

Review

Critical Perspectives on the New Situation of Global Ocean Governance

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Abstract: Global ocean governance is the concretization of global governance. Various interest groups interact with and coordinate ocean issues. Global ocean governance is inevitably linked to the new global governance landscape. In recent years, a series of new scenarios in global governance have emerged. These situations have further shaped the plurality of participants and the diversity of mechanisms in global ocean governance. Science and technology innovation and application are prerequisites and prime movers for the evolution of global ocean governance. Major worldwide crises, represented by global climate change and the coronavirus disease 2019 pandemic, have added great uncertainty to the future development of global ocean governance. The divergence of interests and positions between emerging countries and developed countries, as well as the reshaping of the global geopolitical landscape in recent years, has led to the stagnation or deadlock of a series of international negotiations and international cooperation platforms related to global ocean governance. With the deepening of global governance, non-state actors are not only objects of ocean governance but also bearers of legal obligations and enjoy varying degrees of legal rights, participating in agenda setting, rule construction, and monitoring implementation at different levels of ocean governance. From a critical jurisprudence perspective, in the practice of global ocean governance, the relationship between non-governmental organizations, states, and international organizations is more likely to be one of reconciliation than the “state–civil society” dichotomy of moral imagination. This new set of circumstances exposes the divisive and fragmented nature of global ocean governance. This study concludes that the new situation of global ocean governance constitutes a historic opportunity for countries to reexamine the role of the rule of law during the Anthropocene to bridge the fragmentation and gaps in mechanisms and achieve a truly integrated, holistic, and closely nested global ocean governance. The question of how to implement the rule of law requires the introduction of theoretical perspectives such as the Anthropocene, complex systems theory, and the community of a shared future for humanity to undertake a fundamental critical reflection and rethinking of global ocean governance.

Keywords: ocean governance; global governance; non-state actors; Anthropocene; complex systems



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1. Introduction

Global ocean governance [1] is a manifestation of global governance [2]. It is inevitably linked to the new landscape of global governance [3] and is characterized by complexity [1] and diversity [4,5]. The main actors in global ocean governance include sovereign states and non-state actors, such as international organizations, non-governmental organizations (NGOs), and transnational corporations. Global ocean governance mechanisms include international platforms, such as international organizations and conferences under the United Nations (UN) and regional, domestic, and local communities. It reflects the conflicting interests of developed and developing countries in traditional global governance theory and the ideological pluralism that characterizes ocean governance. Stakeholder groups, such as coastal, landlocked, and maritime powers, small island states [6], and emerging countries [7], interact and coordinate on different ocean governance issues [1]. In recent

years, as the impact of global scientific [8] and technological [9] changes on the penetration of ocean governance has deepened, a series of global crises have caused uncertainty in the development of such governance. The reorganization [3] of the global geopolitical landscape represented by the competition [10] between China and the United States (US) [11,12] in various fields [13] has dramatically affected the issues and fundamental theories of global ocean governance and has further intensified the plurality and diversity of governance participants mechanisms. This study aims to analyze and illustrate the sources of change in global ocean governance by focusing on the new dynamics of its elements.

This paper is organized as follows: Section 2 provides an overview of the origins and development of global ocean governance. Section 3 analyzes new situations and challenges in the evolution of global ocean governance in the following four aspects: science and technology, uncertainty about future development due to climate change and coronavirus disease 2019 (COVID-19), the recent reshaping of global geopolitical landscapes, and a critical view of the role of NGOs. Finally, Section 4 concludes this study.

2. Global Ocean Governance: A Literature Review

2.1. Global Governance

The concept of global governance emerged as a theory in the 1980s. With the rapid development of globalization and the increasing number of global problems facing humanity, some scholars began to apply the analytical framework of governance to the international level, thus creating the concept of “global governance”.

James Rosenau, a leading founder of global governance theory during the same period, considered governance an activity supported by common goals [14]. Global governance can be envisioned as “a system of rules that encompasses all levels of human activity—from households to international organizations—that pursue goals by controlling behavior to produce transnational impacts” [15]. Rosenau argued that contemporary world politics have shifted from sovereign, state-centered dominance to governance centered on the sphere of authority.

Based on this analysis, Rosenau developed his unique theory of global governance—governance on the “domestic–foreign frontier”. He argued that the politics of the frontier means the expansion of the field of action and the space of world affairs and the convergence of domestic and foreign issues, inseparable in an impenetrable network [16]. The frontier is the basis for understanding the current governance system and encompasses both coherence and variation. The frontier can be expressed in market forms, civil society forms, and legal charters, among others. The proliferation of diverse types of spheres of authority has together made possible the governance of spheres of authority and created the conditions for global governance. Rosenau contemplated the issue of authority from an original perspective, arguing that authorities, such as global governance, would eventually replace traditional state coercion.

After Rosenau, Robert Keohane and Joseph Nye viewed governance as “the formal and informal procedures and mechanisms that guide and constrain the collective action of a group” and global governance as “an international mechanism of rules, norms, and institutions” [17]. Keohane’s neoliberal institutionalist view of global governance is based on the critical role of international mechanisms and organizations, forming a relatively complete theoretical system of global governance.

Similarly, according to Pierre De Senecrens, global governance is “first and foremost a product of agreements and practices among nations, especially among the great powers” [18]. Intergovernmental organizations, as well as informal regulatory processes promoted by NGOs or multinational corporations, are also included in this governance, which is both the product of international negotiations in which countries participate and a mixed coalition of individuals, pressure groups, intergovernmental organizations, and NGOs [18].

The main subjects of global governance include sovereign governments, formal international organizations, and informal global civil society. The objects include various

global issues that have affected or will affect humanity, such as global security, ecology and the environment, international economy, transnational crime, and basic human rights. Notably, global governance advocates the development of an operational mechanism of joint participation, cooperation, and consultation, emphasizing that all subjects solve the problems they face together through consultation, interaction, and compliance with norms. Global governance is an extension of good governance at the national and international levels [19].

2.2. Global Ocean Governance

Global ocean governance is the application of global governance to the oceans. It also has unique characteristics that distinguish it from other areas of global governance. Furthermore, it reflects the conflicts between developed and developing countries in traditional global governance theory and the ideological pluralism that characterizes ocean governance.

Geographic discoveries launched humanity's exploration of the unknown oceans. The Dutch jurist Hugo Grotius published his famous *The Freedom of the Seas*, in which he argued that the seas are "terra nullius" or "commons" and are not the exclusive property of anyone [20]. In contrast, the British scholar John Selden argued that the sea, as well as land, is the state's private property and that the state enjoys control over the offshore sea [21]. Based on national strength and naval power, national rulers and jurists jointly established divisions of the territorial sea and the high seas.

With the development of third-world powers, science and technology, and increasing population pressure, land-based resources are increasingly depleted. In this context, breakthroughs emerged in the competition for maritime interests by both traditional naval powers and emerging independent states. The first breakthrough came on 28 September 1945, with President Harry S. Truman's Proclamation 2667 [22], which stated that the continental shelf adjacent to the US coast was under the jurisdiction and control of the US. This proclamation marked a break from the traditional maritime order, and claims to the continental shelf have since become an essential factor in expanding the jurisdiction of coastal states.

The second breakthrough came on 17 August 1967, when the Permanent Representative of Malta to the UN, Arvid Pardo, submitted a proposal to the Secretary-General of the UN for a Declaration and Treaty on the Reservation of the Seabed and Ocean Floor Beyond the Limits of Present National Jurisdiction and the Use of its Resources for the Benefit of Mankind, Exclusively for Peaceful Purposes [23]. This proposal advocated that the seabed and ocean floor beyond the limits of national jurisdiction be considered the "common heritage of mankind" [23]. The third breakthrough was the 1982 United Nations Convention on the Law of the Sea (UNCLOS), which reaffirms the traditional principles of sovereignty over the territorial sea and freedom of the high seas and regulates the conservation of the biological resources of the high seas, marine environmental protection, marine scientific research, and the international seabed area.

Neo-colonialism in contemporary ocean governance models is a real problem and necessitates an awareness of the re-territorialization discourse that pervades the contemporary governance environment. It is not limited to the territorialization (and re-territorialization) paradigm of ocean governance but also includes the "new" paradigm outlined. It is necessary to consider the territorial discourse and the power regime in which territory as a "political technology" is embedded. The practice of territorialization is a political tool for acquiring and appropriating space. Space grabbing through schemes such as protected areas, which, while beneficial for marine protection and conservation, can bypass the needs, experience, knowledge, and use of their marine spaces by local indigenous populations. This de-territorialized management model essentially imposes new technological "fixes" on ocean space and defines the problem according to Western science and policymakers' understanding. In fact, planning and conservation practices based on the logic of territorialization retain with them the traces of colonization, in which territories were originally

created through colonization and the violent plunder of imperial enterprises. It is important to recall and critically engage with these histories in the context of present-day and future-oriented governance and management strategies. Furthermore, it is vital that the homogeneous “we” (a “we” that is usually white, Western, and predominantly male) also step back from governance efforts and completely reorient ocean governance approaches through decolonization. Only then will it be possible to truly “transform” the oceans for sustainable development [24].

For the past three decades, the UN has called on coastal states to implement an integrated ocean management system to maintain the oceans’ sustainable development. Moreover, ocean governance is a conceptual development and breakthrough in the practical activities of ocean management [25,26]. Integrated ocean management needs to be based on integrated scientific advice, which crosses disciplinary and traditional sector boundaries [27]. It is necessary that management be pursued in the context of the overall use of ocean space, with an understanding of the individual and cumulative effects of human activities on the natural environment [26]. Ecosystem-based marine spatial planning and ocean zoning are emerging approaches to integrated ocean management [28].

Ocean governance is based on laws and institutions [29] and emphasizes the “three Cs” principle of coordination, cooperation, and collaboration at the national, regional, and international levels. Such principles are not only applicable to coastal and island states but also require cooperation among all countries in the field of ocean governance [30]. Robert Friedheim defined global oceans governance as the development of a set of ocean rules and practices that are equitable, efficient in the allocation of ocean uses and resources (including the notion of sustainability), provide a means of resolving conflicts over access to and enjoyment of the ocean’s benefits, and specifically attempt to alleviate “collective-action problems in a world of independent actors” [31]. In a broad sense, ocean governance aims to ensure that human needs are met while protecting the marine environment [32].

2.3. Plurality of Participants in Global Ocean Governance

A purposeful transition to more sustainable ocean systems requires a profound shift from business-as-usual to global regulatory efforts that pursue ocean sustainability. The transition to a thriving ocean system will require governance changes across sectors and scales and effective and inclusive participation of multiple players. The result will be a form of “polycentric governance” that can manage shared resources and ocean space [33]. The main subjects of global ocean governance include states, international intergovernmental organizations, international NGOs, multinational corporations, and individuals. Currently, states are the most influential subjects in global ocean governance activities, and other actors act in complementary governance. According to Article 38 of the Statute of the International Court of Justice [34], states are the subjects of international legal rulemaking.

The issue of climate change has been receiving increased attention from the international community in recent years. In recent years, requests for advisory opinions from international judicial bodies on climate change issues have been gaining increasing attention from small island states and the international community. On 12 December 2022, the Commission of Small Island States on Climate Change and International Law (COSIS) filed a formal request for an advisory opinion with the International Tribunal for the Law of the Sea (ITLOS), requesting the Tribunal to clarify in the advisory opinion the specific obligations of UNCLOS States Parties concerning the prevention, reduction, and control of pollution of the marine environment caused by climate change and the protection of the marine environment affected by climate change [35], a request currently before the ITLOS. However, the ITLOS needs to clear some procedural hurdles when faced with an advisory opinion on its obligations to combat climate change. In particular, the ITLOS’s interpretation of the legal basis for the Tribunal’s advisory jurisdiction as a full court has been opposed by a significant number of states, and the lack of state support for the advisory jurisdiction could affect the legitimacy of the advisory opinion, keeping the legal basis for the ITLOS’s advisory jurisdiction as a full court fragile [36]. Although certain

difficulties and challenges are associated with invoking advisory jurisdiction on climate change issues, they are not insurmountable. The advisory jurisdiction is a moderate but powerful pathway between political negotiation and litigation jurisdiction. Although the advisory opinion itself is not legally binding, the status and authority of the ITLOS at the international level will, to a certain extent, influence the future practice of states on climate change issues, which in turn will impact the new situation of global ocean governance.

A focus on governance directs us to look not only at formal politics among states but also at the more subtle politics among diverse actors working to influence who participates in (and is subject to) governance regimes, the scale at which these governance problems are conceptualized, the solutions implemented, and the knowledge that informs such decisions [1]. The state-led pattern with the joint participation of non-state actors through legislative mechanisms has become the trend in international legislation. These actors have an internal identity besides that of the state community and their own normative codes. Non-state actors can be divided into three broad categories: supranational actors, such as international governmental organizations and regional coalitions of states; transnational actors, such as international NGOs, multinational corporations, and violent transnational groups; and subnational actors, such as local NGOs, businesses, and individuals with international influence.

As the most authoritative inter-governmental organization for the governance of the International Seabed Area, one of the International Seabed Authority (ISA)'s mandates is to take the necessary measures with respect to activities in the International Seabed Area to ensure the effective protection of the marine environment from harmful effects that may arise from activities in the Area. To this end, the ISA Strategic Plan (ISBA/24/A/10) [37] and the High-level Plan of Action [38], adopted by the Assembly in 2018 and 2019, respectively, provide appropriate approaches for the implementation of its obligations to protect the marine environment. For example, the progressive development, implementation, and ongoing review of an adaptive, practical, and technically feasible regulatory framework, based on best environmental practices.

As the UN agency responsible for developing and adopting measures to improve the safety and security of international shipping, prevent pollution from ships, and prevent pollution from waste dumped at sea, the International Maritime Organization (IMO) plays an integral role in achieving the UN Sustainable Development Goals (SDGs). For decades, the IMO has developed and adopted mandatory rules as well as recommendations and guidelines to protect the marine environment from any potential negative impacts of shipping activities. One of the main conventions for protecting the oceans is the International Convention for the Prevention of Pollution from Ships (MARPOL) [39]. Special Areas and Particularly Sensitive Sea Areas (PSSAs) are designated to ensure a higher level of protection from shipping activities. The IMO's instruments cover a wide range of matters, from the design, construction, and equipment of ships to the competence of the seafarers who operate them [40].

NGOs have unparalleled opportunities for influence in ocean governance due to governance gaps, and they exert this influence in policy development and agenda setting. They have advocated for particular forms of ocean governance (e.g., MPAs or ecosystem-based management) and sometimes play active roles in implementation. Many receive financial support from American and European private foundations active in ocean philanthropy [24]. The polycentric arrangements of regional and subregional ocean governance have been increasingly recognized [41]. The Biodiversity Beyond National Jurisdiction (BBNJ) Working Group negotiations are an example of NGOs working with countries on complex global environmental issues. They provided much of the expert input in the discussions at the UNGA Informal Ad Hoc Working Group Meeting on Living Marine Resources Beyond National Jurisdiction [42]. The negotiations lasted over a decade and included more than 1523 people representing governmental organizations and NGOs. The outcome was a consensus on the need to negotiate a binding international instrument on BBNJ, a significant feat of global governance.

This collaboration between NGOs and government delegations was partly made possible by the ideologies of governmental and non-governmental actors. The government delegations participating in the BBNJ working group and the UN have been open and willing to consider NGOs' views and suggestions to cooperate and reach an agreement. Similarly, NGOs and individual activists approach negotiations with a "realist" ideology, recognizing the need to work with the political system to reach policy compromises. In the case of the BBNJ Working Group, the formation of the High Seas Alliance in 2011 strengthened NGO voices [43]. The High Seas Coalition aims to "align and coordinate the work of NGOs on BBNJ issues in order to have a greater and more coordinated impact on the negotiations". As a result, a legitimate platform for raising concerns and issues, facilitated by coalition members, was established. The High Seas Alliance permitted the participation of small countries that lacked the resources to attend many of the relevant BBNJ meetings, which led to the High Seas Alliance making statements on all aspects of the BBNJ negotiations [44]. In addition, while progress has been made in addressing key parts of the MGR text (including objectives, notifications, and traditional knowledge), differences remain on key areas related to benefit sharing (including modalities and the nature of benefits) [45].

Businesses and legal entities are also part of the plurality of subjects that play a role in global ocean governance, influencing international ocean business operations and ocean industry development [44]. As important non-state actors, multinational companies are actively exploring the deep sea through mining activities. As of January 2020, the ISA has issued permits and entered 30 contracts with 21 contractors for the exploration of polymetallic nodules, polymetallic sulfides, and cobalt-rich ferromanganese crusts in the deep seabed. The contractors are a mix of corporate enterprises and state-owned companies, with several governments keen to establish the rights to mine and gain a foothold on the international seabed. Of the 30 exploration contracts the ISA has issued to date, at least 18 are held by only seven countries—China, France, Germany, India, Japan, Russia, and South Korea—through their state-owned companies or government agencies and ministries. Another seven contracts are effectively in the hands of three private companies: DeepGreen, a privately held Canadian company; UK Seabed Resources, a subsidiary of US-based Lockheed Martin; and Global Sea Mineral Resources, a subsidiary of the Belgian company DEME Group.

In general, global ocean governance subjects have competing relationships with each other. Global ocean governance is a redistribution of authority between different levels of government, leading to the formation of two competing systems of authority. One is a governance system dominated by sovereign states; the other is a supranational system composed of various non-state actors. The coordination and interaction within each ocean governance system determines the effectiveness and direction of global ocean governance, therefore forming a multifaceted composite structural system.

3. New Situation of Global Ocean Governance

3.1. *Science and Technology as the Role of Prerequisites and Prime Movers*

Science and technology innovation and application are prerequisites and prime movers for the evolution of global ocean governance. On the one hand, scientific and technological advances have expanded the depth and breadth of global ocean governance. On the other hand, many emerging ocean governance challenges have surfaced in tandem with these advances. The fourth technological revolution, mainly characterized by information technology and artificial intelligence (AI), has had a dynamic impact on and posed fundamental challenges to the agenda-setting and mechanism-building of global ocean governance. These challenges arise from the creation of new governance vacuums, generating many issues that did not previously exist or existed but were not exposed. These issues include the competition and regulation of the strategic value of the deep-sea military, the application of AI weapons at sea, the competition for maritime space and strategy through increased

maritime domain awareness (MDA), and the new threats to maritime security governance, such as terrorism and piracy brought about by new technologies.

Innovation and the application of science and technology are prerequisites and key drivers for the development of global ocean governance. Furthermore, continuously updated scientific results and an adaptable international legal regime are important components of the Global Ocean Governance Toolbox. Global ocean governance requires a systematic and comprehensive response from international law, which requires the synergy of multiple disciplines, of which science and technology are key elements. Since the UN's adoption of the 2030 Agenda for Sustainable Development in 2015, scientists have become deeply involved in international legislation, particularly concerning climate change, oceans, and the environment. In the preliminary phase of international legislation, scientists can contribute to scientific consensus and priority setting at the international level, providing a design framework and content elements for the construction of international legal regimes and the negotiation of instruments [46]. In the negotiation of international legal instruments, scientists participate in the design of the instruments and drafting of the first draft in accordance with the procedural rules of the organization conducting the negotiations.

The international maritime order is dynamic and evolving, and is shaped and influenced by historical maritime powers. Technological advancement and scientific cognitive breakthroughs have influenced and stimulated changes in the international maritime order and the contrast of national power. Every major technological change is accompanied by major developments in ocean governance. Digitalization is the key process of what is now termed “the fourth industrial revolution” or “Industry 4.0”. It is about developing an environment utilizing new and disruptive technologies like AI, robotics, virtual reality, and the Internet of Things (IoT), which are changing how people work and live [47].

For example, a large challenge for sustainable fisheries governance is illegal, unreported, and unregulated (IUU) fishing [48], which undermines the ability of fishery governors to make sound, informed decisions [49] and threatens the food security and livelihoods of fishing communities [50]. As both fishing fleets and fish stocks are mobile, there is a need to collect spatially referenced data on the location, gear, and fish catch of fishing vessels to minimize illegal, unreported, and unregulated fishing activity [51].

Technologies identified for such purposes include drifting fish attraction devices, onboard cameras, drones, and satellite vessel-monitoring systems [52]. These three spatial dimensions of information gathering from water, air, and space set new standards for enforcing fishing restrictions and create possibilities for new communities of ocean governance. “The focus on transparency and information has de-territorialized the actors and means of control over ocean governance, as well as re-territorialized existing (legal and illegal) fishing practices” [51]. This means that different sub-communities of actors must apply standardized data access and exchange to enable trusted and controlled interoperability [52]. The continuous development of science and technology can provide accurate and reliable data for the fisheries industry, enhance the understanding of the fisheries situation, make marine operations safer and more efficient, and contribute to the continuous improvement of the legal regulation of fisheries and the sustainable development of the environment.

The Global Ocean Observing System (GOOS), an international framework for collecting and managing data from the world's oceans and seas, is executed by the Intergovernmental Oceanographic Commission-UNESCO (IOC-UNESCO) and dozens of organizations and people devoted to coordinating knowledge of the ocean, from remote sensing systems like satellites and coastal radars to computer models and direct or in situ observations [52]. These systems are meant to provide free, known-quality maritime data for socially relevant purposes following the findable, accessible, interoperable, and reusable (FAIR) principle [53], which is now widely encouraged for oceanographic data [54].

In addition, technology has a major impact on shipping. AI, big data, automation, and the IoT are set to impact shipping more profoundly, not just in navigation but across the full spectrum of ship operations and the logistics chain. In recent years, the pace of

digital adoption of the term “Maritime 4.0” [55] (sometimes referred to as “Shipping 4.0”) has increased. With its IMO Compendium [56], the IMO Facilitation Committee (FAL) is working to facilitate digitalization in shipping, including electronic ship reports.

Major powers are investing in AI strategy, research and development, talent, and production, creating a wave of AI weaponization. More than a dozen countries have launched AI strategies in recent years, including China, France, Canada, and South Korea [57]. Their plans include new research projects, AI-enhanced public services, and smarter weapons [58]. Autonomous weapons have begun to be widely used, and in the maritime field, unmanned vessels have been used as weapons. For example, Sea Hunter (DARPA’s Anti-Submarine Warfare [ASW] Continuous Trail Unmanned Vessel [ACTUV] program) is designed to autonomously detect and track enemy submarines and serve as a research testbed [57]. The maritime domain is a common transnational sphere that hosts a significant amount of commerce. However, this common domain also provides a convenient means for terrorism-related activities or materials that threaten a nation’s basic security. Enhanced MDA is essential to securing the maritime domain from threats, especially terrorism [59]. Many countries have begun to use information technology to drive reform and innovation in the maritime security complex, as reflected in a range of new mechanisms for knowledge production about maritime security environments, particularly the development of what is often referred to as MDA or “Maritime Situational Awareness” (MSA) [60]. In turn, MDA and MSA have intensified their strategic competition.

For example, at the international level, different organizations are developing uniform rules and standards for the operation of maritime autonomous surface ships (MASS), leaving the door open for future developments. The initiatives undertaken by MASS are few and, for the most part, in the early stages of their existence. Priority is given to harmonizing and developing the rules and standards for electronic navigation and manned vessels [61].

Driverless vessels are developing on a large scale, and remotely controlled commercial vessels will soon become a reality, a trend that must be accompanied by corresponding coordination and standardization initiatives. These should be developed in parallel with the e-navigation work, which can be undertaken simultaneously. If the current trend continues, unmanned commercial vessels currently being constructed will be unable to navigate the seas and effectively interact with other (manned or unmanned) ships, shore personnel, governmental authorities, or third parties. The result will be accidents at sea that affect trade activity. Following the proactive stance of the IMO in developing an international legal framework governing MASS, the development and harmonization of rules and standards to accommodate the operational aspects of MASS needs to intensify [61].

Unlike manned vessels, unmanned ships can now operate with varying degrees of independence from human interaction [62,63]. However, the legal framework for regulating unmanned vessels has not yet been established, and the existing mechanism is unable to address a range of questions, such as whether an unmanned vessel constitutes a vessel, whether such a vessel is considered seaworthy, and whether rescue operations at sea should be provided in compliance with other international maritime conventions. To fill this regulatory gap, the IMO has been working in recent years to develop such a legal framework [61].

3.2. Uncertainty Brought by Climate Change and COVID-19

Worldwide crises, such as climate change and the COVID-19 pandemic, have added great uncertainty to global ocean governance. Sea-level rise caused by climate change erodes the living space of small island states and low-lying coastal countries, creating a range of issues. Notably, there is a vacuum in international legal regulation, such as climate migration. Other emerging ocean issues, such as the fight against marine microplastics and ocean acidification, depletion of fishery resources, destruction of marine biodiversity, and melting glaciers in the North and South Poles, are also affected or caused by climate change. Additionally, the COVID-19 pandemic poses a significant risk to ocean health and

human health. The spread of the virus through the cross-border seafood trade, as well as the various global incidents and tragic stories of crew members and cruise ship visitors suffering from COVID-19, have highlighted the regulatory gaps and inadequacies of the flag state, coastal, and port state jurisdiction in the context of traditional international maritime law in dealing with global public health issues. In the face of global crises, fragmented global ocean governance [64] has revealed limited responses, lack of cooperation, and conflicting governance platforms.

Ocean governance is complex and influenced by multiple drivers and actors with different worldviews and goals [65]. Inconsistencies in sectoral approaches, conflicts among actors, jurisdictions with overlapping mandates, and poor communication among governance institutions have undermined the effectiveness of ocean governance [66,67]. Addressing these challenges is integral to developing effective governance for marine ecosystem sustainability [68]. The impact of climate change has increased the uncertainty of ocean governance. In the face of a changing climate, knowledge gaps regarding oceans and ocean ecosystems will likely widen [65]. The COVID-19 pandemic is now significantly changing global economic and social ecosystems, which will likely change future trajectories (e.g., small-scale and community fisheries) [69].

More than 70 countries are currently or are likely to be directly affected by sea-level rise, including mainly coastal countries, low-lying countries, and small island states. However, even if some countries are not directly harmed by global mean sea-level rises, such as several medium- and high-altitude countries, they will still be affected by international law eventually. This series of impacts are manifested in three main areas: the law of the sea, statehood, and personnel protection [70]. The legal implications arising from sea-level rise are by no means limited to the field of the law of the sea. Its systematic and comprehensive nature extends beyond several areas of international law, thus seriously impacting the traditional rules of international law and jeopardizing its inherent stability and certainty. The fragmentation of international law combined with the crosscutting and comprehensive nature of the sea-level rise problem highlights the inadequate application of existing international law to address this challenge. The International Law Commission (ILC) included the topic “sea-level rise in relation to international law” for consideration in its long-term program of work in 2018 and decided to establish an open-ended Study Group on the topic in 2019. According to the ILC’s syllabus, the group will examine the topic on the premise that sea-level rise is a scientifically proven fact, addressing only the “legal impacts of sea level rise” and not “environmental protection, climate change per se, causation, liability, and responsibility”. Specifically, the Study Group will analyze existing international law, including treaties and customary international law, to provide legal assistance to the international community in addressing this issue. However, it will not recommend changes to existing international law, such as UNCLOS.

Plastic pollution in oceans has increased tenfold over the last 40 years. Plastics account for 60–90 percent of the waste that accumulates in the marine environment [71]. COVID-19 has led to a dramatic increase in the use of disposable plastic products such as masks and gloves, increasing amounts of plastic entering the ocean. Marine plastic waste, which exists in large quantities and continues to increase, is constantly breaking down and decomposing in the natural environment or is discharged as a component of many household products [72], becoming microplastics with a particle size of less than 5 mm in the ocean [73]. Owing to the persistent nature of plastic, which hardly degrades, and its small size and light weight, plastic particles can spread everywhere in the world’s waters through ocean currents. Some studies have pointed out that plastic is prevalent throughout the marine environment, from the surface to the seafloor, including in deep-ocean trenches [74]. Microplastics can even travel through the atmosphere and end up in remote, sparsely populated areas [75], even Arctic ice floes [76], and Antarctic waters. Plastic waste permeates the environment far more than is generally imagined, making marine plastic pollution a global, transboundary problem.

Marine plastic pollution requires concerted cooperation among countries worldwide; however, the limitations of existing international and regional mechanisms and the fragmentation of solutions are insufficient to address this challenge. The UN Environment Assembly has adopted four resolutions on marine plastic litter and microplastics. The United Nations Environment Programme (UNEP) established the Ad Hoc Open-ended Group of Experts on the Review and Governance of Marine Microplastics (AHEG) to make recommendations for strengthening the international governance structure for the prevention of marine plastics. AHEG-4 was the last meeting of the working group established for this purpose; however, ultimately, the group of experts did not agree on whether to make a clear recommendation to the UN Environment Assembly on a global, legally binding agreement to address the issue of marine plastics, and the issue remains controversial. At the fifth meeting of the UNEA, it adopted Resolution 5/14 to “End Plastic Pollution: Towards an International Legally Binding Instrument” [77]. However, even with a common understanding of the adverse effects of plastic pollution, the details and contents of key substantive themes for determining the scope and guiding the implementation of a future international treaty [78] have a long way to go.

The COVID-19 pandemic swept the world as the greatest unexpected factor in 2019, seriously impacting many aspects of economic and social development. Various countries launched pandemic prevention and control policies, such as closing their borders and restricting the movement of people to prevent the spread of the pandemic. The suddenness of COVID-19 revealed that the international law of the sea regime is not yet capable of responding to global crises. In the first year of the COVID-19 pandemic, global shipping and trade were severely affected. The world economy suffered supply and demand shocks amid supply chain disruptions, shrinking global demand, and economic uncertainty. The emergence of new variants of the virus and a surge in the number of infections reported across regions continued to disrupt economies, trade, and global logistics. The rapid recovery of containerized trade, supported by economic stimulus packages, increased consumption, and e-commerce, has stretched the maritime supply chain [79]. Recognizing the magnitude of the challenge, the international community has called on governments and relevant stakeholders to support the maritime sector and help shipping and ports navigate the crisis. For example, in response to the pandemic, the United Nations Conference on Trade and Development (UNCTAD) issued a call to action to keep shipping and ports operating [80]. The Secretary Generals of UNCTAD and the IMO issued a joint statement in support of keeping ships sailing, ports open, and cross-border trade flowing during a pandemic [81]. Furthermore, UNCTAD, jointly with the International Labour Organization (ILO), the IMO, and the World Health Organization (WHO), called on stakeholders to support the 1.9 million seafarers worldwide from being unduly affected by the COVID-19 pandemic and related restrictions [82].

Due to climate change, the frequency of heat waves in the ocean has increased twenty-fold. The damage caused by extreme weather events is particularly evident in the fishing industry. However, the fisheries management system has not responded adequately to the damage caused by these extreme weather events. For instance, regulations for certain species on the US East Coast and in Europe allocate access to fisheries based on fixed historical conditions, not on the current distribution of the fish [83]. The management regime fails to consider that fish species that would otherwise be in the local ocean have moved to polar regions. There is a lag in the laws and regulations, which means that fish that were once regulated may have become scarce, and the management regime fails to provide some level of attention to newly migrating species. In the long run, the existing fisheries management system may not be adapted to the realities of new species distributions [84]. Fishing vessels may adapt to this change quickly, yet the adaptation of laws and regulations lags behind [85,86].

The international recommendations and directives issued by the above international organizations have not only helped to inform and guide the responses of public and private actors but have also inevitably led to overlapping and conflicting legal mechanisms. To

mitigate the risk of uncertainty arising from new coronavirus outbreaks, measures must be coordinated to avoid duplication and conflict and improve efficiency. National governments and international organizations should resolve the current fragmented response measures through the proper cooperation of all parties.

3.3. Reshaping of the Global Geopolitical Landscape

The divergence of interests and positions between emerging countries and developed countries, as well as the reshaping of the global geopolitical landscape in recent years, represented by strategic competition between China and the US, has led to the stagnation or deadlock of a series of international negotiations and international cooperation platforms in global ocean governance. The division between developed and developing countries is no longer evident as many new, intricate, and intersecting interest groups have emerged. Thus, the security dimension of polar governance has returned. Against a further intensification of global geopolitics, the Arctic states have all adjusted and strengthened their strategies, planning new deployments to further strengthen competition in the region. In recent years, China's growing ability to participate in Arctic affairs and the increasing frequency and closeness of Arctic cooperation between China and Russia have raised concerns in the US. In recent years, the US Arctic strategy has repeatedly and publicly mentioned that it views China and Russia as major strategic competitors in the Arctic. The US government expects to establish and maintain a US-dominated rule of law in the Arctic. The inertia of the Arctic strategy during Trump's term may continue to play its original role during the Biden administration. The introduction of the US Strategic Competition Act 2021 set the tone for the Biden administration's approach to Arctic governance in China over the next four years, and the legacy of the Trump administration's Arctic strategy will continue to linger. Both military and diplomacy efforts remain the main focus of the US Arctic strategy. The eight Arctic States (Canada, Denmark, Finland, Iceland, Norway, Sweden, the Russian Federation, and the US) have either strengthened their sovereign presence through domestic legislation and policy implementation or used the following strategies: (1) the interregional governmental or unofficial platforms they dominate to increase military security deployments and (2) observation networks to safeguard sovereign security and political and economic stability, and various rights and interests of the Arctic states. Concerned about the increasing militarization of the Arctic and the spread of conflict, on 29 March 2022, the UK presented its new Arctic Military Strategy [87], which set out a defense approach to the Arctic to support the UK government's Arctic policy framework.

The global strategic rivalry between the US and China has spilled over into Antarctic governance in recent years. Antarctic research powers have increased their strategic deployment in Antarctica, promulgating strategies and action plans and using their strong research [88] capabilities to promote the construction of various protected areas in Antarctica and increase their substantial presence. For example, after the South Orkney Islands and Ross Sea Protected Areas proposed by the UK, the US, and New Zealand were adopted, the EU, Australia, and other countries together proposed drafts with three protected areas totaling 3.2 million square kilometers: an East Antarctic Marine Protected Area draft, a Weddell Sea Marine Protected Area draft, and a West Antarctic Marine Protected Area draft. Once adopted, the vast majority of the Southern Ocean will not be open to the development of activities such as commercial fisheries and will be under strict regulation. Behind the debate [89,90] over Antarctic MPAs are complex geopolitical factors [91], economic interests, power struggles [92], and other diplomatic issues [93]. Relevant countries will likely strive to do their best to embed their own interests and needs in the MPA system, and the establishment of Antarctic MPAs will likely be a means for both Antarctic sovereignty claimants and retained sovereignty claimants to increase their substantial presence in the Antarctic region.

3.4. Critical Reexamination of Non-Governmental Organizations

Over the past few decades, NGOs have gradually penetrated almost all levels of global ocean governance [94]. From a critical jurisprudence perspective [95–97], the study of non-state actors [98,99], particularly NGOs, in traditional global governance theory has been overshadowed by a progressive narrative under the aura of global civil society. From a traditional international law perspective, NGOs are seen as benign players driven by the interests of their citizens [100]. However, such a perspective also exposes the rigid view of traditional international law that divides NGOs into opposing positions from other political actors. NGOs exist in the international community, not in a vacuum, but are affected by factors other than the common interests of citizens. In this context, critical international jurisprudence offers a new path for understanding NGOs [101]. As members of the international political community, NGOs are subject to the same international political economy, domestic laws, and other factors. NGOs funded by state agencies have been involved in political activities and have become government agents and implementers of government policy goals [102], representing some particular interests or parties [103], and have lost the independence and impartiality of NGOs. In the process of the creation and operation of international law, NGOs bear an important responsibility in “global civil society” [104] to enhance the democracy and fairness of international law [105]. However, NGOs funded by a particular government tend to defend the interests of their funders or become a tool for the policy goals and exported values of the funding country in their participation in international lawmaking, which is not conducive to the fairness and stability of the international law order, showing the figure’s “dark side of virtue” [106].

In the practice of global ocean governance, the relationship between NGOs, states, and international organizations is more likely to be one of reconciliation than the “state-civil society” dichotomy of moral imagination [107]. While the diversity of mechanisms for global ocean governance has contributed to specialization in different issues and the development of sophisticated governance tools, it has also resulted in a fragmented state of governance.

4. Conclusions

This new set of circumstances exposes the divisive and fragmented nature of global ocean governance. However, it also provides a historic opportunity for countries to re-examine the role of the rule of law under the Anthropocene to bridge the fragmentation and gaps in mechanisms and achieve truly integrated, holistic, and closely nested global ocean governance. The international maritime order is dynamic and evolving, and the authoritative, comprehensive, and extensive nature of the UNCLOS does not imply the Convention’s perfection. As a product of the game of interests and compromise among groups of countries, many provisions of UNCLOS are principled and outlined, which leads to ambiguities and differences in legal interpretations that often need to be addressed in specific applications. UNCLOS also fails to anticipate and exhaust the opportunities and challenges presented by the rapid development of human science and technology and the changes in the earth system during the Anthropocene. The current international ocean order represented by the Convention is in a period of rapid change against the background of the “unprecedented changes of the century”, which requires a response to a series of earth system changes such as sea-level rise, plastic pollution of the oceans, and acidification. The ocean order during the Anthropocene should be distinguished from the zero-sum game of naval power and the land power of forcible plunder during the Holocene. The oceans and continents are in a cooperative and symbiotic relationship, as are humans and the earth system. A fair and reasonable international maritime order must reflect the interests of a vast number of developing countries as well as the new international power contrast. In the face of the potentially disruptive challenges and opportunities of international law under the Anthropocene, developing and developed countries stand at the same starting line of the human community.

The question of how to implement the rule of law requires the introduction of theoretical perspectives such as the Anthropocene, complex systems theory, and the community of a shared future for humanity to undertake a fundamental critical reflection and rethinking of global ocean governance. At the beginning of this century, Paul Crutzen, a Nobel Prize winner for his work on atmospheric ozone, proposed that the Earth system had left the Holocene and entered a new Anthropocene era due to the impact of economic development and population growth on the global environment [108]. The content of current international law is based on the foundational fact that the Holocene is timeless and the Earth system is sufficiently stable. This has long been taken for granted. With the beginning of the Anthropocene, however, international law will face a fundamental challenge. The transition from the Holocene to the Anthropocene will require a response or shift based on the needs and goals of the new situation rather than imposing by analogy or precedent norms or institutions based on previous situations that are no longer valid. Simultaneously, international law will be one in which the search for stability, and ultimately for solutions that promote peace and prevent conflict, tends toward progressive change in the legal sphere [109].

Complexity theory emerged in the second half of the twentieth century. It explains how patterned order can develop in the natural world as a consequence of the actions and interactions of component agents in a networked relationship [110]. Wheatley argued that international law can be regarded as a complex, self-organizing system that results from the communication acts of states and non-state actors. The insights from complexity theory can help to make better sense of the workings of the international law system [111]. While complexity is often used to explain systems with large numbers of component agents, it can also be applied to systems with relatively few actors, where “the agents are complex and the communication language is complex” [112]. While states remain the primary actors of international law, the non-state actors as component agents also contribute directly to the patterns of international law communications. The new situation of global ocean governance requires a holistic rule of law, which may take a different path and assume a new structure. The complexity theory provides insights and new language to understand the evolution of global ocean governance which evolve under the occurrence of significant change and influence of unexpected forces.

The concept of human community with a shared future provides direction for society to meet the challenges of the earth system, with the concept of maritime community with a shared future as a concrete practice of it in the field of global ocean affairs. Under the “Anthropocene with respect to the oceans” [113], the concept of a maritime community with a shared future can guide international law of the sea to respond to the challenges of the earth system in the Anthropocene. The joint promotion of maritime peace is the ultimate goal of the maritime order maintained and pursued by China. In the face of complex and nonlinear changes in the earth system, the maritime order is open and inclusive, based on dialogue, consultation, and multilateralism.

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