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Editorial: Rule of law in the governance of new frontiers of the marine environment

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Editorial on the Research Topic

[Rule of law in the governance of new frontiers of the marine environment](#)

1 Introduction

Multiple human uses and benefits from the seas are causing a gradual increase in human pressure and subsequent changes to oceans, marine ecosystems, and coastal marine habitats. These changes include activities such as overfishing, the introduction of alien species, pollution from contaminants and nutrient enrichment, damage to the seabed, and more. In response to these challenges, the concept of ocean governance has developed (Chang, 2010). The emerging issues in ocean governance encompass various concerns, including plastics pollution, blue carbon, ocean acidification, deep-sea mining, large marine protected areas, biodiversity conservation in international waters, aquaculture, and small-scale fisheries (Wang et al., 2023). All these emerging issues, along with other scientific efforts, require appropriate rules and regulations to govern the associated consequences while upholding the rule of law (Chang, 2009). Therefore, it is important to establish a timely connection between the marine sciences, ocean governance and the rule of law. This Research Topic explores new paradigms and domains of ocean governance and the marine environment from the interdisciplinary perspectives that incorporate the rule of law. It examines the updated development of ocean governance, including legal concepts and practices, and the current state of affairs. Additionally, it addresses the challenges that have emerged in recent decades and how they differ from traditional practices. Furthermore, it presents a more critical stance from diverse authors around the world to shed light on the role that the rule of law plays in shaping the governance of new frontiers in the marine environment and the potential impact this paradigm can have on ocean governance outcomes.

This effort ultimately leads to a more holistic and integrated assessment of the health of the marine environment or ecosystem in contemporary oceans. Furthermore, this Research Topic aims to provide stakeholders with an emerging multidisciplinary approach to data management, data reporting and flows, recent advancements in marine sciences, and assessments that support the development and implementation of relevant policies. It also focuses on the most up-to-date and relevant information sharing and the use of indicators for monitoring the marine environment. Additionally, it emphasizes networking for improved communication and coordination to ensure better ocean governance and a

healthy marine environment through the rule of law. In light of these concerns, this Research Topic is structured as follows: the rule of law in ocean governance, recent developments in marine sciences in relation to ocean governance, the impacts and solutions for marine litter and underwater noise, policy developments regarding the maritime shipping industry, new trends in sustainable marine fisheries, compensation fund systems related to marine environmental governance, and offshore mining operations.

2 The rule of law in ocean governance

The complex field of international law of the sea is examined in a series of insightful studies. Liu's research, titled "How should international judicial bodies constituted under UNCLOS determine if they have jurisdiction over disputes involving territorial sovereignty?", delves into the intricate jurisdictional aspects of the United Nations Convention on the Law of the Sea (UNCLOS). It sheds light on the nuanced conditions that international judicial bodies must consider when determining their jurisdiction in territorial sovereignty disputes. The study identifies three specific limiting conditions, including disputes related to sovereignty and cases that impact state sovereignty claims. It reveals that in certain conflicts related to sovereignty, jurisdiction may be retained as long as settlement or claims remain unimpeded.

"Overlapping and fragmentation in the protection and conservation of the marine environment in areas beyond national jurisdiction", written by Ardito et al., shifts the focus to areas beyond national jurisdiction (ABNJ) and provides a critical assessment of the state of marine protection in the face of increasing anthropogenic pressures. The study addresses challenges such as overfishing and deep seabed mining, highlighting the alarming decline in biodiversity. With a focus on discussions within UNCLOS regarding the conservation of biodiversity in the ABNJ, this study identifies legal gaps and examines global and local mechanisms through revealing case studies (Lost City, Longqi field). The study advocates for a unified approach at the global, regional, and sectoral levels to address cumulative impacts, expressing hope in the forthcoming implementation agreement to strengthen protection in the ABNJ.

Similarly, the study titled "The rule of law for marine environmental governance in maritime transport: China's experience", proposed by King et al., examines China's maritime legal evolution. The study sheds light on China's four-decade-long journey in shaping its legal framework for marine environmental governance. It explores various aspects, including legislation, enforcement, and the establishment of an autonomous maritime judicial system, revealing China's unique approach. The study praises China's efforts in harmonizing domestic and international laws, emphasizing its adherence to global maritime law and its robust legal framework for foreign vessels. Serving as a promising model, this research provides a compelling blueprint for nations facing similar challenges.

Further contributing to the discourse, the study titled "The practical dilemma and solutions of international ship-aircraft

encounter rules on sea: A Chinese perspective" by Associate Li and Khan addresses the challenges posed by fragmented international ship-aircraft encounter (SAE) regulations and proposes innovative solutions from a Chinese perspective. The study advocates for a comprehensive regulatory approach, exploring avenues such as international arbitration and diplomacy, while referencing existing rules like the Code for Unplanned Encounters at Sea (CUES). By examining the origins and risks of fragmentation, the study argues for harmonization and the establishment of unified international SAE regulations to effectively address global challenges.

In addition, the study by Chen and Xu titled "Mitigating effects of sea-level rise on maritime features through the international law-making process in the Law of the Sea" delves into the complexities presented by rising sea levels on maritime features within the framework of the law of the sea. The study highlights the evolving ecological dynamics and shifting legal statuses of these features, emphasizing the potential reclassification of islands and its implications for territorial seas, exclusive economic zones, and continental shelves. It brings attention to the overlooked legal status of these features. Amidst discussions on baselines and boundaries, the study calls for urgent legal solutions to address sea-level rise. It emphasizes the need for comprehensive new rules, both substantively and procedurally, and underlines that the inadequacy of current international regulations requires a consensus-based approach to effective law-making.

3 Recent development in the marine sciences in connection with ocean governance

Exploring various aspects of maritime dynamics, the following studies provide a comprehensive overview of evolving global ocean governance. The study titled "China's choice on the participation in establishing marine protected areas in areas beyond national jurisdiction" meticulously examines China's role in UNCLOS negotiations for areas beyond national jurisdiction (ABNJ), with a particular focus on marine protected areas (MPAs) as essential tools. Yu and Huang analyze the drivers, constraints, and potential solutions, envisioned in China's participation in establishing MPAs in ABNJ and a reshaping of its role in marine conservation within the framework of a shared maritime community.

Shifting our focus, the study titled "United Nations Decade of Ocean Science for Sustainable Development (2021-2030): From innovation of ocean science to science-based ocean governance" by Guan et al. examines the global launch and UN-led efforts to promote science-based ocean governance. The study assesses the impacts of this initiative on global, regional, and national scales, outlining its origins, implementation plan, progress, China's contributions, and suggesting the need to enhance science-policy interfaces for effective collaborative integration in ocean conservation and governance.

Similarly, the potential accession of China to the Convention on the Protection of Underwater Cultural Heritage is a key focus in the study titled "Should China access to the convention on the protection

of underwater cultural heritage? — A SWOT analysis” which examines the disparities between domestic and international laws. In the study, Yuan advocates for the refinement of domestic legislation before participating in the convention, emphasizing the significance of aligning China’s legal frameworks with global standards in preparation for eventual accession to the convention.

However, Taiwan’s ocean governance efforts take centre stage in the study titled “*The development of ocean governance for marine environment protection: Current legal system in Taiwan*”, jointly written by Shih et al. This paper traces milestones such as the establishment of the Ocean Affairs Council, the enactment of the Ocean Basic Act, and the National Ocean Policy White Paper. With a focus on regulations, policies, and the Marine Conservation Act, the study reviews marine laws and provides recommendations for effective governance and conservation, highlighting Taiwan’s dedication to responsible marine management.

4 The impacts and solutions of marine litter and underwater noise

Examining various aspects of maritime concerns, the following studies shed light on global challenges and potential solutions. In “*The path of transboundary marine plastic waste management in China, Japan, and South Korea from the perspective of the blue economy*” written by Hao and Jiang, the focus is on transboundary marine plastic waste management in China, Japan, and South Korea. The study highlights the devastating impact of marine plastic pollution and identifies governance gaps, it proposes remedies such as flexible legal structures and multi-stakeholder engagement. Introducing the blue cycle model exemplified in China’s Taizhou, it advocates for collaborative waste regulation, beginning with the management of fishery plastic waste.

Similarly, Yadav et al. in “*Occupational noise exposure at sea: A socio-legal study on fish harvesters’ perceptions in Newfoundland and Labrador, Canada*” addresses the impact of occupational noise on fish harvesters in Newfoundland and Labrador, Canada. The study reveals health risks associated with prolonged exposure to hazardous noise and identifies gaps in noise prevention during vessel design and limited enforcement of Occupational Health and Safety (OHS) regulations. The study emphasizes the importance of comprehensive hearing conservation measures and collaborative efforts with stakeholders to enhance the well-being of fish harvesters.

In another dimension, “*The use of alternative fuels for maritime decarbonization: Special marine environmental risks and solutions from an international law perspective*” authored by Wang et al. critically assesses strategies for decarbonising maritime operations through the use of alternative marine fuels. Exploring options such as LNG, hydrogen, and more, the study highlights operational risks and proposes legal solutions to mitigate environmental concerns (Griffiths et al., 2021). The study contributes to the dialogue on sustainable shipping, providing insights into effective practices for maritime decarbonization.

5 Policies development regarding the maritime shipping industry

The maritime shipping industry is thoroughly examined through a series of studies, collectively providing a comprehensive understanding of evolving global shipping dynamics. One such study titled “*Analysis of international shipping emissions reduction policy and China’s participation*” by Liu et al. focuses on global shipping emissions reduction policies, with a particular emphasis on China’s role. The study evaluates the greenhouse gas (GHG) control strategies of entities such as the International Maritime Organisation (IMO) and the European Union (EU). It meticulously compares policies, highlighting China’s dual identity as both a maritime power and a developing nation. The study underscores China’s influence in the shipping industry and advocates for strategic engagement in energy transition, navigating complexities to provide insights and recommendations for effective global involvement.

In a similar vein, the study titled “*A sustainable shipping management framework in the marine environment: Institutional pressure, eco-design, and cross-functional perspectives*” by Wang et al. explores the intersection of sustainable shipping, marine preservation, and institutional dynamics. With a focus on sustainable practices and environmental impact, the study employs a comprehensive framework to evaluate crucial factors. External policy pressure, eco-design, and cross-functional green management emerge as key drivers. The study offers holistic insights, making a significant contribution to the field of sustainable shipping management.

Concurrently, the study titled “*The supervision and multi-sectoral guarantee mechanism of the global marine sulphur limit—assessment from Chinese shipping industry*” by Liu examines the IMO’s marine sulphur limit, addressing concerns related to air pollution and ocean acidification. The study navigates the complexities surrounding fuel supply, safety, regulation, and climate governance while exploring implications of low-sulphur oil and alternative fuels. Proposing a global ocean governance within China’s maritime vision, the study advocates for collaborative supervision throughout the marine fuel lifecycle.

Furthermore, Associate Professor Cao et al. investigate China’s shipping transformation under the dual-cycle development model in their study titled “*The path to the construction of a domestic and international dual cycle of China’s shipping industry*”. The study delves into policy innovations within Free Trade Zones, Free Trade Ports, and international agreements. It acknowledges challenges posed by emerging services to global systems and suggests optimising logistics integration and digital innovation. The study provides insights into China’s shipping evolution and prospects for effective implementation.

Likewise, Shi addresses China’s shipping oversight under RCEP, a significant free trade pact, in the study titled “*China’s shipping market supervision system under the RCEP: Influence, challenges and countermeasures*”. The study emphasizes the digital shift in

shipping supervision for transparency and capability enhancement. It identifies challenges such as logistics risks and limited inter-country coordination, proposing remedies that prioritise supply chain resilience and environmental protection.

Similarly, in the study “*International practice analysis of the negative list: Chinese example of shipping market access*” Shi explores international shipping access and China’s negative list in free trade zones. The study traces Shanghai’s list evolution, referencing global practices, and emphasizes transparency and risk management. It offers recommendations to enhance shipping market access through the negative list, thereby enhancing China’s global shipping competitiveness.

6 New trend in sustainable marine fisheries

Examining intricate legal cases and environmental challenges, the following studies collectively shed light on evolving maritime disputes and the imperative for adaptable legislation. A meticulous study, proposed by Wang and Xu, titled “*Reflections on the Nicaragua v. Colombia case (2022): From the perspective of traditional fishing rights*” dissects the Nicaragua v. Colombia case (2022), which revolved around traditional fishing rights within Nicaragua’s Exclusive Economic Zone (EEZ). Despite Colombia’s non-UNCLOS status, the International Court of Justice (ICJ) employed a customary law approach, negating traditional rights due to lack of evidence and Nicaraguan non-recognition. The study critiques the judgment, exploring human rights and law of the sea dynamics, providing an insightful overview of traditional fishing rights in a broader legal context.

Subsequently, Li, in the study titled “*Fishery legislative reform towards Japan’s Fukushima nuclear wastewater discharge into the sea—A Chinese perspective*” focuses on Japan’s Fukushima nuclear wastewater discharge and its repercussions on China’s pelagic fishing industry. While not directly impacting Chinese waters, the ecological and economic consequences have prompted re-evaluations of China’s fishery legislation. The study identifies gaps in addressing nuclear sewage pollution and proposes reforms, including enhanced management standards and digital monitoring. It underscores the importance of legislative adaptability in addressing evolving environmental challenges and cross-border marine pollution management.

Furthermore, in the comprehensive study titled “*Application issues of compulsory conciliation in the settlement of fishery disputes in the Yellow Sea*” Pan extends the analysis to the persistent China-South Korea fishery disputes in the Yellow Sea, assessing the potential role of the law of the sea’s compulsory conciliation. With limited outcomes from bilateral talks, the study delves into the advantages of compulsory conciliation, covering jurisdiction, powers, and the implementation of the Conciliation Commission. The study offers valuable insights into the resolution of entrenched Yellow Sea fishery conflicts.

In light of human rights protection at sea, Hung et al. explored the issue of “*Promoting human rights for Taiwan’s fishermen:*

Collaboration with the primary source countries of Taiwan’s DWF migrant fishermen”. It is suggested that Taiwan has one of the largest distant water fishing (DWF) industry worldwide. However, this industry has led to Taiwan being listed in the 2020 “List of Goods Produced by Child Labour or Forced Labour” of the U.S. Department of Labour. In response to this, the Taiwanese government is actively adopting further management measures to supervise domestic and foreign fishermen agencies. It is also observed that although the C188 Work in Fishing Convention has strengthened the protection of fishermen’s human rights, it still remains ambiguous in terms of private agency management. Therefore, the Taiwanese government should follow the spirit of the C188 but not be restricted to the Convention’s text when amending or formulating regulations and policies of agencies, in order to fully protect the rights of migrant fishermen.

7 Compensation fund system related to the marine environmental governance

Marine environmental governance is a focal point in the interconnected studies below, offering insights into various compensation systems and their legal underpinnings. In the study titled “*Legal advice on the Chinese compensatory fund system for oil pollution damage caused by ships from the perspective of marine environmental governance*”, Fu and Li delve into the Chinese Ship-source Oil Pollution Compensation Fund (CSOPC), analyzing its progress over a decade and its unique regulations. The study critiques certain deviations and proposes legal remedies to address gaps. It recommends top-level improvements, strengthened compensation capacities, and internationalization. This comprehensive assessment calls for expanding compensation scope and establishing an emergency fund, contributing valuable insights to China’s oil pollution compensation system and the enhancement of marine environmental protection.

Correspondingly, in the study titled “*Framework and Rethink of the Environmental Compensation Fund for the international seabed area*” written by Zhou and Xiang proposed Environmental Compensation Fund (ECF) within the International Seabed Authority’s “Draft Regulations on Exploitation of Mineral Resources”. The study evaluates the potential of ECF in bridging liability gaps for environmental damage in the international seabed area. While acknowledging previous concerns, the study emphasises the need for a clear purpose, transparent funding sources, and streamlined payment procedures. The recommendations put forth in the study aim to enhance the efficiency and effectiveness of the ECF.

Expanding on the theme, Wang, in his article titled “*Problems identification and improvement path of China’s marine ecological compensation legal system*” explores China’s growing marine industry and the pivotal role of marine ecological compensation in environmental protection. The study identifies gaps in the legal framework and advocates for a multi-tiered compensation system, the integration of ‘land-sea overall planning’ in legal approaches,

and comprehensive mechanisms. By emphasizing ecological compensation within marine planning, strong regulations, and effective execution, the study provides insightful suggestions to strengthen China's marine ecological compensation framework.

8 Offshore mining operations

Continuing the exploration of maritime regulatory frameworks, the study titled “*Operationalization of the best available techniques and best environmental practices in deep seabed mining regime: a regulatory perspective*” written by Xu et al. focuses on integrating Best Available Techniques (BAT) and Best Environmental Practices (BEP) into deep seabed mining (DSM) regulation. Recognizing the potential environmental impact of DSM, these practices play a pivotal role in minimising harm. The study evaluates the role of the International Seabed Authority (ISA) and proposes strategies for enhanced implementation. These strategies include defining terms, embedding practices into regulations, and establishing operational criteria. Rooted in international instruments and considering the challenges associated with DSM, the research offers valuable insights to strengthen environmental protection in the context of deep seabed mining.

Similarly, the exploration shifts towards China's offshore drilling regulation, underscoring its paramount importance in mitigating industry risks. “*Advancing the Robustness of Risk Regulation for Offshore Drilling Operations in China*”, Yang assesses regulatory robustness by comparing approaches taken in the UK, Norway, the US, and China. Navigating the debate between command-and-control and self-regulation, the study proposes a hybrid approach. This approach is meticulously analyzed, offering a comprehensive perspective along with recommendations to bolster risk governance in China's offshore petroleum sector.

9 Conclusions

This editorial encompasses a spectrum of vital themes within ocean governance and environmental conservation, touching on the rule of law, recent advancements in marine science, solutions for marine litter, maritime shipping policies, sustainable fisheries trends, compensation fund systems, and offshore mining operations. These studies collectively highlight the intricate challenges facing our oceans

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and underscore the importance of effective governance, international cooperation, and interdisciplinary synergy in shaping sustainable ocean practices grounded in the rule of law. The synthesis of legal frameworks with scientific insights offers a profound perspective on ongoing discussions. As a comprehensive repository, this compilation serves as an invaluable resource for scholars, policymakers, and stakeholders dedicated to crafting a more sustainable, just, and resilient ocean future. For academia, these studies emphasize the necessity of fostering interdisciplinary collaborations, prioritizing policy-relevant research, and actively engaging in international platforms to enrich the global discourse on ocean governance.

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