts, tourism, and other challenges. Today these resources and practices are also increasingly subject to the effects of climate change impacts.

The arrival of foreigner voyagers into the Pacific beginning in 1521 brought significant cultural, economic and political changes, and introduced new maritime practices and platforms as well. Pacific Islanders remained resilient in face of this colonialism and neo-colonialism, and adapted new tools and practices that remain relevant to islanders today.

This session will explore this broad and complex range of traditional Indigenous maritime heritage and the more recently introduced maritime heritage, by inviting Pacific Island communities, scholars, government agencies, and any other interested groups and individuals to contribute. It is possible to explore these changes to themes, technologies and cultural practices through many of the remaining resource sites and ongoing Living Heritage, revealing the continuing significance of maritime cultural heritage to Pacific Islanders.

Smallness is a state of mind. With these words, Epeli Hau'ofa (1994: 152) challenged the widely extended notion that islands are small, remote, isolated, and peripheral. Instead, he proposed we “focus on the holistic perspective in which things are seen in the totality of their relationships” (ibid.). This panel pays homage to Epeli Hau'ofa and explores new approaches to the study of islands, expanding his vision – which referred to Oceania – to insular spaces across the Asia-Pacific region. The panel also aims to bring together papers discussing the construction of island identities and connectivity using novel approaches, especially those rooted in the study of socio-ecological systems and the establishment of shared customary practices. The session encourages interdisciplinary approaches and invites submissions from relevant disciplines such as maritime archaeology, cognitive archaeology, ethnography, behavioural ecology, and so on. Understanding maritime networks connecting insular regions is of particular interest to the conveners, especially those that explore networks established by phenomena other than trade, for example, via livelihood activities like fishing, via exploratory voyages, or via religious pilgrimages, as well as local perceptions of watery spaces.

References:

Epeli Hau'ofa, 1994. Our Sea of Islands, *The Contemporary Pacific*, Vol. 6 (1): 148-161.

119. Sea Voyage: the evolving maritime cultural landscape of American Samoa

Hans Van Tilburg

American Samoa is an unincorporated Territory of the United States with a long and continuous history of ocean connection and maritime activities, from the initial voyaging discovery some 3,000 years ago to modern cruise ships and fishing fleets. Understanding this history as it is reflected in the maritime landscape helps us appreciate not only how the maritime past has evolved, but how the cultural and ecosystem benefits related to the ocean persist and remain important today. NOAA's Office of National Marine Sanctuaries recently completed a descriptive story map of American Samoa, drawing from tangible and intangible cultural resources inventories and data compiled by NOAA's sanctuary staff, archival information, archaeological surveys, and site cultural information from participant workshops. The Territory's story is presented as something of a maritime voyage through time, touching upon elements of the original Pacific voyaging and discovery of the islands, Samoan settlement culture and watercraft, western discovery and mapping, faotasi longboat heritage and copra plantations, activities during the naval period and WWII, and contemporary maritime spaces (commercial shipping and fishing). This story map presents our human ties to the ocean, the Maritime Cultural Landscape of American Samoa, placing an importance on ocean locations, activities and events that have shaped the Samoan Islands and continue to define who we are today. Hopefully, a more comprehensive understanding of the cultural significance of our ocean spaces can contribute to better conservation and management of marine resources.

120. A history and archaeology of tuna fishing in the Federated States of Micronesia
Bill Jeffery

Tuna fishing in the Federated States of Micronesia (FSM) is currently a sustainable and profitable fishing industry and part of the leading world tuna fishing industry in the western Pacific.

This paper will outline how the FSM got to this position and what related tangible and intangible heritage exists today. It begins with how indigenous people from the region implemented their fishing practices, using techniques that were implemented in balance and harmony with their marine environment. When Japan colonised the region, they were aware of the rich marine resources, proclaiming Micronesia had "about one-tenth of the total known fish in the world". In 1918 they enthusiastically began to develop a fishing industry, which included exploiting shellfish, beche de mer, mackerel, different species of tuna, and skipjack tuna that became the dominant species exploited, for the benefit of Japanese people and the Japanese economy. However, local people in Micronesia were not actively encouraged to be part of this industry. The Japanese established a research station and imposed several regulations in how the industry should be developed and implemented.

This activity occurred pre-World War II, and during the war many of the fishing vessels were converted to assist in the war effort, then lost during the war. Following World War II, the U.S. attempted to revive the tuna fishing industry in association with local people, having limited success, but today tuna is the FSM's top export, and part of a sustainable billion-dollar industry that provides benefits to local people. Coupled with the extensive tangible and intangible heritage of indigenous fishing before Japanese times, a holistic picture of the cultural landscape and seascape associated with fishing will be provided in this paper.

121. Islands as transitional zones: examining five centuries of socioecological dynamics in the islands of Cuba and Flores, Indonesia
Victoria Ramenzoni

Over the last decades, the emphasis on climate change adaptation within coastal environments has created opportunities for understanding how islands are considered

within socio-ecological studies. More recently defined as ecotones where different "ecosystems intersect, overlap, and (...) exist in creative tension" (Gillis 2006), islands are scarcely seen in their dynamic and operative nature; often exemplifying the strange evolutionary trajectories that can arise from isolation. As such, few empirical approaches have explored islands that, far from remote, act as transitional buffers between the land and the ocean, the old and the new, the known and the unknown. In these geographies, socio-ecological change progresses at faster rates, adaptation can occur within a higher range of responses than in more stable systems, and perturbations can trigger large scale systemic modifications. Through historical ecology and local-place based research, this article presents two case studies showing the dynamic nature of islands. Focusing on Cuba and Flores, it reconstructs five centuries of socio-ecological interactions that have given shape to particular societies: one that built on sugar production, another that relied on kopra exports. Both examples show the interdependencies between biophysical and socioeconomic dimensions across local, regional, and global scales. Most significantly, they exemplify the operative role of islands as affording the integration of different cultures, production systems, and worldviews.

122. At home in our sea of islands: the archaeology of boundless oceans. Veronia Walker Vadillo, Kristin Ilves

Smallness is a state of mind. With these words, the Polynesian scholar Epeli Hau'ofa challenged the widely extended notion that islands are small, remote, isolated, and peripheral. Instead, he proposed we "focus on the holistic perspective in which things are seen in the totality of their relationships" (1994: 152). This understanding of islands as connected features on a vast blanket of water has its origin in the sea and emerges as a perfect example of what Christer Westerdahl called the Maritime Cultural Landscape (1992). The biases in perceptions that islands are small, remote, and isolated likely stem from comparative associations with continental expansions, the research approach firmly grounded in terrestrial approaches. This view excludes the sea and the knowledge and technology developed by maritime communities to expand their worlds beyond land, thus perpetuating the idea of "island smallness". Where Europeans used names like Finisterre (the end of the land) for geographic features and constructed myths of "Here be dragons", the Austronesians launched the greatest human expansion by sea, navigating across two Oceans from Madagascar to Rapa Nui. Despite these well-known migrations, the field of island archaeology has yet to fruitfully incorporate concepts like the MCL and non-Western perceptions of island identities. In this presentation we review the current state-of-the-art in island archaeology and examine theoretical trends through a systematic analysis of the *Journal of Island and Coastal Archaeology*. Especial attention will be given to the way in which the journal engages with maritime archaeology theory, and to what extent non-Western perceptions of islands are incorporated into interpretations. The presentation will then explore ways to contest and combat prevalent ideas of remoteness and isolation in the study of islands by bridging the fields of maritime and island archaeology, as well as highlighting the importance of non-Western epistemologies for our research.

123. La Baleinier Below: A wooden whaling vessel sunk in the waters of Guam
Ryan Bradley, Jason Raupp, Jeremy Borrelli

The topic of this abstract fits best with this session, as it seeks to contribute to our understanding of the maritime networks of whalers operating in the Pacific in the mid-19th century.

The case study under consideration relates to the investigation of the remains of a wooden sailing vessel lost in the waters surrounding Guam in the 19th century. Thought to be the wreck of a whaleship, research included in situ documentation of the extant structure and associated material culture, as well as a biological characterization of the site.

The resources available to conduct the work include a multi-disciplinary team of researchers from Ships of Discovery, East Carolina University, and the University of Hawaii at Hilo, conducted extensive field work at the site using photogrammetric and standard recording methods. Archival and historical research is ongoing, with the goal of identifying the ship and better understanding the events leading up to its loss.

The research questions pertain to the identification of the wreck as a whaleship, its significance to Guam's history, and evaluation for potential eligibility for the National Register of Historic Places. Furthermore, it considers the challenges associated with documenting the site (located in 130 fsw/40 msw) using a mix of open circuit scuba and closed-circuit rebreather technologies.

Among the expected results are a better understanding of whaling activities in the Pacific and Guam's role as a strategic location for provisioning ships. Other results include a detailed review of the extant ship structure and material culture documented at the site, a recommendation for possible NRHP eligibility of the site to ensure future protection, and a discussion of the methods employed to document this relatively deep site.

124. The Sacred Stone Weirs of Fiji Elia Nakoro and Rick Green

The subject of this abstract suits this session best as it will highlight the cultural significance of fish weirs to the iTaukei (indigenous) community.

Perhaps one of the oldest ways of fishing, stone weirs are low boulder walls that are arranged in a horseshoe pattern between tidal marks. This method of fishing is one of the earliest attempts by early man to create a mechanical device that would automatically catch fish.

In Fiji, it is widespread wherever the foreshore is sufficient; it calls for a foreshore beach with a fairly hard bottom and a gently sloping foreshore with an easy gradient so that the distance from high to low water level may be substantial.

Stone weirs or 'moka' as they are known locally, were once widely practiced in Fiji but has fallen into disuse. The majority of people in Fiji are unaware of the dates of when these structures were constructed. However, the entire 'vanua' or community would be needed to take part in the traditional rituals and ceremonies connected with the practice. The remnants of the moka are still visible along Fiji's coastline and are easily visible using Google Earth imagery. In an effort to safeguard and manage these underwater cultural monuments and as a lead-up to the ratification consultation of the UNESCO 2001 Convention, the Fiji Museum is collaborating with Excursion of Escalante to locate all the stone weirs around the Fiji group.

The sacred rituals entailed in the construction of this traditional fishing technique will be covered in this paper; along with how the research can assist the Fiji Museum promote its significance to the local Fijian communities in order to ensure its management and preservation in accordance with the 2001 Convention on the Protection of the Underwater Cultural Heritage.

MANAGEMENT, LEGISLATION, ETHICS

17. The 2001 Convention: from 'constructive ambiguities' to 'destructive misunderstandings'

Chair: Professor Mariano Aznar (Universitat Jaume I de Castelló) maznar@uji.es

Underwater cultural heritage is under the umbrella of an international legislative instrument: the 2001 UNESCO Convention on the Protection of the Underwater Cultural Heritage. However, regional approaches to underwater cultural heritage may vary, with different ethical concerns and different threats.

The objective of this session is becoming the arena where experts can share their experiences on applying this legal framework. Participants of this session will focus on the legal aspects of underwater cultural heritage, the ethics and values of the Asia-Pacific countries in relation to underwater cultural heritage and the difficulties of these countries in applying the 2001 UNESCO Convention. This session hopes to host papers as well as to produce a roundtable.

125. Analysis of UNESCO Best Practices of Underwater Cultural Heritage from the perspective of marine sustainable development and challenges in 2022 New Chinese UCH Regulations
Liu Lina

The topic of this abstract fits best within this Session Law and Policy or Session Marine Sustainable Development because it summarizes the ways in which underwater cultural heritage contributes to the sustainable development as a Marine resource through its own inheritance and development, and suggests that China should change its legislative idea of underwater cultural heritage.

The case studies under consideration are the latest 13 Best Practices of UNESCO 2001 Convention for the Protection of Underwater Cultural Heritage, which are analyzed in three aspects: 1) legal protection based on the legislative concept of marine resource law, 2) protection of cultural heritage resources through long-term monitoring and dynamic classification, and 3) sharing the benefits of cultural resources and environmental economic development.

The resources available to conduct the work include the list of Best Practices of UNESCO 2001 Convention for the Protection of Underwater Cultural Heritage and China's newly revised version of Regulations on the Protection of Underwater Cultural Heritage in 2022. The research questions are how underwater cultural heritage can contribute to the sustainable development of the oceans through its own inheritance and development, and how China should change its legislative idea of underwater cultural heritage. The research approaches are case review and legal text analysis.

The results are the legal protection of underwater cultural heritage in international law with the concept of resource law, and China's responses.

126. Motivating and enabling Pacific States to ratify the 2001 Convention
Ellen Lekka, Craig Forrest

Ratifications of the 2001 Convention by Pacific States has been poor. Using Solomon Islands and the Marshall Islands as case studies, this paper begins by considering the utility of the 2001 Convention for these States before turning to the difficulties and challenges in enabling ratification. These include not only capacity issues but also the extent to which ratification requires amendment of existing laws and broader policy issues relating, for example, to tourism and international relations.

127. The Next Step of Underwater Cultural Heritage Preservation in Taiwan: A Legal Aspect
Wen-Yan Chiau

In order to preserve, protect and manage underwater cultural heritage (UCH) and to value the spirit of the UN Convention on the Protection of the Underwater Cultural Heritage, Taiwan passed its Underwater Cultural Heritage Act (UCHA) in 2015. The UCHA was amended in 2022 with minor revision. Although the law has been in force for seven years, there are still many important elements that have not yet been fully implemented. The main reasons are the insufficient capacity of the competent authorities, the lack of underwater archaeology talents, and Taiwan's special environmental conditions. For example, the implementation of in-situ preservation, the designation of UCH protected areas, shallow water survey technology, the establishment of a national research center of UCH, and raising of public awareness and school education all need to be further studied and implemented. Therefore, this article will illustrate the intention of important

parts of UCHA, as well as the challenges promoted by practice, and finally put forward some suggestions for future protection of UCH in Taiwan. It is believed that the experience of Taiwan may serve as a reference to other countries concerned.

18. Revisiting the UNESCO Foundation and Advanced Courses for Asia-Pacific: Status, Development, and Challenges

Chair: Bobby C. Orillaneda (National Museum of the Philippines)
bcorillaneda.nmp@gmail.com

Co-chair: Nia Naelul Hasanah Ridwan (Research Institute for Coastal Resources and Vulnerability, Ministry of Marine Affairs and Fisheries Indonesia)

From 2009-2011, the United Nations Educational, Scientific, and Cultural Organization (UNESCO) sponsored a series of Foundation and Advanced Courses aimed at developing capacities for Underwater Cultural Heritage (UCH) in the Asia-Pacific region. The venue was at the Regional Training Centre on Underwater Archaeology in Chanthaburi, Thailand under the auspices of the Underwater Archaeology Division of Thailand. The courses produced 76 graduates from 17 countries in Asia, Pacific, and Africa. The program culminated in the First Regional Academic Conference on the Management of Underwater Cultural Heritage held at the National Museum of the Philippines in Manila, in November 2011. Another landmark achievement is the publication of the Training Manual for the UNESCO Foundation Course on the Protection and Management of Underwater Cultural Heritage in Asia and the Pacific.

This session invites Foundation and Advance Course graduates to present on the impact of the Courses for the participating countries. Among the topics that could be discussed include: What is the current status and development of maritime archaeology and the protection and preservation of UCH in each participants' country? Were there maritime archaeology projects launched as a result of the Courses? Did the UNESCO Courses result in discussions and positive steps in ratifying the 2001 Convention on the Protection of the Underwater Cultural Heritage?

128. The Impact of the UNESCO Foundation and Advanced Courses in the Philippines

Bobby C. Orillaneda

From 2009 – 2011, the National Museum of the Philippines (NMP) participated in the United Nations Educational, Scientific, and Cultural Organization (UNESCO) Foundation and Advanced Courses held in Thailand. The courses comprised theories, methods, and applications of maritime archaeology in aid of the protection the Underwater Cultural Heritage (UCH). The Philippines produced five (5) graduates, some of whom are still active in the profession.

The author became a course trainer as part of an international team that conducted underwater archaeology programs in Indonesia. Others attended further trainings in Vietnam and Thailand. A number of projects related to the courses were presented at local and international conferences. The NMP, through the Underwater Archaeology Section that was upgraded into the Maritime and Underwater Cultural Heritage Division, carried out a number of maritime archaeology projects that followed the processes learned from the UNESCO Courses.

In December 2022, the UNESCO Philippine National Commission (UNACOM) organized a “Learning Session on UNESCO Convention on the Protection of the Underwater Cultural Heritage” attended by representatives of cultural and other concerned agencies related to maritime or ocean affairs. The Learning Session aimed at providing an overview of underwater cultural heritage (UCH) in the Philippines including the status of legal framework for its protection, discussing the objectives and benefits of the UNESCO 2001 Convention, and identifying opportunities for collaboration between Philippine government and stakeholders for protection of UCH. The Learning Session resulted in the expression of interest of the participants in helping the NMP in its push

for the ratification of the 2001 Convention. This year, further consultations and seminar workshops with relevant executive and legislative parties are planned to take further steps in ratifying the 2001 Convention.

129. The Impact on the Development of Maritime Archaeology in Sri Lanka through the UNESCO Regional Maritime Archaeology Field Schools.

Wijamunige Chandraratne

Maritime archeology in Sri Lanka began in 1992 with a focus on the historic port of Galle, but most of those programs took place with the direct involvement of foreign funds and consultations. The Avondster (1659): marine archaeology project carried out from 2001 to 2004 contributed to an extent in the creation of a group of local archaeologists and conservators in the field. This was useful when Sri Lankan team took over the research and conservation independently after 2005, after the Tsunami disaster.

In 2006 Initially UNESCO decided to provide funds to Sri Lanka so that a Asia Pacific Regional field school program for Maritime Archaeology could be set up in Galle. The first and second sessions for training the trainers were took place in 2006 and 2008. Yet with lot of reasons, such as lack of support from Sri Lankan government and ongoing war situation in the country at that time, the field school project was shifted to Thailand. The field school was established in Chanthaburi, Thailand. It offered 03 Foundation Courses and 02 Advanced Training Courses for GIS and insitu Conservation. During 2009 to 2012, 76 participants from 17 different countries joined with the training. 11 representatives from Sri Lanka participated for the foundation and advanced courses.

This paper deals with measuring the development of maritime archaeology related human recourses in Sri Lanka, especially after the field school program. This will focus on developing infrastructure, field research, conservation and human recourses of the Maritime Archaeology Unit. This will also discuss the steps taken to start collaboration projects in the Asia-Pacific region and among the participants of the Field School. Further, the progress of the ratification process of the UNESCO 2001 Convention in Sri Lanka will be examined.

130. Underwater Cultural Heritage and UNESCO's Capacity Building in Asia and the Pacific.

Chihiro Nishikawa

The topic of this abstract fits best within the session: Revisiting the UNESCO Foundation and Advanced Courses for Asia-Pacific: Status, Development, and Challenges

The case studies under consideration: UNESCO's past and future capacity building activities in Asia and the Pacific and its impact

The resources available to conduct the work include my professional experience and knowledge as underwater cultural heritage programme specialist at UNESCO as well as related academic papers and information, papers and documentation obtained through my professional network.

The research questions/approach/problem are: Following the adoption of the Convention on the protection of the underwater cultural heritage (2001 Convention), UNESCO organized a series of underwater archaeology trainings between 2009 and 2011 and trained nearly 100 underwater archaeologists in Asia and the Pacific. However, only four countries have ratified the 2001 Convention today while other regions have much higher ratification rate. The paper aims to review the past efforts and propose a new strategy to enhance the regional capacity and national and regional commitment to ensure the protection and sustainable management of UCH.

The expected results are: The past and current efforts reviewed and needs and challenges identified to develop a new capacity building strategy for the region; regional commitment and cooperation enhanced to protect and sustainably manage UCH in the region.

131. The significant contribution of UNESCO courses on underwater cultural heritage on research, development, capacity building, and UCH public outreach in Indonesia

Nia Naelul Hasanah Ridwan and Zainab Tahir

The capacity-building projects of UNESCO Bangkok in collaboration with Royal Norway and Thai Underwater Archaeology Division through UNESCO Foundation and Advanced Courses on Underwater Cultural Heritage programs in 2010-2011 have contributed significantly to enhancing the capacity of individuals working in maritime and underwater cultural heritage fields in Indonesia, increasing quality and impact of the projects, especially in the Ministry of Marine Affairs and Fisheries as well as improving contribution to a wider community.

It can be said that Indonesia has made rapid progress in terms of UCH research, protection, preservation, and management after participating in UNESCO training projects. Increasing capacity building and public outreach programs are also continuously carried out and become an essential part that is inseparable from UCH management activities and in line with the Annex of UNESCO Convention 2001 that emphasizes the importance of UCH dissemination, public access and community engagement. The integration of underwater archaeology with ocean science and the consideration of sustainable management of marine and coastal ecosystems with marine projects designed to achieve SDGs 14. Life Below Water and the Blue Economy principles in UCH Research and development in Indonesia are reinforced.

This paper presents an overview of maritime and underwater cultural heritage projects in the Ministry of Marine Affairs and Fisheries in Indonesia that have been conducted since 2010 after UNESCO's 2nd Foundation and Advanced Courses. Various activities such as multidisciplinary underwater surveys, public consultations, marine heritage tourism development, offline seminars and webinars, writing publication, training, coaching young scientists within organizations for regeneration, and also the construction of the newest marine heritage gallery in West Java are evidence of the positive impact of UNESCO courses in the development of maritime and underwater heritage in Indonesia.

TECHNOLOGY

19. Database, monitoring, non-intrusive documentation techniques and new technologies applied to underwater cultural heritage

Chairs

Dr Felipe Cerezo Andreo (Coordinator of the Nautical and Underwater Archaeology Program. University of Cadiz – Spain. ICOMOS) felipe.cerezo@uca.es

Dr Andy Viduka (Australian Government - Department of Climate Change, Energy, the Environment and Water andrew.viduka@dcceew.gov.au)

Dr Martijn Manders (Kingdom of the Netherlands Government - Cultural Heritage Agency and University of Leiden)

Since the 2001 UNESCO Convention on the Protection of the Underwater Heritage, more and more researchers are developing a non-intrusive approach to their work.

To follow the principles of "Conservation in situ as first option", "limiting impact" and "prioritising non-destructive methods", many researchers are working to develop the innovative methodology based on obtaining the maximum achievable information while causing the lowest possible impact. The combination with the accelerated progress of new technologies results on a rich field of knowledge and research in which we must share our experiences and learn from each other. Non-intrusive methods based on new technologies have not only proved to be very useful for documentation and research, but also for the dissemination and enhancement of the UCH, making it accessible to all the people to whom it belongs, even those who cannot enjoy it in situ.

These techniques are also fundamental in meeting the challenge of Challenge 8 of the Decade of the Oceans, “Creating a digital representation of the ocean”, a point emphasized by UNESCO. This session’s purpose is also to encourage discussion around the use of relational databases to manage underwater cultural heritage sites and their capacity to facilitate shared heritage management outcomes, promote systematic data entry, collate data from remote-sensing activities, become regional research tools, and to enable site specific reporting of condition change from cultural activity or natural events. Opportunity will exist for speakers to highlight their need for a database, to discuss existing systems and their functionalities and issues, or to propose common database fields that could be used to promote UCH research outcomes during the Ocean Decade 2021-2030 and to better enable understanding of the impact of climate change on underwater cultural heritage.

133. Non-intrusive monitoring of underwater cultural heritage by the public - Gathering Information via Recreational and Technical (GIRT) Scientific Divers

Andy Viduka

The topic of this abstract best fits within this session it touches on ‘Non-intrusive methods based on new technologies have not only proved to be very useful for documentation and research, but also for the dissemination and enhancement of the UCH, making it accessible to all the people to whom it belongs, even those who cannot enjoy it in situ.’

The case study under consideration is the Gathering Information via Recreational and Technical (GIRT) Scientific Divers citizen science program.

The paper looks at the development and issues experienced by GIRT Scientific Divers to engage the public in non-intrusive monitoring of underwater cultural heritage. Changing approaches to teaching GIRT are highlighted reflecting experienced challenges in maintaining an engaged public.

The results this paper will consider are member training and feedback from 2018 to 2022 resulting in the impetus to modify the teaching program to a scaffolded learning approach with a rapid GIRT survey option to enable members to develop confidence and build from success.

134. Development of Small Autonomous Surface Vehicle Design for Underwater Cultural Heritage

Jun Seok

In general, underwater surveys are conducted using ship, and in areas that are difficult to access by ship, small boat such as rubber boat is used to conduct underwater surveys. However, there are many cases where surveys cannot be carried out in these areas due to the possibility of problems with the operation of the boat and the safety of the surveyors. In the field of marine survey, various equipment is being developed to conduct surveys in the nearshore and shallow water area where such surveys are difficult. In particular, in recent years, unmanned exploration equipment has been developed by applying rapidly developing ICT technologies such as the 4th Industrial Revolution and 5G technology. In this paper, as part of the research on unmanned exploration equipment, we conducted a study related to the development of a small autonomous surface vehicle for exploring underwater heritage in areas that are difficult to access by ship. In order to develop an autonomous surface vehicle, initial conceptual design was performed by examining the constraints of the vehicle, and the hull foam was developed based on the results of the conceptual design. In addition, the developed hull foam was used to estimate the resistance and motion performance using numerical simulation methods, and the thrusters and related equipment were selected based on this.

135. Joint airborne and shipborne geophysical surveys to inspect the submerged archaeological sites: The Taijiang Waters in Taiwan

Liwen Chen, Sheng-Chong Lo, Lun-Tao Tong, Gwo-Shyh Song, Yi-Wei Lu, Cheng-Wei Tseng, Jheng-Kai Huang, Wai-lam Wong, Wei-Chung Han

To better identify the submerged archaeological targets, multiple the-state-of-art survey techniques were carried out in underwater geoarchaeological studies at the exploration stage. Previous underwater surveys identified ten Dutch colonial vessels dating from the first half of the 17th century. Four of them were found on the banks of the Yanshui River, and most of them were situated at the historical waters of Dayun Port. Underwater archeology research at this inland sea of Tainan, the base for the Dutch route, was the key era in the development of maritime trade in Southeast Asia. Therefore, inspecting the potential archaeology in Taijiang Waters is under our consideration, which is situated in a historical city, Tainan, leads us to link the ancient shipwreck event to ruminate the sustainable preservation solution.

However, it is challenging to inspect the submerged archaeological targets since the geomorphology rapidly changed due to the long- and short-term geological processes. The resources available to conduct the work include accurate frequency control on magnetic data acquisition and comprehensive geophysical integration for data interpretation. Therefore, we combine the acoustic and magnetic techniques and joint airborne and shipborne geophysical surveys to inspect the submerged assessment.

After integrating with previous survey results, seven underwater assets were linked to the ancient shipwreck, which allows us to embark on follow-up verification plans for archeology research, preserving the potential historical footprints of Taiwanese and the treasure wetlands environments of the Taijiang National Park for endangered ecosystems. We regard the topic of this abstract to fit best within the Session related to the “technology application for archaeological studies” because we present a joint strategy to recognize the submerged assess in coastal wetland habitats.

136. Dynamic monitoring technology during dehydration of waterlogged wooden cultural relics
Jiajun Wang

This research provides technical support driven by data for predicting preservation states of waterlogged wooden cultural relics.

The case studies under consideration are determining the key indicators suitable for dynamic monitoring during dehydration of waterlogged wooden relics, and evaluating the effect of dehydration by data analysis.

The resources available to conduct the work include the data collected from waterlogged wooden cultural relics Xiaobaijiao No.1 Shipwreck, non-destructive methods based on new technologies and data analysis tools.

The research approach is to monitor the structure and properties of archaeological wood with different preservation states during dehydration by obtaining the maximum achievable data with conducting non-destructive and micro-damage testing analysis.

The results reveal that the cell size, water status and distribution, porosity, shrinkage rate are the key indicators for evaluating the effect of dehydration of archaeological wood.

137. National Shipwreck Database of Sri Lanka: A non-intrusive documentation of maritime heritage in Sri Lankan Waters

Anuradha Piyadasa , Rasika Muthucumarana , Indika Hewage , Dharshana Jayawardena

The topic of this abstract fits best within this session because it discusses non-intrusive documentation of maritime heritage in Sri Lankan Waters using a relational database and different multimedia formats, and anyone can access it through the web.

The creation of the National Shipwreck Database of Sri Lanka was initiated by the Maritime Archaeology Unit (MAU) to address the fragmented state of data collected from various shipwreck sites around the country. Established in 2001 in Galle under the Central Cultural Fund, the MAU teamed up with the Institute of Archaeology and Heritage

Studies and the Cultural Heritage Agency of the Netherlands to centralize the data and make it accessible to interested parties. The goal of the database was to efficiently manage the information gathered from shipwreck sites and disseminate it to relevant stakeholders. The National Shipwreck Database of Sri Lanka holds significant value for a diverse range of stakeholders, including but not limited to marine science researchers, the tourism industry, the Sri Lanka Navy, universities, and the general public and media. The database plays a crucial role in safeguarding shipwrecks and preventing illegal activities such as salvage work, thereby preserving their heritage significance.

This database is a comprehensive collection of information about 109 wreck sites, including 103 shipwrecks and six plane wrecks, recorded and maintained by qualified researchers and professionals. The database provides detailed information about each site, including its name, operation period, wreck type, depth, and legal status. Additionally, over 80 shipwreck sites in the database feature supplementary materials, such as videos, photos, descriptions, and research information.

The database was created after engaging with stakeholders and potential users. A user-friendly web-based application was developed for data collection and entry, with a visually appealing front end designed for easy navigation. The database offers several key features for convenient access to information, including an interactive map for shipwreck locations, a maritime timeline, details on the discovery of the oldest shipwreck in the Asia-Pacific region, a shipwreck dashboard with a searchable list and interactive charts, publications by the Maritime Archaeology Unit, and restricted access for researchers upon request.

The goal of the National Shipwreck Database of Sri Lanka was to consolidate and centralize disparate information held by various agencies and individuals, and to disseminate this information to relevant stakeholders. This objective was successfully achieved through the implementation of the database.

138. The Herakles project: Towards a minimum intervention methodology for the study of Underwater Cultural Heritage in harbour complex spaces

Felipe Cerezo Andreo, Soledad Solana Rubio, Raúl González Gallero, Alberto Salas Romero, Nicolás C. Ciarlo, Carlota Pérez-Reverte Mañas, José Bettencourt, Elisa Fernández Tudela, Alicia Arévalo González

In recent years, several researchers are focusing their efforts on the development of documentation methods and techniques according to the principles of minimal and non-intrusive intervention on underwater cultural heritage, as promoted by the UNESCO 2001 Convention. These methods have been used successfully to locate and survey some shipwrecks without excavation. However, few projects have succeeded in investigating and extracting all available information from an underwater archaeological site with the minimum possible intervention.

Within the framework of the Herakles project, we have developed a working methodology that aims to apply different non-intrusive techniques for the documentation and research of the UCH, going after to answer questions about its chronology, typology and state of preservation. These answers are not always easy when we talk about geophysical data or surface information. Therefore, our survey methodology is based on the application of known non-intrusive techniques and an individual approach for each site. This allows us to decide which technique best suits the questions we want to answer and to apply them in an efficient way.

We have used geophysical methods with USV survey (Otter Pro) with multibeam - (Norbit), magnetometer (Seaspy2), sub bottom profiler (SES-2000), photogrammetry either with ROV (Nibus), scientific diving, underwater GPS survey and in situ archaeological monitoring and drawing. All data have been further processed in a geographic information system (GIS) useful for research, micro and macro spatial analysis, as well as for management and risk analysis of this UCH. In addition, we must point out how important and useful this work methodology has been for generating

virtual resources such as 3D models or 3600 videos that we have used both for research and to make society aware of its history and heritage.

We have developed a field workflow that has allowed us to document 34 shipwrecks in just one year, identify 150 archeological sites and deepen our knowledge of a privileged nautical space such as the Strait of Gibraltar. We have therefore tested this methodology and found that it can be extrapolated to other case studies.

139. Geophysical techniques for non-intrusive documentation of UCH: comparative analysis of the methodology developed in different study areas at various depths

Soledad Solana Rubio, Felipe Cerezo Andreo, Sebastián Federico Ramallo Asensio, Darío Bernal Casasola, Miguel Ángel Cau Ontiveros, Francisco López-Castejón

Generally, the joint use of different geophysical instruments and archaeological fieldwork provides enough information for the categorizing and superficial study of sites, although the application of these techniques in detailed analysis of specific archaeological sites is still incipient. In this paper we present the geophysical survey work carried out in three different underwater contexts, as part of three research projects, in which we have tested the methodology under different conditions: both in deep and shallow waters and with different seabed types (sandy, muddy, loamy or clayey).

The resources available to conduct the work include a Sub Bottom Profiler (SBP) model SES-2000 standard, manufactured by INNOMAR. Its parametric nature allows a high resolution in the detection of strata and sediment layers, and the signal penetrates, on average, twice the depth at which it sounds out. The equipment also includes a Motion correction sensor (MRU) to correct and refine the spatial location of the signal and a Leica GS18 GNSS Mobile RTK Antenna, which ensures positioning of data readings with a millimeter error margin.

Geophysical prospection allows the application of non-intrusive techniques to achieve the documentation objectives of the UCH, without altering the archaeological material in any way, as recommended by the 2001 UNESCO Convention on the Protection of the Underwater Heritage. Therefore, we have used the Sub Bottom Profiler in several archaeological projects, in different sites in the Mediterranean Sea and Atlantic Ocean, with diverse documentation objectives. The research questions are how much information we can obtain without intrusion on the UCH and how can we best use the equipment to innovate in the development of the non-intrusive methodology. Based on the results obtained in each area, we can draw several methodological conclusions that will serve to lay the foundations for a method that can be extrapolated to other case studies.

143. Exploration-Based Archaeology Guided by Community-Driven Research: NOAA Ocean Exploration in the Pacific FY24-26

Philip A. Hartmeyer, Jeremy Weirich, Hans Van Tilburg, Adrienne Copeland, Mashkoor Malik, Frank Cantelas, Sam Cuellar, Kelley Suhr, Kasey Cantwell

With priority placed on the exploration of deep waters, NOAA Ocean Exploration applies the latest tools and technologies to explore previously unknown areas of the ocean, making discoveries of scientific, economic, and cultural value. As both a valuable cultural resource and habitat for marine organisms, NOAA Ocean Exploration's priorities include maritime archaeology and the discovery of our underwater cultural heritage (UCH). Between 2024 and 2026, NOAA Ocean Exploration and partners will conduct exploratory seafloor mapping and remotely operated vehicle (ROV) explorations in the Pacific basin. This article details the tools, technologies, and typical datasets collected by our program and opportunities for the Asia-Pacific community of archaeologists, historians, and resource managers to contribute to our UCH research prioritization and participate in our live, publicly accessible telepresence-enabled operations. Using this

community-driven archaeology model, we ensure this exploratory work will have the greatest impact and provide a publicly accessible platform for sharing our common cultural heritage.

MUSEUM RESEARCH AND PUBLIC OUTREACH

20. Effective Ways to Deliver Maritime and Underwater Cultural Heritage

Chair: Jong-kuk Shin (National Research Institute of Maritime Cultural Heritage)
nrimch.apconf5@gmail.com

Only a wide variety of understandings of Maritime and Underwater Cultural Heritage can constantly continue protection and research of them. To the non-expert communities, especially, it is unfamiliar theme hard to comprehend, which makes necessity of productive ways to convey them, such as display and education. Thus, this session aims to share the experience of various institutes or individuals, and, furthermore, discusses the effective ways for it.

Diverse and effectual ways to deliver by information technology (IT) that have been developed and utilized are easier to be applied to the Maritime and Underwater Cultural Heritage. It is because virtual experience is simple to convey the atmosphere of sea or underwater which is barely accessible to common people.

Thus, this session will discuss creative ideas for effective delivery of Maritime and Underwater Cultural Heritage, including traditional display and education, publication of booklets, promotion through social media and ICT or videos that has been conducted in museums or relevant institutes. Some examples could be:

- Display of Maritime and Underwater Cultural Heritage
- Education on Maritime and Underwater Cultural Heritage
- Promotion of Maritime and Underwater Cultural Heritage
- Creating contents of Maritime and Underwater Cultural Heritage
- How to use ICT for Maritime and Underwater Cultural Heritage

144. Experience Program of Underwater Cultural Heritage for Disabled Kids at Galleries Yun, Bo Rum

Mokpo National Maritime Museum displays materials of maritime interactions and history of ship in Asia. Also, at the center of underground of gallery 2 displays hull of Shinan shipwreck that was excavated from 1976 to 1984, after complete conservation. Cargo vessels, ceramics recovered from transportation routes in the Goryeo and Joseon periods at the western and southern region of the Korean Peninsula, and weapons resulted from naval battles in the Korean Peninsula almost four-hundred years ago are the main objects in the museum.

The institute has been attempted to deliver underwater cultural heritage, targeting on those with various ages and in diverse organizations. For those with disability, in 2021, a fairy tale book in braille of underwater cultural heritage for those visually impaired was published, and, in 2022, a field experience program for kids with developmental disability was developed.

The paper aims to discuss development and utilization of field experience programs for disabled kids through “experience program of underwater cultural heritage for kids with developmental disability” which is developed by the Mokpo National Museum to help them to “experience underwater cultural heritage”.

For the research, first of all, international and domestic cases of display and education of cultural heritage is reviewed. Secondly, exhibits and exhibiting environments of the Mokpo National Museum is confirmed. Lastly, how to design “experience program of underwater cultural heritage for kids with developmental disability” and the results of its test operation are shared. This process helps to discuss exhibition environment that should

be considered before producing the program, how to design the program depending on types of disability, and reactions of actual participants.

“Experience program of underwater cultural heritage for kids with developmental disability” developed by the Mokpo National Museum is programmed for disabled kids to visit the gallery, understand the historical meanings of underwater cultural heritage, and enjoy the recovered artifacts. To share designing process and results of the program is hopefully devoted to further design and operation of education and experience programs for disabled kids.

145. Development and Implementation of Underwater Excavation Sites in the Media Display Yuri Choi

Even though the history of Korea underwater excavations has been forty years since 1976 when the Shinan shipwreck was excavated, it is still considered as neither familiar nor intimate field. Even though Tte National Maritime Museum has been open to the public to improve their understanding, it is limited to fully comprehend the contents due to the display focusing only on excavated artifacts.

Thus, gallery 3 had been established for visitors to experience and understand underwater excavations at the museum, for two years, from 2021 with basic design, to 2022 with development of contents. The video introduced with the trend of digital technology, helps to feel the actual excavation sites. Realism is enhanced with similar-sized replicas with originals, and elements the visitors can actually join the display helps exotic and interesting experiences.

Development of display is begun with dividing steps of underwater excavations. Display is followed by three areas; excavation vessels of the last land area where the excavation starts, the place to dive to the underwater from the surface, and underwater excavation sites. Videos taken from underwater excavation sites are analyzed to implement actions taken at each area, and reviews by underwater archaeologists helps to enhance the reality. The development and implementation of underwater excavations sites in the media display enable the visitors to feel in every sense and experience the underwater excavations which are considered strange field.

147. Research on the Narrative Display Techniques of Museum of Underwater Archaeology: Focusing on Shipwrecks and Underwater Cultural Heritage Ye-ree Park

As the term of maritime museum is fairly inclusive, not only comprehensive but specialized maritime museums are welcoming visitors. Some of them are called museums of underwater archaeology, which specialize underwater cultural heritage, such as: The National Maritime Museum, National Research Institute of Maritime Cultural Heritage in Korea, the Maritime Silk Road Museum of Guangdong (Nanhi I Shipwreck, 13C) in China, the Mary Rose Museum (Mary Rose Shipwreck, 1545) in the United Kingdom, Vasa Museum (Vasa Shipwreck, 1628) in Sweden, the Viking Museum in Norway and Denmark (Viking Shipwrecks), and The German Maritime Museum (Cog Shipwreck) in Germany. Maritime museums for underwater archaeology, focusing archaeological and historical shipwrecks and artifacts from the ancient times to present which have been long survived with maritime activities of humans, are operated by much time and many efforts of various researchers. Shipwrecks, especially, should be displayed in a sustainable way, considering their waterlogged conditions, unlike any other archaeological artifacts. It also requires how to effectively deliver their remains to the visitors. Since 1994, I have tried diverse display techniques, exhibiting a number of ancient shipwrecks.

The display in museums can be how to implement narratives based on the real stories. Those of being sunken at the specific period, especially, have their own stories. In order to research narrative display techniques; 1) cases of displaying shipwrecks from not only

Korea but others should be analyzed and compared, 2) complex features of displaying shipwrecks and underwater cultural heritage, such as strategy and challenges of exhibiting conditions, conservation and restoration should be considered to give direction for their display, 3) the display techniques to deliver the narrative and value of shipwrecks and underwater cultural heritage should be suggested.

The paper is expected to help to organize the spaces where ‘time and place of the past’ are visualized and spatialized, by encountering contents narrative display with complex display techniques of museums of underwater archaeology.

148. A Digital Multi-tool: Using Storymaps for Education and Public Outreach

T. Kurt Knoerl

This presentation examines a case study conducted on a maritime community in the south eastern United States barrier islands of Georgia but the methodology can be used anywhere.

The resources for this type of work are available at low or even no cost online (digital storymap software).

The research question or approach used in this project addressed how creating a digital storymap of a maritime community helped students understand the concept of a maritime cultural landscape while at the same time offering a public facing tool to cultivate public support for maritime heritage.

The project brought together students and community partners in their efforts to identify culturally significant sights and share their conclusions with a worldwide audience. In 2022, undergraduate students from Georgia Southern University in Savannah, Georgia, U.S.A. conducted one day visual surveys and mapping exercises on five sites related to African American maritime history. As part of their maritime archaeology class, the students conducted historical background research on site, worked with members of the local community and governments, and produced a digital storymap of an African American maritime cultural landscape. By creating the storymap, which shows the sites in relation to each other, students gained a better understanding of the concept of a cultural landscape. Projects like this one can raise public awareness not only on important individual sites but, through a digital storymap, teaches the public, that sites such as these are all connected and together, can tell a deeper story. This paper discusses how the project was organized, software alternatives that are available for similar projects, and the educational and public outreach benefits that cultural resource managers from any area can use to both educate students and build community support.

149. Media Curiosity and Underwater Cultural Heritage

Asmaa Basiony

As stressed by the UNESCO through the 2001 convention and by the Ocean Decade Heritage Network (ODHN), the underwater cultural heritage faces multiple threats such as treasure hunts, looting and commercial exploitation. Therefore, raising awareness about underwater cultural heritage and engaging the public in its preservation and protection are vital points.

There are many ways of engaging the public with Underwater Cultural Heritage (UCH), one of the most obvious ways is through the media.

The goal of media is to convey messages to the audience through the media channels most appropriate for them, which includes printed media, internet media and broadcasting media, which are known as mass media.

Different media delivers different messages in varying ways, but the most powerful medium are films.

Films have a world-wide reachability. They are the best type of mass media to promote cultures and spread social awareness.

This paper will explore the representation of UCH in films, and how it reflects reality. It will also compare the Asian Pacific Cinema with the American and European Cinema, in the way they see UCH and the impact of this representation on people's perceptions, misconceptions and stereotypes.

150. The responsible in situ accessibility and promotion of Underwater Cultural Heritage as a strategy for its protection. A discussion based on recent initiatives in the Mediterranean

Angelos Manglis, Anastasia Fourkiotou, Dimitra Papadopoulou

The topic of this abstract fits best within this session as it discusses the current challenges in the protection of Underwater Cultural Heritage (UCH) and proposes the in-situ preservation and responsible accessibility of UCH sites as a strategy for their protection. The questions in focus are the sustainable management and operational framework that can ensure the UCH sites are protected and accessible for the purposes of both research and raising public awareness. Broad accessibility including divers and non-divers can thus enhance the sustainable operation of sites in the long term.

This work focuses on the Mediterranean region in Europe and presents initiatives which have been implemented or are still ongoing under various national or transnational projects towards the goal of accessible UCH.

The results of the efforts so far include the operation of the first accessible underwater archaeological sites in Greece and integration of technology to reach and educate a wider audience through digital exhibitions, serious games, and dry dive apps available in museums and knowledge awareness centers.

This work further discusses how the planning of underwater archaeological field surveys should include considering parameters related to the responsible promotion of the site on a later phase, after the end of excavation or conservation works, as a protection practice.

21. New Technologies and Interdisciplinary Strategies for the Promotion and Protection of Maritime Cultural Heritage

Chair: Panos Tzouvaras (University of Southampton, Centre for Maritime Archaeology (CMA) - Southampton Marine and Maritime Institute (SMMI)) pat1n16@soton.ac.uk

Co-chair: Dimitrios Karampas (University of Oxford, Oxford Centre for Maritime Archaeology (OCMA)) dimitrios.karampas@stx.ox.ac.uk

The investigation of Maritime Cultural Landscape via the analysis of shipwrecks, harbours, and of coasts has always been a challenging expedition for maritime archaeologists, who have constantly applied new methods and techniques to advance the constructive interpretation of the extant evidence, aiming for a deeper understanding of the relationship between humans and the sea. In the last decade, a great range of new technological and technical features have been introduced, focusing on both the analysis and preservation of the submerged human past. As such, the preservation and documentation of our cultural heritage are of the utmost importance. Due to environmental or human agencies, these monuments are at constant risk. Additionally, landscape erosion and sea-level change threaten their integrity, making the need for novel, non-destructive methodological frameworks of analysis and recording vital. Hence, the sites' intertemporal character, in conjunction with their fragility, requires an interdisciplinary approach and innovative way of recording.

In this session, we welcome papers focusing on the development of research in the Maritime Archaeology of the Asia-Pacific region via interdisciplinary methods through the application of new means of technology. For instance, the exploitation of tools offered by other sciences that can be applied in maritime contexts concerning the preservation of underwater and maritime cultural heritage, excavation and research of submerged sites, wrecks etc., reconstruction techniques and so forth. More specifically, this session aims to explore and

promote new methodological approaches and provide a conducive environment for the discussion and research on this gradually developing field

151. Satellite-derived bathymetry and rock detection for maritime archaeology using VENμS imagery

Gerardo Diaz, Yoav Lehahn, Emmanuel Nantet

The topic of this abstract fits within this session because since its beginnings in 1975, deriving bathymetry by means of using satellite imagery is a method which has not yet been fully exploited in the maritime archaeology realm. It focuses on applying non-destructive techniques which can be replicated in time and space, whilst keeping low costs and covering large areas. The study areas are the harbour of Sebastos (built by King Herod) and the Achziv ridges on the northern coast of Israel. The resources available to conduct this work include ground-truth data such as chlorophyll-a [mg/m^3] time series concentration from 2013 to 2019, sonar bathymetric maps of 50 m/pixel resolution high, and 153 in-situ depth measurements; drone and high-resolution satellite imagery (VENμS), and a Matlab code script designed for transforming pixel values into relative depths based on the sonar data and the processed images. The research problems are concerned with weather and water conditions (e.g., chl-a content) needed to be considered prior to analyse satellite imagery, maximum depth penetration as well as the reliability of the method in comparison with in-situ measurements. The results here presented show that for the Israeli coast, satellite-derived bathymetry mapping is more efficient for satellite images taken between March and September when chlorophyll- a concentrations are likely to be lower; maximum depth penetration using VENμS is found to be approximately up to 23 m depth, furthermore, an algorithm for identifying maritime features (e.g., shallow rocks above and below the water level) is provided as well. Likewise, this technique can also be applied in the Asia-Pacific region as long as their waters remain oligotrophic (i.e., with low concentrations of plant nutrients in the water column) considering that satellite sensors allow us to trace back past images when such conditions were met in a specific area of interest.

152. Navigation, boating and underwater archeology in ancient Iran based on coins and seals
Zohreh Baseri

As well as being the birthplace of history and the cradle of world civilization, the Persian Gulf region is also considered the world's first seafaring center. Iranian fleets from the Persian Gulf and the Sea of Oman to the Indian Ocean China Sea, Red Sea, Mediterranean Sea, etc He took control of the African continent. In this way, when we talk about Iranian seafaring First of all, familiarity with the historical and geographical background of this The area that is the center of the fleet in all periods of history Iran's naval power seems to be necessary. The name "Persian Gulf" is one of the oldest geographical names in the world As from the beginning by the first Persian people The inhabitant of this Persian Gulf land is named It has always been called by the same name The first time that a name has come from the Persian Gulf It is in one of the Assyrian inscriptions that the Persian Gulf It is called "Bitter River" which is in Assyrian language. Persian Gulf always in terms of geographical location Geographical importance and many other features It has been one of the most sensitive areas in the world.

153. The application of photogrammetry for recording Indonesian vernacular and historical boats and boat miniatures in museum collections

Ahmad Ginanjar Purnawibawa, Chiara Zazzaro, Agni Mochtar

The topic of the proposed abstract fits best within Session 27, New Technology and Interdisciplinary Strategies for the Promotion and Protection of Maritime Cultural Heritage Session, because it is about the preservation and dissemination of Indonesian

museum collections of vernacular and historical boats and boat miniatures. The case study under consideration concerns challenges and strategies of using photogrammetry for recording these museum collections and for preservation, dissemination, and scientific publication. The resources available to conduct the work include the full-size and miniature Indonesian boats kept in the Museum Nasional and Kebaharian Museum in Jakarta and other collections in Indonesia and abroad. The research questions of this project are: what is the suitable method, and what are the challenges in the 3D documentation of full-sized boats and miniatures in museums using the photogrammetry technique? The results of this project are comprehensive data regarding the photogrammetry workflow for museum collections and sets of digital boat models suitable for disseminating information and for scientific publication. This project is part of the Indonesian Boatbuilding Endangered Heritage Project, an ongoing collaboration among Indonesian and Italian scholars.

154. The Potency of Maritime Archaeology (Shipwreck Sites) for Sustainable Marine Tourism Management and Strengthening Historical Narrations in Tidore, North Moluccas, Indonesia
Wisnu A. Gemilang, Nia N. H. Ridwan, Guntur A. Rahmawan & Ulung J. Wisna

he potency of shipwreck site resources in “Spice Routes”, Ternate-Tidore, reflects several historical pieces of evidence relating to archaeological remains from the Portuguese and Spain eras in the surrounding sea and coastal areas. In the 1990s, a plethora of archaeological remains had been salvaged. An integrated archaeological study is an initial step to optimize the use of underwater archaeological resources in the area of interest. The survey consisted of local coordination, expert consultation, literature study, field surveys and underwater observations, mini excavations using water dredging, artefact samplings, site measuring and documentation, artefact desalination, and C14 carbon dating analysis for wooden materials found within site. Moreover, the water quality survey for marine tourism interest and Trinidad ship reconstruction is significant in supporting 500 years of Circum Navigation of the Earth by Ferdinand Magellan and Juan Sebastian Elcano and supporting publication and dissemination. Based on the present study, it is observed that Soasio and Tongwai sites are the potentials to be developed as the centre of integrated marine ecotourism with maritime archaeology-based sites. This consideration is due to plenty of historical artefacts and tourism feasibility assessments. Therefore, local and regional regulations relating to regional spatial planning are crucial before implementing the ecotourism project in this area.

22. Underwater Cultural Heritage and Maritime Museums - Vishi Upadhyay (Bihar Museum, India)

Chair: Dr Vishi Upadhyay (Bihar Museum, India) vishi.arch@gmail.com

The submerged sites and their cultural materials in the riverscapes and oceanscapes are less studied than the surface sites in Asia. It is primarily due to the methodological differences, high expenses in prospecting for sites and retrieving cultural materials to research. Underwater Archaeology is largely believed to have centred on deep dive activities in the waters. This thought process has overshadowed potential studies in maritime trade, marine technology, port sites, cultural materials, inland trade supplementing for overseas exchanges, and the whole urbanisation process surrounding it. Museums and educational institutions have systematic role play to enhance awareness of underwater archaeology. Maritime Museums play a vital role in the restitution and presentation of noteworthy marine artefacts alongside recounting remarkable marine events. Maritime museums have more significant challenges than other kinds of museums due to conservation issues of objects. Conserving those in precise environmental conditions and making them accessible to visitors in an interactive way is an uphill task.

The session invites researchers on different aspects of 1) strategies for underwater cultural heritage conservation and awareness activities, 2) maritime museum designing on the sustainable

model and exhibition techniques and 3) exploring challenges and issues in practising underwater archaeology and the site museums for effective dissemination. 4. Offshore/ Other/ General museums holding objects related to Underwater Cultural Heritage (UCH)/ Maritime Heritage, recent initiatives, challenges, and possibilities such as constructing the narratives of UCH, interpretation, documentation, digital representation etc.

155. Proposed The New Models Of Underwater Archaeology Museum In Indonesia: Advantages And Challenges

Hutomo Putra

The author will provide a title of “proposed new models of underwater archaeology museum in Indonesia: advantages and challenges” to be submitted in APCONF 2023 session. The topic of this abstract fits best within this session APCONF 2023 because the consideration of a long history and rich significant maritime cultural resources in Indonesia that need to be maintained by using the new UCH management perspectives. Apart the major loss from the long - track record of unethical events of salvaged historic shipwreck and material culture finds since 1989 – 2010, Indonesia still has the other major number of potential maritime archaeological resources that need to be sustained, including “Kapal Punjulharjo” in Rembang, the USAT Liberty shipwreck in Tulamben Bali, potential World War II underwater archaeological finds in Ambon Bay, underwater archaeological remains in Belitung, potential underwater cultural remains in Natuna and Bintan, M. V. Boelangan Netherland shipwreck in West Sumatera, and underwater archaeological finds in Sagori island, Southeast Sulawesi. Nevertheless, in situ preservation become a priority to be applied instead of the salvage for the rescue archaeology. However, the question now is how these unique heritages should be presented? How to deliver this heritage to the public? Those questions become the concerning issue for the Government of Indonesia in attempt to establish the proper UCH management in international and best-standard practice. In broader scale, some countries including Australia, the U.S, and Israel, already established and implemented the multiple concepts of underwater archaeology museum resulted in a successful attract of public attentions. This research will try to provide the alternative solution to enhance the UCH management in Indonesia by proposing new models of underwater archaeology museum. It also aims to describe the advantage that will be gained and the potential challenges that will be faced in order to establish a sustainable heritage in the future.

156. Maritime Trade between Gujarat and Mesopotamia: The Need for a Reappraisal

Janardhana Bora

This paper attempts to portray maritime trade between Gujarat and Mesopotamia by examining cultural materials during the third millennium BC found in archaeological sites of Indus Valley culture. The early maritime history of the subcontinent commenced with and was largely confined to trade links between the Indus Valley and Mesopotamia, and needs to be further nuanced by re-examining the role of Gujarat in the light of recent interpretations. In this article I review some of the evidence for Indus external trade of maritime archaeology. The possible consequences of such a prominent maritime role are also explored. The topic of this abstract fits best within this Session X because observations and deliberations of this study have been presented archaeological evidences pertaining to maritime trade such as pottery, semiprecious stone beads, seals and sealing, cubical weights and other numerous evidences.

157. Digital Reconstruction and Conservation of Maritime Heritage in the Ajanta Murals

Dr.Shreekant S.Jadhav

India's maritime heritage dates to around 4,500 years, since the Indus Valley Civilization. The impetus to revisit and re-develop maritime links was trade (primarily in cotton,

pepper, and other spices), due to the monopoly of the Persians and, later, the Arabs over land-based caravan routes. Later maritime journeys spread the influence of ancient and medieval Indian civilisation as far as the islands of Indonesia to the East, the islands of Japan to the north, and the east coast of Africa to the west. There are many representations of ships and boats in early Indian art. The earliest are those found among the Sanchi sculptures belonging to circa. 2nd century B.C. At the Ajanta caves, paintings from the 5th century C.E. reveal the life of the people of the time. The frescos depict sea-going vessels conveying goods overseas, representing ships and boats from an era that witnessed India's expansion and the spread of Indian thought and culture over the more significant part of the Asiatic continent. The vitality and individuality of Indian civilisation, fully developed during the era of Vakataka-Gupta imperialism, by the end of the 7th century transplanted itself to the farther East, affecting the cultures of Java, Cambodia, Siam, China, and at the most significant distance, even the to Korean peninsula and Japan. A painting on the wall of Cave No. 1 at Ajanta is still easily recognisable as a vivid representation of the Persian envoys' ceremonial presentation of their credentials.

Griffiths rightly interprets the representations of ships and boats in the Ajanta paintings as a "vivid testimony to the ancient foreign trade of India." The present paper deals with the ships and boats depicted in the paintings of Ajanta. Several scholars have studied these images, more particularly from Cave Nos. 1, 2, 16 and 17. In continuation of the Magnum Opus work of Dieter Schlingloff, the author shall try to show the missing features depicted in the panels of ships and boats through newly reconstructive line drawings and photographs. Digital restoration utilising photographs processed to adjust the brightness and contrast forms a significant step in studying the original painting and analysing its remains and damage. This process allows digital reconstruction with line drawing and colour using the original colour palette. As a result of this detailed work, one may visualise the paintings and their use of ancient maritime activity as subject matter.

158. 'Stapled' boatbuilding tradition of Bengal: a case study on chhot boat
Swarup Bhattacharyya

We have documented a boat building procedure which is unique in Bengal (India). The typological name of the boat is chhot. A smooth skinned, rabbeted, and stapled boat of Bengal with 'v' shaped cross section and prominent keel. Project took place in Dehimondalghat of Haora district on the bank of river Rupnarayan. Digitization of the entire process of boat building was undertaken on this EMKP, UK project. Panchanan Mandal and his four sons created the full scale boat of 35 feet in length and 9.5 feet in cross beam. Documentation of chhot is important as the boat type is no longer use in the river. Skill of chhot boat building will disappear in near future. It is the first project on digitization of a boat in India.

159. Narrating Boat Tradition of Bengal: A Case Study of Water Transport Gallery, Nehru Museum of Science and Technology, IIT Kharagpur
Arnab Hazra and Swarup Bhattacharyya

The Nehru Museum of Science and Technology was established in 1990 as a university museum in Indian Institute of Technology, Kharagpur (IITKGP). IITKGP is the first higher technical institution of India and presently one of the premium institution of the nation, situated in the state of West Bengal, India. This museum is dedicated to the knowledge of science, technology and cultural history. One of the most important galleries of this museum is 'Water Transport Gallery'. It narrates the water transportation of Indian subcontinent with the main focus on Boat building tradition of Bengal. In this gallery more than 30 scaled models of boats are displayed with supportive information, installation and digital display of their usages and dimensions to depict the rich legacy of boat building in Bengal and also at the other provinces of our country. This gallery also

has some boat models of other countries too to allow the visitors to understand and compare the technology of indigenous boat building tradition. Bengal is not a landlocked country rather it is riverine in nature and surrounded by Bay of Bengal to its south. Since ancient time Bengal was famous for its overseas trade through river ports. In such a land of waters, boating is bound to be the principal means of all purpose of life. Boating was one of the main professions of these people. They developed skill in naval architecture and built appropriate boats and ships for inland and overseas navigation. This gallery is a result of joint efforts of different faculties and scholars of IITKGP to act as a bridge between humanities and technical disciplines. Apart from catering educational needs this gallery also serve as a place of developing aesthetic sense and recreation for the students and visitors. This paper is an attempt to discuss the objective behind the water transportation gallery, which combines the indigenous knowledge and modern technology to discuss the lesser known aspect of water transportation through riverine and seas.

160. From Past to Present, Tradition to Tactical: Visualizing Maritime History of India in National Museum, New Delhi
Moumita Dhar

India is one of the oldest civilizations with maritime activities due to its geographic location and advanced technologies. National Museum, New Delhi (India) provides an opportunity to peep into its marine history in spite of its landlocked location in central India, far from coastal areas. India has a coastline of 7517 km and is surrounded by the Arabian Sea on the west, the Bay of Bengal on the east, and the Indian Ocean to the south. The earliest evidence of marine history of India goes back to 3000 BCE in the Indus Valley Civilization which was located in the western part of modern India. There is a continuous chronological development of marine activities of India throughout history with South-East Asia, the Gulf and Arabic area, Europe, and Africa. These could be experienced in the gallery dedicated to Marine Heritage in National Museum. It showcases the material remains from 300 BCE to contemporary times. The displayed material relics are ranging from epigraphy, manuscripts, cartography, art objects, boat models, navigational instruments, etc. which narrate a story of overall marine activities including trade, traditions, religion, and strategic development. India is a large and diverse country; hence, the history of five thousand years is shown in a restricted manner yet representing different parts of the country. Antiquities displayed in the other galleries of this museum also create a basic idea in the mind of visitors which help them to grasp the story narrated in the maritime heritage gallery. In this paper, all the aspects will be described in context with the support of historical records, text, material culture, excavation report, research papers with the perspective of neo- museological aspects. The paper will discuss the challenges, opportunities and scope of narrating marine history in a general museum in order to find a better alternative solution.

161. Geospatial study of early historic sites and navigation potentialities at the lower reaches of river Bhima, South India
Deepak Pal, Arjun R

The river Bhima, one of the major tributaries of river Krishna, origin at Bhima Shankar hills in the Western Ghats (Maharashtra) at the elevation of 945 msl, flows southwards for about 861 km and confluence with river Krishna in Gundloor (Karnataka) at the elevation of 537 msl. The upper and lower reaches of the river are found with several Prehistoric and Early Historic sites, which suggest the antiquity of human association with the Bhima. The number of Early Historic site relatively are higher at the lower reaches of the Bhima, where the basin is broad and shallow in the open landscape. On the advent of establishing sedentary villages to emergence of larger settlements/ towns in the Early Historic period (300 BCE- 500 CE) the significance of the river Bhima at the lower

reaches must have drastically enhanced towards the use of it in short-long distance navigation. With this approach, this paper examines on the possible inland navigation route connecting Sannati with other prominent Early Historic settlements. Sannati is a complex of site surrounded by Ranamandala, Kanaganahalli, Sirwal, Benagutti, they are Buddhist stupa sites with monasteries and brick embankments; suggesting larger population residing in this area and frequently accessed by number of pilgrims. These sites were archaeologically excavated and found cultural materials such as the Ashokan Rock Edicts, Relief panel of King Ashoka, Black-and-Red ware, Russet Coated Painted ware and Rouletted ware, coins (inscribed and uninscribed) of copper, silver and potin, belonging to Iron Age, Mauryan (?) and Satavahana. Having such range of archaeological potentialities and cultural contacts, gives rise to trace the role of Bhima in inland navigation for domestic or trade purposes. As there is lack of direct cultural material evidences to maritime activities, in this paper, a preliminary attempt is made to identify possible navigational activities with the use of geo-spatial tools and analysis, and the review of archaeological reports in reconstructing the socio-economic contexts.

162. Underwater Archaeology in India: Initiatives of Archaeological Survey of India
Aprajita Sharma

India is surrounded by a vast coastline and encircled by a terrific riverine system. Due to this travellers and merchants easily managed to reach India through sea and riverine connections along with the land routes. The trade aspect enhanced other integral aspects like cultural interactions and economic exchanges which is why India is known to all other countries since antiquity. Archaeologically, a wide range of studies have been carried-out in India, however, the underwater archaeological studies are quite meagre. The history of India cannot be completed without the inclusion and proper study of its underwater cultural heritage.

To complete a wide gap in underwater archaeological studies, the Archaeological Survey of India (ASI), Ministry of Culture (MOC) has been involved in underwater explorations since the 1980s. Collaborations with the National Institute of Oceanography were done initially for studying and analysing underwater cultural heritage in India. During this period, many sites were explored along the west coast in the Arabian Sea and along the east coast in the Bay of Bengal.

Sites on the west coast viz. Bet Dwarka, an island in the Gulf of Kachchh, Dwarka, Sopara, Elephanta and on the east coast such as Arikamedu and Mahabalipuram was explored and investigated.

Giving the subject a more serious thought, an Underwater Archaeology Wing (UAW) under the purview of the Archaeological Survey of India (ASI) officially came into existence in 2001. Thereby a number of activities commenced viz expedition at Bangaram Island, Dwarka, Mahabalipuram, Loktak Lake (Manipur), Elephanta Island, etc.

163. The maritime museums and material culture of artisanal Capiz (*Placuna placenta*) dive fishery in the Philippine archipelago
Ma. Arve B. Banez

My paper explores the material culture of artisanal Capiz (*Placuna placenta*) dive fishery as a subject of maritime museums. The labour of fisher-divers produces the cultural materials of artisanal dive fishery, which encompasses their local knowledge of underwater maritime ecologies. The improvised diving gears, and, the tools employed to gather the shells in *Placuna* beds, represent the material culture of artisanal dive fishery. The Capiz shells handicrafts likewise signify the commodity generated from the artisanal dive fishery. A combination of fieldwork in the source community that practices artisanal Capiz dive fishery, museum visits, and review of previous research will be conducted. Basically, my study inquires about the anthropology of maritime museums with focus on

the intersecting themes of places, people, and objects in artisanal Capiz dive fishery in the Philippine archipelago.

164. The Boats and Ships in the Indian Paintings: Examining the Commercial and Domestic Aspects in Maritime Activities

Vishi Upadhyay

Paintings are visual artefacts and one of the significant art narratives supplemented as a primary source in the construction or reconstruction of social and cultural lifeways of different periods since the Early Historic period—for example, the murals of Ajanta, Cholas, Vijayanagara, and the Mughal school of paintings. Among the diverse visual content, the Indian paintings consists is the depiction of the relationship between the water and humans in the forms of navigation activities through boats and ships of various kinds. Such images are further connected with social and economic aspects, which need to be examined and analysed to differentiate between domestic and commercial functioning. The analysis has been much on identifying trade-related activities and largely has ignored the other side of the social construct with the paintings bearing the marine activities. For example, the sailors and pilgrimage on the riverside temples, and the boats and sailors in recreational activities. Which have been lesser known and studied. In this paper, the painting in the collections of museums in Bihar shall be examined to narrate the visual craftsmanship surrounding the identity of boats and ships in detail, including but not limited to their forms/ models, designs, types, methods of making, and their functions. Further, they are categorically examined and studied for commercial (interstate trades) or private uses (personal rides). The paintings in Rajput, Mughal, Patna Kalam, Boondi, Pahadi, Rajasthani, Kagada and Delhi School of Art, representing the beautiful boats and ships in different fabrics and shapes, are the focus on this study.

165. Crossing the rivers and connecting the early settlements: Tracing the lesser-known inland cultural heritage of South India

Arjun R

This paper is focused on the network of late prehistoric (Neolithic and Iron Age) and early historic sites located on the non-perennial rivers of south India. The region has potential archaeological site-centric data on the cultural heritage of the non-perennial rivers, but due to the lack of methodological frameworks we have known least on the inland (short/long distance) water navigation network and the frequent river crossing patterns adopted by the early societies. The significance of rivers in inland routes has received lesser focus in Indian Archaeology, except for several studies centered on the Indus, Ganga-Yamuna rivers and coastal ports of the Indian Peninsula. The major rivers such as the Kaveri, Krishna, Tungabhadra, and Bhima, origin from the Western Ghats, flow through several ecological regions and plateaus on reaching the delta in Bay of Bengal. At several places with archaeological sites, these rivers have broader (1-1.5 km in width) and narrow but deeper channels cutting through the plains and valleys and are seasonally navigable. Several early sedentary villages during the Neolithic (3200-1200 BC) and Iron Age (1200-300BCE) and larger settlements in the Early History (300 BCE-500 CE) lead to urbanization seem archaeologically disconnected & undermined with the possible inland navigation methods and river crossing behavioral patterns. Lack of primary literature and relief panels of the early literate societies has handicapped such studies, therefore resorting to stress on the archaeological settlements and geomorphological studies. What archaeological and cultural materials (directly or contextually) can support such studies, and to what extent the geo-locations and the local geomorphological findings can support for developing research on the inland navigation are to be assessed. Hence, I place this paper as the beginning to developing methodological approaches to access cultural heritage of non-perennial rivers.

166. Investigating the causes of deterioration and the appropriate conservation treatment method of an excavated wooden schooner found in coastal area of Bangladesh
Rokonuzzaman S

A waterlogged wooden schooner was collected from Kuakata, a famous coastal region of Bangladesh, during the excavation period from 23rd December, 2012 to 27th February, 2013 under the Directorate of Archaeology. This schooner was measured 72 feet in length and weighed about 90 tons in wet conditions. A lot of valuable information regarding trade relations with other countries in ancient times, migration of people of certain communities, species of wood etc. can be obtained from this artifact. Unfortunately, the schooner has been kept under a canopy in the open for nearly 10 years after excavation without any consultation from conservation experts. The condition of this artifact was found to be extremely damaged and fragile when visited on 21st September, 2022. Attacks of various types of microorganisms and insects were observed in most of the woods. Different types of physical changes were also found in the wood of the schooner. Even the original shape of the artifact was disfigured by shrinkage, cracking, twisting and splitting of wood. It is known that the conservation treatment of waterlogged wood consists of four steps such as dehydration, substitution, consolidation and controlled drying processes. These are very expensive and lengthy processes. Now it is impossible to apply a complete conservation treatment method on the wooden schooner, because the artifact has already lost all characteristics of waterlogged wood. There are three objectives of this study: (i) to investigate the causes of deterioration of wood, (ii) to revive the characteristics of waterlogged wood and (iii) to recommend an easy and appropriate conservation treatment strategy for this waterlogged wooden schooner. Recommendation of treatment strategy is the most important part of this study. Considering the time duration and financial cost, the treatment strategy will be introduced. After the successful completion of this study, the countries like Bangladesh will protect their waterlogged wooden heritage using this new method.

23. Collections-based Research

Chair: Dr Jennifer Craig (APConf Organizing Committee member) jlocraig@gmail.com

In collections-based research we turn to existing museum collections; no single site or settlement could reveal this complex story. The collections used in our research were generated over a period of decades, beginning as early as antiquity and continuing right on through to the present, each with its own history of creation. Some of the collections were generated by academic institutions, some by museums, and some by not-for-profit organizations. As varied as these collections are, the comparative perspective our projects require reveal relationships among these sites that otherwise would have gone unnoticed.

As more archaeologists around the world study this way, new ideas, new approaches and theories develop. What are the current case studies in the Asia Pacific Region? In this region, with our maritime/underwater perspective, what epistemologies do we bring to collections-based research?

167. 15th century carnelian bead cargo of the Indian Ocean World
Jennifer Craig

The topic of this abstract fits best within the Collections-based Research Session because existing museum collections of carnelian beads from two archaeological shipwreck sites were analyzed. The sites include different ship constructions located at the far ends, to the north and south, of the Philippines; and they carried comparable artefacts. Both the Pandanan (1460-1487 CE) and Santa Cruz (1488-1505 CE) carried cargoes of similar ceramics (i.e. Chinese Jingdezhen and Thai Maenam Noi) and black glass beads (i.e. west India soda alumina); yet these sites also carried dissimilar cargo in both the ceramics and

glass beads. Both sites also carried disproportionate carnelian beads. The resources to conduct the work to study carnelian are the morphological analysis of measurement and descriptors, technological analysis of SEM and compositional analysis of LA-ICP-MS. My research questions ask what geographic patterns these analyses indicate of the carnelian beads: What is the source of the carnelian? Where were the bead workshops? What sailing routes did the carnelian move over to ultimately shipwreck off the Philippines? The expected results are that riverine systems that connected interior Indian carnelian were used to move raw material to west India bead workshops, via the Indian Ocean, Bay of Bengal into the Straits of Malacca to Southeast Asian entrepôt.

168. Preliminary analysis of the early handheld guns recovered from shipwrecks plying the seas of the pre-colonial Philippines, c.1400 – c.1600

Nero M Austero, BC Orillaneda, LM Neri

This study presents the six early muzzle-loading handheld guns also known as “handgonnes” or hand cannons recovered from shipwrecks plying the seas of the pre-colonial Philippines. In this paper, three guns HHG-001, HHG-002, and HHG-003, feature shorter and stubby barrels with prominent reinforced sections, and bulbous breech regions. The flared muzzles of these guns are typical of a blunderbuss type and or dart-firing guns of the 14th and 15th centuries CE. Both guns HHG-002 and HHG-003 also feature a prominent stock or tiller socket at the breech, and a lug probably designed for handling and aiming targets. However, the shallower tiller socket and the absence of a lug or handle in HHG-001 also suggest that the gun was stock-mounted. The remaining handheld guns, on the other hand, feature longer gun barrels probably designed for long-range firing. Both HHG-004 and HHG-005 features tapering gun barrels and prominent tiller sockets. Although the tiller socket of HHG-005 appeared to have been broken, unless otherwise, the socket may have been originally longer. Also, the prominently thick gun barrel of HHG-006 was probably designed to withstand more powder charges. Whereas its shorter tiller socket suggests the need for additional reinforcement straps and a support stand when firing.

The discovery of these early handheld guns in various merchant ships such as those of the Santa Cruz, Pandanan Shoal, and Lena Shoal shipwrecks is clear evidence of their use by the early seafaring merchants. Despite their size and doubtful offensive functions against pirates and crews of enemy ships, firing them would be intimidating. A more in-depth analysis may also yield additional archaeological information and knowledge, crucial to their identification and their role as part of the larger shipwreck’s archaeological assemblages. X-Ray Fluorescence (XRF) analysis, for example, will determine the materials used in manufacturing these guns.

169. Pottery collection of Cu Lao Cham shipwreck (Hoi An, Quang Nam): Introduction to the maritime trade networks of Vietnam in the 15th-16th centuries

Phạm Ngọc Uyên

This essay will introduce for the first time the artifacts from the ancient shipwreck in Cham Island (Cù Lao Chàm in Vietnamese), in the waters of Hoi An, Quang Nam (Vietnam); it was recovered in the years 1997-1999. Ceramics account for a large number of artifacts recovered from the shipwreck, reflecting the ceramic characteristics of kilns in Vietnam, Thailand, and China. First, I will briefly introduce the ceramic collections from the shipwreck being displayed at five museums in Vietnam; I will also categorize those objects into groups based on their external appearance. Comparing the groups with other items from abroad might lead to the assumption that cultural exchanges can occur between Vietnam and the nations in Southeast and Northeastern Asia during the ancient times. Some of the typical types will next be compared with artifacts found from recent underwater archaeological excavations within area; in which the glaze, decorations, designs that will be discussed in order to identify the similarities and differences, which

might document for reconstruction the Vietnamese's ceramic evolution during the 15-16 centuries CE. This introduction also wishes to receive information sharing about related documents and future cooperation opportunities.

170. Contemporary Maritime Graffiti in Bandar-i Kong: key to comprehend the ancient graffiti?!
Shadi Kalantar

Maritime iconography, including sea-related symbols, illustrations, miniatures, graffiti, seals and seal impressions, etc., are remarkable parts of every fishing and mariner society which could reflect their beliefs, myths, lifestyle, rituals and subsistence. This article aims to study contemporary maritime iconography, more specifically ship graffiti, in Bandar-i Kong, south of Iran, therefore, the topic of this abstract fits best within the session "Staying afloat or diving deep": The importance and challenges of maritime iconography.

The case studies under consideration are contemporary ship graffiti incised on the interior side of walls and colored with charcoal to answer the following research questions: 1) What are these depictions: what do they represent, who and why made them? 2) To what extent could contemporary iconography in current maritime societies, graffiti of Bandar-i Kong in particular, be useful to interpret maritime iconography in archaeological contexts; for instance, graffiti of Siraf in Bushehr Province of Iran which are dated to 10-11 centuries BCE.

resources available to conduct the work include interviews with people of Bandar-i Kong that have been conducted along with the ethnographic research for the PhD dissertation of the author. The expected results are that even though extending the connection between contemporary iconography and the society that created them to old graffiti and archaeological contexts is not always reasonable, in some cases it is possible.

171. Early Modern Japanese Whaling: An Iconographic Study
Michelle Damian.

I will be using woodblock prints and scrolls to analyze information about whaling in early modern Japan. The case studies under consideration are primarily the collections at the New Bedford Whaling Museum (Massachusetts, USA) and the Marquand Library (Princeton University, USA). The resources available to conduct the work include internal funding for research travel from the University of Wisconsin-Whitewater. The research approach will be a systemic analysis of the imagery in these artworks to learn more about the strategies of whaling in the early modern period. The expected results will include a catalog of the vessels and equipment, capture and processing techniques, and evidence of shore support, and will shed light on how whales themselves were viewed and used in early modern Japan.

24. Recovering dispersed and salvaged legacy collections of UCH in Southeast Asia

Chair: Dr Martin Polkinghorne (Flinders University)
martin.polkinghorne@flinders.edu.au

Co-chairs:

Dr Wendy Van Duivenvoorde (Flinders University)

Zainab Tahir (Kementerian Kelautan dan Perikanan / Ministry of Marine Affairs and Fisheries)

Nia Naelul Hasanah Ridwan (Kementerian Kelautan dan Perikanan / Ministry of Marine Affairs and Fisheries)

Dr Natali Pearson (The University of Sydney)

Dr Mark Staniforth (Flinders University)

Notwithstanding the near-universal acknowledgement of the urgent necessity to protect material cultural heritage, it continues to be destroyed and exchanged for commercial gain. To mitigate cultural loss, the management and trade of material cultural heritage is governed by international and country-specific laws. However, these laws are enforced with irregularity, limited jurisdiction, and criteria that often does not account for local contexts. In Southeast Asia, decades of poorly conceived and implemented legislation has facilitated the removal of vast quantities of Underwater Cultural Heritage from the sea without application of systematic archaeological protocols. These objects have been alienated from their archaeological and historical contexts and their present custodians can only appreciate their aesthetic and economic qualities. Drawing attention to the implications of problematic salvage is a critical step toward better management outcomes. This session invites papers that consider how these issues might be explored by generating knowledge from dispersed and salvaged legacy collections of UCH from Southeast Asia.

172. Reuniting orphaned cargoes: Underwater Cultural Heritage of the Maritime Silk Route

Martin Polkinghorne; Wendy Van Duivenvoorde; Natali Pearson; Zainab Tahir; Nia Naelul Hasanah Ridwan; Craig Forrest; Widya Nayati; Noel Tan; Rachel Popelka-Filcoff; Yuni Sato; Pakapadee Yukongdi; Catherine Morton; Jarrad Kowlessar; Mark Staniforth

This paper will introduce the ‘Reuniting Orphaned Cargoes Project’ funded by an Australian Research Council Linkage Grant, which aims to address the problematic salvage and dispersal of trade ceramics from Indonesian territorial waters. ‘Reuniting Orphaned Cargoes’ will concurrently research a collection amassed through legislated salvage because of its purportedly low economic value alongside another dispersed on the antiquities market expressly for financial gain. Examined together, the collections will highlight the scale and gravity of inadequately regulated salvage. Using methods of archaeological science, the project will attempt to reconnect unprovenanced objects with their archaeological find-spots. Foregrounding archaeological value, the project will establish a plan of action to deal with unprovenanced UCH and build capacity across the Asia-Pacific to recover cultural knowledge from objects that have been separated from their relevant communities and languish in institutional and private collections.

173. Batavia or Batavian Ware in the Michael Abbott Collection of Trade Ceramics.

Mark Staniforth, Wendy van Duivenvoorde, Martin Polkinghorne, Zainab Tahir and Nia Ridwan

Batavia or Batavian Ware decoration is where the interior (concave) surface was decorated in hand-painted cobalt blue under a clear glaze on white porcelain (so-called “blue and white” underglaze porcelain) and the exterior (convex) surface was painted with a monochrome plain (or solid) chocolate brown or lighter brown (called “café-au-lait”) using an iron-oxide pigment. Batavian ware was made and completely finished at the important ceramic production centre at Jingdezhen (formerly Ching-tê-Chên) in Jiangxi (formerly Kangxi) province, China. Batavian wares were then transported, including by European vessels direct to places like Europe and North America or by Chinese and South-East Asian junks across the South China Sea (or the “Nanhai”) to Batavia in Indonesia where they were trans-shipped into Dutch vessels for longer distance transportation. Chinese Batavian Ware first appeared in the late seventeenth century, became common through the eighteenth century and had largely ceased by the 1790s. Accurate dating of Batavian Ware has largely come from a series of shipwrecks, particularly of Dutch East India Company ships, that were carrying part cargoes of Batavian ware.

A controversial shipwreck that has been called the “Blue Chrysanthemum” or the “Kangxi Bintan” shipwreck has been described as having been lost in the “South China Sea” or “off the coast of South East Asia” but is actually believed to be located in

Indonesian waters off the coast of the island of Bintan. The site has been reported to have been located in the early 2000s, or perhaps before. The “Blue Chrysanthemum” shipwreck has been claimed as the source of a variety of Chinese Export Porcelain wares including some Batavian Wares. Approximately 100 pieces of Batavian Ware are present in the Michael Abbott Collection of Trade Ceramics and the paper will examine what we can learn from these objects that are suspected to have come from the “Bintan” shipwreck.

174. The social history of artefacts and the law in Southeast Asia
Craig Forrest

The loading of objects on a vessel, their loss, then physical discovery, recovery and subsequent movement, all take place in a legal context. That context is not static and cannot be viewed entirely in hindsight from the now. In unravelling the legal rights and interest to recovered objects the inter-temporal nature of the law requires consideration and possible application. Moreover, irrespective of what law applies at any given time, this intertemporal legal context reflects evolving values and is part of the object’s social history. This paper examines this intertemporal nature of salvage law and other related laws as they might apply to objects recovered in Southeast Asia over the past 60 years.

175. Take it or leave it: The life of commercially salvaged cargoes in Indonesia
Zainab Tahir, Nia Naelul Hasanah Ridwan and Martin Polkinghorne

Underwater cultural heritage management in Indonesia does not stand alone. It relates not only to heritage preservation, but also to the commercial exploitation of heritage for pecuniary benefit. Following the legislated commercial salvage policy between 1989 and 2010 there are approximately 250,000 state-managed artifacts stored in government warehouses.

These collections comprise the earliest maritime findings in Indonesian waters, including objects from the 9th century Belitung shipwreck, the 10th century Intan and Cirebon shipwrecks, the 18th century “Blue Chrysanthemum” shipwreck, and the early 19th British merchant ship, the Forbes. The variety of artifacts demonstrate a pattern of continuous regional maritime relations beginning with the Srivijaya Empire, through to the Mataram, Singosari, Majapahit, Islamic, and colonial periods.

However, the discovery and salvage of these objects was conducted with limited application of archaeological principles resulting in the loss of context and integrity. The circumstances of collection have forced these objects into a kind of scholarly isolation and thus far prevented their interpretation. Yet, undeniably, these enormous collections dating from 9 to 19th century are still a valuable source of knowledge, with significant historical meanings. This paper will discuss efforts to make new discoveries about these objects and the ethical challenges in working with them.

176. Making Sense of a Partial Cargo: Insights from the Java Sea Shipwreck Collection
Lisa Niziolek, Gary Feinman, Wenpeng Xu, Huan Xiong, Stephanie Hornbeck, Claire Scott, Amanda Respass, Laure Dussubieux, Isabelle Druc, Felix Grewe, Cynthia Wagner, Jun Kimura, Peter Gayford

The Java Sea Shipwreck collection at the Field Museum of Natural History in Chicago includes about 7,500 items—mostly ceramics and iron—recovered from a trading vessel that sank in the Java Sea in the late 12th or early 13th century. Discovered by fishermen in the 1980s, the wreck site was subjected to looting and several salvage efforts, the last one conducted by Pacific Sea Resources in 1996. Despite the cargo being dispersed and the site being exposed to destructive natural and cultural processes for centuries, research on the Field Museum’s collection demonstrates the importance of investigating even portions of cargos and the time-ravaged sites. In this paper, we review results of research

projects undertaken on the Java Sea Shipwreck collection since 1999 and consider the potential contributions of partial cargos.

146. Delivering scientific diver training for underwater archaeology: international best practice an a micro-credential case study

Hiro Yoshida, Wendy van Duivenvoorde, John McCarthy, Jonathan Benjamin

Delivering education in underwater archaeology is challenging for a variety of reasons, including the requirements to prepare archaeology students to become professional scientific divers. In practice, the discipline blends traditional academic archaeology with maritime sectors and diving industries. To address some of the issues facing underwater archaeologists and students around the world, the UNESCO UNITWIN Network for Underwater Archaeology published a model code of practice for safe diving, which is publicly available. This paper builds on these principles of conducting safe underwater archaeology by trained divers, presenting a case study from Flinders University, South Australia where we have developed an accredited qualification in Professional Scientific Diving. The micro-credential meets both the Australian Standards and the American Academy for Underwater Sciences (AAUS) standards for Scientific Diver qualification and enables graduates to be classified as diving-workers under legal regimes where qualifications and professionalization is required. Delivery of this educational component within a maritime archaeology program is now critical important for career progression in maritime archaeology. We discuss the challenges to delivering teaching of diving for archaeology in a modern university with complex health and safety requirements and regulatory frameworks. We consider the barriers facing educators, students, and professionals and how to create a safe and inclusive culture of scientific diving, critical to modern maritime archaeology and marine science in the coming decades.

25. Environmental implications of underwater cultural heritage degradation and the conservation of marine ecosystems

Chair: Dr. Bishnu Pada Bose (Indian Institute of Technology Kharagpur, India)
bosebishnu@gmail.com

Plastic pollution in the marine environment threatens marine ecosystems, maritime cultural heritage, and damages marine biodiversity. The economic activities of native and indigenous communities of the coastal areas are mainly oceans based. The presence of plastic waste in marine ecosystems has become a source of negative impacts on the local, native, and indigenous communities and individuals. It is essential and highly urgent to conserve marine ecology and heritage, and improve maritime cultural heritage sustainability. Another issue is the direct effects on marine ecosystems and heritage by unmanaged dredged sediments (DS) have been well documented. Protecting marine ecosystems and conserving maritime heritage are crucial challenges to managing tourism and seaborne trade. These ports must maintain the proper navigable depth to stay operational through the routine dredging process. Worldwide, abundances of sediments are the outcome of the routine dredging process.

There is overlap between the information required by archaeologists, environmental scientists and those physically managing the environmental and safety risks associated with underwater cultural heritage. This session aims to bring these diverse stakeholders together to facilitate dialogue and design ways of working together that maximizes benefit from each sector.

177. Synergetic management strategy towards sustainable use of the ocean resources and enhance the blue economy

Bishnu Pada Bose

As intensified anthropogenic activities and altered global climate system impose cumulative pressures on marine ecosystems, their ability to provide tangible, and

intangibles benefit to people and the planet might decrease, causing degrading marine heritage. The marine environment considers a precious heritage of the global community. A healthy marine environment can boost the resilience of marine heritage. On the other hand, the blue economy in the context of the maritime industry is strongly gaining global importance. Blue economy cooperation at both global and regional levels will drive the development of a common concept of the ocean environment, and the protection of marine heritage. The worldwide ocean covered 71% of Earth's surface area, and expected to become the great economic frontier in the coming future, with tremendous potential for resource generation and development across multidirectional segments. As the oceans are very large and particularly sensitive to ocean trades, coastal economics, marine heritage, and ecosystems, which need to be preserved, a balance between trade and commerce and the protection of the marine ecosystems and cultural heritage has to be found. Worldwide, 80% of global trade is achieved using the seas, and 40% of the world's population lives near coastal areas. It has been estimated that the annual "gross marine product" (GMP) is US\$2.5 trillion, and the total "asset" base of the ocean is at least US\$24 trillion, also the ocean economy is capable of providing a livelihood for over 3 billion people. To optimize mutual benefit for the well-being of people and the planet, it's essential to pursue the blue economy sustainably. The marine civilizations including coastal zones contribute to food security and poverty eradication worldwide. The increased rate of marine pollution is a global concern, and it is a consequence of the growing rate of harvesting ocean resources, economic activities in the coastal zone, have led to the deterioration of marine ecosystems and cultural heritage worldwide. To achieve SDGs goal 14 (sustainable use of the oceans) and conservation of marine ecosystems, stakeholder initiatives, policy formation, and transboundary cooperation are of extreme importance. It requires disruptive approaches to eliminate marine pollution and conserve marine ecosystems and heritage to enhance the blue economy at the global level. This paper discusses ocean pollution caused by anthropogenic sources, global action, and initiatives, as well as agreements and measures to prevent pollution sources. At the end, essential policies, and regulations are required to protect marine ecosystems, conserve marine heritage and enhance the blue economy.

178. Conservation of Marine cultural heritage and associated tribes of Balochistan
Tajammal Abbas Rai

This paper will focus on conservation of marine cultural heritage and associated tribes of coastal villages of Balochistan from Goth Haji Alano near Sindh border to Jiwani near Iranian Border. To take environmental implications of underwater heritage important sites will be mapped through recent regional surveys and new approaches will be suggested to save it. On the other hand this coastal area has been populated from pre historic times to till now. Indus valley civilization Alexander's expeditions in the region up to now and whole historical period is full of accounts of these ports and fishermen. The current research project comprises of wide-ranging survey and mapping of cultural heritage around these coastal villages and coastline at some selected using ArcGIS. A field survey was conducted in September and October 2022 in order to collect archaeological, botanical zoological material and also GPS-generated tracks and locations were produced. The results show at some sites from two to four overlapping periods in different regions. Primarily, sites identified near associated villages and also coastal areas dates back to circa 2700 BC. This paper will highlight the forms evolving from the research and field data and propose interpretation of both environmental and archaeological heritage.

179. Symbiosis: biodiversity surveys on archaeological shipwreck sites, managing for a better future

Vishmi Gunasinghe, Chathurika Munasinghe, Tharushi Malshani, Rasika Muthucumarana, Anuradha Piyadasa, Dharshana Jayawardena

Preliminary surveys on the biological diversity of shipwrecks around the country was started in 2018 with SS Sagaing; an iron wreck purposely sunken by Sri Lanka Navy. The purpose was to document the recruitment and colonization of marine organisms on the vessel's surface after two months of re-sinking the ship in Trincomalee harbour. This became the foundation for a new relationship between marine archaeology, marine biology and information technology.

In 2021 The National Shipwreck Database of Sri Lanka was established. The National Database for Shipwreck Sites in Sri Lanka is an online database that provides details of known shipwrecks in Sri Lankan waters, preserving their heritage value for future generations. It uses multimedia formats to present the information interactively. Shipwrecks have multiple benefits, including serving as artificial reefs for marine life and attracting visitors for tourism. The data in the database is collected by the Maritime Archaeology Unit of the Central Cultural Fund, with contributions from other sources such as professional divers and research institutes. There are 103 shipwrecks and of 06 aircrafts details available on the database.

Eventually, every shipwreck site transforms into habitats for fish and other marine organisms, and because of that, those will automatically become marine biodiversity hotspots. Archaeologists, environmental scientists, marine biologists and many other government/non-governmental agencies must hold hands to protect the shipwrecks and the marine ecosystems associated with them. The preliminary work and the research were begun after a series of discussions to use the national shipwreck database to upload ecological baseline data gathered from the surveys. This will be an initiation for long-term monitoring of the changes in diversity and abundance of fish and other fauna on shipwrecks and guide the future enhancement of in-situ protection and conservation of shipwreck ecosystems. The result of this project brings these diverse stakeholders together to facilitate dialogue and design ways of working together to get the maximum benefit from each sector.

180. The Submersion of Heritage Caused by Human Cause Permanent Damage and Destruction to Cultural Heritage

Zhang Yue

The topic of this abstract fits best within this Session because in the process of divergent economic and social expansion, human beings have almost inevitably caused damage to cultural heritage. Since modern China, in the process of building dams and reservoirs, many cultural relics and monuments with high heritage value have been submerged underwater, and these human activities have completely changed the living environment of cultural relics and monuments, and caused irreversible damage to them, such as the construction of the Three Gorges Dam that caused Fuling Baiheliang to be permanently submerged under the reservoir. Such examples are not limited to China, but also in the Asia-Pacific region and even the world, and developing countries will inevitably encounter the issue of development and cultural relics protection in the process of economic development. If this problem is left unchecked, more terrestrial cultural heritage will sink under the water. This paper will use academic resources, focus on theoretical aspects, summarize the cases of Chinese cultural heritage submersible under water, the corresponding countermeasures and protection measures, analyze their advantages and disadvantages, and further consider what human activities are permissible and which are unethical in the face of economic development and cultural relics protection at the same time. The result are that when the urgency of economic development is called into question, we should prioritize the protection of cultural heritage and resist the permanent destruction of cultural heritage by submerging it underwater. Second, there is a time limit for the definition of underwater cultural heritage in the Convention on the Protection of Underwater Cultural Heritage—at least 100 years. Questions remain about whether there is a scientific basis for setting this deadline. This

paper argues that the determination of underwater cultural heritage should not be limited to 100 years, but evaluated from the perspective of the scientific, artistic and cultural value of the heritage, otherwise it will be difficult for a cultural heritage with a high value such as Baiheliang to be protected if it is not listed as underwater cultural heritage in a timely manner after the construction of the reservoir is submerged. Therefore, this paper will expand on the above ethical issues in detail, in an attempt to provide suggestions for the sustainable development of underwater cultural heritage in the Asia-Pacific region.

181. The Fates of Hepingdao and Dashawan: Environmental challenges of coastal archaeological sites in northern Taiwan

Ellen Hsieh

An in-situ exhibition and preservation is ideal for public archaeology, but it is not always easy for various reasons. This paper focuses on the environmental challenges of cultural heritage management of two archaeological sites located in the coastal area of Keelung, northern Taiwan. Funded by the local government, archeologists revealed the remaining structures of a Spanish church at Hepingdao, and a Qing fort at Dashawan in 2019. The former is the only tangible cultural heritage of the Spanish colonial period (1626-1642), and the latter is the witness of the Sino-French War (1884-1885), together reflecting the rich history of Keelung and the dynamics of regional maritime history during the early modern period. Moreover, the prehistorical cultural layers at both sites provide critical data regarding how indigenous communities used marine resources and the prehistorical maritime exchange networks of the region. Although both sites were designated as official city-level archaeological sites, different arrangements were made after the excavations: an in-situ exhibition center is planned for Hepingdao, whereas the archeological discovery of the Dashawan fort has been backfilled. This paper will discuss how climate change and other environmental challenges affected the decision-making processes and the consequence of the decisions from the perspective of cultural heritage management, site preservation, and public archaeology.

26. General session

Chairs:

Dr Carlota Perez-Reverte (Universidad de Cadiz) carlotapreverte@gmail.com

Dr Elena Perez-Alvaro (Nelson Mandela University/UNIR)

elenaperezalvaro@gmail.com

This session will include papers of many different disciplines in order to create a holistic perspective of the several topics of the APConf.

182. Early coins from Kerala: Situating the trade networks with special reference to Pattanam. Harisankar B, Dineesh Krishnan

The paper is intended for session 8 titled “Early coins from Kerala: Situating the trade networks with special reference to Pattanam.” The research problem of the paper is to understand the distribution of coins and their role in understanding the trade network. The study would be based on the catalogue of coins from Kerala. Kerala, being known for the spices from the ancient times were not a secret to the world. Merchants from different parts of Europe, Arab countries and from pacific regions came here for commercial activities and resulted in exchanges of ideologies, and material culture. Pattanam, being an early historic port site in Kerala’s coast close to the Arabian sea, have produced evidences of commercial activities with foreign countries which is indicated by the presence of ceramics and other material remains in large volume. According to the early literary evidence, the region was under the control of Cheras and the presence of their coins from Pattanam is too supporting this. Apart from these Chera coins the surrounding

regions of the Pattanam site have been reported with the Roman Gold and Silver coins and early Indian silver punch marked coins in the form of hoards. Interestingly, these coins were found in the sites which were connecting the Pattanam region to the neighbouring early historic sites like Kodumanal, Keezhadi and Azhagankulam. Hence, these sites can be considered as the part of the hinterland trade networks which connects the region with other early historic period port town in the southern India.

This paper tries to discuss the hinterland trade network of Pattanam site and how these coins can be used to trace the early economic condition of the region and its monetary exchanges.

183. Maritime Legacy and Trade Network of Harappans

Garima Singh

After India's independence from the British rule in 1947, the newly formed republic began its search for Harrapan sites/Indus Valley sites in India. In the 1950s, partition from India to Pakistan led Indian archaeologists discovered sites such as Lothal and Dholavira in Gujarat belonging to Indus Valley Civilization, which resulted into the discovery of well-planned settlements with water reservoir and features such as a dockyard, indicating that the Indian Subcontinent possessed maritime expertise as early as 2500 BCE. Harrapan research, now a century old, has yielded a vast amount of information that has aided in the discovery of maritime trade commodities and international commercial trade links between the Indus Valley and Mesopotamia. This paper seeks to investigate the maritime history of Harrapans in the Indian subcontinent and Pakistan. It focuses on retrieved datasets and factors that contributed to determining Harappan and contemporary maritime trade. In addition, the study attempts to investigate the contribution of coastal regions to the expansion of the trade network and its material culture. It also discusses the role of museums in storing the excavated materials from these sites and how these sites have brought forth a paradigm shift in the way archaeologists work in the field.

184. Religion, Trade and Polity: River Ganga on the Gateway of Bengal

Eshan Harit

The essay will shed light on River Ganga in the Kahalgaon- Sahibganj region. In the Historic Period (c.600 BCE- 400 CE) the banks and rocky islands of the river was a liminal space on the border of state societies ideal for ascetics. The riverscape as a mystical and sacred space has been testified by the writings of Xuan Zang in the 7th Century CE. This tradition continued in the following century as evidenced by the establishment of the Vikramashila Mahavihara.

The riverscape is marred by rocky outcrops of the Rajmahal and Chotanagpur hills which were a source of minerals like iron, precious stones like agate, timber and fine alluvial soil for terracotta material. The presence of these raw minerals within the riverscape allowed for a robust trade. Evidence of such exchange could be found through a study of inland ports.

The 6th Century CE was a period of state formation in Bengal. In the concurrent centuries Bengal emerged as a dominant political and cultural zone in eastern part of South Asia. Ganga was the boundary between the ancient settlements of Champa (Bhagalpur) and the early medieval (c.600 CE- 1200CE) political centre at Pundravardhana (Malda-Dinajpur). The river became a contested boundary and a crucial link between Bengal and northern India.

The river and its surrounding landscape have lived through these multiple narratives in/of time and space. It was a liminal space, a site of production and exchange and a site of conflict and control. The riverscape is littered with evidence of these activities from the past. Archaeological evidence of religious activities can be seen etched on the walls and excavated cave sites on the rocky islands of Kahalgaon and the port site of Bateshwar (literally, god of travellers). Evidence of trade too can be found on the ports and in the

surrounding landscape with evidence of iron smelting in settlements near the port. Fortifications on the hills besides the river at sites like Teliagarhi and Sakrigali present evidence of political history of the river in this region.

185. In-situ preservation of underwater cultural heritage in Taiwan and related issues
Cheng-hwa Tsang and Han-chang Huang

Since 2006, when the Bureau of Cultural Heritage of the Ministry of Culture commissioned the Underwater Archaeology Team of the Academia Sinica to launch the investigation of underwater cultural heritage, underwater archaeologists have collected more than 700 pieces of data on shipwrecks in the waters around Taiwan from documentary resources, and conducted underwater archaeological investigations and verifications on more than 500 underwater targets. And ninety- seven targets have been identified as remains of shipwrecks. Among those shipwrecks, 20 are considered to have historical value, and 6 of them have been listed as important underwater cultural heritage in accordance with the provisions of the Underwater Cultural Heritage Preservation Act. Since preserving underwater cultural heritage is a new affair in Taiwan, the ways of how to preserve these important underwater cultural heritage have become a subject of debate. According to Article 27 of the Underwater Cultural Heritage Preservation Act, which was first adopted on December 9, 2015 by the Ministry of Culture of the Republic of China, in-situ preservation of underwater cultural heritage shall be the first option before allowing or engaging in any activities directed at this heritage, but the competent authority has not come up with effective protection strategies and methods. So the situation is currently in a dilemma. In addition to explaining the current situation and problems of Taiwan's underwater cultural heritage preservation, this paper also intends to discuss the legal and the practical issues related to the preservation in-situ of underwater cultural heritage being considered as the first option declared by the UNESCO Convention on the Protection of Underwater Cultural Heritage.

186. Non-Party State's Experience Implementing the UCH Convention: Taiwan's Perspective
Pei-Fu Wu

The topic of this abstract fits best within Session 22 (The 2001 Convention: from 'constructive ambiguities' to 'destructive misunderstandings') because the author would like to share his long term legislative experience and observation regarding Taiwan's incorporation of the 2001 UCH Convention into the 2005 Underwater Cultural Heritage Preservation Act (UCHPA) as well as its implementation, with particular reference to international cooperation/engagement. The following case studies are being taken into consideration: the drafting experience of the UCHPA, and the protection practices of shipwrecks with verifiable links with other States in Taiwan's waters. The official documents pertaining to the UCHPA legislation, research papers, and government-commissioned project reports on file with the author are among the resources accessible to carry out the work. Pertinent international or regional instruments are also included. Since Taiwan is a non-Party State to the 2001 UCH Convention, the research topic is whether Taiwan may take a realistic approach to cooperate or engage with adjacent or other States regarding shipwrecks protection. In this regard, the author would like to identify the challenges and explore potential legal and policy tools for bilateral, regional and international cooperation/engagement. The anticipated result is that, despite Taiwan not being a Party State to the 2001 UCH Convention, given the fact of Taiwan's crucial role in UCH protection in East Asia waters, diverse legal/policy tools could be identified and adopted within and beyond the framework of the 2001 UCH Convention and Taiwan's UCHPA, such as law of the sea, law of human rights and law of heritage protection in the event of armed conflict. This pragmatic strategy may sheds light on Taiwan's cooperation/engagement with pluralistic international stakeholders/partners and enhance the implementation of the 2001 UCH Convention in this region.

188. Development of New Technology Convergence Contents for the world's first Sea Tomb, the Tomb of Great King Moonmu Jin-ho Park, Si-jung Kim, Sang Gyu Park, Jae Byung park

Among the many monuments created by mankind, the only royal tomb under the sea is the underwater tomb of King Munmu of the Silla period. Nevertheless, the underwater tomb of King Mundae is located on the sea, far from land, making it very difficult to access.

The underwater tomb of King Munmu is the underwater tomb of King Munmu, the third king of Unified Silla. In recognition of this value, it was registered as a UNESCO World Heritage Site in 2005. The Underwater Tomb of King Mundae is known as the oldest underwater royal tomb in the world, and its value is very high.

It is an underwater tomb located 200 meters away in the sea, and although it is a structure of no origin in the world, it is not accessible to visitors. Through this new technology convergence content, we intend to replace the viewing of underwater tombs under the sea that are inaccessible. It is a kind of time machine-type tour. It can also be called a space machine, or digital experiential tourism system. This underwater tomb is the crystallization of a splendid maritime culture that has been handed down from the Silla period to the present day for more than a thousand years. Through this new technology convergence content, it will be possible to satisfy the utility of new cultural tourism. In a larger context, it is used as marine cultural content.

189. A study on the analysis of immersive contents based on the Shinan shipwreck
Wi Sang-hee , Ahn Hyung-gi

The Shinan Shipwreck is a Chinese Yuan Dynasty trading ship excavated off the coast of Shinan, Jeollanam-do, South Korea in 1975. It is a symbol of Asian underwater archeology and an important maritime cultural resource in the history of East Asian maritime exchange in the 14th century.

Currently, the production of contents on underwater cultural assets in the Korean military is insufficient, whereas the Shinan shipwreck is being produced with various immersive contents.

Most of the immersive contents of the Shinan Shipwreck were produced for museum exhibitions, and the subjects of the contents were mainly about the process of sinking and excavation, and excavated artifacts. Technically, projection mapping is used to enhance the visual immersion of the exhibition space. In addition, depending on the purpose of the exhibition, projection mapping was combined with technologies such as VR, AR, XR, hologram, media wall and media art.

However, VR and AR contents that wear HMDs were developed with a very small number of individual experiences. Some contents reflect interactive elements, but there is a limit to the interaction between experience participants and spatial elements. In addition, although different museums produce contents with the same material, Shinan Shipwreck, the original source required for content development and the utilization of previously developed contents are insufficient.

Above all, the storytelling is uniform as the theme is focused only on the 'sinking and excavation of the Shinan Shipwreck, and excavated artifacts'. In this regard, even if various technologies such as VR, AR, XR are applied, the subject is the same, so it is not clear to differentiate the content according to the technological difference. Therefore, it is necessary to develop various storytelling and contents through creative ideas and modern transformation beyond simple reproduction of the present. To this end, based on accurate historical research, life, historical sites, and cultural characteristics should be reflected in the contents.

192. Benthic life and fish composition at historic site of the HMAS Perth's Warship, North Banten Waters, Indonesia

Mujiyanto, Y Sugianti, R Rahayu, R A Budikusuma

On February 28, 2018, the HMAS Perth region was designated as a maritime conservation area. A three-dimensional model of the conservation area exists. Data and information are periodically required for that area's management. To evaluate the success of the conservation site, updated of the data and information going to be detailed. This study aimed to analyze benthic life and fish species compositions that use HMAS Perth shipward as their living. Data were collected in July 2020 using the Stationary Visual Census method. Analysis data used descriptive statistics and ecological index to know the association between species and the species dominance that utilize ship-wreck bodies. Benthic life composition found on the HMAS Perth's surface was 27 species from 25 genera and 19 families, with the most significant percentage from Demospongiae. Fish species composition consisted of target and major fish groups. The fish target consisted of seven families, while the fish mayor consisted of two families (Lutjanidae and Labridae). Given the cultural heritage site value and condition strategy, its cargo can be positioned as sensitive areas to change caused by various things, especially human activities. So, optimizing the historical site also needs to increase its load to preserve educational, tourism, economic, historical, social, and cultural values.

POSTERS

1. A review of underwater cultural heritage survey using geophysical method and Korean act on inspection for underwater cultural heritage

Sang-Hee, Lee, Sung-Bo, Kim, Jin-Hoo, Kim, Chang-Uk, Hyun

2. Dutch Mariners in the Pacific Region and the Material Evidence of their Alcohol Consumption Habits Onboard Ships

Charlotte Jarvis

3. Pondering the 500-year gap of lashed-lug boats in the archaeological record

Ligaya Lacsina

4. Stoneware Ceramics in the 13th Century Shipwrecks in the Philippines

Rachelle Anne Geline P. Ureta and Bobby C. Orillaneda

5. Decades after UNESCO Underwater Cultural Heritage protection courses: stance, progression and forthcoming aspiration regard to UCH in Thailand

Sira Ploymukda

6. Godawaya: discoveries of the oldest shipwreck site in the Asia-Pacific region

Rukshan Priyandana, Rasika Muthucumarana & Indika Hewage

7. A Real time Experience of Underwater Archaeology: A New Approach to Museum

Shivani kamdi, Rupesh Dhokane

8. Ceramic Consumption in the Transoceanic Trade before the 10th Century: Evidence from the Phanom-Surin Shipwreck, Thailand

Pornnatcha Sankhaprasit

9. The Origin of The Bidong Shipwreck from Relative and Scientific Approaches

Kamarul Redzuan Muhamed, Baharim Mustafa, Rafidah Hanipah, Ruzairi Arbi, Fatin Izzati Minhat, Muhammad Hafeez Jeofry, baszley Bee Basrah Bee and Hasrizal Shaari

10. A Study on a Hybrid Power system for supplying Electricity to the power train System of ASV for underwater cultural heritage investigation

Dongwook kim

11. Hong Kong's potentials in maritime archaeology: A study of public's viewpoint towards maritime archaeology

Jay Mok

12. A study on Landscape Restoration in the Prehistoric Period of Korea Using Aerial Archaeology Analysis: Focusing on the Midstream area of the Boseong River

Kim In Gyeong

13. The role of African non-governmental organizations in introducing underwater cultural heritage in Asia / Assalam organization as a model

Cheikh EL Mami Ahmed Bazaid

14. The Earl Temple: Connecting India and the Philippines in the 18th Century CE

Nero Austero

15. Preservation and Scientific analysis for Wooden Ship Timber of Bonghwang-Dong, Gimhae, Korea

Lee Kwanghee

16. The Scientific Analysis of Glazed Earthenware Found in the Mado Shipwreck

Sujin lee, KIM Gyuh

17. The Chemical Composition Analysis of Reddish-Brown Beads Excavated from the Korean Peninsula in the Indo-Pacific Trade Network

EUNA KIM, KIM Gyuh

18. Connecting the South Sea: Approaches to the Findings and Potential of the Interdisciplinary Study of the Maritime Cultural Landscape of the Port of Buenaventura, Colombian Pacific.

Jesús Alberto Aldana Mendoza, Jung Young-Hwa, Carlos Del Cairo Hurtado, Victoria Báez Santos, Carla Riera Andreu, Andrés López Narváez

19. Anthropocene and the Sea: Collaborative Methodologies for Assessment of Climate Change Impacts on Colombian Maritime Cultural Heritage

Carlos Del Cairo Hurtado, Jung Young-Hwa, Gabriela Caro León, Carla Riera Andreu, Liliana Patricia Rozo Pinzón, Victoria Báez Santos, Jesús Alberto Aldana Mendoza, Juan David Sarmiento Rodríguez, Nathaly Andrea Palacios Alba

20. Perspectives and Lessons Learned in the 2015-2022 Conservation of Materials from an 18th Century Shipwreck in Colombia, South America

Carla Riera Andreu, Jung Young-Hwa, Carlos Del Cairo Hurtado, , Jesús Alberto Aldana Mendoza, Victoria Báez Santos

21. Developing Shipwreck Preservation at Taean Conservation center: Facility, Application, and On-going Research

Jaewan Choi, Seojin Kim