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# On the obligations of states to respond to climate change and China's legal consequences: based on the advisory opinion in case no. 31 of the international tribunal for the law of the sea

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**Introduction:** Climate change presents a critical global challenge, requiring states to develop and implement robust legal and policy frameworks. The 2024 Advisory Opinion issued by the International Tribunal for the Law of the Sea (ITLOS) in Case No. 31 highlights the legal obligations of states under the United Nations Convention on the Law of the Sea (UNCLOS) to address climate change, emphasizing the role of the marine environment in this context.

**Methods:** This study conducts a comprehensive analysis of the Advisory Opinion and examines its implications for China's existing climate change legal framework. The analysis identifies key challenges, including expanded legal responsibilities, the harmonization of international law with domestic legislation, and the increased risk of international climate litigation for domestic enterprises.

**Results:** The Advisory Opinion establishes a higher standard for China's legislative response to climate change, necessitating the integration of its international obligations into its domestic legal framework. Key findings reveal gaps in China's current legal system and emphasize the need for proactive measures to align with international standards.

**Discussion:** To address these challenges, the paper proposes several recommendations: developing a comprehensive legal framework for climate change, reinforcing due diligence obligations, establishing a robust climate monitoring and assessment system, and enhancing the capacity of domestic enterprises to handle international climate litigation. These measures aim to position China as a proactive contributor to global climate governance.

**Conclusion:** The study provides valuable insights for advancing China's climate change law and aligning it with the international legal framework. The proposed measures serve as essential guidance for China to assume greater responsibility and influence within the global climate legal system.

#### KEYWORDS

China's climate legislation, marine environmental protection, legal obligations, advisory opinions, climate change, legal responses

## 1 Introduction

Climate change has become one of the most significant environmental challenges of the twenty-first century, endangering global ecosystems, economic development, and social stability (Sarangi, 2023). In response to the global challenge of climate change, governments, international organizations, and scientific research institutions are developing and implementing legal and policy frameworks to address the issue (Alkoud et al., 2024). These frameworks aim to reduce greenhouse gas emissions, adapt to the impacts of climate change, and protect vulnerable ecosystems (Deep, 2023). As one of the world's largest emitters of greenhouse gases, China has made notable efforts to address climate change (Agarwala, 2022). In recent years, China has been an active participant in the construction of the international legal system on climate change, as well as in the advancement of a series of legal and policy measures at the domestic level (Zhifei et al., 2021). In 2024, the ITLOS issued an advisory opinion on climate change in Case No. 31(AO31). Although AO31 is not legally binding, as it holds significant persuasive authority under international law. The opinion unambiguously establishes that states must exercise due diligence to take all appropriate measures to prevent, reduce, and control pollution of the marine environment in response to climate change (Gattani, 2024). For China, the Advisory Opinion presents a number of new legal and policy challenges, particularly in relation to the effective translation of international legal obligations into domestic legislation and the assurance of compliance with relevant laws (Guo, 2023).

At the international law level, the UNFCCC, the Kyoto Protocol, and the Paris Agreement represent the three major international legal instruments on climate change. These instruments provide the legal basis for addressing climate change in terms of the overall framework, emission reduction targets, and global cooperation (Rietig et al., 2023). While these documents have primarily concentrated on terrestrial emissions and global mitigation strategies, some progress has been made in addressing the marine environment through the International Maritime Organization (IMO). It is noteworthy that the IMO has developed commitments that are aligned with the Paris Agreement. These include its strategy to reduce greenhouse gas emissions from shipping, which indirectly addresses marine-related aspects of climate change. However, these efforts remain sector-specific and

do not comprehensively integrate the broader role of the oceans in global climate change. As a result, there are significant gaps in fully leveraging the marine environment's potential in mitigation and adaptation strategies (Borg et al., 2023; Li and Xu, 2020).

Recently, there has been a growing interest among scholars in exploring the nexus between climate change and the UNCLOS (Minas, 2019; Nguyen, 2024; Klein, 2020). Oceans are not only affected by climate change, such as through sea level rise and ocean acidification (Visbeck and Keiser, 2021), but they also play a crucial role in responding to climate change, acting as carbon sinks. The existing international legal framework presents significant complexities and challenges in addressing these issues, largely due to the fragmentation of governance structures, the absence of dedicated legal provisions addressing ocean-climate interactions, and the inadequate integration between climate-focused agreements like the Paris Agreement and ocean-focused instruments such as UNCLOS (Brauch et al., 2024). These shortcomings impede the development of comprehensive and enforceable strategies to fully harness the potential of the oceans in mitigating and adapting to climate change. In this context, the AO31, issued by the ITLOS on May 21, 2024, has become a significant milestone in international law (ITLOS, 2024). Initiated by the Small Island States Commission on Climate Change and International Law (SISCCIL), the case explores the legal obligations that states must fulfill in their response to climate change. Specifically, the Tribunal provided an authoritative interpretation of the responsibilities of states under UNCLOS regarding climate change mitigation and adaptation (Khng et al., 2023). The ITLOS advisory opinion clarifies the legal obligations of states in responding to climate change and offers a novel legal framework and guidelines for protecting the global marine environment (Mingozzi, 2023). It analyzes the relationship between UNCLOS and international climate treaties, such as the Paris Agreement and UNFCCC, further detailing the specific responsibilities and obligations of states under international law (Adriansyah, 2023). As the world's largest developing country and a major greenhouse gas emitter, China plays a pivotal role in global climate governance (Wen et al., 2024). However, amid an intensifying climate crisis and a complex international landscape, China faces significant challenges in formulating and implementing climate change policies and legislation (Yang and Walker, 2024). These challenges are particularly pronounced in meeting the

heightened standards for fulfilling its climate change responsibilities within the framework of international law.

This article will provide a detailed account of the principal content and legal implications of the AO31. Despite its shortcomings, including the question of the tribunal's plenary advisory jurisdiction, the definition of pollution, and a lack of attention to the Convention's mandate and the original intent of the parties, the advisory opinion is frequently referenced in various documents and materials. (Xinmin, 2024) Its international influence should not be overlooked. Consequently, China should adopt the principle of "strategically belittling the enemy and tactically valuing the enemy" in its approach to the advisory opinion. Based on the advancement of domestic legislation, China should respond to international challenges and prepare for all eventualities. It is hoped that the research presented in this article will serve as a reference for China when formulating and implementing climate change policies and laws, and promote China's active participation and contribution to international climate governance.

## 2 Key elements of AO31

AO31 examines several critical aspects, including the Tribunal's jurisdiction, its discretion to issue an Advisory Opinion, the applicable legal framework, the scope of the request, and the interrelationship of the issues presented (ITLOS, 2024).

### 2.1 Anthropogenic greenhouse gas emissions as a form of pollution of the marine environment

A noteworthy aspect of the Advisory Opinion is the ITLOS integration of climate science to elucidate concepts, categorize and prioritize the legal issues presented, and establish its stance within the context of the climate emergency (Baars, 2023). The ITLOS commenced its deliberations by examining the scientific dimensions of climate change, with particular reference to the authoritative reports of the Intergovernmental Panel on Climate Change (IPCC) (AO31, paras. 47-51). Furthermore, the ITLOS adopted the IPCC's definitions (AO31, paras. 52-54) and acknowledged the critical role of the oceans in regulating the climate system (AO31, paras. 55-57). Furthermore, the ITLOS underscored the detrimental effects of anthropogenic greenhouse gas emissions on the marine environment (AO31, paras. 57-65). The ITLOS underscored the fact that climate change represents a significant threat to humanity, with particular implications for vulnerable populations and communities situated in coastal areas (AO31, para. 66).

The aforementioned scientific elements enabled the ITLOS I to reinforce and substantiate its significant opinions. Nevertheless, the efficacy of these elements would be compromised in the absence of the Tribunal's emphasis on their validity (Liao, 2017). In light of these considerations, the Tribunal placed particular emphasis on the reliability of the IPCC's scientific findings and the pivotal role of the oceans in climate change. In conclusion, the Tribunal aligned

with the majority of submissions and determined that anthropogenic greenhouse gas emissions constitute "marine pollution," as defined in Article 1(1)(4) of UNCLOS. In reaching this determination, the Tribunal observed that the definition of "marine pollution" under UNCLOS comprises three essential elements: The presence of a substance or energy, the direct or indirect introduction of such substance or energy by humans into the marine environment, and the resultant or potential harmful effects of such introduction (AO31, para. 161) are the three components that define marine pollution. The Tribunal determined that anthropogenic greenhouse gas emissions satisfy all of the aforementioned criteria. These emissions introduce carbon dioxide and heat (energy) into the marine environment, which in turn causes climate change and ocean acidification. This, in turn, results in the adverse effects described in the definition of marine pollution (AO31, para. 178).

### 2.2 Specificity of state obligations

The ITLOS acknowledged the scientific findings of the IPCC and declared that "as a result of the accumulation of greenhouse gases in the atmosphere, excess heat (energy) enters the marine environment, leading to warming of the oceans, and that anthropogenic emissions of greenhouse gases are contributing to climate change, including warming of the oceans and sea level rise." The characterization of excess anthropogenic greenhouse gases as pollution of the marine environment in ITLOS thus enables the application of the provisions of UNCLOS (in particular Part XII, articles 192, 193, and 194) concerning the obligation of States to prevent, reduce, and control such pollution from any source.

#### 2.2.1 Strict due diligence obligation

In accordance with Article 194, paragraph 1, of the Convention, State parties to the Convention bear a particular responsibility to implement the requisite measures to prevent, reduce, and control marine pollution resulting from anthropogenic emissions of greenhouse gases. Furthermore, they are obliged to coordinate their policies in this regard. These measures should be objectively determined, taking into account, inter alia, the best available science and relevant international rules and standards in climate change treaties, such as the UNFCCC (AO31, para. 243). Furthermore, relevant international rules and standards set forth in treaties such as the UNFCCC and the Paris Agreement, particularly the global temperature goal of limiting the increase in temperature to 1.5°C above pre-industrial levels and the emission pathways to achieve that goal, should also be taken into account (Rachel et al., 2022). Additionally, a target and a timetable for an emissions pathway to achieve this goal should be established. The scope and content of the requisite measures may vary according to the resources available to the States Parties and their capabilities. The Tribunal ruled that the obligation to take the necessary measures to protect and preserve the marine environment requires States to ensure compliance with such measures by non-state actors under their jurisdiction or control (Ollino, 2022). In this context, the obligation of states is one of due diligence (AO31, para. 396). In addition to the obligation to prevent,

reduce, and control marine pollution from anthropogenic greenhouse gas emissions, Article 194, paragraph 2, of UNCLOS establishes particular obligations for States parties that pertain to the transboundary environment (Testa, 2022). In accordance with this provision, States parties are obliged to take all necessary measures to ensure that anthropogenic emissions of greenhouse gases under their jurisdiction or control do not cause damage to other States and their environment (Voigt, 2022). Furthermore, they are obliged to ensure that pollution resulting from such emissions under their jurisdiction or control does not spread beyond the area in which they are exercising their sovereign rights (Savov, 2022). This is also an obligation of due diligence (AO31, para. 258). In light of the distinctive characteristics of transboundary pollution, ITLOS posited that the standard of due diligence set forth in article 194, paragraph 2, might be more rigorous than that prescribed in article 194, paragraph 1. The Tribunal additionally addressed the nature of the due diligence obligation, which is contingent upon the particulars of the specific treaty obligation and may evolve over time. The standard of this obligation is dependent, *inter alia*, on a comprehensive assessment of the risk and the extent of the harm (AO31, para. 397).

### 2.2.2 Obligation to monitor and assess marine pollution

The Tribunal makes it clear that Articles 204, 205, and 206 of the Convention set out distinct obligations for States parties in relation to monitoring pollution risks or effects, publishing reports, and conducting environmental impact assessments with a view to addressing marine pollution from anthropogenic greenhouse gas emissions (AO31, para. 367). In accordance with Article 204, paragraph 1, States parties are obliged to observe, measure, evaluate, and analyze the risks or effects of marine pollution caused by such emissions (Azik, 2023). Furthermore, paragraph 2 stipulates that States parties are obliged to maintain continuous monitoring of the potential for permitted or engaged activities to pollute the marine environment.

In accordance with Article 205, States parties are obliged to publish the results of their monitoring activities or communicate these results to the competent international organization for dissemination (Herrando and Gargallo, 2009). Article 206 establishes the obligation to conduct environmental impact assessments for any planned activity, whether public or private, that could cause substantial pollution or significant and harmful changes to the marine environment through anthropogenic greenhouse gas emissions, including cumulative impacts (Duan and Shen, 2024). It is incumbent upon the Contracting Party under whose jurisdiction or control the planned activity falls to conduct the aforementioned assessment. The objective is to mitigate and adapt to the adverse effects of such emissions on the marine environment, with the results reported in accordance with Article 205 of the Convention (Clarke et al., 2022).

### 2.2.3 Enforcement obligations for specific sources of pollution

The Tribunal, based on the submitted information, observes that the majority of atmospheric emissions of anthropogenic greenhouse gases contributing to marine pollution originate from land-based

sources, as well as from vessels and aircraft (Wang et al., 2023). Furthermore, emissions also arise from certain activities conducted on the seabed, including discharges and flaring (AO31, para. 263). While there are numerous sources of greenhouse gas emissions, the Tribunal's focus is on marine pollution resulting from emissions into the atmosphere from land-based sources, vessels, and aircraft (Wong and Lanzoni, 2023). The following UNCLOS provisions are pertinent to this type of pollution: Articles 207 (Pollution from Land-Based Sources), 211 (Pollution from Vessels), and 212 (Pollution from or through the Atmosphere). The corresponding enforcement provisions can be found in Articles 213 (Enforcement in Respect of Pollution from Land-Based Sources), 217 (Flag State Enforcement), and 222 (Enforcement in Respect of Pollution from or through the Atmosphere) (AO31, para. 264).

In accordance with Articles 213 and 222, the enforcement of national legislation and the implementation of applicable international rules and standards for pollutants from land-based sources and atmospheric pollution are required (Ungureanu and Nesteriuc, 2019). The primary obligations of states can be distilled into two fundamental principles: firstly, the enforcement of existing legislation and regulations, and secondly, the adoption of new laws and regulations, accompanied by the implementation of applicable international rules and standards (AO31, para. 283). The enforcement obligation entails the obligation of states to prevent, reduce, and control marine pollution from land-based or atmospheric sources. The term "enforcement" encompasses a range of methods employed to ensure compliance within the national legal framework. These include monitoring, inspection, administrative guidance, investigation and prosecution of violations, and judicial or quasi-judicial proceedings (AO31, para. 284).

The second obligation requires that states adopt legislation and implement regulations to ensure compliance with applicable international standards and rules. The term "applicable international rules and standards" is defined as those that are binding on a state under the auspices of either treaty or customary international law (AO31, para. 285). In accordance with Article 217 of UNCLOS, States are obliged to ensure that ships flying their flag or registered in their jurisdiction comply with international rules and standards, as well as national laws and regulations pertaining to marine pollution from anthropogenic greenhouse gas emissions. In consequence, UNCLOS requires States to implement the requisite measures to ensure the enforcement of these international rules and standards in conjunction with their national regulations.

## 2.3 Methods for incorporating external rules into UNCLOS interpretations

UNCLOS primarily addresses matters pertaining to the marine environment. However, for a comprehensive understanding of its implications, it is essential to interpret and apply it consistently with other international treaties addressing climate change, such as the UNFCCC and the Paris Agreement (Kusuma and Putra, 2024). It is imperative to view the obligations imposed by UNCLOS as part of a comprehensive effort to address environmental degradation. In its interpretation and application of UNCLOS with regard to marine

pollution from anthropogenic greenhouse gas emissions, the Tribunal considers the UNFCCC and the Paris Agreement, which it deems to be primary legal instruments on global climate change, to be relevant (Nguyen, 2023). The temperature targets and emission pathways set forth in the Paris Agreement provide the framework for the requisite measures under Article 194, paragraph 1, of UNCLOS (AO31, para. 222).

Nevertheless, adherence to the Paris Agreement, in and of itself, does not satisfy the obligations set forth in Article 194(1) of UNCLOS. These agreements have distinct obligations. The Paris Agreement complements, but does not supersede, UNCLOS with regard to the regulation of marine pollution from anthropogenic greenhouse gas emissions (AO31, para. 223). In accordance with Article 194, paragraph 1, of UNCLOS, States are legally obliged to take all necessary measures to prevent, reduce, and control marine pollution from such emissions, including measures to reduce emissions (Nguyen, 2023). A failure to comply with this obligation results in international responsibility for the state in question.

The Tribunal concluded that the Paris Agreement is not a special agreement that takes precedence over UNCLOS and does not modify or limit its obligations (AO31, para. 224). Therefore, the principle of *lex specialis*, which provides for the derogation of a specific agreement from a general treaty, does not apply to the interpretation of UNCLOS. Even if the Paris Agreement were to possess an element of *lex specialis* with respect to UNCLOS, the protection and preservation of the marine environment, which constitutes a fundamental objective of UNCLOS, should not impede the realization of UNCLOS's broader objectives (Churchill et al., 2022).

### 3 Challenges to China's climate change legislation posed by the ITLOS case no. 31 advisory opinion

The AO31 has profound implications for international law, introducing novel challenges and requirements for the domestic legislation of numerous countries. For China, this Advisory Opinion presents significant legal and policy challenges in addressing climate change. In 2011, the Seabed Disputes Chamber of the ITLOS issued an advisory opinion that clarified the legal obligations of sponsoring states with regard to the exploration and exploitation of deep-sea mineral resources (Hoffmann, 2022). In response to this, China enacted the Law on Exploration and Exploitation of Resources in Deep Seabed Areas, which provides a clear legal framework for China's activities in deep-sea resource exploration and ensures compliance with international law while protecting the marine environment (Xing et al., 2022). Similarly, the AO31 requires China to reassess and potentially revise its climate change legislation in order to align it with its international obligations. The opinion highlights the necessity for robust legal and regulatory frameworks to effectively address greenhouse gas emissions and marine pollution. This thus requires China to undertake a careful consideration of its current policies and to consider potential legislative adjustments in order to meet these international standards. Furthermore, the Advisory Opinion has prompted not only China but also other countries, including

Germany, the United Kingdom, France, Japan, and Australia, to enact or amend relevant domestic legislation in order to comply with international obligations (Davenport, 2022). This global response underscores the necessity of aligning national legislation with international environmental standards, thereby ensuring a unified and effective global effort in combating climate change. By addressing these challenges, China can enhance its legal and regulatory approach to climate change, thereby contributing to global environmental governance and fulfilling its international responsibilities.

### 3.1 Clarity and expansion of legal obligations: from marine pollution to climate change

The AO31 elucidates the obligations of states under UNCLOS, particularly in regard to the issues of marine pollution and the impacts of climate change on the marine environment. This Opinion reaffirms the obligation to prevent marine pollution and expands the responsibilities of states to take measures to protect the marine environment in the context of climate change. As a party to UNCLOS, China has already enacted legislation to fulfill its obligations to prevent and reduce marine pollution. This is exemplified by the Marine Environmental Protection Law, which provides specific measures for preventing marine pollution.

However, China's legislative framework concerning climate change is relatively underdeveloped (Veselova, 2023). The current legislative landscape primarily comprises the Law on Prevention and Control of Air Pollution, the Law on Environmental Protection, and the Law on Renewable Energy. However, these legislative instruments do not adequately address the protection of the marine environment. For example, the Marine Environmental Protection Law requires the protection of marine ecosystems and the prevention of marine pollution, yet it lacks detailed provisions concerning the impact of climate change. Chapter 1 of the Law on Prevention and Control of Air Pollution requires various governmental bodies to implement measures aimed at controlling and reducing greenhouse gas emissions and preventing climate change. Although it does mention the control of greenhouse gas emissions, its primary focus is on atmospheric quality, and it does not fully consider the specific needs of the marine environment (Jing, 2019). The draft legislation includes a number of provisions designed to address the issue of climate change (Yuanyuan, 2024). The document delineates the fundamental tenets and comprehensive goals of China's approach to climate change. It underscores the necessity for state and local governments to curtail greenhouse gas emissions and fortify their capacity for adaptation. It delineates the responsibilities and targets for emission reduction across a range of industrial sectors, and mandates the implementation of specific emission reduction measures in sectors such as industry, energy, and transportation. Furthermore, the legislation requires that governments at all levels enhance their capacity to adapt to climate change, including the implementation of measures to protect the ecological environment and maintain water resource safety (Veselova, 2023).

Notwithstanding these measures, the draft still falls short of meeting the requirements set forth in the AO31. While the

document places considerable emphasis on the protection of ecosystems, it lacks a detailed examination of the specific impacts and protection measures required for the marine environment. The issue of marine measures is addressed in Article 55, which focuses on marine hazards and the improvement of response capacity (Wibisono, 2006). However, there is no explicit integration of climate change into the marine environmental protection framework.

Moreover, although the draft legislation does provide for the control of greenhouse gas emissions, its primary focus is on the protection of the terrestrial and atmospheric environment. Further refinement is required with regard to the reduction of carbon emissions in the oceans and the addressing of the impacts of climate change on marine ecosystems (Ungureanu and Nesteriuc, 2019). The adaptation measures proposed in the draft, such as disaster prevention and ecological protection, lack comprehensive planning for marine ecosystems. For example, the draft could include monitoring, assessment, and governance measures for ocean acidification, thereby enabling a comprehensive response to the impacts of climate change on the marine environment.

The AO31 introduces new requirements for China's climate change legislation, emphasizing the integration of marine environmental protection and climate change response. While the draft includes certain provisions, it must further clarify and expand specific measures to ensure the full implementation of legal obligations. This requires improvements at the legal level and joint efforts by governments and society to address the multifaceted challenges posed by climate change.

### 3.2 Enhanced due diligence: from traditional pollution prevention to climate change response

The AO31 unambiguously establishes that states must exercise due diligence to take all appropriate measures to prevent, reduce, and control pollution of the marine environment in response to climate change. This obligation extends beyond the traditional scope of pollution prevention and control, encompassing the necessity to reduce greenhouse gas emissions and mitigate the impacts of climate change on marine ecosystems. In accordance with the Advisory Opinion, states bear the responsibility for emission reductions, the development of climate adaptation plans, and the strengthening of international cooperation (AO31, paras. 152, 153, 157). For China, this Opinion significantly influences its environmental legislation and policies by underscoring the need to enhance legal mechanisms addressing marine pollution caused by greenhouse gas emissions, integrate climate adaptation measures into national marine governance frameworks, and foster international cooperation on climate-ocean issues. This shift requires revising existing laws, such as the Marine Environment Protection Law, to align with UNCLOS obligations and further incorporating climate resilience into environmental policymaking.

The AO31 establishes that states bear a legal responsibility to control and reduce greenhouse gas emissions, which directly

impacts how China fulfills its duty to protect the marine environment. In accordance with Articles 192 and 194 of UNCLOS, states are obliged to implement suitable measures to prevent, reduce, and control marine pollution. The Advisory Opinion further extends these obligations to include combating the impacts of climate change on the marine environment, such as sea level rise and ocean acidification. Consequently, China must enhance its legislation on traditional pollution prevention and adopt more stringent legal measures to address climate change. Furthermore, the Opinion elucidates the due diligence obligations of states, underscoring the imperative of implementing pragmatic and efficacious measures to attain global emissions reduction targets. This entails not only the protection of the marine environment but also the concretization of these responsibilities. For example, Part XII of UNCLOS requires states to implement measures aimed at preventing, abating, and controlling marine pollution. The Advisory Opinion elucidates that this encompasses the necessity of addressing climate change, which presents a challenge to China's existing legislative framework. China's extant climate change-related legislation, including the Air Pollution Prevention and Control Law, the Environmental Protection Law, and the Marine Environmental Protection Law, provides for the prevention and control of pollution and the protection of the environment (Zhu, 2022). Nevertheless, the implementation of the due diligence obligations set forth in The AO31 presents a significant challenge. The due diligence obligation necessitates the implementation of proactive emission reduction and adaptation measures; however, the existing Chinese legislative framework lacks detailed and comprehensive provisions pertaining to these requirements (Guo, 2023). For instance, the Air Pollution Prevention and Control Law is primarily concerned with the control of air pollution, with provisions relating to greenhouse gases largely confined to Article 2. This article places an emphasis on the comprehensive prevention and control of air pollution from a multitude of sources, as well as the synergistic control of greenhouse gases. However, it does not specify any particular emission reduction targets or measures for greenhouse gases. Furthermore, the obligation underscores the necessity for the state to devise and implement climate change adaptation plans, an area where Chinese legislation remains underdeveloped. The National Strategy for Adaptation to Climate Change 2035 (Draft) indicates that local governments should develop adaptation measures, yet it lacks detailed implementation and monitoring mechanisms. In practice, the pursuit of economic development frequently presents a challenge to environmental protection, making it difficult for local governments to fully implement their due diligence obligations. For instance, in regions with a high concentration of industrial activity, local governments may opt to relax corporate emission regulations due to economic considerations, which may not align with the due diligence requirements emphasized in the Advisory Opinion (Li and Xu, 2020). To comprehensively address the challenges posed by climate change, it is imperative that China develops and improves specialized climate change legislation that fully integrates the obligations outlined in The AO31.

### 3.3 Improvement of the monitoring and evaluation system: from absence to construction

A significant challenge in China's climate change legislation is the absence of a comprehensive monitoring and evaluation system. Notwithstanding the Climate Change Monitoring and Assessment Work Program, issued by the [China Meteorological Administration \(CMA\) in 2021 \(Agency, 2021\)](#), a comprehensive and coherent framework for monitoring and assessing climate change impacts and the effectiveness of response measures remains lacking. The AO31 explicitly mandates that states establish effective monitoring and assessment mechanisms to ensure the scientific and operational validity of their climate policies. Consequently, China is obliged to develop a robust framework to fulfil this international obligation, integrating continuous monitoring, rigorous evaluation, and transparent reporting processes.

Firstly, the existing monitoring and assessment system for greenhouse gas (GHG) emissions is inadequate. Although the Climate Change Monitoring and Assessment Work Program calls for an expansion in the number of GHG observatories, the current level of coverage and data continuity remains inadequate. This inadequacy impedes China's capacity to maintain continuous monitoring of GHGs, such as carbon dioxide, particularly in industrialized and marine regions. As a result, an accurate assessment of emissions and trends cannot be made, which in turn affects the formulation of policy and international cooperation. Secondly, the monitoring of marine pollution under the programme is insufficient. The emphasis is primarily on conventional pollutants such as oil and plastics, with insufficient monitoring of carbon dioxide as a marine pollutant. The absence of defined mechanisms for monitoring and assessing marine carbon dioxide emissions hinders the development and implementation of effective countermeasures. This deficiency may serve to exacerbate the phenomenon of ocean acidification and the destruction of marine ecosystems, which contravenes the requirements set forth in ITLOS Case No. 31. Additionally, the current legislative framework lacks comprehensive implementation guidelines and standards. While legislation such as the Air Pollution Prevention and Control Law addresses greenhouse gases, it primarily focuses on traditional pollutants and lacks specific provisions for climate change monitoring and assessment. Similarly, the Environmental Protection Law addresses environmental monitoring, yet it provides a general legal basis that fails to offer detailed guidance for climate change-specific monitoring needs ([Henheik, 2022](#)). It is imperative to elucidate the precise responsibilities and obligations of governments and enterprises with regard to GHG monitoring, reporting, and verification. Ultimately, China's climate change monitoring and assessment system is not adequately aligned with international standards and best practices, resulting in inconsistencies in data and methodologies. To illustrate, China's national carbon emissions trading system, which commenced in 2017, is deficient in terms of integration with the EU carbon emissions trading system, largely due to discrepancies in accounting methodologies and quota distribution. This discrepancy impedes the mutual recognition of carbon credits and consequently undermines China's influence and participation in the global carbon market ([Guan et al., 2012](#)).

### 3.4 Enhancement of the legal framework: from fragmentation to systematization

In accordance with The AO31, states are obliged to fulfil their climate change obligations with a view to protecting the marine environment. This in turn requires the establishment of a systematic legal framework. However, the current climate change legislation and policies in China are fragmented and lack coherence and coordination, which impedes their ability to effectively address the complex challenges posed by climate change.

At present, China's climate change-related legislation is primarily embedded within broader legislative frameworks, such as the Environmental Protection Law and the Law on Prevention and Control of Air Pollution. The absence of a specialized climate change law results in a lack of systematization and coordination in the implementation of climate policies ([Veselova, 2023](#)). The absence of unified legal guidance has resulted in the operation of ministries and departments in an independent manner, which has led to the fragmentation of policies and inefficiencies in the utilization of resources ([Zhang, 2010](#)). As a signatory to the Paris Agreement, China has pledged to reduce carbon emission intensity and enhance forest cover. The accomplishment of these objectives necessitates the implementation of coordinated initiatives across a range of sectors, including energy, transportation, and industry. However, the absence of a harmonized legislative framework has resulted in sectoral policies operating independently, which has led to conflicts and overlaps. This was particularly evident in the initial stages of the Paris Agreement implementation, where discrepancies in carbon emissions data and statistics, as well as inconsistencies in reporting, affected the overall efficacy of the policy. Furthermore, the lack of coordination between sectors gives rise to conflicts in policy implementation ([Chang and Tian, 2021](#)). For example, the Ministry of Environmental Protection advocates for stringent regulation of coal usage and the promotion of clean energy development, whereas the Energy Bureau, which is primarily concerned with ensuring energy security, prefers to maintain a certain percentage of coal usage. The absence of a unified legal framework and coordination mechanism renders the reconciliation of inter-departmental policy conflicts a challenging endeavor, impeding the realization of overall emission reduction goals. The discrepancy in the implementation of climate change policies at the local government level further compromises their efficacy. While the central government formulates unified climate change policies, the varying resource and capacity differences among local governments result in disparate implementation effectiveness. For example, Article 8 of the Renewable Energy Law requires local governments to develop plans and measures for renewable energy development in accordance with national regulations and local conditions. However, the efficacy of these policies exhibits considerable variability. The implementation of renewable energy sources has been slower in Shanxi Province, a region with a long history of coal production, due to technical and financial constraints ([Zou et al., 2022](#)). In contrast, Jiangsu Province, which has stronger economic and technological advantages, has made substantial progress in wind and photovoltaic power generation ([Chao et al., 2023](#)). These regional implementation disparities impact the overall efficacy of China's climate change policy.

In conclusion, in order to address the challenges posed by climate change effectively, it is imperative that China develops and implements a specialized, systematic, and coordinated legal framework that ensures unified policy guidance, cross-sectoral cooperation, and consistent local implementation.

### 3.5 Increased risk of international climate change litigation: from potential threat to real challenge

The issuance of The AO31 may serve to stimulate an increase in international litigation pertaining to climate change. As a significant emitter of CO<sub>2</sub>, China is likely to face considerable pressure and challenges in such litigation. It is possible that legal action may be initiated by countries or non-governmental organizations (NGOs) that have been significantly affected by climate change. Such action may allege that China has failed to fulfill its obligations to address climate change.

Firstly, as global attention on climate change has intensified, international legal regulations governing corporate environmental conduct have become increasingly stringent (Martini and López Velásquez, 2023). In recent years, there has been a proliferation of litigation in Europe and the United States against corporations for their greenhouse gas emissions and climate change impacts, particularly from the flaring of non-renewable resources such as oil and natural gas (Al-Nasser, 2023). The result of these lawsuits has been substantial economic losses and significant reputational and competitive damage to the companies involved. It is probable that Chinese enterprises, particularly those with considerable influence in the global market, will encounter comparable legal risks. Secondly, the extant legal framework in China is inadequate in responding to international climate change litigation. Although the country's legislation includes provisions on corporate environmental liability, as exemplified by the Environmental Protection Law and the Law on Prevention and Control of Air Pollution, there is a notable absence of specific legal norms addressing climate change. This legal deficiency places Chinese enterprises at a disadvantage in international climate change litigation, as they frequently lack effective legal support and protection mechanisms. It is imperative that Chinese enterprises demonstrate robust environmental management and compliance capabilities in order to effectively address international litigation. A considerable number of Chinese enterprises exhibit considerable deficiencies in their environmental management and compliance practices. These deficiencies include the absence of systematic environmental risk assessment and management mechanisms. Such deficiencies not only elevate the likelihood of legal ramifications but also jeopardize the enterprises' capacity for sustainable development. In the context of international climate change litigation, it is incumbent upon enterprises to provide sufficient evidence to demonstrate the legality and reasonableness of their environmental practices. The lack of such evidence frequently results in unfavorable outcomes for enterprises.

In conclusion, the probability of Chinese enterprises being involved in international climate change litigation has increased considerably, posing a significant challenge in the context of

climate change legislation. To address this challenge, it is necessary to improve relevant national laws and regulations, reinforce corporate environmental responsibility, and enhance the environmental management and compliance capabilities of enterprises in order to effectively mitigate the risk of international climate change litigation.

## 4 Legal challenges for China in responding to the AO31

This section addresses the challenges identified in Part III and proposes corresponding legal solutions to the climate change issues highlighted in The AO31.

### 4.1 Developing a systematic legal framework on climate change

To address the current fragmentation in its climate change legal framework, China needs to develop a systematic and coherent legal structure (Yanfang, 2010). The evolution of China's climate change legislation began in 2006, initially focusing on climate system protection and mitigation measures (Veselova, 2023). However, the existing framework is characterized by quasi-federalism, which, despite fostering innovative local solutions, has resulted in policy fragmentation across various government levels (Yi and Cao, 2023). To enhance coherence, China should consolidate its administrative laws to align with the demands of the low-carbon era and ensure consistency in climate action across all government levels and sectors (Fang and Tan, 2023).

China can achieve this by enacting a comprehensive Climate Change Response Law. This law should delineate the specific responsibilities and obligations of all government levels, businesses, and the public in addressing climate change. It should encompass the control of greenhouse gas emissions, the development of renewable energy, the promotion of energy-saving and emission-reduction technologies, adaptation measures, and international cooperation.

Specifically, the law should:

1. **Set Greenhouse Gas Emission Ceilings:** Establish industry-specific emission limits and formulate corresponding reduction plans and measures.
2. **Promote Clean Energy:** Encourage the research, development, and application of renewable energy through financial subsidies, tax incentives, and support for the new energy industry.
3. **Advance Energy-Saving Technologies:** Promote the research, development, and application of energy-saving and emission-reduction technologies, establish mechanisms for technology promotion, and enhance energy utilization efficiency.
4. **Implement Adaptation Measures:** Develop specific adaptation strategies such as strengthening infrastructure, improving agricultural practices, and enhancing disaster prevention and mitigation capabilities.

5. **Foster International Cooperation:** Actively participate in global climate change efforts, fulfill international commitments, and contribute to global climate governance.

It is also imperative that the existing legal framework for environmental protection be augmented with specialized provisions on climate change. For example, the Environmental Protection Law could be amended to include new chapters that explicitly address the legal responsibilities and obligations related to climate change. This would clarify the specific duties of governments and enterprises at all levels. Moreover, the Law on Prevention and Control of Air Pollution should incorporate specific provisions pertaining to the regulation of greenhouse gas emissions and the implementation of carbon trading mechanisms, with the objective of fostering the development of a low-carbon economy. Moreover, the Renewable Energy Law should be reinforced in order to provide greater support for technological innovation and market expansion in renewable energy. It is imperative that the government enhance cross-sectoral coordination and cooperation, integrate resources, and create synergies in order to improve and implement the climate change legal system (Barbi et al., 2016). To this end, an inter-departmental working group comprising relevant departments, such as environmental protection, energy, transportation, and agriculture, should be established with the objective of holding regular meetings and coordinating policy formulation and implementation. It is essential to issue comprehensive policy documents that address climate change responses across various fields in order to ensure consistency and synergy among different departments. Moreover, it is imperative to reinforce the guidance and supervision of local governments to guarantee the effective implementation of policies at the local level.

By implementing these measures, China can establish a comprehensive and coherent legal framework for climate change, thereby providing robust legal safeguards for addressing this critical issue.

## 4.2 Enhancing due diligence obligations in climate change response

In order to more effectively fulfill its due diligence obligations, China must reinforce its existing legal frameworks, particularly in the context of climate change response. Primarily, the Environmental Impact Assessment Law must be amended to include climate change factors within the scope of environmental impact assessments (Veselova, 2023). This would require that long-term impacts on climate change be evaluated prior to project approval. This entails the clarification of evaluation criteria and the development of specific standards to ensure scientific accuracy and reliability. Furthermore, the process should facilitate public participation, soliciting input from a diverse range of stakeholders to enhance transparency and credibility. It is recommended that a specialized auditing body be established to review environmental impact assessment reports for compliance with relevant legal provisions (Rajavuori et al., 2023). Furthermore, the Company

Law should be revised to enhance enterprises' due diligence obligations in responding to climate change. Enterprises should conduct climate change risk assessments as part of their operations, formulate and implement emission reduction plans, and regularly disclose their climate change response measures and outcomes to the public, thereby enhancing transparency and accountability. To ensure effective implementation, the legal responsibilities of enterprises in climate change response must be clearly defined, with penalties for non-compliance (Aldoseri and Albaz, 2023).

It would be prudent for the government to implement and enhance monitoring procedures to guarantee the efficacious implementation of legal stipulations (Shan, 2023). This entails the establishment of a specialized supervisory entity, charged with the oversight and evaluation of the due diligence practices of governments and enterprises at all levels. It is recommended that regular inspections be conducted to verify compliance, and that penalties be imposed on entities that fail to meet their due diligence obligations. By implementing these measures, China can effectively enhance its due diligence obligations in climate change response, ensuring the robust implementation of all legal provisions and providing a solid legal framework for addressing climate change.

## 4.3 Establishing a comprehensive climate change monitoring and assessment system

In order to address the existing deficiencies, it is imperative that China establishes a comprehensive climate change monitoring and assessment system. This system must be capable of tracking and evaluating the impacts and effects of climate change in an efficient manner (Xu et al., 2022). The Environmental Impact Assessment Law (EIA Law) represents a pivotal component of China's environmental protection legal framework. Its purpose is to prevent environmental pollution and ecological damage by evaluating the potential impacts of proposed projects (Zhao and Tian, 2023). Although the EIA Law has a comprehensive assessment procedure, it requires further development to incorporate climate change monitoring and assessment, particularly in accordance with the requirements set forth in the ITLOS Advisory Opinion in Case No. 31.

At present, the environmental impact assessment system is primarily concerned with evaluating the environmental impacts of specific projects. However, there is a lack of a systematic, global, and forward-looking climate change monitoring and assessment mechanism. It is therefore imperative to establish a comprehensive system based on the EIA Law in order to enhance China's legal and institutional capacity in addressing climate change (Zhao and Tian, 2023).

Firstly, the EIA Law should be amended to include specific provisions on climate change, outlining the contents and requirements of climate change monitoring and assessment (Leskinen et al., 2024). It is essential that the legislation mandate regular monitoring and assessment by each province, major city, and key region. This should encompass greenhouse gas emissions, the impact of climate change on the ecological environment, and

the frequency and intensity of extreme climatic events. Furthermore, it is essential that all levels of government and relevant organizations be obliged to prepare and publicly disseminate climate change assessment reports on a regular basis, thereby ensuring transparency and accessibility of information. Such a system would serve to heighten public environmental awareness and furnish a scientific foundation for the formulation and modification of governmental policy.

Secondly, the establishment of a national-level climate change monitoring and assessment center is recommended to facilitate the coordination and management of national climate change monitoring efforts (Dupuits et al., 2024). The center would be responsible for formulating standards and norms, providing guidance on regional monitoring and assessment activities, and ensuring the uniformity and comparability of assessment data. Furthermore, it should collate, arrange, and examine national monitoring data in order to produce authoritative climate change assessment reports that inform national decision-making processes. In a similar vein, provincial and municipal governments should establish their own monitoring and assessment bodies, maintaining close communication with the national center to ensure a seamless information flow and coordination.

Finally, a robust mechanism for data sharing and information disclosure must be established. It is recommended that the EIA Law be amended to include provisions for the sharing and disclosure of climate change monitoring data. Such amendments should mandate the timely uploading of data to a national data-sharing platform and regular public disclosures (Weber and Baisch, 2023). Such an approach would enhance transparency, prevent the formation of information silos, and foster cross-sectoral and cross-regional cooperation. Furthermore, a public participation mechanism should be established to encourage input from scientific research institutions, social organizations, and the general public, thereby fostering a collaborative atmosphere in addressing climate change.

#### 4.4 Enhancing the capacity of domestic enterprises to respond to international climate change litigation

In light of the AO31, Chinese enterprises are confronted with considerable challenges in responding to international climate change litigation. The Advisory Opinion emphasizes the legal obligation of State Parties to fulfill their climate change obligations, thereby elevating the stakes for national policies and legislation and directly impacting the business environment and legal risks for enterprises. In order to enhance the capacity of domestic enterprises to navigate international climate change litigation, it is imperative that China refines its legal framework, with a particular focus on the Company Law and associated statutes, with the objective of strengthening corporate compliance and risk mitigation (Wang, 2023).

Firstly, Article 20 of the revised Company Law of 2023 stipulates that companies are obliged to assume social responsibility in their business activities. This obligation extends beyond mere economic pursuits to encompass environmental protection and social

responsibility. In the context of international climate change litigation, the environmental responsibility of corporations is frequently subjected to close scrutiny (Mandal, 2022). In order to reinforce compliance and transparency, enterprises should implement a robust environmental management system, conduct regular environmental risk assessments, and adopt comprehensive environmental protection measures (Balakin, 2023). Such measures not only enhance the enterprise's environmental reputation but also provide concrete evidence in litigation that the company has proactively minimized its environmental impact (Klyuchnikov, 2023). Furthermore, enterprises should develop and enforce clear environmental policies that govern all aspects of their operations, from production to waste disposal, ensuring adherence to environmental standards. Secondly, Article 226 of the revised Company Law of 2023 stipulates that companies are obliged to disseminate environmental protection information on a regular basis to both their shareholders and the general public. This disclosure mechanism is of paramount importance for demonstrating transparency and compliance in international litigation. It is incumbent upon enterprises to implement a rigorous information disclosure system to guarantee the accuracy, timeliness, and comprehensiveness of environmental data, including emissions statistics, environmental governance investments, and performance assessments (Li et al., 2023). Such transparency serves to enhance the credibility of the corporation in question and serves as evidence of the enterprise's commitment to environmental responsibilities in litigation. Moreover, it is recommended that enterprises engage third-party independent organizations to audit their environmental measures and provide audit reports. Such third-party verifications can serve as pivotal evidence of compliance with international standards in legal proceedings (Jiang et al., 2023).

In conclusion, international climate change litigation presents a multitude of intricate legal challenges, thereby necessitating the presence of robust legal knowledge and capabilities within enterprises. It is imperative that companies fortify their legal risk management apparatus by establishing proficient legal teams tasked with monitoring and analyzing shifts in environmental legislation at the domestic and international levels. These teams must also be vigilant in staying abreast of the latest legal trends and requirements. It is imperative that enterprises collaborate with professional legal service organizations in order to obtain expert advice and support, which is essential for the formulation of sound legal strategies designed to mitigate risks. Furthermore, training management and employees on pertinent legislation and regulations fosters environmental awareness and legal literacy, thereby ensuring comprehensive involvement in environmental protection initiatives (Sun, 2022).

## 5 Conclusion

The AO31 has profound legal significance with regard to the intersection of international maritime law and climate change. It elucidates the legal obligations of states in marine environmental protection and climate change response, particularly by offering new interpretations and requirements under the United Nations

Convention on the Law of the Sea (UNCLOS). This opinion reinforces the legal obligations of states in addressing marine environmental changes and the impacts of climate change, thereby providing a crucial legal foundation for global climate governance.

China is confronted with significant challenges in the formulation of climate change legislation. The extant legal framework is conspicuously deficient in terms of systematization and coordination. Despite the existence of numerous laws and policies related to climate change, they are often fragmented and lack cohesion, thereby undermining effective legal synergy in addressing the multifaceted issue of climate change. Furthermore, there are considerable deficiencies in meeting the due diligence obligation, which entails a standard of reasonable care and prudence for states and enterprises in environmental protection and climate response. China's legal provisions and enforcement mechanisms are insufficient, resulting in operational difficulties. Furthermore, China's climate change monitoring and assessment system is underdeveloped, lacking scientific accuracy and effective assessment tools, which consequently weakens the legal foundation for policy formulation and implementation. The increase in international climate change litigation further intensifies the legal risks for domestic enterprises, creating obstacles to the sustainable development of China's economy.

In order to effectively address these challenges, it is imperative that China implement a series of legal measures that are in alignment with the requirements set forth in the AO31. First and foremost, it is imperative to enhance the systematic legal framework for climate change. The enactment of a Climate Change Response Law and the revision of the Environmental Protection Law would facilitate the comprehensive integration of climate change measures into the national legal system, thereby ensuring legal cohesion. It is also imperative to reinforce the enforcement of due diligence obligations, thereby guaranteeing that enterprises and governments exercise reasonable care and prudence in fulfilling their climate responsibilities by explicitly delineating their legal obligations. Furthermore, the establishment and enhancement of a climate change monitoring and assessment system is of paramount importance. This system must be supported by legal provisions that facilitate the collection, analysis, and dissemination of robust data, thereby ensuring the formulation of evidence-based policy decisions. It is imperative to safeguard domestic enterprises from the legal risks posed by international climate litigation in order to secure their rights and facilitate sustainable development in the global market.

In the future, China must enhance international legal cooperation in addressing climate change. It should learn from

and integrate advanced international legal practices to improve its legal system and governance capacity. Active participation in the development of the international legal framework will enable China to contribute its insights and strategies to global climate governance. Legal innovation and policy optimization are imperative for China to ensure a comprehensive and effectively implemented legal system, achieving a balance between economic development and environmental protection.

## Data availability statement

The original contributions presented in the study are included in the article/supplementary material. Further inquiries can be directed to the corresponding author.

## Author contributions

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