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Between Sovereignty and Sustainability: The Future of Ocean Governance under UNCLOS

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The United Nations Convention on the Law of the Sea (UNCLOS) has been an important part of international maritime governance legislation, establishing legal frameworks for navigation rights, maritime zones and the exploitation of ocean resources. UNCLOS is readily being tested in the evolving geopolitical, environmental and technological realities. The article provides a critical and analytical examination of the UNCLOS's capacity to address these contemporary challenges. It examines five major concerns: the legal uncertainty caused by sea-level rise and shifting baselines, the governance vacuum in deep-sea mining under Part XI and the role of International Seabed Authority, the disruptive impact of emerging technologies such as autonomous vessels and cyberthreats, jurisdictional complexities posed by satellite and AI driven maritime surveillance and the uneven enforcement of dispute settlement mechanisms like ITLOS, Annex VII Arbitration and the ICJ. The article highlights the Convention's interpretive flexibility through cases such as the South China Sea arbitration. It further explores the role of soft law mechanisms, regional agreements and evolving state practice as pathways for legal adaptation. Rather than arguing for formal amendment, the article explores the advantage of pragmatic reinterpretation, stronger institutional cooperation and the progressive development of customary international law. UNCLOS's enduring value can be reaffirmed while also calling for innovation in legal thought and global cooperation to uphold ocean sustainability.

Keywords: *UNCLOS, climate change, deep-sea mining, ITLOS, maritime technology.*

INTRODUCTION

The United Nations Convention on the Law of the Sea (UNCLOS)[1] was adopted in 1982 and enforced in 1994, which represents a codification of international maritime law. It was designed to settle the ambiguities concerning maritime zones, navigational freedom, and jurisdiction of coastal and flag states. The convention defines maritime zones such as territorial sea (12nm), exclusive economic zone (EEZ, 220 nm), and continental shelf while also regulating passage rights, environmental protection and maritime research. UNCLOS also introduced the International Seabed Authority (ISA)[2] and the International Tribunal for the Law of the Sea (ITLOS),[3] and provided a binding dispute settlement regime under Part XV of the convention. The convention aims to equitably distribute ocean resources while ensuring peaceful navigation.

UNCLOS is being tested today as the changing Geopolitical and Environmental Climate, especially in regions like the South China Sea, has exposed the Convention's limits in restraining unilateral maritime claims. The 2016 arbitral awards in Philippines v China under Annexure were ignored by Beijing, revealing the Convention's lack of direct enforcement despite its legal clarity. The climate crisis has introduced an unprecedented legal challenge that UNCLOS never fully anticipated. Sea-level rise threatens to submerge low-lying island states, raising questions about the permanence of maritime baselines and entitlements. Also, the surge in interest in deep-sea mining enabled by technological advances and growing demands for rare earth metals has pressured the UNCLOS's environmental safeguards.

The article argues that while UNCLOS remains the cornerstone of international ocean law, its future relevance depends on dynamic interpretation and stronger dispute resolution compliance and a new round of multilateral negotiations.

LEGAL FRAMEWORK OF UNCLOS

UNCLOS divided maritime spaces into a series of legally defined zones radiating outward from the baseline, each with specific entitlement. Coastal states exercise full sovereignty over their

[1] United Nations Convention on the Law of the Sea 1994
[2] United Nations Convention on the Law of the Sea 1994, pt XI
[3] United Nations Convention on the Law of the Sea 1994, Annex VI and art 287

territorial sea (up to 12 nautical miles), including airspace and seabed, subject to articles 2-26 of the Convention.[4] The contiguous zone (up to 24 nm) where states can enforce laws that are related to customs, immigration and sanitation, mentioned in Article 33.[5] The exclusive economic zone, established under articles 55-75,[6] extends up to 200 nm, which grants sovereign rights for exploring and managing natural resources. The EEZ regime balances sovereign rights with the freedoms of navigation, overflight and laying submarine cables. The continental shelf under Article 76-85[7] allows coastal states to exploit seabed resources even beyond the 200 nm, subject to submission and review by the Commission on the Limits of the Continental Shelf (CLCS).

Dispute Settlement Architecture: UNCLOS's dispute resolution, which is codified in Part XV, is regarded as a hallmark of the convention. It requires the state to settle disputes through peaceful means and provides compulsory binding procedures (a) ITLOS annexe VI, (b) International Court of Justice, (c) General Arbitral tribunals under annexe VII, (d) Special arbitration under annexe VIII.[8] Part XV is riddled with opt-out clauses and jurisdictional limitations. Article 298 allows the states to exclude categories like sea boundary and law enforcement from compulsory procedures. The effectiveness of awards depends on state compliance, which cannot be compelled beyond diplomatic pressure.

Article 121: The Island v Rock Distinction: Article 121[9] distinguishes between islands (capable of generating EEZs and continental shelves) and rocks (which cannot). Article 121(3)[10] states that rocks which cannot sustain human habitation shall not have any exclusive economic zone or continental shelf. It has triggered extensive litigation and debate in the context of strategic maritime features. There is ambiguity around the term 'human habitation,' which has allowed states to artificially enhance features to bolster legal claims. The 2016 South China Sea Arbitration Tribunal[11] interpreted Article 121(3) rigorously, curbing expansive claims based on

[4] United Nations Convention on the Law of the Sea 1994, arts 2–4
[5] United Nations Convention on the Law of the Sea 1994, art 33
[6] United Nations Convention on the Law of the Sea 1994, arts 55–58
[7] United Nations Convention on the Law of the Sea 1994, art 76
[8] United Nations Convention on the Law of the Sea 1994, art 287; United Nations Convention on the Law of the Sea 1994, Annex VI -VIII
[9] United Nations Convention on the Law of the Sea 1994, art 121
[10] United Nations Convention on the Law of the Sea 1994, art 121(3)
[11] *South China Sea Arbitration (Philippines v China)* (Award of 12 July 2016) PCA Case No 2013–19 ICGJ 495 para 477

features that are ecologically or physically marginal. Article 121 continues to be weaponised, with few institutional checks beyond arbitral tribunals.

GEOPOLITICAL CONTESTATIONS

South China Sea Disputes: Lawfare v Gunboat Diplomacy: The South China Sea has emerged at the epicentre of geopolitical contestations where UNCLOS's rule-based framework collides with state-centric power assertion. China's "nine-dash line" claims, which lacked a basis under UNCLOS, conflict with the maritime entitlements of the Philippines, Vietnam, Malaysia, and Brunei. While all these states are parties to UNCLOS, their interpretations vary widely, with China asserting historic rights that UNCLOS does not recognise. The term "lawfare" refers to the strategic use of legal institutions to counterbalance the strategic advantage of more powerful states. UNCLOS's legal structure, through normative power, becomes vulnerable when state power is asserted outside the law.

Artificial Island Construction and Militarisation of Maritime Features: One of the destabilising strategies used by China is the large-scale construction of artificial islands on previously submerged reefs and rocks. Features such as Fiery Cross Reef and Subi Reef have been transformed into military installations.[12] UNCLOS does not explicitly prohibit island construction, but Article 60[13] limits its legal effect. The tribunal in the Philippines V China held that China's militarised features were legally low-tide elevations and not islands capable of generating maritime entitlements.

Case Study: Philippines v China (2016 Arbitration):[14] The 2016 arbitral award, which was delivered by the Permanent Court of Arbitration under Annexe VII of UNCLOS, was a legal rebuke of Chinese Claims. The tribunal found that:

- China's "nine-dash line" has no legal basis under UNCLOS.
- Several maritime features, which were claimed by China, were not islands capable of generating an EEZ.

[12] Robert Beckman, 'The UN Convention on the Law of the Sea and the Maritime Disputes in the South China Sea' (2013) 107 American Journal of International Law 142, 146–148
[13] United Nations Convention on the Law of the Sea 1994, art 60
[14] *South China Sea Arbitration (Philippines v China)* (Award of 12 July 2016) PCA Case No 2013–19 ICGJ 495 paras 473–483

- Chinese activities violated the Philippines' sovereign rights in its EEZ.
- Environmental destruction through dredging and artificial island construction breached UNCLOS environmental obligations.

This case showcased the strength of UNCLOS as a legal instrument for small states to assert their rights.

Limitations of Enforcement Mechanisms under UNCLOS: UNCLOS lacks a robust enforcement mechanism. While Article 226[15] renders arbitral awards final and binding, the Convention does not offer coercive enforcement. It is dependent on voluntary compliance, international pressure or regional diplomacy. The case highlights the fundamental limitations of UNCLOS; it can clarify the law, but it cannot compel powerful states to adhere to it.

CLIMATE CHANGE AND SEA-LEVEL RISE

Legal Uncertainty over Shifting Baselines and Entitlements: UNCLOS does not address climate-induced changes to coastlines. The maritime zones-territorial, EEZ and continental shelf are calculated from the normal baseline, which is defined in Article 5,[16] which defines the low-water line along the coast as marked on large-scale charts officially recognised by the coastal state. This creates a problem of what happens when that baseline shifts inland or disappears altogether due to sea-level rise. The legal doctrine assumes relative physical stability of coastlines. Yet, in many parts of the world, coastlines are eroding at an alarming rate due to rising sea levels, leading to recession or submersion of low-lying land features. This ambiguity has created an interpretative gap. UNCLOS offers mechanisms for establishing and depositing coordinates with the United Nations, but it remains silent on the legal effect of changing geography.

Threats to low-lying states: Kiribati, Maldives, Tuvalu: Small island developing states (SIDS) such as countries like Kiribati, Maldives, and Tuvalu face the prospect of permanent submersion within the next century. If the UNCLOS continues to link maritime zones to physical coastlines, the loss of land could result in the loss of their territorial sea, EEZ and continental shelf. This leads to the notion of "reterritorialised maritime sovereignty", where a state loses its

[15] United Nations Convention on the Law of the Sea 1994, art 226
[16] United Nations Convention on the Law of the Sea 1994, art 5

physical territory but continues to maintain legal personality and sovereign rights based on pre-established baselines.[17] This concept lacks robust legal validation under existing international law. To avoid this crisis, the states have begun to deposit their maritime claims based on current coastlines with the UN Division for Ocean Affairs and the Law of the Sea. Their goal is to preserve legal entitlements even after potential physical submersion.

LEGAL RESPONSES: FIXED BASELINES. TREATY AMENDMENTS. CUSTOMARY EVOLUTION

Fixed Baselines: The best short-term solution is to freeze the baselines as they exist today, using official documentation. Even if coastlines move due to erosion, the maritime zones generated from those baselines remain intact. Several states, including the Pacific Islands Forum, have issued declarations to fix their baselines and preserve maritime entitlements. Although these declarations are not binding in themselves, they represent an important step towards creating consistent state practice, which would also contribute to the formation of customary international law.

Treaty Amendments: UNCLOS should be amended to explicitly address the problem of sea-level rise under Article 312.[18] This process requires widespread state consent and ratification, given the diverging geopolitical interests, especially for major maritime powers.

Customary International Law: If a sufficient number of states consistently act as if baselines are fixed and believe they are legally entitled to do so, such practice adds it to customary law. This process has been encouraged by regional agreements and scholarly commentary.

Advisory Role of ICJ and ITLOS in Climate-linked Maritime Issues: Small island states have increasingly turned to international courts and tribunals for legal clarification. In December 2022, the Commission of Small Island States on Climate Change and International Law submitted a request to the International Tribunal for the Law of the Sea for an advisory opinion on the legal responsibility of states for climate harm on the maritime environment. Though neither tribunal has enforcement power, its interpretive authority carries significant

[17] 'Declaration on Preserving Maritime Zones in the Face of Climate Change-related Sea-Level Rise' (*Pacific Islands Forum*, 12 August 2021) <https://forumsec.org/publications/declaration-preserving-maritime-zones-face-climate-change-related-sea-level-rise> accessed 07 June 2025
[18] United Nations Convention on the Law of the Sea 1994, art 312

legal weight.[19] If these advisory opinions affirm the validity of fixed baselines and impose obligations on states to preserve the entitlements of vulnerable nations, this could reshape the normative foundations of maritime law.

DEEP-SEA MINING AND SEABED GOVERNANCE

UNCLOS Part XI and the Role of the International Seabed Authority: The governance of mineral resources in the deep seabed, referred to in UNCLOS as "the area," is an innovation of the Convention. Part XI of UNCLOS declares the area and its resources to be the "common heritage of mankind," Article 136, meaning no state can claim sovereignty over it, and its exploration and exploitation are to be regulated internationally for the benefit of all. To operationalise this regime, UNCLOS established the International Seabed Authority based in Jamaica[20]. The ISA has the job of regulating deep-sea mining, issuing licenses and ensuring equitable benefit sharing, especially for landlocked and developing states. However, ISA has been criticised for its lack of transparency and enforcement teeth. The 1994 implementation agreement modifies some provisions of Part XI to appease the industrialised countries and leaving key questions about environmental liability.

The Environmental Cost v Commercial Push for Rare Earths: Deep-sea mining targets polymetallic nodules, cobalt-rich crust, which contain minerals like cobalt, nickel and rare earth elements, which are essential for clean energy and tech infrastructure. The commercial interest has increased, especially among private companies. The environmental risks are largely unknown; they often disturb fragile ecosystems. Sediment plumes, noise pollution could have irreversible consequences. This concern is that the push for strategic minerals may outpace the scientific understanding of ecological risks.

Lack of Clear Liability Framework and Enforcement for Ecological Damage: Despite UNCLOS containing obligations to protect the marine environment, the liability framework for enforcement remains vague. Part XI lacks clarity on: Who bears responsibility for environmental damage caused by a contractor? What standard of due diligence applies to sponsoring states under Article 139? How reparations or penalties are to be enforced. Cases like Seabed Disputes

[19] Natalie Klein, *Dispute Settlement in the UN Convention on the Law of the Sea* (CUP 2005) 121–123
[20] 'Responsibilities and Obligations of States Sponsoring Persons and Entities with Respect to Activities in the Area' (*International Tribunal for the Law of Sea*) <https://www.itlos.org/index.php?id=109> accessed 03 June 2025

Chamber Advisory Opinion (2011) clarified that states have an obligation of due diligence, including legislative and administrative measures to ensure contractor compliance. There is no precedent for claims, no standing body to hear damage complaints and no mechanism for liability.

Calls for a Moratorium: Legal Viability and Stakeholder Conflicts: In 2021, Nauru triggered a two-year rule under UNCLOS to track the adoption of mining regulations. In response, calls for a precautionary pause have grown, led by countries like France, Chile, and New Zealand. Legally, UNCLOS does not mention a moratorium, but the precautionary principle, recognised under general international environmental law and implied in Article 206[21] of UNCLOS, can be invoked; the ISA could delay licensing on this basis. The debate over a moratorium reflects tensions between developmental equity, environmental protection and technological progress.

EMERGING TECHNOLOGIES AND LEGAL GAPS

Autonomous Vessels and Unmanned Underwater Vehicles (UUVs): Legal Status and Control: The emergence of modern technologies poses challenges to traditional assumptions embedded in UNCLOS. The convention assumes that ships are manned and under the effective control of a flag state, as seen in Articles 91-94. These provisions require the state to exercise jurisdiction over ships flying its flag. Autonomous surface ships (MASS) and UUVs disrupt this framework. They may lack a crew, operate under artificial intelligence and be launched without clear state control. UNCLOS does not discuss anything about vessel autonomy, and there is no agreed-upon international standard for classification or regulation of these ships. This normative vacuum poses risks where state and private actors can exploit regulatory gaps to avoid liability. The same issue arises with UUVs conducting surveillance or seabed operations in EEZs. While Article 58(3)[22] requires the state to respect the laws in the EEZ, it becomes legally complex when the operator is unidentifiable.

UNCLOS's Adaptability in the face of Technological Innovations: UNCLOS does not address cyber threats to maritime infrastructure. Submarine communication cables are protected under Articles 112-115 of UNCLOS, which prohibit interference. However, these

[21] United Nations Convention on the Law of the Sea 1994, art 206
[22] United Nations Convention on the Law of the Sea 1994, art 58(3)

provisions do not address digital sabotage or hacking. Cyberattacks have become a prominent issue on board autonomous vessels. The silence of UNCLOS creates a dangerous legal vacuum, where cybersecurity falls into a grey area.

Satellite technologies and AI are increasingly used for fisheries enforcement, piracy detection and monitoring maritime boundaries. Article 24 protects the rights of innocent passage, and Article 56 grants coastal states sovereign rights in their EEZs. Satellite monitoring blurs these boundaries. UNCLOS offers no guidance on remote sensing, autonomous law enforcement or algorithm decision making. Law enforcement may outpace legal standards, undermine due process and create new forms of technological overreach in the ocean.

UNCLOS is open-textured, which allows for interpretative flexibility through Articles 192-194(general environmental obligations). Article 300(good faith) and Part XV (dispute settlement). These can be read in light of emerging customary law and advisory opinions. Institutions such as the International Maritime Organisation are gradually filling in the gap by adopting guidelines on MASS and encouraging digital navigation systems. UNCLOS provides a durable legal foundation, but not provide tools to confront 21st-century technological realities.[23]

Future of Dispute Settlement under UNCLOS: UNCLOS provides several dispute resolution paths. ITLOS offers quick, specialised rulings and is suited for urgent cases, but its limited case history makes outcomes less predictable. Annexe VII arbitration is flexible and widely used, but lacks strong enforcement. The ICJ brings legal authority but only hears cases when both states consent. There is a growing shift towards soft law approaches. For instance, the ASEAN-China Declaration on the Conduct of Parties in the South China Sea (2002) showcases how regional diplomacy can partially defuse tensions. These instruments lack binding force but create platforms for engagement and help in preventing escalation.[24] Pragmatic alternatives include prioritising resource sharing over sovereignty and operating outside the adjudicative framework of UNCLOS, showing that law-based cooperation can fill gaps by formal enforcement. There are calls to reform Part XV, which should focus more on compliance and

[23] DNN Nagarjun, 'Law of the Sea: Navigating Maritime Disputes, Preserving Navigation Rights, and Shaping the Legal Framework for Ocean Governance' (2023) 11(12) International Journal of Creative Research Thoughts 755, 766–767 <https://ijcrt.org/papers/IJCRT2312205.pdf> accessed 03 June 2025

[24] Robert Beckman, 'The UN Convention on the Law of the Sea and the Maritime Disputes in the South China Sea' (2013) 107(1) American Journal of International Law 142, 151–153 <https://doi.org/10.5305/amerjintelaw.107.1.0142> accessed 03 June 2025

enforcement mechanisms. Reform efforts should be channelled through Interpretive evolution, Institutional synergy capacity building, and also creating penalty-based enforcement.

CONCLUSION

UNCLOS is a foundational treaty for global ocean governance, but its ability to address the issues and complexity of the 21st century is decreasing. The Convention's framework was built around assumptions of stable coastlines, manned vessels and clear state responsibility. In today's world, climate change, especially sea level rise, is undermining these assumptions and exposing gaps in liability, environmental regulation and benefit sharing, while UUVs and autonomous ships are operating in a grey area. There are dispute settlement mechanisms such as ITLOS, Annexe VII arbitration, and the ICJ are important for peaceful resolution, but their enforcement remains weak. Reinterpretation through judicial opinions, evolving state practice and institutional cooperation, such as the IMO and the ISA, provides a way forward. Soft laws such as regional agreements, joint development arrangements and diplomatic initiatives are also becoming essential to the formal legal regime. For UNCLOS to remain relevant, it should be treated as a living document which is capable of evolving through legal innovation, normative pressure and committed multilateral cooperation.