

Rising Seas and Uncertainties: Establishing Static Maritime Borders to Ensure Equity in the Face of Sea Level Rise

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Executive Summary: The UN Convention on the Law of the Sea (UNCLOS), adopted in 1994, establishes international maritime boundaries that are measured from the “normal baseline” where the ocean meets the coast. However, UNCLOS does not account for changes in the normal baseline that are expected to occur as a result of climate change-induced sea level rise. These uncertainties leave room for maritime territorial disputes that threaten the political and economic resources of small island developing states (SIDS) and developing coastal nations. Here, we discuss the impacts of sea level rise on maritime boundaries with a focus on equity for SIDS and developing coastal nations. These nations, though they contribute the least to climate change, experience its effects most drastically and are the least equipped to adapt. To safeguard against the inequities that are expected to result from rising sea levels, we recommend a science-informed, diplomatic effort to address this issue: that the International Maritime Organization introduce an international convention to establish static maritime baselines. This approach would freeze maritime boundaries, allowing all island and coastal nations to retain their existing oceanic zones and entitlements. Establishing a static baselines promises to mitigate the disproportionate effects of climate change on SIDS and represents a necessary step in the push for international equity in the face of climate change.

I. Introduction

Coastal and island nations claim a specified range of oceanic territory according to the UN Convention on the Law of the Sea (UNCLOS; *Convention on the Law of the Sea* 1982). However, since oceanic territory is defined with reference to a nation’s ocean-shoreline interface, it is unclear how global sea level rise will alter the diplomatic recognition of coastal nations’ oceanic boundaries in the coming decades. As no international provisions have been agreed upon, this unanswered question has serious implications for territorial sovereignty, international equity, and economic power. In particular, it remains to be seen whether the needs of poorer nations will be considered equally to the preferences of richer

nations as the climate crisis unfolds. Here, we describe and discuss possible solutions to this predicament. We prioritize equity in preparation for the advancing climate crisis, with the ultimate recommendation that the Council of the International Maritime Organization introduce an international treaty to establish static baselines.

II. Current regulations

Written in 1982 and ratified in 1994, UNCLOS (*Convention on the Law of the Sea* 1982) established regulations to standardize coastal nations’ sovereignties over bordering oceans, with specific privileges at various distances. These boundaries are defined with reference to a “standard baseline”

where the ocean meets the land. A state's *territorial sea*, over which it has complete sovereignty, extends twelve nautical miles from this baseline. Extending 200 nautical miles from the baseline, a state's *exclusive economic zone* (EEZ) represents the oceanic area over which it has complete economic control, including exclusive privileges over fishing, mining, and other resource extraction. The International Maritime Organization (IMO), a specialized UN agency, oversees implementation of the legal frameworks defined in the UNCLOS treaty through rules and regulations for matters such as maritime shipping, environmental conservation, and security (Beckman and Sun 2017). The IMO is not specifically empowered to enforce its UNCLOS-based regulations with tangible consequences. Rather, like with most international agreements, the responsibility of enforcing the IMO's conventions falls on the governments of individual member states (International Maritime Organization 2019).

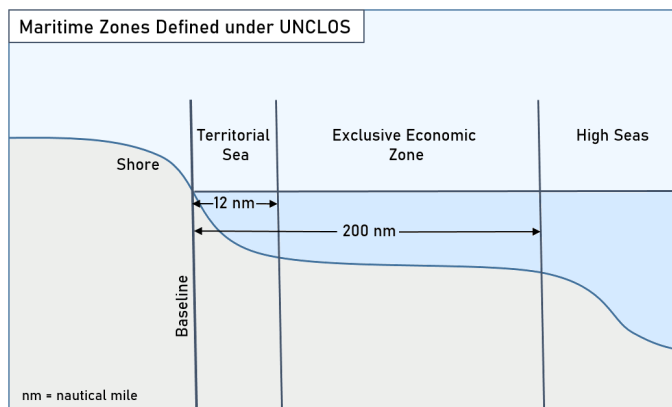


Figure 1. Illustration of maritime border delineations outlined in UNCLOS.

III. Statement of issue

The Intergovernmental Panel on Climate Change (IPCC) found that global mean sea level (GMSL) rose 3.6 mm annually from 2006-2015 (IPCC 2019). The IPCC published GMSL projections based on four scenarios involving varying levels of climate change action. If global mean temperature rises just 2 degrees Celsius (the international goal for limiting warming according to the Paris Agreement; Paris Agreement 2015), GMSL is expected to be 0.43 m higher in 2100 compared to 1986-2005. Under the "business as usual" scenario, where no climate change mitigation action is taken, GMSL is expected to rise 0.84 m by 2100 (IPCC 2019). GMSL rise is already in motion and is "virtually certain" to

"continue for many centuries" beyond 2100, with devastating increases of up to 7 m in the long term if the entire Greenland ice sheet melts (IPCC 2014).

Small Island Developing States (SIDS) are a group of fifty-eight island states in the Caribbean and South China Seas and the Pacific, Atlantic, and Indian Oceans. These states, home to about 65 million people (Abram et al. 2019), are at the front lines of sea level rise. Sea level is rising up to three times faster in maritime regions such as the western Pacific than in the rest of the coastal world (IPCC 2014). This represents an equity issue for SIDS, which possess less economic power and diplomatic leverage than the global north. Even small increases in GMSL could be disastrous for many SIDS, as many lie only a few meters above sea level (Mead 2021) and are generally ill-equipped to deal with dramatic losses in land mass, reductions in economic activities, and relocation of displaced citizens. Large swaths of coastal land or entire islands are expected to experience seasonal or permanent inundation by 2100 (Martyr-Koller 2021). Unlike wealthy developed nations, SIDS do not have the financial resources to undertake large-scale coastal fortification measures to physically maintain their territories in response to sea level rise, such as the building and maintenance of sea walls, backfilling lost shoreline, tide and flood control systems, and engineering of natural barriers (Griggs and Reguero 2021). Five of the Solomon Islands have vanished within the past decade, forcing the relocation of entire communities and the loss of densely vegetated ecosystems (Albert 2016). Climate change will continue to exact broad environmental and socioeconomic consequences on SIDS, including sea level rise, loss of biodiversity, and more frequent extreme weather events.

The EEZs of SIDS play a vital role in their economies and are, on average, 28 times larger than the state's land mass (UN-OHRLLS 2022). For many SIDS, GMSL rise would not only cause shrinkage of land mass but may also cause the loss of authority over previously held territorial seas. This represents not only a matter of food and economic security for nations that rely on fishing economies, but a potential sovereignty crisis. The GDPs of SIDS are highly dependent on the extent of maritime entitlements such as oil and gas deposits and fisheries (Goyal and Gupta 2020), which could be lost without a

resolution to maintain current zones. Undefined maritime boundaries may lead to economic and social instability due to increased competition from wealthy developed states over resources previously entitled to SIDS.

Although the UNCLOS preamble proclaims its purpose is to settle “all issues relating to the law of the sea” (*Convention on the Law of the Sea* 1982), the document was negotiated in the 1970s when GMSL was assumed to be fixed. Moreover, no international organization, like the IMO, has yet specified how GMSL rise could influence the interpretation of oceanic boundaries described in UNCLOS on a global diplomatic scale. To prevent future maritime territorial disputes and to ensure that global governance structures preserve equity for future centuries, a formal resolution must decide how the interpretation of UNCLOS regulations, which is currently ambiguous, will be influenced by GMSL rise.

IV. Policy options

i. Option 1: Status quo

Currently, UNCLOS does not specify how sea level rise will influence the interpretation of maritime baselines (*Convention on the Law of the Sea* 1982), leaving regulations open to interpretation by individual states.

Advantages

- No diplomatic energy would be expended to amend UNCLOS or establish a separate treaty to clarify the current ambiguity.

Disadvantages

- Leaves ambiguity in the interpretation of current UNCLOS regulations, leading to future conflicts. In a suit involving a dispute between the U.S. and Alaska over ownership of submerged lands along Alaska’s Arctic Coast, the Supreme Court recognized the possibility of ambulatory baselines (*United States v. Alaska* 1997). However, courts in various nations may rule differently, resulting in direct conflict and underscoring the need for an international resolution. Similar disputes over maritime resources have also occurred. For instance, a dispute over economic control of oil and gas

exploration between Myanmar, Bangladesh, and India lasted three decades until a ruling by the Hague-based Permanent Court of Arbitration awarded Bangladesh nearly four-fifths of a disputed area in the Bay of Bengal spanning 9,700 sq miles (Rajput 2018; Paul 2014).

- International litigations and arbitrations arising from territorial disputes are costly and would pose a disproportionate burden on SIDS, 54% of which have GDPs less than \$1 billion (Powers 2012; UN-OHRLLS 2013).
- Current ambiguity in the interpretation of UNCLOS zone regulations would likely work in favor of developed nations, who possess the power to impose their political and economic interests on SIDS and poorer coastal states.

ii. Option 2: Ambulatory baseline

An ambulatory approach would shift the limits of maritime boundaries in response to changes in their normal baselines. Thus, the outer limits of maritime boundaries would move inland as sea levels rise. Although this scenario is currently assumed to be the “default” interpretation of UNCLOS regulations, an unequivocal resolution would convert this assumption into explicit law. This could be carried out via an amendment to the UNCLOS treaty, or a separate clarifying treaty potentially introduced by the IMO.

Advantages

- Would preclude territorial disputes in oceanic zones.
- Would effectively convert previously-held maritime zones into high seas, which are free for any nation to use. This would stimulate economic activity in the high seas. This scenario is expected to benefit wealthy developed states, given that a rise in sea level and subsequent loss of EEZ will not substantially reduce their freedom of navigation and resource extraction in the high seas.

Disadvantages

- The conversion of maritime zones previously held by a single coastal or island nation into high seas would introduce economic competition. SIDS and poor coastal states are

worse equipped to compete for resources on the high seas compared to large developed states (Sumaila 2015). Thus, this approach would exacerbate international inequities associated with the worsening climate crisis, which SIDS largely did not cause. For instance, this may cause overfishing in international waters in the high seas, because although UNCLOS provides a framework for establishing sustainable yield for high seas fisheries, enforcing allowable catches and promoting conservation efforts is difficult in the high seas (Rogers 2020).

- Expected to cause disproportionate economic harm to SIDS that rely heavily on maritime activities, and especially to archipelagos that may lose large swaths of oceanic zones if entire baseline features (e.g., very small islands on the archipelagic edge) become submerged.
- Maritime zones would require periodic geographic mapping and updates as normal baselines shift inland, which could be costly.
- Would either require a diplomatic resolution or a significant amendment to UNCLOS and, by extension, cooperation from its 167 member states (*Convention on the Law of the Sea* 1982). Either approach is expected to be a time-consuming process.

iii. Option 3: Static baseline

A static baseline approach entails freezing current maritime baselines, thus preventing them from receding landward in response to a rise in sea level (Goyal and Gupta 2020). Like Option 2, this could be done by amending UNCLOS, or with a separate treaty.

Advantages

- No large-scale impact to economic activities would directly result from maritime territory loss, thus mitigating the disproportionate effects of climate change on SIDS and allowing all coastal nations to retain their existing oceanic resources and entitlements.
- Maritime zones would not require periodic reassessments as sea level continues to rise.
- Like the ambulatory approach proposed in Option 2, a static approach would preclude territorial disputes.

Disadvantages

- Would result in EEZs and territorial zones whose sizes, in some cases, far exceed the stipulations of UNCLOS. As a result, like Option 2, this approach would either require a significant amendment to UNCLOS or a separate diplomatic resolution. Large economically and politically powerful states may favor the ambulatory approach, which would convert previously held zones into free high seas.
- Like Option 2, may necessitate a one-time mapping of current baselines and boundaries so that they may be maintained in the coming decades. In order to maintain boundaries for states that have already experienced measurable reductions in shoreline caused by GMSL, boundaries could estimate those that existed at the time of UNCLOS's ratification in 1994. Mapping would require an upfront cost from member states or a governing body such as the UN.

V. Pacific case study

As recently as August 2021, a group of 18 island states in the Pacific, known as the Pacific Islands Forum (PIF), resolved to address the question of the impact of sea level rise on maritime boundaries. The resulting Declaration on Preserving Maritime Zones in the Face of Climate Change-Related Sea-Level Rise (Pacific Islands Forum 2021) represents the first multilateral diplomatic agreement to implement a static baseline approach by freezing current maritime zones. The agreement is expected to add resilience to current maritime economic activities and diplomatic relations in the Pacific (Jackson 2021; New Zealand Ministry of Foreign Affairs and Trade 2021). It should be noted that all PIF nations have relatively homogeneous economic interests and concerns relating to the effects of sea level rise. Implementing the static baseline approach on a global scale, although a promising option for mitigating inequities caused by climate change, may meet more resistance due to the diverse political and economic interests of the 167 nations represented in the original UNCLOS agreement. Amendments to current regulations, in favor of equity, would require a concerted, diplomatic effort by SIDS and developing coastal nations. However, these nations have a successful history of diplomatic collaboration. The inclusion of the Ocean Sustainable Development

Goal (SDG) to improve ocean governance in the 2030 agenda is a direct result of Pacific Island Countries diplomatic efforts (Quirk and Hanich 2016).

VI. Policy recommendation and implementation

Based on the PIF case study and the existing information, we recommend the adoption of a static baseline approach (Option 3) across the board. Relative to Option 2, this approach is expected to prioritize global maritime equity as well as food and economic security for SIDS who rely heavily on maritime resources, and who are experiencing the vanguard of the advancing climate crisis.

Although the ambiguity in maritime boundaries could, in theory, be resolved by amending the original UNCLOS agreement, amendments to this convention require unanimous assent from all 167 member states (*Convention on the Law of the Sea* 1982). As unanimity is unlikely, **we recommend that the Council of the International Maritime Organization (IMO) introduce an independent resolution on the establishment of static baselines in the face of climate change.** Such a convention would be proposed by the Council and negotiated by the IMO's 174 member states before being ratified by the governments of assenting member states. Although there is no obligation for IMO member states to ratify a given treaty, any amount of agreement on the global level of the United Nations would represent a significant step forward for legal precedent in ocean diplomacy and equity for SIDS.

Additionally, during the 2018 Conference of the International Law Association (ILA), their Committee on International Law and Sea Level Rise released a report on the possible impacts of sea level rise on state territories with an emphasis on SIDS,

with proposals for the development of international law (Schofield 2021). The ILA committee yielded a resolution endorsing the maintenance of existing maritime entitlements. The Secretary-General of the UN requested that this resolution be forwarded to the attention of the Registrars of International Court of Justice, the International Tribunal on the Law of the Sea, and the Secretary-General of the Permanent Court of Arbitration in order to further develop international law of the sea.

Although powerful coastal nations like the US and China might prefer an ambulatory approach that would open up economically-valuable high seas zones, this increased competition would come at a high cost for SIDS and developing coastal nations. The Paris Agreement treaty on climate change offers an excellent precedent to this sort of large-scale altruistic buy-in on the part of wealthy nations. Thus, this resolution could be framed as an important diplomatic extension of the Paris Agreement. Moreover, the mapping of maritime boundaries would require the diplomatic collaboration and expertise of cartographers and expert ocean scientists from around the world. Such a project could be delegated to the IPCC Working Group II on Impacts, Adaptation, and Vulnerability, which is funded by voluntary contributions from UN member states including the U.S. (44% of funds), Austria, Belgium, Germany, Italy, Japan, and UNFCCC (a combined 25% of funds), and several others (IPCC Secretariat, 2017).

In sum, current evidence indicates that freezing maritime boundaries with a static baseline approach would be most equitable to SIDS and other developing coastal nations outside of the global north by protecting their existing oceanic zones and maritime economic interests.

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