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The rule of law for marine environmental governance in maritime transport: China's experience

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Maritime transport is a major source of pollution of marine environment, which is the essential object in a series of international maritime legislations and various countries' domestic laws. Focused on protecting the marine environment, China has spent over 40 years developing the rule of law for marine environmental governance in maritime transport, including efforts made in legislation, law enforcement, and the judiciary. In this article, we attempt to examine China's experience and practice in the marine environment, explain the logic and consideration in relevant practices, and summarize China's paradigm for the rule of law for such governance. China has sought to resolve two major issues: the relationship between domestic and international law and the balance of interests between flag, coastal, and port states, offering a vivid model of marine environmental governance on which other countries can base their own legal systems. The findings reveal that with following and enforcing the international law of the sea, now China's domestic laws have form lawful authority on binding foreign vessels. China is continually strengthening the construction of its legislative system to harmonize inconsistencies and keep pace with international marine environmental law. To eliminate administrative inefficiency resulting from cumbersome procedures, China has reformed its maritime enforcement system by consolidating multiple administrations. China's independent maritime judicial system is meeting the demand to develop environmental specialization, enabling further exploitation of its profession in solving maritime environment cases and implementing environmental legislation.

KEYWORDS

marine environment, ocean governance, marine environmental governance, the rule of law, marine pollution from vessels, maritime transport, China's experience

Introduction

As the purpose of establishing the International Maritime Organization (IMO) (IMO, 2013), prevention of marine pollution from vessels has been a major target for international ocean governance. In the early stages of shipping, any impact on the marine environment was minimal, and thus scarcely considered (Tan, 2005, 18). However, with the development of shipbuilding and navigation technologies, ships can sail to wider sea areas carrying oil and other harmful substances, some of which are even large-scale oil tankers or chemical tankers. Maritime transport has become an important threat to the marine environment. The various types of pollutants emitted by vessels are now the main source of pollution threatening this environment (Arachchige et al., 2021). According to the statistics, in 1990, about 22% of marine pollution was derived from maritime transport and dumping of wastes at sea (IMO/FAO/Unesco/WMO/WHO/IAEA/UN/UNEP Joint Group of Experts on the Scientific Aspects of Marine Pollution, 1990). Taking the Bohai Sea as a case, the study shows that noise pollution, light pollution, and hydrodynamic interaction from vessel activities are major ecological stressors in this important maritime transportation corridor of China, their scope of influence even far exceeds channel areas (Liu et al., 2021). Following the crash of SS *Torrey Canyon* in 1967 leaking 120,000 tons of crude oil and serious damage to the ecological environment, high priority has been given to regulating maritime transport, giving rise to a series of maritime legislation[1].

Vessels are responsible for many kinds of pollution, emitting oil, chemicals, garbage, and sewage into the sea and releasing atmospheric pollutants (Karim, 2015; Vakili et al., 2021; Dąbrowska et al., 2021). With the continuous development of environmental science research, microplastics, noise, and other new sources of pollution have been gradually receiving more attention (Nast, 2013; Scott et al., 2017). In recent years, carbon emissions reduction has received particular focus from marine environmental governance. Statistically, from 2011 to 2019, maritime CO2 emissions rose at an average rate of 2.1% annually (Marine Benchmark, 2020). For controlling marine pollution from vessels, the IMO has established a regulatory framework of marine environment conventions (Karim, 2015). In addition, countries and regions are contributing through their own legal regimes. For example, the United States implementing laws and regulations on oil contamination, represented by the *Oil Pollution Act of 1990*, which is distinguished from international conventions, has profoundly influenced the legislation of various countries around the world (Rodriguez and Jaffe, 1990). Meanwhile, the European Union's efforts to reduce the carbon emissions of marine transport have been controversial, with relevant regulations purportedly applying outside EU territory (Dobson and Ryngaert, 2017). In Southeast Asia, attempts to enhance the protection of marine environment include the designation of Particularly Sensitive Sea Areas under the IMO regulatory framework, for which the Tubbataha Reefs Natural Park can be deemed as a successful case (McCreath, 2017).

Marine transport is one of the earliest domains in which China sought to integrate domestic legislation with international regulations. Regarding the prevention and control of vessel-source pollution, China joined the *1969 International Convention on Civil Liability for Oil Pollution Damage*[2] in 1980, the *International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties*, *1969* in 1990, and the *2001 International Convention on Civil Liability for Bunker Oil Pollution Damage* (the *Bunker Convention*) in 2008. In 1982, China enacted the *Marine Environment Protection Law* as comprehensive legislation focused on preventing marine pollution. Except for continuously strengthening its legislation, China has established a maritime law enforcement system and a specialized maritime judicial system. However, like many countries that have recently developed the rule of law in the same area, China has confronted multiple challenges in the process of strengthening ocean governance: China's domestic laws have been accused of violating the international law of the sea (Pedrozo, 2021); the fragmentation of international marine legal regimes posing "the danger of conflicting and incompatible rules, principles, rule-systems and institutional practice" (Koskenniemi, 2006); flag states failed to strictly exercise their jurisdiction in law enforcement; and the limited expertise of general courts in maritime environment cases (Pring and Pring, 2009).

This paper attempts to figure out how does China respond to the above challenges, by considering developments in the international law of the sea and China's growing experience in ocean governance, and to provide some insights and references for other late-developing countries to reinforce their marine environmental governance.

1 The Legal Committee of IMO was established in 1967 as a subsidiary body to deal with legal questions which arose in the aftermath of the *Torrey Canyon* incident: A large proportion of the claims concerning oil pollution damages could not be settled and this resulted in global instruments on liability and compensation for oil pollution victims (*1969 International Convention on Civil Liability for Oil Pollution Damage*); UK's actions against the incident inspired the adoption of a convention which permitted coastal states to take action to response on the high seas in cases of oil pollution casualties (*The 1969 International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties*).

2 China subsequently joined the *International Convention on Civil Liability for Oil Pollution Damage, 1992* in 2000 (CLC 1992), and simultaneously withdrew from *CLC, 1996*.

Interaction between domestic and international rule of law for the maritime environment

The IMO is the leading authority for the governance of maritime transport (Karim, 2015, p. 15). As a specialized UN agency, it is responsible for the safety of maritime navigation and the prevention of marine pollution by vessels. The IMO and its predecessor (the Intergovernmental Maritime Consultative Organization) have promoted the adoption of several marine environment conventions, such as the *1969 International Convention on Civil Liability for Oil Pollution Damage* and the *International Convention for the Prevention of Pollution from Ships* (*MARPOL*), long before the adoption of the *United Nations Convention on the Law of the Sea* (*UNCLOS*) in 1982. *UNCLOS* makes only one explicit reference to the IMO in Article 2 of Annex 9 concerning establishing the list of experts in the special arbitration procedure; however, several articles refer to a "competent international organization" in charge of formulating shipping regulations and standards for preventing and controlling marine pollution from vessels. It is generally believed that this term, when used in the singular, it refers to the IMO (Secretariat of the IMO, 2014). Therefore, all state parties to *UNCLOS* are obliged to take into account, conform with, or implement the generally accepted regulations, rules, and standards of the IMO. This even makes the IMO's international maritime conventions binding on non-state parties (Karim, 2015, p. 35).

Since the restoration of the IMO membership in 1973[3], China has played an active role in ocean governance and been "one of the most committed and active" members of the IMO (Lim, 2019). At the 32nd session of the IMO Assembly 2021, China was re-elected for the 17th consecutive time as a category A council member. China's participation has been considerably deepened, and in-depth participation further indicates China's increasing willingness to contribute to the IMO's regulatory governance (Bai and Li, 2021, p. 10). Besides joining many IMO conventions and protocols, China has continually translated relevant content of the international law of the sea into domestic laws, aiming to synchronize its own rule of law with international developments. By complying with and implementing the international law of the sea, China's domestic laws have acquired binding effect to foreign vessels (Karim, 2015, p. 35; Xing, 2021, p. 100). Nonetheless, China has faced accusations that its domestic laws violate international conventions. For instance, the 2021 amendment to the *Maritime Traffic Safety Law* (*MTSL*) was alleged to exceed the permissible jurisdiction under UNCLOS, which violates the international rules-based order (Pedrozo, 2021, pp. 956-968). However, this criticism ignores the incompleteness of *UNCLOS* regulations and the ambiguity of key expressions, which results in different understandings (Chen, 2021). In that, various countries interpret terms such as "innocent passage" in different ways in their domestic laws, making these interpretations conforms with international law and they have been important driving force for the development of ocean governance. Meanwhile, being intentionally or recklessly, criticisms of China's maritime laws ignore the explicit primacy of international laws: *MTSL*, the *Marine Environment Protection Law*, and the *Chinese Maritime Code* all stipulate that, except for declared reservations, the provisions of international laws to which China is subject shall precede over inconsistent provisions of domestic laws[4].

In the ocean governance led by the IMO, one major dynamic is conflicts and coordination of interests among flag states, coastal states, and port states (Karim, 2015, p. 16; Tan, 2005, p. 13) (Figure 1). Under customary international law, the flag state has full jurisdiction over marine pollution from vessels (Birnie et al., 2009, p. 401). However, since flag states lack the incentive to regulate vessel activities that harm other states' interests (Tan, 2005, 18), this governance approach has limited effectiveness. To address this limitation, the international law of the sea, such as *MARPOL* and *UNCLOS*, expanded the authority of coastal and port states (Birnie et al., 2009, p. 400). For example, Article 19 of *UNCLOS* provides that a coastal state may prevent the passage of a foreign vessel if it engages in willful and serious pollution within that state's territorial waters. Based on the jurisdiction of a port state over its internal waters, *MARPOL* stipulates that port states are entitled to inspect

3 After China resumed its lawful seat in the United Nations in 1971, it immediately proceeded to restore its membership in the specialized agencies under the United Nations. In 1972, the 28th Council of the International Maritime Organization adopted a resolution recognizing the lawful seat of China in the organization, and in 1973, China formally ratified the relevant IMO conventions, became a member, and started paying its membership fees.

4 Article 121, *MTSL*: "Where an international treaty concluded or acceded to by the People's Republic of China contains provisions differing from those contained in this law, the provisions of international treaty shall apply. However, the provisions about which the People's Republic of China has declared reservations shall be excepted." Article 96, *Maritime Environment Protection Law*: "Where an international treaty regarding marine environment protection concluded or acceded to by the People's Republic of China contains provisions differing from those contained in this law, the provisions of international treaty shall apply. However, the provisions about which the People's Republic of China has declared reservations shall be excepted." Article 268, *Maritime Code*: "If any international treaty concluded or acceded to by the People's Republic of China contains provisions differing from those contained in this Code, the provisions of relevant international treaty shall apply, unless the provisions are those on which the People's Republic of China has announced reservations".

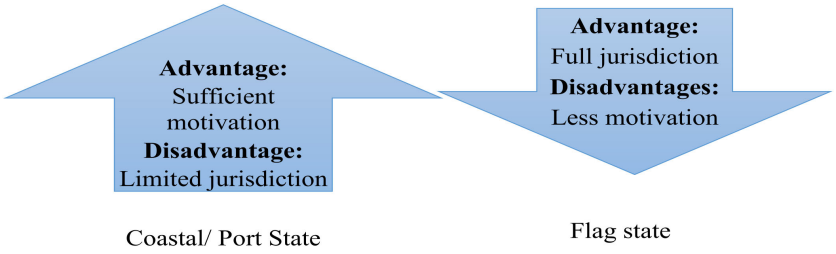

FIGURE 1
Regulating Marine Pollution Based on Different Identities.

certificates of vessels in ports in accordance with article 5 of *MARPOL*. Article 218 of *UNCLOS* further authorizes port states to investigate and institute proceedings over any discharge wherever they have taken place, independent of the jurisdiction of flag states (Birnie et al., 2009, pp. 421-422). In summary, the marine environmental governance in maritime transport evidently seeks to weaken the jurisdiction of flag states and expand the jurisdiction of coastal and port states. Nonetheless, the authority of coastal and port states is restricted by freedom of navigation under the primacy of flag state jurisdiction.

One state may choose to interpret or apply the international instruments of the sea based on its flag, coastal, or port state identity (Karim, 2015, p. 16). However, China takes a relatively neutral approach in its domestic marine environment legislation, reflecting its status as one of the world's leading flag, coastal, and port states. According to statistics from UNCTAD, as of January 2021, China had the second highest number of registered vessels and the fifth highest vessel tonnage (UNCTAD, 2021)[5]. In 2020 China's total imports and exports amounted to a world-leading USD 4.64 trillion (World Trade Organization, 2021). Moreover, of the 20 largest cargo throughput ports in 2020, 15 were in China (Shanghai International Shipping Institute, 2020).

China's balancing of the interests of flag, coastal, and port states is illustrated by *Chapter 2, "Vessels, Off-shore Facilities and Crew Members"* in the latest amendment of *MTSL*. On the one hand, this chapter imposes comprehensive obligations on China's vessels, including provisions on compliance with the *International Safety Management Code* and prevention of marine environment pollution. On the other hand, this chapter also includes stipulations regarding marine environmental governance such as innocent passage and port state control, which are necessary to coastal and port states. Moreover, substantial content about vessel navigation services[6] is included in the new *Chapter* 3 of *MTSL*, *"Maritime Traffic Condition and Navigation Services"*, in which China as a coastal state is obligated to ensure maritime navigation safety and protect the marine environment with a positive attitude. This demonstrates China's commitment to take responsibility for effective global ocean governance.

Fragmentation of international marine environment legislation and the systematization of domestic laws

The prevention and control of marine pollution from vessels are important aspects of *UNCLOS* in Article 194. However, its provisions essentially outline the main issues, leaving the IMO to formulate detailed and specific law enforcement rules (Tan, 2005, p. 9). With the conceptual evolution of marine environmental governance and ongoing discoveries of new sources of maritime traffic pollution, the current legal framework grows increasingly complicated. *MARPOL* remains the core convention for marine environmental governance by the IMO (Birnie et al., 2009, p. 548): besides targeting oil as the most typical source of marine environment pollution, it also

5 The statistic excludes tonnage for the special administrative regions of Hong Kong and Macao. In terms of the transport capacity of controlled ships, China ranked second in the world (240 million tons).

6 The *MTSL* stipulates various measures aimed at ensuring marine traffic safety. For example, it requires the Chinese government to establish and improve the maritime traffic support service system, such as vessel positioning, navigation, timing, communication, and remote monitoring (Article 21); ensure the rational layout and effective coverage of radio communication facilities for maritime traffic safety (Article 23); deploy, construct, and manage public aids to navigation (Article 26); issue navigational warnings and broadcast marine traffic safety information (Articles 28 and 29); and determine and issue the security level of vessels, offshore installations, and ports (Article 32). In addition, there are also provisions regarding ensuring marine traffic safety in the revised *MTSL*: *Chapter 6—Maritime Search and Rescue* and *Chapter 7—Investigation on Maritime Traffic Accident*.

addresses many other pollution sources, including the emission by vessels of sewage, garbage, air pollutants and the bulk carriage of noxious liquids and harmful substances. For this purpose, *MARPOL* contains six annexes that regulate different sources of pollutants. As of 2020, the member states of *MARPOL* and its mandatory Annexes I and II accounted for 98.95% of the world's merchant shipping gross tonnage, while the number of optional Annexes III-VI exceeded 96% of merchant tonnage (Byrnes and Dunn, 2020, p. 23). Therefore, some treat *MARPOL* as customary standards enforceable against vessels of all states (Birnie et al., 2009, p. 404).

International law has been accompanied by the emergence of specialized and (relatively) autonomous rules or rule-complexes, legal institutions and spheres of legal practice, what once appeared to be governed by "general international law" has become the field of operation for such specialist systems (Koskenniemi, 2006, p. 3). This phenomenon which is called fragmentation also appears in the marine environment. Despite ongoing refinements to *MARPOL* through protocols, annexes, and many amendments[7], the complexity of ocean governance necessitates increasingly specialized legislation, thereby intensifying the fragmentation of laws protecting the marine environment. The complexity includes the following: First, marine pollution from vessels can be divided into "optional" and "accidental" (Birnie et al., 2009, p. 404). *MARPOL* focuses on the governance of optional pollution from vessel operations, while other legislation targets accidental pollution. However, *MARPOL* leaves many issues of optional pollution unaddressed, such as the harmful organotins in anti-fouling paints used on ships and untreated ballast water discharges, which raises the need for specialized conventions[8]. Second, *MARPOL* mainly governs the elimination of pollutant discharge from ships through modern scientific, technological, and operational means (Birnie et al., 2009, 404), but does not regulate emergency disposal of pollutants discharged by ships or compensation following pollution accidents. There are many conventions in this field, such as the *CLC Convention* and *Bunker Convention*. It follows that with many pollutants requiring different legal countermeasures and an abundance of means to control marine pollution, international laws on the marine environment are increasingly fragmented. As shown in the list of legislation in Table 1.

The fragmentation of legislation severely challenges marine environmental governance for all countries. For example, the international community has established several conventions on compensation for marine environment pollution: the *CLC Convention* governs civil liability for pollution damage caused by vessels carrying oil in bulk; the *Fund Convention* covers a relevant compensation fund to victims of oil pollution in cases where the liability is not sufficient, or when the shipowner is not liable to pay; the *Bunker Convention* regulates the liability and compensation for damages resulting from bunker oil from vessels, and the *Hazardous and Noxious Substances* (HNS) *Convention* sets out a liability regime for the carriage of HNS by sea. These conventions have different state parties and validity[9] but constitute the civil liability and compensation regime for marine pollution damages as a whole. China has joined both the *CLC Convention* and *Bunker Convention* but not the *Fund Convention* or *HNS Convention*. International conventions can push state parties toward reaching full consensus, thereby generating more support and coming into effect promptly. However, the fragmentation places excessive demand on domestic legislatures, with few countries having enough resources to formulate detailed legislation on marine environment; consequently, international laws cannot be efficiently translated into domestic laws (Molenaar, 1998, p. 521). Furthermore, laws and regulations designed for coordinated application are vulnerable to being enforced in isolation under domestic legislation. For example, the *CLC Convention* sets a two-tier mechanism for compensating the damage caused by oil pollution from vessels: tier one will be covered by compulsory insurance taken out by shipowners, who would be able to limit their liability according to the *CLC Convention*; a second tier of compensation will be paid from a fund that establishes in the *Fund Convention*, in those cases where the insurance cannot cover an incident or is insufficient to satisfy the claim (Rue and Anderson, 2009, p. 17). Therefore, where a state only joins the *CLC Convention* but left the *Fund Convention* behind, the compensation regime lacks effectiveness.

To offset the adverse effects of fragmented international conventions, China legislates systematically on marine environment. The *Chinese Maritime Code* is amending to include a new chapter on "*Compensation for Oil Pollution Damage from Ships*" (Chu et al., 2020) with reference to international conventions, which integrated and streamlined

7 *MARPOL* has been revised several times over the years to reflect the latest insights on preventing pollution from vessels. *MARPOL* get passed in the IMO in 1973, which had not taken effect yet. After a series of maritime accidents, the IMO enacted a protocol of *MARPOL* in 1978 incorporating the initial convention. The new protocol was called *MARPOL 73/78* and took effect in 1983. In 1997, the IMO passed a new protocol and introduce a new Annex VI which took effect in 2005. Over the years, MARPOL has also revised itself through a large number of amendments.

8 They are *the International Convention on the Control of Harmful Anti-fouling Systems in Ships* and *International Convention for the Control and Management of Ships' Ballast Water and Sediments.*

9 As of 2022, there were 147 state parties to *the 1992 CLC Convention*, 121 state parties to *the Fund Convention*, and 100 state parties to *the Bunker Convention*. Such conventions have come into force. However, the HNS Convention has only been ratified or acceded by six states, which is not enough to take effect.

TABLE 1 International instruments concerning marine environment protection.

Marine environmental issue	Major international instruments
Oil pollution	*International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto and by the Protocol of 1997 (MARPOL)* Annex I, *International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC), International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties (Intervention Convention)*
Chemical pollution	*International Convention for the Safety of Life at Sea, MARPOL Annex II, The International Maritime Dangerous Goods, Protocol on Preparedness, Response and Co-operation to pollution Incidents by Hazardous and Noxious Substances (OPRC- HNS Protocol), Protocol Relating to Intervention on the High Seas in Cases of Pollution by Substances other than Oil (Intervention Convention Protocol 1973)*
Garbage pollution	*MARPOL* Annex V
Sewage pollution	*MARPOL* Annex IV
Air pollution	*MARPOL* Annex VI
Greenhouse gas emissions	*MARPOL* Annex VI
Dumping of waste and other matter	*Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter*
Transfer of invasive species	*International Convention for the Control and Management of Ships' Ballast Water and Sediments*
Harmful anti-fouling systems	*The International Convention on the Control of Harmful Anti-fouling Systems in Ships*
Pollution by shipbreaking	*The Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships*
Compensation for marine pollution from ships	*The CLC Convention, Fund Convention, Bunker Convention, HNS Convention, Nairobi International Convention on the Removal of Wrecks*

existing scattered domestic laws,[10] administrative laws,[11] and judicial interpretations[12], thereby building a comprehensive civil liability system for pollution and damage caused by vessels. Meanwhile, China has not only engaged in translating the *CLC Convention* and *Bunker Convention* into the *Chinese Maritime Code* but also established a national compensation fund system for oil pollution from vessels, with reference to the *Fund Convention* (Cao and Chang, 2022, pp. 1-10). Regarding HNS transport by sea, however, China has not yet established a compensation regime for HNS, and disputes over which party is liable, the scope of compensation, and limits of liability are common (Zhuo, 2020, pp. 226-235). There are wide calls to further amend *the Chinese Maritime Code* to include HNS liability and compensation regime (Hu et al., 2021, p. 552). However, given the difficulty for shipowners to obtain a certificate of financial liability from the International Group of P&I Clubs until the *HNS Convention* takes effect, unilateral domestic law in China would seriously affect international HNS transportation, burdening ships of various countries. China does not wish to destabilize the structure of international ocean governance, especially when recognizing the importance of balancing the rights and obligations of coastal and flag states. Accordingly, China will consider relevant provisions after the *HNS Convention* becomes effective.

The integration of a compensation system into the *Chinese Maritime Code* embodies the systematic development of China's marine environment legislation in recent years. Various matters related to the ocean are organically linked. Maritime legislation should respect these connections and eliminate the defects in cohesion and continuity caused by fragmentation (Chu and Chang, 2018, p. 7). In the field of maritime legislation, the *Marine Environment Protection Law* provides the core and comprehensive legislation on marine environment; it is supplemented by administrative regulations such as the *Regulation on the Prevention and Control of Vessel-induced Pollution to the Marine Environment*. In the *Marine Environment Protection Law*, the chapter titled "*Prevention and Control of Pollution Damage to the Marine Environment Caused by Vessels and Their Related Operations*" provides fundamental regulation on preventing marine pollution from

10 Article 89 of the *Marine Environment Protection Law of the People's Republic of China* provides the principle of compensation for marine pollution damages, which is overly vague to implement.

11 The *Regulation on the Prevention and Control of Vessel-Induced Pollution to the Marine Environment*; the *Measures of the People's Republic of China for the Implementation of Civil Liability Insurance for Vessel-Induced Oil Pollution Damage*; the *Detailed Rules for the Implementation of the Administrative Measures for the Collection and Use of Compensation Funds for Vessel-Induced Oil Pollution Damage*.

12 The *Supreme Court Regulations on Issues of Hearing Disputes over Oil Pollution and Damage from Vessels*.

vessels. The *Regulation on the Prevention and Control of Vessel-Induced Pollution to the Marine Environment* set specific standards on the discharge and collection of pollutants from vessels, prevention of pollution from vessel operations, emergency disposal of pollution from vessels, and investigation and compensation in cases of pollution accidents. The above-mentioned amendment of *the Chinese Maritime Code* further improves the civil liability system for pollution and damage from vessels, providing a stronger legal basis for enforcing the relevant administrative regulations.

China's marine environmental governance and transportation legislation system is characterized by a clear structure, extensive content, and well-organized hierarchy. It thus achieves the convergence and transformation of fragmented international marine environment legislation. Of course, this system is not flawless: for example, regarding greenhouse gas reduction, China has issued regulations on the air pollutants discharged by vessels but not regulated shipping decarbonization. Further discussion is needed of whether an environmental legal system targeting prevention and control of pollutant discharge should encompass reducing greenhouse gas emissions. Fortunately, Like the *Chinese Maritime Code*, the *Maritime Environment Protection Law* has been included in the legislative work plan of the National People's Congress of China. This means the marine environment legislation system is still open for adjustment in response to emerging environmental issues.

Implementation of law: system reform, technology deployment, and international cooperation

Proper implementation is another key element of marine environmental governance. Lack of compliance and enforcement in this domain is regarded as a major challenge at the global level (Tan, 2005, p. 4, p. 55; Karim, 2015, p. 128). For a long time, *MARPOL* has not been effectively implemented by flag states (Churchill et al., 2022, p. 554) since they are unable or even unwilling to exercise jurisdiction over vessel-source pollution, and coastal states are expected to undertake more responsibilities for environmental governance through enforcement action therefore. However, coastal state jurisdiction is inconsistent in different maritime zones, such as territorial seas and exclusive economic zones, which obstruct the exercise of powers of coastal states. Another challenge is that most coastal countries lack the capacity needed to effectively enforce international regulations in their maritime zones (Tan, 2005, p. 27). Under this condition, port states' enforcement jurisdiction has expanded from states' jurisdictional zones under customary international law to areas outside their jurisdiction (Kasoulides, 1997, p. 138). Compared to enforcement at sea, enforcement in port is more widely adopted in the practice of marine environmental governance (Molenaar, 1998, p. 524).

China has built its enforcement capacity in tandem with its construction of maritime laws. In 1998, the Harbor Supervision Administration and the Vessels Examination Administration were merged into the China Maritime Safety Administration (CMSA). Positioned directly under the Ministry of Transport, the CMSA is responsible for supervising water transport safety and preventing marine pollution from vessels. In recent years, China has been reforming its maritime law enforcement system to eliminate administrative inefficiency due to overlapping governance. The China Coast Guard Bureau was established in the administrative system reform in 2013 through the integration of four maritime law enforcement agencies: the Marine Surveillance of the State Oceanic Administration, the Maritime Police under the Ministry of Public Security, the Fisheries Law Enforcement Command under the Ministry of Agriculture, the Anti-smuggling Police at sea under the General Administration of Customs. The *Chinese Coast Guard Law* came into effect on February 1st, 2021 which regulates and guarantees the performance of duties of the China Coast Guard. However, the CMSA was preserved as a professional maritime law enforcement agency, and its functions were strengthened by incorporating inspection, supervision and management of fishing vessels from the Ministry of Agriculture. At present, the dual force of the China Coast Guard and the CMSA constitutes China's maritime law enforcement forces. *MTSL* is an important legal basis for law enforcement by the CMSA, and its amendment reflects the essence of administrative system reform (Zhang and Wang, 2022, p. 4). The CMSA is responsible for administering coastal waters and inland river arteries of provinces and autonomous regions, and the waters in major ports, through 15 regional branches. Other waters are administered by local maritime agencies established by the competent departments pursuant to Article 4 of MTSL.

The CMSA is China's major authority in executing jurisdiction of flag, coastal, and port states in cases of marine pollution. According to statistics from the International Chamber of Shipping, vessels flying the flag of China were on the white list in 2021 (International Chamber of Shipping, 2022), denoting optimum fulfillment in implementing *MARPOL* and its six annexes of two major regional Port State Control organizations in the world: the Paris Memorandum of Understanding on Port State Control and the Memorandum of Understanding on Port State Control in the Asia-Pacific Region (Tokyo MoU). This reveals the high proficiency of China's law enforcement system in executing flag state's jurisdiction over registering ships in mainland China. As regards jurisdiction over coastal and port states, the CMSA conduct port state and coastal state supervision and inspection of foreign vessels in accordance with the article 88(2) of *MTSL*. According to the annual report of Tokyo MoU, China executed

3,673 vessel inspections (more than any other member state) in 2021, and its detention rate for unqualified vessels was 2.78%, thus exceeding the 2.31% average of all Tokyo MoU members (TOKYO MOU, 2021).

Applying technology can promote the effectiveness of maritime law enforcement by coastal and port states (Molenaar, 1998, p. 532). Especially amid the coronavirus pandemic, countries have reduced the frequency of boarding inspections. For instance, before the breakout of Covid-19, the total number of vessel inspections by Tokyo MoU members was 31,372 in 2019; this number dropped dramatically to 19,416 in 2020 and only recovered to 22,730 in 2021 (TOKYO MOU, 2021). To avoid negative impact on the marine environment, China took the lead in drawing up *Guidance on Remote PSC Inspection*, which was approved and adopted by Tokyo MoU member states as an alternative to boarding inspection. Nowadays, technologies including unmanned aerial vehicle and 5G have been widely applied in China's port state law enforcement. Space-based platforms, including remote sensing monitoring satellites and the Beidou Navigation Satellite System, have played an important role in monitoring maritime oil spills. China will continue promoting the application of the Beidou System, communication satellites, and remote-sensing technology to strengthen its capacity in safeguarding navigation security in deep and open seas, focused on constructing an "comprehensive maritime traffic control system" according to the *Outline of the 14th Five-Year Plan for China Maritime Safety Administration System*.

To address major accidental pollution, the CMSA has formulated National Major Maritime Oil Spill Emergency Plan; established a five-tier emergency response network connecting the state, coastal areas, provinces, cities, and ports; built a response center and a technology center for oil pollution emergencies; and set up an oil spill emergency equipment center (MOT of PRC, 2018). By deploying these facilities, the CMSA has successfully handled dozens of major pollution accidents involving vessels, including the *Arteaga* stranding in 2005[13], the *Golden Rose* collision in 2007[14], and the *Sanchi* collision in 2018[15]. In all cases, it has effectively controlled and alleviated damage from pollution, thereby protecting the marine environment in the Western Pacific. Moreover, China has cooperated with countries such as Liberia, Indonesia, and Malaysia and with regional organizations such as the Association of Southeast Asian Nations, the Secretariat for Cooperation between China and Central and Eastern European Countries in setting up a series of international emergency response mechanisms. These endeavors are creating a good institutional basis conducive to international cooperation in responding to pollution emergencies, as can be seen in Table 2.

Specialized judiciary for environmental disputes in maritime courts

A strict, just, and efficient judicial system is the key to the recognition of a country's rule of law. Environmental judiciary is increasingly specialized in the international community. As of September 2016, a combined total of 1,200 environmental courts or tribunals (ECTs) had been established by 44 countries, including in civil law, common law, and other legal systems (Pring and Pring, 2016, p. IV). ECTs can be found in the largest (e.g., China, India), and smallest (Trinidad and Tobago) countries, and in both wealthy developed and impoverished developing nations (Pring and Pring, 2016, p. 4). The sharp increase in the amount of ECTs is driven by many factors (Whitney, 1973, p. 476; Pring and Pring, 2010, p. 4). First, proper settlement of marine environment disputes requires judges with expertise in both legal knowledge and environmental technology, who are able to strike a balance between the interest of the individual and that of the community as a whole; meanwhile, being able to apply rules of proof and applicable laws. Accordingly, in order to hear and rule on marine environment cases properly, a specialized court with related expertise is essential, Second, ECTs help to alleviate the caseload of general courts and ensure sufficient time and judicial resources can be devoted to solving marine environment cases. Moreover, environmental disputes face danger of regional protectionism in general courts. For example, quite a few local courts of China had issued internal documents to ban the reception of environmental disputes in the form of class-action lawsuits (Lin et al., 2009, p. 9). Third, the judges of the general courts have long restricted opportunities to hear environmental cases, and their training in environmental law is relatively limited, which may lead to inconsistent and contradictory judgments. Specialized ECTs would achieve a degree of uniformity (or at least a consistency) in their decisions, which was lacking in general courts. Fourth, the lack of professionalism in general courts has resulted in public distrust of the nation's environmental judicial system. The total number of victims who would either choose to put up with the situation or find non-

13 On April 3rd, 2005, the Portuguese oil tanker *Atigo* ran aground off the berth of Dalian Port, causing hazardous leaks and spills of crude oil to marine environment and local aquaculture industry. See (2005) Da Hai Shi Wai Chu No. 121.

14 There is a collision between *Golden Rose* and *JINSHENG* on May 12nd, 2007 which produced an oil spill in the Bohai Strait of China. See (2008) Qing Hai Fa Chu No. 15.

15 On January 6th, 2018, Panama-registered *Sanchi* tanker carrying condensate oil collided with Hong Kong-registered freighter *CF Crystal*. The accident caught fire, had oil spilled, exploded, and then sank.

TABLE 2 China's cooperation in the field of marine environment.

Cooperation partner	Date	Document (Mechanism)	Content
Regional Cooperation			
The Member States of the Association of Southeast Asian Nations	Nov. 2002	*Declaration on the Conduct of Parties in the South China Sea*	Cooperative activities in marine environmental protection
ASEAN	Oct. 2003	ASEAN-China Maritime Consultation mechanism	Technical cooperation in Marine Environmental Protection Against Pollution
The member states of North-West Pacific Action Plan (China, Japan, Russia, Korea)	Nov. 2004	Memorandum of Understanding on Regional Cooperation on Preparedness and Response to Oils Spills in the Marine Environment of the Northwest Pacific Region	Cooperative activities in marine pollution preparedness & response
Central and Eastern European Countries	Sept. 2012	China-CEEC Coordinating Secretariat for Maritime Issues	Cooperation in shipping and maritime affairs
Bilateral Cooperation			
Indonesia	Mar. 2013	*Memorandum of understanding on maritime cooperation between the government of the People's Republic of China and the government of the Republic of Indonesia.*	Cooperation in maritime search and rescue, environment protection, and cooperation in the international forums such as the IMO.
	Mar. 2015	*Memorandum of Understanding on Maritime Search and Rescue Cooperation between the Ministry of Transport of the People's Republic of China and the National Search and Rescue Agency of the Republic of Indonesia.*	Cooperation in environmental salvage.
Russia	Mar. 2015	*Memorandum of Understanding between the Ministry of Transport of the People's Republic of China and the Ministry of Transport of the Russian Federation on Cooperation in the Safety of Maritime Navigation and the Protection of the Marine Environment*	Cooperation in protection and preservation of the marine environment
The Philippines	Oct. 2016	*Memorandum of Understanding between the Philippine Coast Guard and the China Coast Guard on the Establishment of a Joint Coast Guard Committee on Maritime Cooperation*	Cooperation in protection and preservation of the marine environment
Panama	Nov. 2018	*Memorandum of Understanding between the Ministry of Transport of the People's Republic of China and the Panama Maritime Authority*	Cooperation in port state control, prevention of pollution, marine investigation.
Liberia	Nov. 2021	*Memorandum of Understanding between the Maritime Administration of the People's Republic of China and the Liberia's Maritime Authority on Maritime Cooperation*	Cooperation in port state control, prevention of marine environment pollution from vessels.

litigious means, such as reaching a private agreement that was more or less equal to those being resorted to lawsuits in China (Lin et al., 2009, p. 8). ECTs would allay public mistrust.

Unlike the independent ECTs in some countries, which are completely separated from general courts, China has set up green bench within previous general court system. The first one was established in the People's Court of Qingzhen Municipality in 2007, following the enactment of *Opinions of the Supreme People's Court on Providing Judicial Guarantees and Services to Accelerate the Transformation of the Economic Development Pattern.* This action had pushed China's courts at all levels to establish environment tribunals. In 2014 the Supreme People's Court established an exclusive tribunal for environmental and natural resource cases and subsequently released *Opinions of the Supreme People's Court on Fully Strengthening Environmental Resources Trial Work to Provide Powerful Judicial Safeguards for Promoting Eco-civilization Construction*, which specifies provisions for environment trials in details.

Most of China's ECTs are set up in key environmental protection areas and basins, including resource protection areas as well as industrial and mining areas. However, none of them have been established for marine environment. Instead, China has integrated ECTs for the marine environment with its marine judicial system. From 1984, China gradually established a maritime judicial system exclusively accepting first-hearing maritime or shipping cases. The system now comprises 11 maritime courts, 39 detached maritime tribunals, and over 500 professional judges. China's maritime judicial system is the largest and most complete in the world, and the country accepts more maritime cases that any other (People's Supreme Court, 2014). To ensure that marine environment disputes are settled professionally, in 2016 the People's Supreme Court expanded the scope of jurisdiction with "disputes related to the exploit and environment protection in marine and navigable water" according to *Regulation on Maritime Court Case Acceptance Scope*. To date, environmental disputes in marine and navigable waters have become the main case types of maritime courts.

China's maritime judicial system has unique advantages in hearing marine environment cases. First, there are often close connections among maritime cases, including disputes over

marine infringement, marine contracts, and marine environment cases. For example, a vessel collision may result in marine oil spill pollution. At the same time, conventions concerning the maritime environment (such as the *CLC Convention* and the *International Convention on Salvage*) are also important maritime traffic conventions. Compared to ECTs set up in general courts, the marine judicial system has more professional advantages in the understanding of maritime environmental cases and the implementation of environmental legislation. Second, China's maritime courts are located in the major port cities based on its coastline. Therefore, marine environment disputes can be handled cross-regionally, and to some extent this would limit the occurrence of regional protectionism. Finally, to address maritime lawsuits, China has formulated *the Special Maritime Procedure Law* for maritime courts with some innovative legal methods, such as marine injunctions to prevent marine pollution, which cannot be found in procedures of other general courts. Greater protection of the environment could be achieved than those through general lawsuits (Wang, 2016, p. 89).

Proficient hearing of marine environment cases is promoted by China's ongoing reform of maritime jurisdiction. Following its expansion of jurisdiction to include administrative cases, the next step was to enable the maritime courts to hear criminal cases. This development is considered conducive to unifying the maritime judicial system, harnessing the expertise and judicial resources of maritime courts, and rectifying the marginalized status of maritime criminal cases (Chang, 2022, pp. 451-452). In 2017 the People's Supreme Court designated the Ningbo Maritime Court as the first one of this kind to hear a criminal case, which involved a vessel collision[16]. In 2020 the Haikou Maritime Court heard a public interest civil lawsuit concerning environmental damage resulted from illegal fishing, which was subject to connected criminal proceedings[17]. Although no maritime environmental crime has been confronted by the maritime courts, pilot work is being carried out continuously and it is expected that maritime environment crimes including marine pollution from vessels will soon be accepted, which is conducive for better realization of marine environment protection and pollution control through specialized judiciary.

Conclusion

China seeks to harmonize domestic and international laws and to achieve external validity and legitimacy of its domestic rule of law through compliance with the international law of the sea. Given China's status as a flag, coastal, and port state, its transportation legislation is particularly focusing on balancing competing interests. Moreover, through systematizing maritime laws, China has eliminated the coordination difficulties caused by the fragmentation of international marine environment legislation. In the field of law enforcement, China has built a unified maritime law enforcement system while retaining specialized enforcement agencies to maintain the professionalism of environmental governance. It has also applied many cutting-edge scientific and technological tools to facilitate law enforcement. Finally, in the judicial field, China has built specialized ECTs in its independent maritime judicial system. The established judicial system has been transformed by the expansion of the scope of jurisdiction and carrying out reforms to hear criminal cases regarding the marine environment, thereby achieving fair and efficient trials of marine environment cases.

China's efforts to address the challenges of the rule of law for maritime transportation and the marine environment offer a model for marine environmental governance. China's experience shows that ensuring the domestic rule of law is met with the trend of global governance is crucial. The long-term investment in marine transport and technology lays a solid foundation for the efforts. Although the interpretation of the trend is non-unique because of the different identities and interests of nations, their practices have shaped and will continue to shape the rules-based international order at sea.

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HX: original idea and writing up. XC: research advice and supervision. ZS: writing up and proofreading. All authors contributed to the article and approved the submitted version.

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Conflict of interest

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16 (2017) Zhe 72 Xing Chu No.1.

17 (2020) Qiong 72 Xing Chu No.1 Criminal Judgment.

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