Report

International Conference "Marine Geology: Marginal Seas - Past and Future"

14-18 October, 2025

By Peter D. Clift, Joanna Dudzińska-Nowak, Jan Harff, Wojciech Jeglinski, Franto Novico, Yenny Risjani, Marzia Rovere, Jinpeng Zhang, Yuanzhi Zhang

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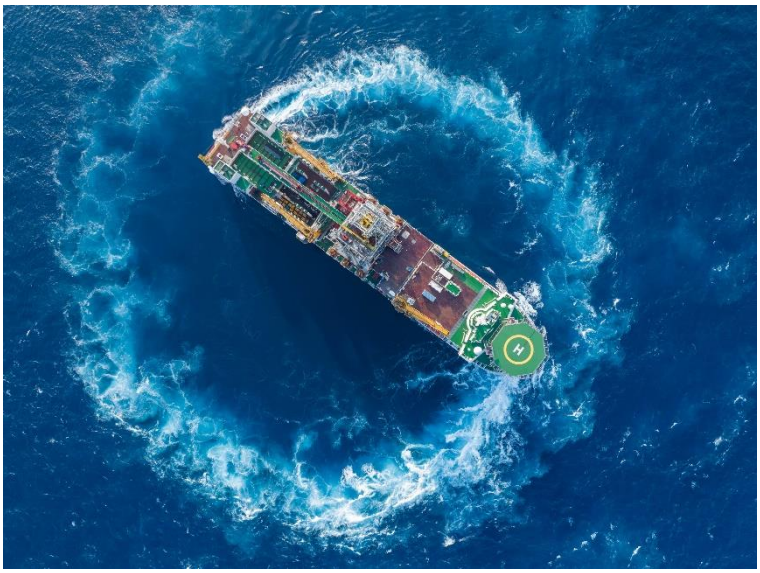

Guangzhou Marine Geological Survey,

China Geological Survey,

Guangzhou, P.R. China

Organized by

Guangzhou Marine Geological Survey, China Geological Survey, China

Base for International Science & Technology Cooperation of Deepsea Geoscience, MOST, China

Key Laboratory of Marine Mineral Resources, Ministry of Natural Resources, China

Co-organized by

University of Szczecin, Poland

Polish Geological Institute-National Research Institute, Poland

The Chinese University of Hongkong

Baltic Earth System Science for the Baltic Sea Region

Coordinating Committee for Geoscience Programmes in East and Southeast Asia

DDE Marginal Seas Task Group

Section of Marine Geology, Polish Scientific Committee on Oceanic Research, Polish Academy of Sciences, Poland

Guangzhou Association for Science and Technology, China

Outline

1. Introduction

Marginal seas are zones of transition between continents and oceans and are increasingly becoming the focus of international marine research. This is because of their importance as buffer zones for the natural transfer of matter and energy between the mainland and the open ocean. They are also a source of marine raw materials, for energy production, and they act as trade routes and links for the socio-economic networking. Moreover, some coastal zones and the people living there are increasingly threatened by sea level rise and extreme weather phenomena, so that effective coastal zone management is of vital importance. To contribute to the demands of society concerning marine geosciences, and to foster international cooperation we have established a network of marine scientists to launch scientific research initiatives focused on marginal seas sciences.

On 28th November, 2019, the 1st Marginal Seas Expert Meeting took place at Guangzhou, China, entitled "Eurasian Marginal Seas: Past and Future". This meeting was hosted by the Guangzhou Marine Geological Survey (GMGS), China Geology Survey (CGS), and was attended by 18 overseas experts from seven countries, together with 50 Chinese colleagues. In 2020 the "Marginal Seas Task Group" has been established within the framework of the Deep-Time Digital Earth (DDE) Big Science Program of the International Union of Geological Sciences (IUGS), to serve for further scientific events as organizer and co-organizer together with the Baltic Earth (BE) scientific network.

Although, the COVID-19 pandemic interrupted some activities, the conferences on "Marine Geology: Marginal Seas - Past and Future" were held in hybrid form, on-line and in-person, at the end of 2021 and 2023 in Guangzhou, China. The University of Szczecin (USZ), Poland and the BE scientific network, held conferences entitled "Marginal seas: Past and Future" on 16-17th December 2020, and 5-7th December 2022, respectively, co-organized with international partners. Supported by BE, the International Association for Mathematical Geosciences (IAMG), and the IUGS, topical sessions on Marginal Seas were held during the 4th Baltic Earth conference, Jastarnia, Poland, 31st May to 2nd June, 2022, the IAMG2023 Conference, Trondheim, Norway, 5-12th August, 2023, the 5th Baltic Earth conference, Jurmala,

Latvia, 13-17th May, 2024, and the 37th International Geological Congress, Busan, Korea, 25th-31st August, 2024, respectively. Additionally, a topical session on Marginal Seas was integrated into the EGU General Assembly 2025 in Vienna, Austria, and at the IAMG2025 Conference, Zhuhai, China, 9-13th October, 2025.

These conferences and meetings have helped to establish a network of researchers in marine geosciences, including supporting young scientist training and with the capability of enhancing the construction of a joint international scientific organization. Scientific communication and joint research pave the way for integrating new, "big data" analysis and modeling techniques, including Artificial Intelligence (AI) and Machine Learning (ML), which will promote marine geosciences development.

To continue advancing the Marginal Seas initiative, an International Conference titled "Marine Geology: Marginal Seas - Past and Future" was held in Guangzhou, 14-18th October, 2025. The theme was **"Marginal Seas - Sustainable Future of the Continent/Ocean Interface"**, benchmarking to the United Nations (UN) 2030 Agenda of Sustainable Development Goals. The scientific topics to be addressed were in marine geosciences, and included updating the Marginal Seas initiative roadmap, discussion of the establishment of a joint international academic organization, and potential support to the DDE program of IUGS. As the 10th Marginal Seas Expert Meeting, it supported communications for geo-marine sciences and technology between Chinese scientists and their international partners active in marine geosciences, including those addressing coastal and marine environmental research, mathematical geosciences, future projections of marginal seas' evolution, and its management for the upcoming decades.

The conference was held in a hybrid mode online and onsite. It was free of registration fee, organized and hosted by the GMGS/CGS in Guangzhou, China. The conference was structured into an opening ceremony, three topical sessions, three open topical discussion, and a conclusion, that took place over three days with oral and poster presentations, and discussions in the English language.

Six Main Targets

- Extension of the international Marginal Seas Research Network,
- Further development of fundamental and applied fields in Marginal Seas Research,
- Updating Marginal Seas Initiative's Roadmap to globalization,
- Co-construction of International Organization on Marginal Seas Sciences,
- Scientific support to DDE program and future DDE Marginal Seas Task Group's updating,
- Definition of the grand challenges of Marginal Seas Research as basis for the preparation of future research program and projects.

2. The Conference

The main venue sets in the GMGS Nansha Base in Guangzhou. The conference received 61 abstracts.

Opening ceremony:

During the opening session the participants of the conference were welcomed by. Prof. Zhenqiang Xu director general of GMGS and Prof. Xueyi Xu, vice president of CGS.

(Dr. Wojciech Jeglinski, director general of Marine Geology Branch of Polish Geological Institute-National Research Institute (PGI-NRI), Poland, and Prof. Dr. Kinga Flaga-Gieruszyńska, vice rector of the University of Szczecin, Poland, and Prof. Qiuming Cheng, past president of IUGS, Chairman of DDE Executive Committee, from China University of Geosciences, Beijing, China, attended the opening ceremony and delivered welcome speeches. Prof. Hanquan Zhang, vice director of GMGS chaired the opening ceremony on behalf of conference host and sponsors.

Representatives from the Division of Fundamental Geology, and Division of International Cooperation of CGS, and representatives from Guangzhou Municipal Science and Technology Bureau, as well as representatives from Nansha District Science and Technology Bureau attended the opening ceremony.

Scientific Program:

The scientific part of the conference was introduced by two plenary keynote lectures. During the topical sessions, four keynotes lectures and 41 regular lectures were delivered, and 11 poster lectures were presented.

Open Discussion:

Extended discussions summarized the results of each topical session and a final discussion session was held to conclude the general outcomes of the conference.

3. Keynote lectures

Jan Harff (University of Szczecin, Poland), gave an introduction to the motivation within the scientific community to establish the marginal seas initiative in 2019 starting with the 1st International Marginal Seas Expert Meeting on invitation of the Guangzhou Marine Geological Survey / China Geological Survey. He described the development of this initiative from a first phase A of base line studies to targets, chances and challenges of the phase B ***"Marginal Seas – Sustainable Future of the Interface between Continents and Oceans"*** in line with the UN Sustainable Development Goals to be launched with the current conference.

The second keynote lecture was presented by **Huodai Zhang**, who was a representative of the GMGS/CGS to introduce the multiple drilling vessels operated by GMGS.

4. Scientific Topical Sessions

The conference was structured into three sessions. The first session focusses on **Sources-to-Sink models and links to climate development** and was mainly devoted to using marine sedimentary records to reconstruct the evolution of environmental conditions and climate over a variety of timescales that required a detailed understanding of how sediment is transported from source areas into the ocean.

The second session on **River Mouth Systems and Urban Seas** was designed to address

interdisciplinary research with “Urban Seas” and estuarine systems amid multiple stresses from climate change and human activities. River mouth systems, where rivers meet the sea, are dynamic zones characterized by complex interactions between fluvial and marine processes, which play a crucial role in the dispersal of river sediments into coastal seas, influencing coastal morphology and sediment budgets.

The third session focused on **Biogeography - biostratigraphy from Deep-time among marginal seas** was anticipating to explore the biodiversity patterns, biogeographic processes, and biostratigraphy application in marginal seas, emphasizing the integration of micropalaeontological, ecological, and biological “big-data” in marine geosciences with the goal of aiding sustainable development.

4.1. Session 1

Sources-to-Sink models and links to climate development

***Conveners*:** Peter D. Clift (University College London, UK), Gaowen He (Guangzhou Marine Geological Survey, CGS, China), Wojciech Jeglinski (Polish Geological Institute-National Research Institute, Poland), Xinong Xie (China University of Geosciences, China).

Main topics addressed by presentations and discussions:

1) Processes that control sediment generation and transport.
2) Sediment transport in the coastal zone and along continental margins.
3) The anthropogenic impacts on coastal and delta sediment supplies.
4) Use of coastal and deltaic sediment to reconstruct past terrestrial environmental conditions.

Keynote lecture:

Peter D. Clift (Department of Earth Sciences, University College, London, UK) reported about “Controls on Sediment Flux to the Deep South China Sea”. He highlighted the influence of the monsoon on patterns and rates of erosion/sediment generation. He further showed how anthropogenic processes have influenced the composition of sediment in the modern rivers, thus making them poor analogs of the paleo-discharge into the South China Sea. The speaker

then discussed the risks for the Greater Bay area in the context of sealevel rise during the 21st Century. He noted that reduced sediment flux from the Pearl River since 1980 because of damming poses a threat to the sustainability of the coast around Lingding Bay when coupled with subsidence and sea level rise. Finally, he discussed what can be learned from scientific drilling of the continental shelves around the South China Sea.

Regular presentations:

Franto Novico (National Research and Innovation Agency, Indonesia) presented the paleoenvironmental evolution of Quaternary sediments in Jakarta Bay, Indonesia. The sedimentary record of Jakarta Bay highlights the roles of climatic and eustatic sea-level change as primary drivers of coastal evolution, with minimal influence from tectonic activity.

Gertrit J. de Lange (Utrecht University, Netherland) discussed how the most recent Mediterranean Sapropel S1 formed between 10.8 and 6.1 kyr BP. Sapropel formation mechanisms are related to the sensitive interplay between S and N borderland climate systems. Assessing distinct, sub-Milankovitch climate variability is vital for understanding and forecasting future climate change.

Jiawang Wu (Sun Yat-sen University, China) presented a unified framework of hydrodynamic proxies to constrain depth fluctuations of Mediterranean Outflow Water (MOW) over last 250 kyr, through records of the terrigenous grain-size sortable silt and benthic foraminiferal carbon isotopes from IODP Site U1588 on the Iberian Margin. The findings highlight precessional forcing of MOW northward propagation, including both strength and depth fluctuations.

Mingkun Li (Lingnan Normal University, China) reported a magnetic mineral dissolution study from three Late Holocene sediment cores from the inner shelf of the northern South China Sea. The dissolution front was delimited by acceleration of Late Holocene sediment accumulation in the inner shelf, especially over past 1-2 ka, which likely linked to intensified human activity.

Edlic Sathiamurthy (University Malaysia Terengganu, Malaysia) delivered a paleogeographic study of the Sundaland Marginal Sea since the Last Glacial Maximum (LGM) to Present. Rising sea level separated the landmasses and created sea connections (through flow) that altered sea circulation pattern and sea surface temperature profile in equatorial conditions, and

created ‘shifting’ wetlands ecosystem.

Ananna Rahman (South China Sea Institute of Oceanology, CAS, China) reported organic geochemical proxies and pollen analyses from sediment core from the middle Bay of Bengal. Two significant intervals ~36.9–29.1 ka in MIS 3, and ~7.8–6.9 ka in the Holocene Climatic Optimum, shown environmental transformation, by increased C_3 plant proportions and terrestrial input, driving from Indian Summer Monsoon intensity.

Junjie Deng (Sun Yat-sen University, China) presented a comparative study of bayhead delta evolution on the wave-dominated coast of Lake Illawarra, and tide-dominated Lingding Bay. The distinct evolutionary patterns provide diagnostic criteria for interpreting ancient estuarine deposits and crucial insights for predicting estuarine response to environmental changes.

Tingping Ouyang (South China Normal University, China) presented a study addressing Chinese River Sediment Bulletin and Remote Sensing data, giving broad introduction to variations in source-to-sink processes and sediment supply, and highlighting new changes in sediment transport and deposition in the Pearl River delta, under the stress of intensified global change and human activities.

Weiyi Sun (Nanjing Normal University, China) reported a study focused on transient simulations (iTraCE) to demonstrate that East Asia experienced greater winter warming compared to summer during the last deglaciation. Sensitivity experiments indicate that the inundation of continental shelf area due to rising sea-level played a critical role in driving these differential warming trends.

Fengling Yu (Xiamen University, China) reported a comparative analysis of seasonal samples of suspended particles and surface sediments from the river-estuary-bay continuum of two subtropical mountainous rivers, in southern China. The results provide vital information for effective management of these highly dynamic and sensitive ecosystems.

Licheng Cao (China University of Geosciences, Wuhan, China) presented the latest results of detrital provenance and geochronology from the oldest accretionary complex (Permian Bacuit Formation) of the Palawan Continental Terrane in West Philippines and from the Cretaceous strata (Baliojong Ocean Plate Stratigraphy) of the Sabah terrane in Northeast Borneo. The study reveals

the paleogeographic origins of the microcontinents and their implications for the evolution of the Paleo-Pacific Ocean and Proto-South China Sea.

Zhilong Cheng (Shantou University, China) reported a study investigating the Platform area, in the northwestern South China Sea, with new multi-proxy data, including Sr-Nd isotopes, grain-size distributions, and calcareous nannofossil records, to investigate sediment provenance and depositional processes in this area since the late Marine Isotope Stage 3 (MIS3).

Poster presentation:

Syeda Maksuda Yeasmin (South China Sea Institute of Oceanology, CAS, China) reported on a high-resolution study of pollen in sediment cores, sampled across the Sunda Shelf, to reconstruct mangrove development since the LGM. They found episodic sea-level anomalies related to El Nino-Southern Oscillation (ENSO) activity in late Holocene may have modulated local mangrove dynamics.

Shaohua Yu (Guangzhou Marine Geological Survey, CGS, China) reported vegetation changes inferred from pollen and carbon sink linkages in the Pearl River delta over the last millennium. Pearl River delta's environmental evolution since late Holocene reflects a superposition of climatic influence with population growth and land-use change, while in modern times human activities have become the decisive force governing changes in vegetation and the carbon cycle.

Zhiyuan Gao (Sun Yat-sen University, China) presented analyses of seismic reflection and bathymetric mapping to identify two distinct types of contourite deposit, mixed drifts (main in passive margins, Ross Sea and Weddell Sea) and small elongated drifts (active margins of the Antarctic Peninsula). The work emphasized the coupling between tectonic setting, slope morphology, and deep-water circulation in shaping Antarctic depositional systems.

Wenqin Jiang (China University of Geosciences, Beijing, China) presented shallow gas investigation by dense and high-resolution seismic profiles interpretation and clay minerals measurement, in the contact zone between the Yellow and Luan rivers and their subaqueous delta in Bohai Bay, China, exposing the intricate relationship between gas distribution and sedimentary processes for marine geohazards evaluation under the pressure of global warming.

4.2. Session 2

River Mouth Systems and Urban Seas

***Conveners*:** Joanna Dudzińska-Nowak (University of Szczecin, Poland), Junjie Deng (Sun Yat-Sen University, China), Gary Greene (Moss Landing Marine Laboratories, California, USA), Joanna Waniek (Leibniz Institute for Baltic Sea Research, Warnemünde, Germany), Yuanzhi Zhang (The Chinese University of Hong Kong, China)

Main topics addressed by presentations and discussions:

1) Definition and understanding of the Urban Seas as a complex marginal sea example.
2) Development of the coast in Holocene including dynamics and causes of sea-level rise, paleo-geographic reconstruction and numerical modelling of future scenarios as an important insight for further understanding the source-to-sink processes.
3) Pollution patterns and biological distribution of coastal lagoons and Coastal Vulnerability Index as an important factor for environmental management and ecological restoration of coastal zones.
4) Multidisciplinary and multiproxy approach for research and monitoring marginal seas crucial for risk assessment and mitigation strategies in coastal regions under the global warming.

Keynote lectures:

Wojciech Jegliński (Polish Geological Institute-National Research Institute, Gdańsk, Poland) in his key note lecture, gave a talk about geological research carried out since the early 21st century has significantly improved the understanding of the Holocene evolution of the Baltic coast in the Gdańsk region as an "Amber Coast", particular for Vistula River Mouth Area. The submerged part of the delta extends from several to about 20 km offshore, reaching depths of 60–65 m. The partial submergence of the delta occurred during the Littorina Sea Transgression, with the Vistula Spit forming along this transitional zone. The current morphology of the southern Gulf of Gdańsk coast has been shaped by the evolution of distributary channels within the Vistula Delta under conditions of Holocene sea-level rise,

combined with later anthropogenic modifications.

H. Gary Greene (San Jose State University, USA) in his key note lecture expressed the concept of Urban Sea Systems, with eight characterizations, as ports, hubs, nexuses, nodes, centers, sites, and drivers. The Salish Sea of the Pacific Northwest of USA is an example of an Urban Sea, a nearly enclosed marginal sea, an inland sea, that has two primary connections to the global Pacific Ocean. Many marginal seas are Urban Seas and can be characterized in the same way as Urban Sea Systems as both are influenced by their location and processes within distinct watersheds. He expressed the digital twin is important field in next steps of constructing for each of the characterizations listed.

Md Ashrafuzzaman (University of Chittagong, Bangladesh) gave a lecture entitled, "Dynamics and causes of sea level rise on the coastal region of southwest Bangladesh at global, regional and local levels", to replace the original abstract "River Mouth Systems and Urban Seas in the Baltic Region: Sources-to-Sink Dynamics and Anthropogenic Pressures", for supporting to MS Roadmap updating as including the Bay of Bengal.

Xuhui Dong (Guangzhou University, Guangzhou, China) reported the study to examine heavy metals and biological communities, including ostracods and foraminifera in 39 coastal lagoons in the South China. The findings provide essential insights into the pollution patterns and biological distribution of coastal lagoons and are also significant for environmental management and ecological restoration of coastal zones.

Marzia Rovere (Institute of Marine Sciences, CNR, Bologna, Italy) presented preliminary results of an interdisciplinary oceanographic cruise conducted in late 2023-early 2024 on board the CNR vessel Gaia Blu in different study areas located in the Gulf of Taranto, using a multidisciplinary and multiproxy approach from marine geophysical and geological data.

Jakub Miluch (Polish Geological Institute-National Research Institute, Gdańsk, Poland) presented a case study on paleogeographic numerical modeling of marginal seas – Baltic Sea, through application of conceptual Relative Sea Level (RSL) equation that allowed to generate a set of paleogeographic scenarios in Holocene with 500 year-time intervals.

Xing Wang (Tianjin Center, CGS, China) reported a study on quantitatively assessing the

eco-geological vulnerability of China's coastal zones, via Coastal Vulnerability Index (CVI). This index introduces key indicators to the evaluation system, providing scientific guidance for ecological restoration and conservation efforts in coastal regions from North to South China.

Shunling Wu (Third Institute of Oceanography, MNR, China) reported paleo-salinity reconstruction in the Taiwan Strait and its Implications for Minjiang River flooding and climate change over the past 330 Years, based on diatom records and a diatom-salinity transfer function to be used in two sediments cores, with established age framework by 210Pb analysis.

Fatin Izzati Minhat (University Malaysia Terengganu, Malaysia) gave a presentation to introduce the study and efforts in the past to safeguarding Straits of Malacca for sustainable development, initiated the Future Challenges.

Yuanzhi Zhang (City University of Hong Kong, China) delivered a comparison study on mangrove classification results derived from traditional satellite Landsat data with those obtained from AlphaEarth imagery in the Pearl River Estuary, China. The results demonstrate that AlphaEarth provides reliable information for small-scale land cover mapping and highlights its strong potential for rapid mangrove monitoring in coastal environments in the case study.

Poster presentation:

Muyi Zhang (Xiamen University, China) reported a study on a percussion core taken from the Zhangjiang estuary, southern China, with comprehensive measurement of sediments grain size, bulk organic $d^{13}C$, C/N, major-trace elements from XRF core scanning, and AMS ^{14}C dating, showing at least six major compound flooding events during 4300-500 cal. yr BP.

Yanren Zhou (Xiamen University, China) reported a study on provenance and transport patterns of particulate organic carbon (POC) in the Turbidity Maximum Zone of the Jiulong River Estuary, Southern China. The findings provide important insights for further understanding the source-to-sink processes of POC within the estuarine turbidity maximum.

Joanna Dudzińska-Nowak (University of Szczecin, Poland) reported coastline changes on the Polish Baltic Coast during the Last Millennium in light of dating submerged forests,

which shown numerous fossil depressions filled with lacustrine and marsh sediments that were accumulated in the Holocene period. This geomorphological situation significantly facilitated the rapid ingress of the sea onto low-lying land areas which proved the reconstructed rates of coastal change.

Note: We cannot report on Rudianto's (Brawijaya University, Indonesia) lecture, which was announced in the program, as the scientist passed away shortly before the conference.

4.3. Session 3

Biogeography - biostratigraphy from Deep-time among marginal seas

***Conveners*:** Jinpeng Zhang (Guangzhou Marine Geological Survey, CGS, China), Kevin McCartney (University of Maine at Presque Isle, USA), Yenny Risjani (Brawijaya University, Indonesia), Federica Foglini (The Institute of Marine Sciences of the National Research Council, Bologna, Italy), Baohong Chen (The Third Institute of Oceanography, MNR, China).

Main topics addressed by presentations and discussions:

1) Fossils biogeography and biostratigraphy of silicoflagellates, calcareous nannofossil, trace fossils (graphoglyptids, 14 ichnogenera and 19 ichnospecies) in deep-time and the palaeoecological, paleoclimatic, palaeoceanographic events study.
2) Reconstruction on primary productivity, paleo-salinity, paleo-elevation, coastal line, sedimentary environment in LGM and Holocene.
3) Modern organisms' biodiversity and distribution in coasts, and natural and human impact on epimicroplastic and imposex, via molecular identification analysis.

Keynote lecture:

Kevin McCartney (University of Maine at Presque Isle, USA) delivery interesting phenomena from his forty years of silicoflagellates study from skeletal shape, taxonomy, evolution throughout the 100 million years of their history. Silicoflagellates may well be the oceanic "canary in the coal mine", that numerous occurrences in the geological record where plexus events, shown by extreme abundance and unusual silicoflagellates skeletal morphologies, result from environmental stress. And he suggested marine microscopists should

be looking for these in the modern ocean.

Regular presentations:

Yenny Risjani (Brawijaya University, Indonesia) reported study on imposex in Marine Gastropods from the rapid industrialization, urbanization, and faster economic development area along the Java Island's coast. The work discovered excellent biogeographical indicators with limited dispersal, clear habitat preferences, and sensitive to pollutants, and biogeographic patterns of species' sensitivity, for exposing precious environment faces threats from various anthropogenic activities.

Nilufar Yasmin Liza (South China Sea Institute of Oceanology, CAS, China) reported a high-resolution study on sediment core from the ninety-east ridge in the Southern Bay of Bengal, over the last 53 kyr, based on quantitative analysis of coccolithophore assemblages' variations. The trend is influenced by monsoon winds variations, sea level fluctuations, and nutrient fluxes input.

Roman Marks (University of Gdansk, Poland) presented a talk about bubble mediated assembly of viral matter, which directly suggests that marine bacteria may be an immediate indicator for the appearance of new variants of viruses that could potentially spread to all biota. The research assumes that especially warming of the surface coastal water occurring in shallow marginal seas may be responsible for assembly of new RNA that may impact biota in the coastal seas.

Baohong Chen (Third Institute of Oceanography, MNR, China) reported the investigation in three bays in Fujian showing that epimicroplastic microalgae communities were mainly composed of diatoms and dinoflagellates. The study highlights prevalence of benthic microalgae on MPs and their change in vertical distribution, which are new discoveries in algal ecology and may have significant implications for marine primary productivity and marine food webs.

Poster presentation:

Elya Putri Pane (University of Brawijaya, Indonesia) reported findings represent of an unveiling *Halamphora* sp. at Balekambang Beach, through the molecular identification analysis, using the rbcL gene marker, which contribute to the documentation of diatom diversity in Indonesian coastal ecosystems.

Ali Hamadai (University of Hassiba Benbouali, Algeria) reported quantitative and

qualitative diatom analyses from the Hassi Manda sediment in Algerian Sahara lakes, providing evidence of Holocene lacustrine conditions linked to the African Humid Period. Shallow-water conditions with wide littoral zones and evaporation periods quickly emerged during 11,000 BP and 5,000 BP, from a Green Sahara to the Present Desert in last millennia.

Xiaoyu Chen (Xiamen University, China) reported comprehensive measurement on AMS^{14}C dating, grain-size, biogenic component of biosilica content and total organic carbon, and diatom to the sediments core in slope of Noth South China Sea, in order to reconstruct the sedimentary environment and paleoclimatic evolution processes since the LGM.

Wenhui Liu, (Xiamen University, China) presented a study develops and applies diatom-based transfer functions to quantitatively reconstruct late Holocene coastal environmental changes in the Zhangjiang estuary, southeastern China, especially for robust reconstructions of paleo-salinity and paleo-elevation.

Xiwen Xiao (Guangzhou University, China) gave a research result on ostracods and foraminifera as microfaunal indicators from 39 lagoons integrated analysis in South China. That highlight biogeographic patterns and paleoenvironmental reconstruction for improving understanding of environment evolution, coastal management, and biodiversity conservation.

Yasu Wang (Hainan University, China) presents a detailed record of calcareous nannofossil assemblages from the middle-upper Lengqingre and lower Gambacunkou formations exposed in southern Tibet, China. The section was an inner shelf setting of the eastern Tethys Ocean during the Late Cretaceous, responded to the Cenomanian–Turonian Oceanic Anoxic Event (OAE 2).

Changlong Xiang (China University of Geosciences, Wuhan, China) reported a research result from a comprehensive ichnofabric analysis for sand-rich deepwater Crocker Fan on the onshore Sabah, Borneo, Malaysia. The study of trace fossils graphoglyptids (ichnogenera & ichnospecies), offers valuable indicator of paleoenvironmental reconstruction and associated paleoecological changes in deepwater deposits in Oligocene–Lower Miocene.

Bouhameur Mansour (University Oran 2 Mohamed Ben Ahmed, Algeria) briefly introduced Messinian diatom assemblages of diatomites in the Lower Chelif basin (NW

Algeria), exposing accumulation of sapropel was probably controlled multi-factors: warmer sea surface temperatures, primary productivity (river runoff), increased stratification of water column, and periods of blooms accompanying possible upwellings in the Mediterranean.

Jinpeng Zhang (Guangzhou Marine Geological Survey, CGS, China) gave a brief introduction on preliminary results about big-data analysis on public literatures and sediment materials measurement, to record the species presence and abundance in known diatom ooze and diatomite, for Deep-Time biogeography and biostratigraphy study.

Note: Cüneyt Nadir Solak from Dumlupınar University, Kütahya, Türkiye made mistake of the local time zone, thus did not present the lecture *Halamphora* diversity in Turkish coasts.

4.4. Others

Rifqi Ibrahim (Universitas Brawijaya, Indonesia) presented on the topic of blue-economy geopolitics in the South China Sea, a typical marginal sea with overlapping Exclusive Economic Zone claims, intensifying fisheries exploitation, and rapid port expansion, from the view of interdependence, risk and opportunities for cooperation, under ongoing ASEAN-China negotiations, and other bilateral arrangements. He highlighted the need for collaborations if marine resources are to be sustainably exploited.

Hangjun Xian (China University of Geosciences, Wuhan, China) reported investigation on the origins of overpressure in the Dongfang area, Yinggehai Basin, NW of South China Sea, by utilizing well log combinations, loading-unloading curves, and acoustic velocity-density cross-plots.

Sijia Huang (China University of Geosciences, Wuhan, China) reported the study to explore the application of deep learning methods in wave spectrum reconstruction based on Wave Watch III model data, and to conducts a comparative study with traditional methods.

5. Open Discussion Sessions

5.1. Discussion Session 1

Updating Marginal Seas Initiative's Roadmap

***Host*:** Peter D. Clift (University College London, UK)

Peter Clift gave a brief introduction on "DDE Marginal Sea Task Group", including the joint work conducted during Phase A, "Marginal Seas Base Line Studies" (2021–2024) and Phase B "Marginal Seas - Sustainable Future of the Interface between Continents and Oceans (2024-Present).

Joanna Dudzinska-Nowak gave a presentation, entitled "Baltic Sea Future Plans: Southern Baltic Sea coast", to present on the subject of coastal problems and needs for the safe coasts and Integrated Coastal Zone Management, particularly in coastal research related to deep-time understanding of coastal zone morphodynamics and development over different time scales (up to millennia in duration). In addition, a joint work plan for understanding the evolution of the Pearl River and South China landscape was presented.

Grzegorz Uścinowicz gave a brief introduction on the "Area of interest" in Gulf of Gdańsk and the Vistula Delta. He emphasized the need for integrated research covering both the terrestrial and submarine parts of the delta in light of new data, the extensive archival geological materials (which require reinterpretation), and the unique character of the area resulting from the strong influence of riverine processes shaping the modern delta and their interactions with marine dynamics. In summary, the area is significant for three main reasons: (1) it has high economic importance due to the presence of the Gdańsk–Sopot–Gdynia metropolitan area and major seaports; (2) the Polish Geological Survey possesses a substantial archive of geological data that can be reprocessed and used for new research and practical applications; and (3) the area represents a unique natural system illustrating the complex interactions between continental (the Vistula River as the largest river in the Baltic catchment) and marine processes.

Marzia Rovere gave a presentation to introduce "various Marginal Seas of the Mediterranean Region", including the Adriatic Sea, the Ionian Sea and the Tyrrhenian Sea.

These areas are characterized by multiple stressors including contamination from industrial coastal sites and climate change (e.g. both heat waves and deep-sea heat accumulation) combined with a region characterized by coastal and open-sea marine geohazards (submarine volcanoes, landslides, faults), complex ocean circulation (deep and thermohaline) and very little know biodiversity.

Franto Novico gave a brief introduction on "Proposed Area: Java Sea and adjacent areas (Karimata Strait, Riau Archipelago area)", delivering important information, that 1) problems in Abrasion, erosion, subsidence, coastline retreat, 2) extremely events by earthquake, tsunami, flood, etc., and human activities impact on subsidence, those amplify the risks along coast and bay area.

Yenny Risjani gave a presentation to introduce Flores Sea, Banda Sea and adjacent area for sustainable future from the view of algae biology and biodiversity hotpots of Sundaland and Wallacea. She delivered the analysis of subseries of problems, habitat loss, pollution, climate change, land-based activities caused threat, etc., and plan for future prospect of international cooperation in roadmap.

Fatin Izzati Minhat gave presentation to introduce conservation and management on the Strait of Malacca. She delivered an important concept of "effective conservation requires robust strategies and collaboration among various stakeholders to protect the strait of Malacca's ecological integrity." Environmental challenges-climate change and pollution in the Strait of Malacca that need monitoring and research with collaborative efforts by integrating science, policy, and communities to pave a way for a resilient ecological future.

Jinpeng Zhang, Fengling Yu and Liping Liu, joint gave a presentation to introduce the "China Seas" for a joint work plan in the northern South China Sea, Taiwan Strait, Bohai Sea and Yellow Sea, 1) Integrate data and documents, 2) Paleogeography, paleoceanography, and natural environment in Last Glacial Cycle (LGC), Holocene and Anthropocene (Late Quaternary scale), 3) Future expectations up to 2100 CE, 4) strategic suggestions for sustainable development. Because of the geological conditions and specific field conditions, each sea area has a little different detail in the main work content. This roadmap is described

by researchers across different institutions and in areas from south to north China.

Furthermore, Md Ashrafuzzaman gave a presentation on October 15th in which he introduced the Bay of Bengal before this discussion session, entitled "Dynamics and causes of sea level rise on the coastal region of southwest Bangladesh at global, regional and local levels". His presentation delivered important information concerning the coastal geology of Bangladesh, a nation at extreme risk under climate change, that 1) sea-level faster rising in the Bay of Bengal, causes submergence and flooding, 2) tropical cyclones are likely to become more intense. 3) coastal waters are warming and acidifying with high confidence, 3) a net decline in freshwater input is expected for the region.

Discussion results:

1) Most of Members do the own things, that need collaboration and do comparison study.
   Joanna Dudzinska-Nowak and Franto Novico expressed preliminary interest in coastal comparison study in Baltic Sea and Java Sea. Joint collaboration in South China Sea is coming up with more institutions.
2) The geological scale of the previous Marginal Seas Initiative, should be extended to Pleistocene, because of new materials for joint work and frequency interglacial and glacial cycles in Pleistocene for understanding paleoclimate, paleoceanography, and paleoenvironment.
3) New key-areas are added to the Marginal Seas Initiative, including the Java Sea, Flores Seas, Banda Sea, especially in the coastal areas of Indonesia, and the northern Bay of Bengal. New members are added from Indonesia, Bangladesh and Malaysia. Their research areas have more sensitivity to climate change and sea-level rise, because of the huge populations living along the coast, and complicated tectonic and geological background.
4) Gulf of Mexico (Gulf of America), Gulf of California are suggested to be taken into account for the Marginal Seas Initiative with America and Mexican researchers, especially for enlarging the initiative to a global scale.
5) How will the Marginal Seas Initiative work?
   To set a program and apply research projects from international support/financial sources

and national grants and local investment. Except for the IUGS-DDE grants, the UN Sustainable Development Program is a good platform for our Marginal Seas initiative, followed by a search for national and local funding to support joint work.

6) Joanna Dudzinska-Nowak expressed the successful cooperation between USZ and GMGS and other partners for research and noted that the series of Szczecin Marginal Sea Webinars for education and training, allowing these experiences can be shared with others.

7) For enhancing climate system, geological system, ecosystem and socioeconomic system research, as a quadrangle important relationship in our Marginal Seas Initiative, we invite ecological researchers from Indonesia and Malysia who have established backgrounds in international cooperation and fruitful achievements. Examples we might emulate include the recent work by Fengling Yu and her work team that was recently published in *Nature*.

5.2. Discussion Session 2

Co-construction of International Organization on Marginal Seas Sciences

***Host*:** Jinpeng Zhang (Guangzhou Marine Geological Survey, CGS, China),

Jinpeng Zhang gave a presentation, entitled "International Association for Marginal Seas Sciences, Co-discussion, Co-construction, Co-sharing", to introduce co-construction on new International Organization "IAMSS". The contents included property, purpose/mission, scope of activities, funds for activities and their sources, domicile, members, organizational structure, the Council, Secretariat, national offices, academic committee, management advisory committee, and plenary assembly. A paper copy was distributed to the participants in the meeting room for joint discussion.

The attending participants in-site and online delivered the following comments:

1) There needs an introduction to explain why we need this IAMSS, to express the significance. We need clarify concerning the specific rationale, what has been done and what we need to discuss.

2) The disciplinary fields should be broadened, and need an interdisciplinary approach considering geo-, eco-, socio-economic system and climate

3) We need to think about a set of programs to gather researchers for projects, plus how to generate the support grants.

4) At beginning stage, the charter and organizational structure should be simpler and briefer, before going forward to next stage.

5) We need to take into account the different conditions and background of countries and regions. For example, national offices may not be needed in countries with just a fewer members. While, countries with larger research communities like China and Indonesia may need a national office to take charge of domestic affairs for IAMSS development.

6) Regarding the proposed Management Advisor Committee, the participants were worried about the structure, but other participants commented that this is needed to recruit and invite partners and members.

7) Concerning the relationships with IUGS and DDE, if we want to affiliate with IUGS, we need prepare documents following IUGS rules and communicate more with IUGS president and council, before applying to and receiving approval in a IUGS council meeting.

Jinpeng Zhang mentioned that this IAMSS could follow the example of DDE that is planning to establish an international scientific organization to be affiliated to IUGS, according to Chinese law. The IAMSS as a new organization for worldwide researchers related to Marginal Sea Sciences, could apply for support from China Association for Science and Technology, then affiliate to IUGS. [Note: To compare with DDE activities see the minutes of the 10th DDE Governing Council (GC) meeting of Dec. 9 and 11, 2025, (http://ddeworld.org/events/detail/350, 2026-1-4)]

Jan Harff made advice that we should discuss a global program for marginal seas sciences with the Intergovernmental Oceanographic Commission (IOC) of the UNESCO, and seek corresponding financial support.

8). About the membership.

-- Jinpeng Zhang reported that according to the preliminary demand to register the IAMSS, under the support of China Association for Science and Technology, 15 overseas institutional members and 50 overseas personal members are needed. Participants on-site worried about willingness of their institutional membership because of current financial and political stresses.

-- According to Participants onsite with PhD or Postdoc position, those require the student

membership, we get a common sense that as an international association the door is open to students and young generation.

5.3. Discussion Session 3

Potential Support to DDE program

***Host*:** Jinpeng Zhang (Guangzhou Marine Geological Survey, CGS, China),

Prof. Qiuming Cheng, Chairman of DDE Executive Committee, Chairman of DDE General Experts Group in China, from China University of Geosciences, Beijing, China, gave a lecture entitled "Deep-time Digital Earth Big Science Program". His presentation with four main parts Background, Overview of DDE, Progress of DDE, and Future Outlook. He appreciated the DDE Marginal Seas Task Group with series of positive and active actions to support the DDE development and clarified the continuable support from DDE to Marginal Seas Task Group in new stage. Due to this transition period to early 2026, when IUGS evaluate DDE Program, the DDE has independent status to run the domestic and international affairs in order to promote DDE growing up and enlarge business.

Prof. Minghua Zhang, from DDE Standard Work Group attend the discussion, expressing the sincerely appreciation to DDE MS TG on collaboration for DDE meta data standard research, and delivering the continent cooperation willing in new stage.

The attending participants online and onsite addressed several questions to DDE work progress, including the evaluation results to MS TG report and R&D project report (2021-2024), the next step activities and grants support, the new potential member join in, etc. MS TG is interested to enhance the collaboration with other DDE work groups, e.g., with Standard Work Group to research the metadata in MS field.

The results are, DDE already gave comment to MS TG report and R&D project report (2021-2024), but need wait council meeting to release the result. Due to its independent status, DDE welcomes more experts to take concern and join in DDE, and co-construct the regional center as well. The grant in new stage on the Chinese side mainly from Ministry of Science and Technology, China, while still wait a time to confirm proposal calling.

6. Conference Summary

As the tenth Marginal Seas experts meeting with thematic **"Marginal Seas - Sustainable Future of the Continent/Ocean Interface"**, benchmarking to the United Nations 2030 Agenda of Sustainable Development Goals, the conference supported researchers' communication in geo-marine science and technology among the international partners, including the coastal and marine environmental research, fundamental geology, marginal sea future projections and management for the upcoming decades. It also provided opportunity for multidisciplinary collaborative research in the field of marine sciences, as several actions or plans are express the strong demand international cooperation in the coming future.

The scientific lectures and discussions encourage the organizers to continue the tradition of scientific conferences on marginal sea issues (International Marginal Seas Expert Meetings). The initiation of new joint international research program and projects is emphatically supported. The joint international science and technology organization (International Association for Marginal Seas, IAMSS) is anticipating to be creation for the broad collaboration among the researchers. In this way, the relatively new and modern fields of marginal sea research can be further developed in a targeted manner.

6.1. Summary of Scientific Sessions

1) Sources-to-Sink models and links to climate development (Session 1):

Session 1 focused on the process of sediment transport from source mountains, their storage and recycling in flood plains and on continental shelves, and the final deposition in deep water repositories. A number of studies were presented spanning a variety of systems but especially addressing transport systems in Antarctica, the Mediterranean Sea and across SE and East Asia. The Pearl River and the South China Sea were particular locations of interest. Provenance methods involving zircon U-Pb dating and radiogenic isotopes have demonstrated that erosion patterns within the Pearl River basin are linked to rainfall patterns and thus monsoon intensity. It was concluded that this pattern must have changed through glacial cycles as the monsoon waxed and

waned. Once the sediment leaves the Pearl River it is transported to the west by long-shore currents and has been stored on the inner shelf during the Holocene (<10 ka). Loss of this sediment from the coastal zone impedes its use in preserving the coast from the effects of future sea level rise. Sediment will only reach the deep basin after being reworked during the next glacial lowstand. The sediments deposited on the shelf represent different parts of the sealevel cycle and are often separated by sharp unconformities. Another study show that magnetic and chemical proxies within the sediment of the Pearl River Delta indicate recent changes in provenance that are linked to human settlement of southern China, the onset of agriculture and the development of industry. Similar surveys in the near offshore in the Java Sea show stacked packages formed of marine, deltaic and even lowstand fluvial and channelized sediments.

Not only climate has impacted the river but also human settlement and especially the start of agriculture which intensified soil erosion and caused the sediment reaching the ocean to become more chemically altered. Magnetic properties in these sediments allow the division of the sediments into three packages spanning the Late Holocene. Mass accumulation rates have shown a sharp increase over the last 2000 years in southern China reflecting the onset of intense agriculture in the region. Several studies examined the issue of reconstructing paleogeography in the past. A study focused on the Sunda Shelf and more broadly across Sundaland indicates that accurate reconstructions are only possible after a correction for the sediment accumulation, including a correction for the companion of those sediments. Rising sea levels across the Sunda shelf following the LGM resulted both in the termination of the extensive regional river systems that flowed across the shelf during the sea level low stand, as well as the elimination of a corridor of savanna north of the island of Java in what is now the Java Sea. In turn, this flooding of the continental shelf had an impact on rainfall and oceanic circulation patterns because the presence of sea provides a source of moisture to the adjacent land. As the flooding takes place bodies of water are connected through gateways allowing new circulation patterns to develop. A study of pollen records from the Bay of Bengal was presented and combined with stable carbon isotopes that show that C3 vegetation, which is mostly representative of trees, tended to dominate the Ganges-Brahmaputra drainage system during MIS3 and MIS1 which are times of strong monsoon. Conversely more C4 vegetation, which is represented more by grass, tends to dominate during the dryer LGM and MIS2.

Studies of river mouth and delta sediments show that these are strongly affected by wave and

title activity. Along wave dominated coasts such as seen in Southeast Australia sediment distribution away from the river mouth was significant, although the development of bayhead deltas was also dependent on the rate of sediment supply. This type of delta contrast with tidal systems such as the Pearl River mouth, which shows the development of large bayhead deltas that prograde oceanwards but are rotated as a result of interaction with the tidal systems. The angle between the discharge and the tidal currents is critical in shaping the rotation.

A remote sensing study of sediment discharge from deltas across the entire planet shows that sediment flux to northern hemisphere rivers has decreased by 50% in the recent past because of increased damming and this contrast with southern hemisphere rivers where sediment flux has increased sharply as a result of deforestation. Looking specifically at the Pearl River, we see that reduced sediment flux has made the coast of the delta vulnerable to transgression.

Mangroves and their associated wetlands are an important part of many coastal systems across Southeast Asia and a survey of this region showed that during the LGM mangrove wetlands were very sparse across coastal Indochina and that this contrasted with the LGM of the Sunda Shelf which was heavily populated by mangroves because of the wide and low topography of the region. Deglaciation and associated sea level rise fostered the development of more mangrove friendly settings. The wetlands in which the mangroves grow can be important sinks of carbon in the form of peat. The seaward advance of the Pearl River delta is a good example of efficient carbon storage in peat bogs. In general, during the Holocene the Pearl River Delta transitioned from being a region dominated by lagoons to one of delta plain activities and this impacted the type of vegetation that developed across the delta. In particular forest on the Pearl River Delta were seen to be impacted by the Little Ice Age, as well as the Medieval Warm Period.

Since the 1850s the Pearl River Delta has transitioned to being a source of carbon to the atmosphere rather than a sink as a result of the extensive land reclamation. Other sources of carbon in coastal marine settings include venting of gas through the Quaternary sediments in the Bohai Sea. In this region gas is being vented through chimneys via a series of strata whose architecture is controlled by sea level variation. Gas distribution within the shallow sub-surface is linked to the mass accumulation rate, the mineralogy of the clay assemblages and the grain size which controls the physical properties and therefore the reservoir characteristics of these strata.

Further work was done in the Mediterranean looking at the interaction of climate and

discharged to that body. It was seen that chemical proxies can be used to constrain some of the processes. For example, Ba/Al can be used as a proxy for biological productivity whereas Ti/Al is a proxy for aridity. These proxies were used to show that biological production in the Mediterranean is modulated by orbital cycles reflecting rainfall and therefore discharge in the regional river systems. In turn this affects the Mediterranean Outflow Water (MOW) which is an important component of North Atlantic circulation. The use of sortable silt as well as carbon isotopes in foraminifers can be used to show that the strength of the MOW and its depth vary over orbital cycles. During glacial times the MOW moves to deeper levels because of cooling of Mediterranean waters coupled with melting events in the North Atlantic, which vary over precessional timescales. Antarctica also provides an interesting example of processes in marginal seas. Drift deposits in particular develop on the continental margins under the influence of the Circum Antarctic Current. However, the drift deposits form different geometry in different locations. On passive margins contourites accumulate together with gravity mass wasting deposits. This contrasts with the active margins, particularly in the Antarctic Peninsula, where elongated drifts form as a result of the rugged topography on the continental margin.

Finally, a study of sustainability in the coastal oceans of Southeast Asia shows that these are threatened by climate change, sea level rise, pollution as well as human construction activities on the coast or within the ocean basin themselves. It was concluded that international agreements are important for preserving their sustainability and that international cooperation between scientists is critical if we are to have comprehensive research across national boundaries.

2) River Mouth Systems and Urban Seas (Session 2):

Session 2 focused on broad spectrum of topics related to marginal seas research. Starting from definition and understanding of the Urban Seas, which are a good example of marginal seas influenced by their location and processes within distinct watersheds. Taking into account that many marginal seas are Urban Seas and can be characterized in the same way, proposed definition can be a good starting point to future research on global comparison of the marginal seas. Another aspect raised concerned the development of the coast and basin of the Baltic Sea in Holocene, including dynamic and causes of sea level rise, paleogeographic reconstruction and numerical modelling of future scenarios as a important insights for further understanding the source-to-sink processes. From

geological investigations which significantly improved the understanding of the Holocene evolution of the Baltic coast in the Gdańsk region, to paleo-geographical environmental reconstruction of the basin sedimentation processes based on paleogeographic numerical modeling with application of conceptual Relative-Sea Level (RSL) equation resulted a set of paleogeographic scenarios in Holocene with 500 year-time intervals.

Presented results also focused on impact of sea level rise and flooding on the coastal regions, showing dynamics and causes of sea level rise on the coastal region of southwest Bangladesh in local, regional and global scales. Study based on a percussion core taken from the Zhangjiang estuary, southern China shows at least six major compound flooding events during 4300-500 cal. yr BP. Diatom records allowed to provide paleo-salinity reconstruction in the Taiwan Strait and its implications for Minjiang River flooding and climate change over the past 330 years.

The presentations also highlighted the study on provenance and transport patterns provide important insights for further understanding the source-to-sink processes of POC as well as pollution patterns and biological distribution of coastal lagoons and Coastal Vulnerability Index as an important factor for environmental management and ecological restoration of coastal zones.

Finally for future research and better understanding the processes, the multidisciplinary and multiproxy approach from marine geophysical and geological data to satellite RS data for research and monitoring marginal seas, crucial for risk assessment and mitigation strategies in coastal regions under the global warming, was presented.

3) Biogeography - biostratigraphy from Deep-time among marginal seas (Session 3):

Throughout this session, we have explored a wide range of studies that together bridge deep-time paleoenvironmental reconstructions and modern ecological monitoring. From ancient diatoms and coccolithophores to present-day mangroves and microalgae, each presentation has contributed to a deeper understanding of how marine ecosystems record and respond to environmental changes through both natural processes and human impacts.

We began with a fascinating overview of silicoflagellates as early indicators of environmental stress, followed by an important case highlighting marine gastropods biogeography and their imposex incidence as a bioindicator of pollution.

The subsequent talks carried us through the geological past—from deep-sea trace fossils,

coccolithophore productivity, to calcareous nannoplankton responses during major oceanic anoxic events, —each revealing how biotic assemblages can trace the evolution of marine environments and climate through time.

Modern perspectives were equally compelling: studies on mangrove mapping using AlphaEarth imagery, microplastic pollution impacts, and diatom-based reconstructions of coastal and lagoonal environments, all highlighted the value of integrating advanced remote-sensing and biological approaches for present and future ecosystem management.

In this session, biogeography and biostratigraphy from deep time among marginal sea, have highlighted the importance and the role of marine organisms occupied in the ecosystem of marginal seas from USA, Indonesia, Malaysia, Borneo, Bengal Bay, Pearl River in China, South China Sea, East Asia and Pacific Ocean.

Together, these presentations illustrate a clear message — that the integration of biogeography and biostratigraphy, across spatial and temporal scales, provides powerful insights into ocean history, biotic adaptation, and anthropogenic stress. They remind us that understanding our planet's past is essential for predicting and mitigating future environmental change.

6.2. Summary of Open Discussion Sessions

1) To the MS initiative roadmap updating

-- Enlarging to a globalization initiative for Marginal Seas research.

-- New key seas areas, Gdansk Bay, Ionian Sea and Tyrrhenian Sea, Java Sea, Flores Sea, Banda Sea, Bay of Bengal are joining in the MS initiative.

-- New members from Indonesia, Malaysia, Bangladesh are joining in the MS initiative.

-- To develop a program in UN programs, Decade of Ocean Science for Sustainable Development and the International Decade of Sciences for Sustainable Development.

-- To search international, national, and local grants/support for joint research on MS Initiative.

2) To IAMSS construction

To continue communication on co-construction the "International Association for

Marginal Seas Sciences (IAMSS)" whereby in a transition time the group of international researchers established as the DDE Marginal Seas Task Group could function as a "Marginal Seas Initiative Group" and form also the nucleus of an IAMSS.

3) To support DDE Program

On the basic of MS TG work in 2021-2024, in new stage in term of DDE structure and situation re-shaped, and IUGS evaluation by next year, MS TG will update the group members and enhance the collaboration with other DDE work groups, to promote DDE internationalization development. MS TG work will continue to apply the grants in DDE program, according to DDE demand.

7. Conference photos

Conference photos

from GMGS/CGS website

from GMGS/CGS website

from GMGS/CGS website

8. Appendix 1: Conference agenda

Conference Agenda

14-17th October, 2025 (Meeting)

Opening Ceremony

UTC/GMT+8 Time zone (Beijing Time).

Time/14th	Issue	Speaker/Affiliation/Local time	Host
15:00-15:10	Welcoming words	Zhengqiang Xu, Director General, Guangzhou Marine Geological Survey, CGS, China	Hanquan Zhang, Deputy Director, GMGS
15:10-15:15	Opening the conference	Xueyi Xu, Vice President, China Geological Survey, China	
15:15-15:20	Brief speech	Wojciech Jeglinski, Leadership of Polish Geological Institute-National Research Institute, Poland	
15:20-15:25	Brief speech	Kinga Flaga-Gieruszyńska, Vice Rector, University of Szczecin, Poland [9:20am, Szczecin] on-line	
15:25-15:30	Brief Speech	Qiuming Cheng, Academician, China University of Geosciences, Beijing, China [15:25, Beijing] on-line	
15:30-15:45	Group photo		
15:45-15:50	Video adjustment		

Time/14th	Plenary lecture	Speaker/Affiliation/Local time	Host
※15:50-16:20	Marginal Seas Sciences – Chances and Challenges	Jan Harff, Academician, University of Szczecin, Poland [9:50 am, Szczecin] on-line	Jinpeng Zhang
※16:20-16:45	Introduction of multiple drilling platforms of GMGS	Huodai Zhang, Representative, Guangzhou Marine Geological Survey, CGS, China	
16:45-17:05	Exhibition Hall visit		

(※, keynote speech, green colour remarks the on-line presentation)

Scientific Session One: Sources-to-Sink models and links to climate development

Time/15th	Lecture	Speaker/Affiliation/Local time	Host
※9:00-9:20	Controls on Sediment Flux to the Deep South China Sea	Peter D. Clift, London University College, UK	Grzegorz Uścinowicz
9:20-9:35	Paleoenvironmental Evolution of Quaternary Sediments in Jakarta Bay, Indonesia	Franto Novico, National Research and Innovation Agency, Indonesia	
9:35-9:50	Formation and Preservation of Mediterranean Organic-rich S1 unit; Diagenetic Control and Variability	Gertrit J. de Lange, Utrecht University, Netherland	
9:50-10:05	Magnetic mineral dissolution front delimited by Late Holocene sediment accumulation acceleration in the inner shelf, northern South China Sea	Mingkun Li, Lingnan Normal University, China	
10:05-10:20	Sundaland Marginal Sea (Last Glacial Maximum to Present) - Implications	Edlic Sathiamurthy, University Malaysia Terengganu, Malaysia	
10:20-10:35	Indian Summer Monsoon-Driven Organic Carbon Dynamics and Vegetation Shifts in the Bengal Basin Since 37 ka: A Multi-Proxy Approach	Ananna Rahman, South China Sea Institute of Oceanology, CAS, China	
20 minutes	Breaktime		
10:55-11:10	A Comparative Study of Bayhead Delta Evolution under Wave-Dominated and Tide-Dominated Estuarine Settings: Case Studies from Southeastern Australia and the Pearl River Estuary, China	Junjie Deng, Sun Yat-sen University, China	Peter Clift
11:10-11:25	Impact of source-to-sink process variation and sediment supply on sustainable future of coastal ecosystem	Tingping Ouyang, South China Normal University, China	
11:25-11:40	Depth fluctuations of Mediterranean Outflow Water along its northward propagation during the late Pleistocene	Jiawang Wu, Sun Yat-sen University, China	
11:40-11:45	Mangrove evolution across the Sunda Shelf driven by sea-level and tropical climate changes since the Last Glacial Maximum 【poster】	Syeda Maksuda Yeasmin, South China Sea Institute of Oceanology, CAS, China	
11:45-11:50	Pollen-inferred vegetation change and carbon sink linkages in the Pearl River Estuary over the last millennium 【poster】	Shaohua Yu, Guangzhou Marine Geological Survey, CGS, China	
11:50-11:55	Contrasting Contourite Systems Along Antarctic Margins: Mixed vs. Elongated Drift 【poster】	Zhiyuan Gao, Sun Yat-sen University, China	

11:55-12:00	The impact of multi-source sediment supply in subaqueous deltas on the distribution of shallow gas: Insights from northern Bohai Bay, China 【poster】	Wenqin Jiang, China University of Geosciences, Beijing, China	

Scientific Session Two: River Mouth Systems and Urban Seas

Time/15th	Lecture	Speaker/Affiliation/Local time	Host
※15:00-15:20	The Vistula River Mouth Area: Holocene Development of the Sea Coast in the Gdańsk Area	Wojciech Jegliński, Polish Geological Institute-National Research Institute, Poland	Joanna Dudzinska-Nowak
15:20-15:35	River Mouth Systems and Urban Seas in the Baltic Region: Sources-to-Sink Dynamics and Anthropogenic Pressures	Md Ashrafuzzaman, University of Chittagong, Bangladesh [13:20, Dhaka] on-line	
15:35-15:50	Coastal lagoons as a transitional zone between land and sea: insight from heavy metals and modern biological communities in surface sediments	Xuhui Dong, Guangzhou University, Guangzhou, China	
15:50-16:05	Multidisciplinary study of the northern Ionian Sea: from fluid seepage to environmental change	Marzia Rovere, CNR, Istituto di Scienze Marine Bologna, Italy	
16:05-16:20	Restoration of Coastal Ecosystems as an Approach to the integrated Mangrove Ecosystem Management and Mitigation and Adaptation to Climate Changes in North Coast of East Java	Rudianto Rudianto, Brawijaya University, Indonesia	
16:20-16:35	Paleogeographic numerical modeling of marginal seas – Baltic Sea case study	Jakub Miluch, Marine Geology Branch, PGI, Poland [10:20 am, Warsaw] on-line	
20 minutes	Break time		
16:55-17:10	Evaluation of Ecological and Geological Vulnerability of China's Coastal Zone	Xing Wang, Tianjin Center, CGS, China [16:55, Beijing] on-line	Joanna Waniek (Replaced by Dudzinska-
17:10-17:25	Paleosalinity Reconstruction in the Taiwan Strait and its Implications for Minjiang River Flooding and Climate Change over the Past 330 Years	Min Chen, Third Institute of Oceanography, MNR, China	
17:25-17:30	Messinian diatom assemblages of diatomites in the Lower Chelif basin (northwestern Algeria) 【poster】	Bouhameur Mansour, University Oran 2 Mohamed Ben Ahmed, Algeria [10:25am, Algiers] on-line	

17:30-17:35	From a Green Sahara to the Present Desert: Example of Holocene Lacustrine Sedimentation at Hassi Manda (Erg Er Raoui, Tabelbala, Algerian Sahara) 【poster】	Ali Hamadai, University Oran 2 Mohamed Ben Ahmed, Algeria [10:30am, Algiers]	Nowak)
17:35-17:40	Late-Holocene compound flood records in southern China: Implications for subtropical coastal hazards【poster】	Muyi Zhang, Xiamen University, China	
17:40-17:45	Provenance and Transport Patterns of Particulate Organic carbon in the Turbidity Maximum Zone of the Jiulong River Estuary, Southern China【poster】	Yanren Zhou, Xiamen University, China	
17:45-17:50	Coastline Changes on the Polish Baltic Coast During the Last Millennium in Light of Dating Submerged Forests【poster】	Joanna Dudzińska-Nowak, University of Szczecin, Poland	

Scientific Session Two: River Mouth Systems and Urban Seas

Time/16th	Lecture	Speaker/Affiliation/Local time	Host
※9:00-9:20	Progress in Defining Urban Sea Systems – A Marginal Seas Exercise	H. Gary Greene, San Jose State University, USA [18:00, California] on-line	Marzia Rovere

Scientific Session Three: Biogeography - biostratigraphy from Deep-time among marginal seas

Time/16th	Lecture	Speaker/Affiliation/Local time	Host
※9:20-9:40	Silicolagellates as the “canary in the coal mine”	Kevin McCartney, University of Maine at Presque Isle, USA [21:20, Maine] on-line	Marzia Rovere
9:40-9:55	Indonesian Biogeography of the Incidence of Imposex in Marine Gastropods as Bioindicator of Pollution	Yenny Risjani, Brawijaya University, Indonesia	
9:55-10:10	Diverse deep-sea trace fossils from the Crocker Formation, northwestern Borneo, Malaysia	Changlong Xiang, China University of Geosciences, Wuhan, China	
10:10-10:25	Primary productivity variations in the Southern Bay of Bengal since the last glaciation:	Nilufar Yasmin Liza, South China Sea	

	evidence from coccolithophores	Institute of Oceanology, CAS, China	
20 mites	Break time		
10:45-11:00	Mangrove monitoring using Landsat data and AlphaEarth data in Pearl River Estuary (China)	Yuanzhi Zhang, City University of Hong Kong, China	Yenny Risjani
11:00-11:15	Microplastic pollution and response of microalgae	Baohong Chen, Third Institute of Oceanography, MNR, China	
11:15-11:30	Continental shelf area inundation drove reduced temperature seasonality in East Asia during the last deglaciation	Weiyi Sun, Nanjing Normal University, China	
11:30-11:35	Calcareous Nannoplankton Response to the Cenomanian–Turonian Oceanic Anoxic Event (OAE 2) in the eastern Tethys: evidence from southern Tibet【poster】	Yasu Wang, Hainan University, China	Baohong Chen
11:35-11:40	Unveiling *Halamphora* sp. from Balekambang Beach, Malang Regency, Indonesia: Morphological and Molecular Insights【poster】	Elya Putri Pane, University of Brawijaya, Indonesia	
11:40-11:45	Sedimentary Diatoms and Paleoenvironmental Significance Since the Last Glacial Period in the Northern South China Sea【poster】	Xiaoyu Chen, Xiamen University, China	
11:45-11:50	The Application and Development of Diatom Conversion Function in the Study of Coastal Environmental Evolution【poster】	Wenhui Liu, Xiamen University, China	
11:50-11:55	Biogeographic Patterns and Paleoenvironmental Reconstruction of Coastal Lagoons of South China: Insights from Ostracods and Foraminifera【poster】	Xiwen Xiao, Guangzhou University, China	
11:55-12:00	Deep-Time diatomaceous ooze -- biogeography and biostratigraphy【poster】	Jinpeng Zhang, Guangzhou Marine Geological Survey, CGS, China	

Scientific Sessions - extend 1

Time/16th	Lecture	Speaker/Affiliation/Local time	Host
14:30-14:45	*Halamphora* diversity in Turkish coasts	Cüneyt Nadir Solak, Dumlupınar University, Türkiye [11:30 am, Istanbul]	Yuanzhi Zhang
14:45-15:00	Bubble mediated assembly of viral matter	Roman Marks, University of Gdansk, Poland	

		[8:45 am, Gdansk]	
15:30-15:45	Sedimentary organic matters within the subtropical mountainous river-estuary-bay continuum: Provenances, fates and implication	Fengling Yu. Xiamen University, China	
15:15-15:30	Past Efforts and Future Challenges in Safeguarding the Straits of Malacca	Fatin Izzati Minhat, Universiti Malaysia Terengganu, Malaysia [15:15 am]	
15:30-15:35	Blue-Economy Geopolitics in the South China Sea: Interdependence, Risk and Opportunities for Cooperation【poster】	Rifqi Ibrahim, Universitas Brawijaya, Indonesia	
15:35-15:40	Origin analysis of overpressure s and quantitative assessment in the Dongfang area, Yinggehai Basin【poster】	Hangjun Xian , China University of Geosciences, Wuhan, China	
15:40-15:45	Reconstruction of Ocean Wave Spectrum Based on Deep Learning【poster】	Sijia Huang, China University of Geosciences, Wuhan, China	
30mitues	Break time		

Scientific Sessions - extend 2

Time/17th	Lecture	Speaker/Affiliation/Local time	Host
9:00-9:15	Paleogeographic Origins of Microcontinents in the Southern South China Sea and Evolution of the Paleo-Pacific Ocean and Proto-South China Sea	Licheng Cao, China University of Geosciences, Wuhan, China	Xinong Xie (Replaced by Peter Clift)
9:15-9:30	Linking sedimentary and biologic characteristics with paleoenvironmental evolution since the Late Glacial off the Xisha Platform, northwestern South China Sea	Guanhua Li, Shantou University, China	

Open discussion Session one: Updating Marginal Seas Initiative's Roadmap

Time/16th	Topic	Speaker/Affiliation/Local time	Host

16:05-16:10	A brief introduction	Peter Clift	Peter Clift, Junjie Deng, Jinpeng Zhang
16:10-16:20	Baltic Sea	Joanna Dudzinska-Nowak	
16:20-16:30	Baltic Sea, Gdansk Bay	Wojciech Jegliński, Grzegorz Uścinowicz	
16:30-16:40	Adriatic Sea, Ionian Sea	Marzia Rovere	
16:40-16:50	Java Sea and adjacent areas (Karimata Strait, Riau Archipelago area)	Franto Novico	
16:50-17:00	Banda Sea and adjacent area	Yenny Risjani	
17:00-17:10	Strait of Malacca	Fatin Izzati Minhat [16:55, Kuala Lumpur] on-line	
17:10-17:20	Bengal Bay	Md Ashrafuzzaman [15:05, Dhaka] on-line	
17:20-17:30	China Seas	Jinpeng Zhang, Fengling Yu, Min Chen, Jun Liu, Junjie Deng	
17:30-17:40	Break		
17:40-18:10	MS Initiative updating Discussion		

Open discussion Session two: Co-construction of International Organization on Marginal Seas Science

Time/17th	Topic	Speaker	Host
9:35-10:45	International Scientific Organization for Marginal Seas Sciences [Mission, Structure, Charters/Regulations, Actions, Founding members and their obligations and rights]	All the participants	Jinpeng Zhang

Open discussion Session three: Potential Support to DDE program

Time/17th	Topic	Speaker	Host

11:00-12:00	DDE Discussion [Marginal Seas Task Group updating and routines to empower the partners and their linkage with other groups] Qiuming Cheng gave a presentation to introduce DDE big science program	All the participants	Xinong Xie (Replaced by Jinpeng Zhang)

Conclusion Session

Time/17th	Topic	Speaker	Host
15:00-15:30	Conference content discussion, Conclusion	Session's convenors, All the participants	P. Clift, W. Jegliński, X.N. Xie, J. Dudzińska-Nowak, J. Deng, J. Waniek, Y.Z. Zhang, J.P. Zhang, Y. Risjani, M. Rovere, B. Chen, Jan Harff
15:30-16:000	Future joint work discussion, Conclusion	All the participants	
16:00-16:15	Publication issues discussion, Conclusion	Potential Journal/Magazine editorial office, all the participants	
16:15	**CONFERENCE CLOSE** **(Closing ceremony)**	GMGS/CGS Managers	Zhibin Sha

9. Appendix 2: IAMSS

17th October, 2025, Guangzhou

International Association for Marginal Seas Sciences (IAMSS)

Co-discussion, Co-construction, Co-Sharing

Concept-Draft

1. Property

- The International Association for Marginal Seas Sciences (IAMSS) is a non-governmental and non-profit scientific organization that promotes the global advancement of sciences in interdisciplinary basic and applied research of marginal seas – the interface between continents and Oceans.
- The official working language is English.

2. Purpose/Mission

- Generalize: To carry out international and interdisciplinary cooperation for research in the field of marine sciences, coordinate discipline-specific terminology and related standards, and discuss academic issues of common concern.

3. Scope of activities

1) to carry out international scientific and technological cooperation in the field of marginal seas;
2) to build a diversified international science and technology joint unit, to serve the international network;
3) to launch initiation of research projects;
4) to organize various forms of training and education;
5) to organize the international meeting on marginal seas;
6) to publicize the diverse culture of marine sciences and the popularization of science among the public;
7) to operate international publications in the field of marginal seas;
8) to cooperate and develop together with other international organizations.

4. Funds for activities and their sources

- The International Association for Marginal Seas Research (IAMSS) is funded mainly by
- membership fees;
- revenues from activities;
- external donations;
- government sponsorship;
- Other sources of income include:

- science and technology funds from the governments of various countries and regions to member units and individuals,
- and activities funds from the host countries and donors of the International Conference on Marginal

Seas.

5. Domicile

- Guangzhou City, Guangdong Province, China.

6. Members

- Institutional member and personal member.
- For launching this IAMSS, under the support within China Association for Science and Technology (administration organization), we need ~~15 oversea institutional members~~ and 50 oversea personal members, as founding members [as pioneers].
  [Note: updating information by 24th October "50 oversea personal members from 20 institutions"]

7. Organizational Structure

- The management and operation bodies of the Association are mainly composed of the Council, Secretariat, National Office, Academic Committee, and Management Advisory Committee.
- The staff is nominated by individual members and institutional members, and voted by all members.

8. The Council

- 1) The Council is nominated and elected by the Secretariat, National Office, Academic Committee, Management Advisory Committee, and institutional and individual members. Each member in Council has only one vote on the Council for a term of XX years. In principle, each country should have at least one Council member and a maximum of two members, but not from the same membership.
- 2) The Council meeting is the highest decision-making body of the IAMSS and is held during the Plenary Assembly. The decision-making and transactional meetings of the Council during the non-plenary session shall be organized and convened by the Secretariat, under the guidance from the Council.
- 3) The Council will elect the IAMSS Executive Council and take charge of important documents such as the IAMSS Development Plan.
- 4) The Executive Council is responsible for implementing the relevant decisions of the Council and is the most important body responsible for daily administrative affairs.

The Executive Council consists of one chairman, one vice-chairman, one secretary general, one former chairman, one treasurer, four common members. Each term is XX years, with 9 persons. In addition, a representative of the Organizing Committee of the General Assembly joins in the Executive Council.

9. Secretariat

- The Secretariat is the central body at the daily operational level of the IAMSS. Relying on the country's strengths, the Secretariat will take turns to undertake the operation in different countries for a period of XX years.
- The Secretary General automatically becomes a member of the Executive Council of the current session of the Council.
-

10. National Office

- The National Office is a liaison office set up in each country based on its superior academic strength for IAMSS, bringing together national practitioners, promoting members, nominating members of the Council, Academic Committee, and Management Advisory Committee, and collaborating with the Secretariat on daily operations.
- The National Office shall be initiated by the member on their own terms.
- The establishment application need decision by Council through the Secretariat submission documents.

11. Academic Committee

- The Academic Committee is the highest academic body at the academic guidance level of the IAMSS, which is composed of experts with certain academic attainments to jointly provide advice and guidance for the academic development of the society.
- The Academic Committee has a high degree of freedom in dealing with academic affairs, including the organization of international conferences on specific topics and the publication of academic journals, monographs and academic research reports. Relevant matters shall be reported to the Council and the Secretariat.

12. Management Advisory Committee

- The Management Advisory Committee (MCC) is the guiding body for the scientific management aspects of the IAMSS. According to the member's affiliation, the National Office will nominate them to jointly provide consultation and guidance for the management and development path of the Association. In principle, each country should have one member.

13. Plenary Assembly

- The Plenary Assembly is held once every XX years. The Council shall notify the members of the agenda of the meeting 60? /XX days in advance of the Plenary Assembly of the association. The Plenary Assembly adopts on-site and online voting.