BRILL
NIJHOFF

THE INTERNATIONAL JOURNAL OF
MARINE AND COASTAL LAW 34 (2019) 415–439

THE INTERNATIONAL JOURNAL OF MARINE AND COASTAL LAW

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International Law as an Adaptation Measure to Sea-level Rise and Its Impacts on Islands and Offshore Features

Nilüfer Oral
Istanbul Bilgi University Law Faculty; Istanbul, Turkey; International Law Commission

Abstract

Climate change-induced sea-level rise will result in the partial or complete inundation of low-lying coastal areas and insular features. The consequences of this include the loss of baselines from which maritime zones are established. The loss of baselines raises a number of legal questions, in particular concerning the legal status of maritime entitlements and in some cases the potential loss of statehood. Solutions proposed include maintaining existing baselines or outer limits of maritime zones, or the construction *de novo* of artificial islands. This article examines the current state of international law under the international climate-change regime and the law of the sea in relation to adaptation and adaptive measures, such as maintaining of baselines, island fortification and the construction of artificial islands. In addition, the article explores the question as to whether measures such as maintaining baselines would constitute adaptive measures under the existing climate-change regime.

Keywords

climate change – baselines – low-lying coastal areas – islands – adaptation

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 | DOI:10.1163/15718085-13431094

The sea is eating the ground.[1]

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Introduction

According to the Fifth Report of the Intergovernmental Panel on Climate Change (IPCC), '[o]cean thermal expansion and glacier melting have been the dominant contributors to 20th century global mean sea level rise'.[2] The Fifth Assessment Report further states that '[g]lobal mean sea level will continue to rise during the 21st century … [and] the rate of sea level rise will very likely exceed that observed during 1971 to 2010…'.[3] Previous predictions of up to 1 metre of sea-level rise by 2100 are now considered to be a conservative estimate.[4] Some scientists warn that without effective mitigation of carbon dioxide levels the melting of Antarctic ice sheets and glaciers alone has the potential to contribute more than one metre of sea-level rise by 2100 and more than 15 metres by 2500.[5] According to experts this doubles previous estimates to which Antarctic ice provided a minimal contribution.[6] In 2018 NASA confirmed the accelerating ice loss from Antarctica.[7] Sea-level rise will not be uniform and will have a 'strong regional pattern, with some places experiencing significant deviations of local and regional sea level change from the global

1 13-year-old Maria, a child from the Carteret Islands, Papua New Guinea, in S Nazer, 'The Last Islanders: Rising sea levels in Papua New Guinea'; available at https://blogs.unicef.org/east-asia-pacific/the-last-islanders/; accessed 5 May 2019.

2 See Intergovernmental Panel on Climate Change (IPCC), 'WG1AR5: Chapter 13'; available at http://www.climatechange2013.org/images/report/WG1AR5_Chapter13_FINAL.pdf; accessed 4 December 2018.

3 The Fifth Assessment Report of the IPCC estimates that the global mean sea-level rise is likely to be between 26 cm and 98 cm by the year 2100. See IPCC, *Climate Change 2013: The Physical Science Basis. Working Group I Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, Cambridge, 2013), 25.

4 B Dennis and C Mooney, 'Scientists nearly double sea-level rise projections for 2100, because of Antarctica' (30 March 2016) *The Washington Post*; available at https://www.washingtonpost.com/news/energy-environment/wp/2016/03/30/antarctic-loss-could-double-expected-sea-level-rise-by-2100-scientists-say/?utm_term=.9c64ca8910a4; accessed 4 December 2018, citing RM Deconto and D Pollard, 'Contribution of Antarctica to past and future sea-level rise' (2016) 531 *Nature* 591–597).

5 Deconto and Pollard (n 4).

6 *Ibid.*

7 P Brennan, 'New study sharpens focus on Antarctic ice loss;' available at https://sealevel.nasa.gov/news/110/new-study-sharpens-focus-on-antarctic-ice-loss; accessed 5 May 2019.

mean change'.[8] Sea-level rise poses a serious, and in some cases existential, direct threat to coastal and island communities. The inundation of low-lying coastal areas and islands will make these zones less and less habitable and in some cases eventually uninhabitable. It is likely to result in their partial or full depopulation. Moreover, the problem is not one that lies in the future, as the effects of sea-level rise are already being experienced in certain regions.

This article examines the existing international law framework in relation to adaptation under the global climate-change regime, with specific focus on sea-level rise, its impacts on islands, and its possible relationship to related measures and obligations under the international framework for the law of the sea. Specifically, issues such as possible adaptive measures to address the impacts on baselines and related maritime entitlements, as well as other adaptive measures, such as island construction or fortification and artificial islands, are examined. In addition, the article explores the question as to whether measures such as maintaining baselines would constitute adaptive measures under the existing climate-change regime.

Adaptation and Sea-level Rise

The IPCC defines adaptation as an 'adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities'.[9] Adaptation to climate change is a broad concept that involves various types of responses to climate change, such as enhancing dykes, creating water-storage capacity, modifying land-use planning, increasing efficient water use, agricultural transitions, flood protection measures, fortification of coastal areas by building seawalls, allowing shorelines to retreat, or elevating land surfaces and beaches, planting mangroves, and in more extreme cases island fortification, the construction of artificial islands or the complete relocation of populations.[10]

One notable example of adaptation is being carried out by the Maldives, which is composed of a chain of twenty-six atolls in the Indian Ocean. The

8 IPCC (n 2), 1140.

9 IPCC, Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, in ML Parry, OF Canziani, JP Palutikof, PJ van der Linden and CE Hanson (eds), Climate Change 2007: *Impacts, Adaptation and Vulnerability* (Cambridge University Press, Cambridge, 2017) 17, available at https://www.ipcc.ch/site/assets/uploads/2018/03/ar4_wg2_full_report.pdf; accessed 5 May 2019.

10 MJ Hallt and DC Weiss, 'Avoiding Adaptation Apartheid: Climate Change Adaptation and Human Rights Law' (2012) 37 *Yale Journal of International Law* 309–366.

Maldives embarked upon a major adaptation project to construct a new city called Hulhumalé on an artificial island.[11] It is expected to be completed in 2023 with a 130,000-person capacity. In addition to an investment of many millions of dollars, construction activities require extensive reclamation of land. Sand is pumped from surrounding atolls and deposited on shallow reefs that surround the original lagoon. In addition, the new structure is being fortified with walls rising three metres above sea level, one metre higher than the highest natural island.[12]

The physical fortification of naturally formed islands and the *de novo* construction of habitable artificial islands provide an attractive, albeit costly, alternative to the option of the complete relocation of island residents to foreign territory. In addition to the economic costs of relocating populations, adaptation measures, such as island fortification or construction, provide important political, social and cultural advantages, such as the retention of sovereignty, keeping communities intact and preserving long-standing cultural practices. However, from an international law perspective, sea-level rise raises questions that include: the impact on baselines and on the maritime zones from which such baselines are established; an inundated island's continued status as an *island* under international law; and the status of artificial islands under international law.

The International Regime of Adaptation to Climate Change

Sea-level rise is a factual reality that is taking place at the present time. As recently as 2009, the Carteret Islands in Papua New Guinea were inundated during the annual king tides-forcing residents to leave. A relocation plan for the islands was prepared at a cost of some US$1.5 million.[13] It is hoped that by 2020 half of the islanders will be relocated to the Autonomous Region of Bougainville in Papua New Guinea.[14] In the meantime, the Carteret islanders

11 M Gagain, 'Artificial Islands: Saving the Maldives' Statehood and Maritime Claims through the Constitution of the Oceans' (2012) 23 *Colorado Journal of International Environmental Law & Policy* 77–120; NJ Dauenhauer, 'On front line of climate change as Maldives fights rising seas' (20 March 2017) *New Scientist*; available at https://www.newscientist.com/article/2125198-on-front-line-of-climate-change-as-maldives-fights-rising-seas/; accessed 4 May 2019.

12 *Ibid.*

13 R Jarvis, 'Sinking Nations and Climate Change Adaptation Strategies' (2010) 9 *Seattle Journal of Social Justice* 447–486.

14 L Beldi, 'Carteret climate refugees seek home' (6 August 2016); available at http://www.abc.net.au/news/2016-08-07/carteret-climate-refugees-new-home/7693950; accessed 4 May 2019.

are taking adaptation measures, such as planting mangroves and building seawalls to hold the rising tides back. However, sea levels continue to rise.[15]

Scientists continue to study the extent to which areas will be affected by sea-level rise. The IPCC is preparing a special report on the oceans and cryosphere.[16] These studies are of critical importance to national and international authorities, who must take sea-level rise into account in their planning. However, in some cases this will involve taking major adaptation measures to either reduce or prevent the impacts of sea-level rise, or simply to search for alternative means of living. Moreover, the ability and capacity of States to adapt to sea-level rise will differ significantly. For example, continental States can move coastal populations inland to higher ground, albeit at significant economic and social cost. Whereas for many small island developing states (SIDS) this is simply not possible, and they are required to find other options, such as relocation to another State.[17] The challenge for the fifty-two SIDS that are located in different regions of the world is especially difficult, as many of them lack the financial and technical capacity to adapt.[18]

Although sea-level rise is an ocean phenomenon, its cause lies on land; it is the result of human activities. The threat of climate change was brought to the attention of the international community in 1988 when Malta spoke before the United Nations (UN) General Assembly and declared climate change to be a 'common concern of mankind'.[19] This was followed by the adoption of the 1992 United Nations Framework Convention on Climate Change[20] (UNFCCC). The UNFCCC is a framework instrument with universal membership,[21] and it is the principal global agreement for climate change.[22] In addition, the current

15 Nazer (n 1).

16 At its 43rd Session (Nairobi, Kenya, April 11–13, 2016), the IPCC decided to prepare a special report on climate change and the oceans and the cryosphere. Decision IPCC/XLIII-6. available at https://www.ipcc.ch/site/assets/uploads/2018/05/p43_decisions.pdf; accessed 4 May 2019.

17 Jarvis (n 13).

18 *Ibid.*

19 UN Doc. A/RES/43/53 (6 December 1988) *Protection of global climate for present and future generations of mankind.*

20 United Nations Framework Convention on Climate Change (Rio de Janeiro, 9 May 1992, in force 21 March 1994) 1771 *UNTS* 107.

21 There are 197 parties to the UNFCCC; available at http://unfccc.int/essential_background/convention/items/6036.php; accessed on 4 May 2019.

22 D Bodansky, J Brunnée and L Rajamani, *International Climate Change Law* (Oxford University Press, Oxford, 2017).

climate-change regime includes the 1997 Kyoto Protocol[23] and the 2015 Paris Agreement.[24] An important component of the climate-change regime involves adaptation to climate change.

Adaptation to the adverse impacts of climate change is central to the objectives of the UNFCCC, as stated in Article 2, which seeks 'the stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system' and that:

> [s]uch level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.

The ultimate goal of stabilizing greenhouse gas concentrations in the atmosphere is thus tied to natural ecosystem adaptation, food production and economic development, which in the case of SIDS are under threat because of sea-level rise.

Furthermore, Article 4(1)(b) in the UNFCCC, in addition to the obligation of all Parties to develop national or regional programmes for mitigation of greenhouse gases covered by the UNFCCC, also provides for taking measures to *facilitate adequate adaptation to climate change*. Moreover, in relation to adaptation to climate change, Article 4(1)(e) requires that all parties cooperate in preparing for adaptation to the impacts of climate change, which includes, *inter alia*, developing appropriate and integrated plans for coastal zone management. The UNFCCC also imposes an obligation for developed country Parties, and other Parties (i.e. the European Union (EU)) listed in Annex II of the UNFCCC, to assist the developing country Parties that are particularly vulnerable to the adverse effects of climate change in meeting the costs of adaptation to those adverse effects. Specific reference to small island countries and countries with low-lying coastal areas is made in Article 8, in which the developed country Parties and other Parties listed in Annex II are required to 'give full consideration to what actions are necessary under the Convention, including actions related to funding, insurance and the transfer of technology,

23 Adopted on 11 December 1997 and entered into force on 16 February 2005; as amended in Doha on 8 December 2012. The amendment to the Kyoto Protocol extends it until 31 December 2020 (not yet in force as of 17 November 2018).

24 Paris Agreement (Paris, 12 December 2015 and in force 4 November 2016), UN Doc. FCCC/CP/2015/L.9/Rev.1, 12 December 2015.

to meet the specific needs and concerns of developing country Parties arising from the adverse effects of climate change …'.

The issue of adaptation to climate change, in particular for developing countries and least developed countries, garnered greater attention in 2007 with the adoption of the 2008 Bali Action Plan under the UNFCCC.[25] The Bali Action Plan sought to 'launch a comprehensive process to enable the full, effective and sustained implementation of the Convention through long-term cooperative action, now, up to and beyond 2012' and included enhanced action on: adaptation; technology development and transfer to support action on mitigation and adaptation; and on the provision of financial resources and investment to support action on mitigation and adaptation and technology cooperation.[26] Another important outcome in relation to adaptation adopted at the Bali Conference of the Parties in 2007 was the decision of the Meeting of the Parties (MOP) of the Kyoto Protocol to create an Adaptation Fund for those developing country Parties that are particularly vulnerable to the adverse effects of climate change to meet the costs of adaptation.[27]

Following the unsuccessful Conference of the Parties held in Copenhagen in 2009,[28] the State Parties to the UNFCCC met in Cancun, Mexico where they adopted the Cancun Adaptation Framework, recognizing the urgent need to cooperate on adaptation 'to enable and support the implementation of adaptation actions aimed at reducing vulnerability and building resilience in developing country Parties, taking into account the urgent and immediate needs of those developing countries that are particularly vulnerable'.[29] In addition, the Parties established an Adaptation Committee, whose functions include promoting the implementation of *enhanced* action on adaptation. This includes:

25 1/CP.13; FCCC/CP/2007/6/Add.1 (14 March 2008) available at https://unfccc.int/sites/default/files/resource/docs/2007/cop13/eng/06a01.pdf; accessed on 4 May 2019.

26 *Ibid.*

27 Decision 10/CP.7 (2001) See https://unfccc.int/resource/docs/cop7/13a01.pdf#page=52. However, the Adaptation Fund did not become officially launched until 2007 by Decision 1/CMP.3; available at https://www.adaptation-fund.org/wp-content/uploads/2015/01/Decision_1-CMP.3.pdf; accessed on 4 May 2019.

28 The 15th Conference of the Parties held in Copenhagen between 7–18 December 2010 failed to adopt the Copenhagen Accord which was to have replaced the Kyoto Protocol. *See* 2/CP.15 in which the Parties only took 'note' of the Copenhagen Accord of 18 December 2009; available at https://unfccc.int/sites/default/files/resource/docs/2009/cop15/eng/11a01.pdf; accessed on 4 May 2019.

29 FCCC/CP/*2010/7/Add.1, Framework Convention on Climate Change, Report of the Conference of the Parties on its sixteenth session, held in Cancun from 29 November to 10 December 2010, Decision 1/CP.16* (*para. 13*); available at https://unfccc.int/sites/default/files/resource/docs/2010/cop16/eng/07a01.pdf; accessed on 4 May 2019.

providing technical support and guidance to the Parties; sharing relevant information, knowledge, experience and good practices; promoting synergy and strengthening engagement with national, regional and international organizations, centres and networks; and providing information and recommendations, drawing on adaptation good practices, for consideration by the COP when providing guidance on means to incentivize the implementation of adaptation actions, including finance, technology and capacity-building. In addition, the Parties established the Green Climate Fund (GCF) within the framework of the UNFCCC as an operating entity of the Financial Mechanism under Article 11[30] with its headquarters in Songdo, Incheon, South Korea.

In 2013, the 19th Conference of the Parties under the UNFCCC adopted the 'Loss and Damage Warsaw International Mechanism for Loss and Damage associated with Climate Change Impacts' (Loss and Damage Mechanism), to address loss and damage associated with impacts of climate change, including extreme events and slow-onset events in developing countries that are particularly vulnerable to the adverse effects of climate change. Slow-onset events include sea-level rise.[31] The issue of loss and damage dates back to the 1991 initiative of the Alliance of Small Island States (AOSIS), which sought the creation of an insurance pool for the impacts of sea-level rise.[32]

One important outcome from the Warsaw COP was the adoption of a decision inviting Parties to submit Intended Nationally Determined Contributions (INDCs) towards achieving the objective of the UNFCCC, as set out in its Article 2.[33] The INDCs were later to play an important part in the Paris Agreement as Nationally Determined Contributions (NDCs) in Article 3. The loss and damage mechanism and the GCF were also incorporated into the 2015 Paris Agreement, which is discussed below.

Adaptation is featured in many provisions of the 2015 Paris Agreement, highlighting the importance that it has achieved in the climate-change regime. Indeed, some of the most detailed provisions relate to adaptation, as in Article 7 and the Loss and Damage Mechanism in Article 8. Article 2 of the Paris

30 *Ibid*.

31 Decision 2/CP.19; available at https://unfccc.int/sites/default/files/resource/docs/2013/cop19/eng/10a01.pdf; accessed on 4 May 2019.

32 M Burkett, 'Loss and Damage' (2014) 4 *Climate Law* 119–130, 126; L Vanhala and C Hestbaek, 'Framing Loss and Damage in the UNFCCC Negotiations: The Struggle over Meaning and the Warsaw International Mechanism'; available at http://discovery.ucl.ac.uk/1478385/1/Vanhala%20and%20Hestbaek%20%282016%29%20Framing%20Loss%20and%20Damage%20Final.pdf; accessed on 5 May 2019.

33 Decision 1/CP.19, FCCC/CP/2013/10/Add.1 (para.2 (b)); available at https://unfccc.int/resource/docs/2013/cop19/eng/10a01.pdf; accessed on 4 May 2019.

Agreement, which outlines the aim of the Paris Agreement 'to strengthen the global response to the threat of climate change, in the context of sustainable development and efforts to eradicate poverty', expressly places adaptation as part of the overall aim by, *inter alia*, increasing the ability of countries to adapt to the adverse impacts of climate change. It is significant that Article 7 of the Paris Agreement elevated adaptation to a *global goal*, stating:

> Parties hereby establish the global goal on adaptation of enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change, with a view to contributing to sustainable development and ensuring an adequate adaptation response in the context of the temperature goal referred to in Article 2.[34]

Moreover, the Parties acknowledge that adaptation actions, *inter alia*, should take into consideration vulnerable groups, communities and ecosystems.[35] Article 7 lays out a detailed framework that includes 'assisting developing country Parties in identifying effective adaptation practices, adaptation needs, priorities, support provided and received for adaptation actions and efforts, and challenges and gaps, in a manner consistent with encouraging good practices',[36] as well as '[i]mproving the effectiveness and durability of adaptation actions'. Moreover, it specifically links Article 7 to the *global stocktake* process established under Article 14, whereby the Parties, beginning in 2023, are required to 'periodically take stock of the implementation of this Agreement to assess the collective progress towards achieving the purpose of this Agreement and its long-term goals …'.

The developing countries were successful in having the Loss and Damage Mechanism incorporated into the text of the Paris Agreement in Article 8, despite resistance by the developed country Parties. Article 8 recognizes 'the importance of averting, minimizing and addressing loss and damage associated with the adverse effects of climate change, including extreme weather events and slow onset events …'[37] – the latter inclusive of sea-level rise. Article 8 further exhorts the Parties to

> enhance understanding, action and support, including through the Warsaw International [Loss and Damage] Mechanism, as appropriate,

34 Article 7(1).
35 Article 7(5).
36 Article 7(7)(d)(e).
37 Article 8(1).

> on a cooperative and facilitative basis with respect to loss and damage associated with the adverse effects of climate change.[38]

Sub-paragraph 4 of Article 8 sets out a non-exhaustive list of 'areas of cooperation and facilitation to enhance understanding, action and support..'. – included and of particular relevance to adaptation and sea-level rise are: slow-onset events; events that may involve irreversible and permanent loss and damage; comprehensive risk assessment and management; risk insurance facilities, climate risk pooling and other insurance solutions; and resilience of communities, livelihoods and ecosystems.[39] And, from an economic perspective, Article 9 of the Paris Agreement requires developed country Parties to provide financial resources to assist developing country Parties with respect to both mitigation and adaptation, and encourages other Parties to provide or continue to provide such support voluntarily.[40]

The legally binding commitments for the developed country Parties listed in Annex B of the Kyoto Protocol to reduce greenhouse gas emissions through mitigation actions gave way to be replaced by the obligation for all Parties to 'communicate and maintain successive nationally determined contributions that it intends to achieve' under Article 4 of the Paris Agreement, which will be recorded in a public registry maintained by the Secretariat.[41] These NDCs, however, are not limited to mitigation actions for reduction of greenhouse gases, but also include enhanced adaptation actions under Article 7, enhanced financial support to developing countries under Article 9, and enhanced capacity-building efforts for developing countries, 'in particular countries with the least capacity, such as the least developed countries, and those that are particularly vulnerable to the adverse effects of climate change, such as small island developing States, to take effective climate change action …' under Article 11. In addition to SIDS, which are expressly recognized to be among the most vulnerable, developing States with low-lying coastal areas must be included.

The question is whether the current legal framework under the climate-change regime provides the necessary legal foundation to address the impacts of sea-level rise, which is a slow-onset event that results in the partial or total loss of land territory, renders islands uninhabitable, and in some cases results in the possible loss of statehood. How can these States adapt under international law? The adaptation framework under the UNFCCC regime sets out the

38 Article 8(3).
39 Article 8(4).
40 Article 9(1)(2).
41 Article 4(12).

broad contours for global cooperation for technical and scientific cooperation, capacity building, supporting developing countries with their adaptation plans and for financial support for adaptation. However, the current international climate-change regime does not provide guidance on specific adaptation measures to preserve life on the islands, including preserving maritime zones and their appurtenant entitlements, through measures such as island or coastal fortification/preservation or even the construction *de novo* of artificial islands. However, an examination of the relevant international instruments under both the international climate-change regime and that of the law of the sea demonstrate that this is an area where the different arms of international law should be intertwining. Sea-level rise is a multi-faceted issue, as recognized by the work of the International Law Association (ILA) Baselines Committee[42] and the Committee on International Law and Sea-Level Rise.

The Law of the Sea and Adaptation

The principal framework for the law of the sea is set out under the 1982 United Nations Convention for the Law of the Sea (LOSC).[43] At the time of its adoption the LOSC both codified customary international law and created new law. One of the important areas where the LOSC developed new law was in the creation of the exclusive economic zone (EEZ), which provides for an expanded maritime entitlement of an area of up to 200 nm from the baseline from which the territorial sea is measured, over which the coastal State exercises sovereign rights. In addition, Article 76 of the LOSC also provides for the circumstances where a coastal State may extend its continental shelf up to 350 nm from the baselines from which the breadth of the territorial sea is measured or up to 100 nm from the 2,500-metre isobath. This extended maritime space in the EEZ and continental shelf gives the coastal States exclusive rights over valuable living and non-living marine resources. Based on the well-known principle that 'land dominates the sea', articulated by the International Court of Justice (ICJ) judgment in the 1969 *North Sea Continental Shelf* cases, these rights of the coastal

42 In the final report of the Baselines Committee, adopted in 2012, the ILA recognized that substantial territorial loss resulting from sea-level rise was an issue that extended beyond baselines and the law of the sea and encompassed consideration of several parts of international law. This led to the establishment of the ILA Committee on International Law and Sea-Level Rise. See ILA Resolution No. 1/2012; available at http://ilareporter.org.au/wp-content/uploads/2015/07/Source-2-Baselines-Resolution.pdf; accessed on 4 May 2019.

43 United Nations Convention on the Law of the Sea (Montego Bay, 10 December 1982, in force 16 November 1994) 1833 *UNTS* 396.

State would appear to be dependent upon the existence of land territory.[44] The legal question raised is whether these rights would survive or be extinguished with the resulting loss of land territory from sea-level rise?

The 1982 LOSC was negotiated before climate change emerged as an issue on the international scene. Only some ten years later, in 1992, a new international regime for climate change was adopted: the UNFCCC.[45] Consequently, the LOSC—as a pre-climate-change instrument—did not take into account the impacts of climate change, and in particular sea-level rise. For this simple reason there are no provisions on climate change, including possible measures in response to the impacts of sea-level rise on, for example, baselines or the status of islands under Article 121.

Work of the International Law Association

The ILA's Committee on Baselines under the International Law of the Sea (Baselines Committee) was established in 2008 with a mandate that included identifying, and possibly clarifying or developing, 'the existing law concerning the normal baseline arises in response to possible sea-level rise that has been predicted to accompany the phenomenon of climate change, and the effects this may have in particular upon low-lying, small island developing states'.[46] The baseline is important as it is the starting point for measuring the breadth of the territorial sea, and is the starting point to delineate the outer limits of the continental shelf (Article 76), the EEZ (Article 57), and also the contiguous zone (Article 33). Notably, the only express reference to the permanency of baselines under the LOSC is for the continental shelf under Article 76 (9). In this Article, coastal States are required to deposit with the Secretary-General of the United Nations 'charts and relevant information, including geodetic data, *permanently* describing the outer limits of the continental shelf' (emphasis added). There is no similar reference to permanency, however, for the other maritime zones.

Following an extensive study, the ILA Baselines Committee concluded that 'as a matter of international law', 'the normal baseline is ambulatory' and that

44 *North Sea Continental Shelf Cases* (*Federal Republic of Germany/Denmark; Federal Republic of Germany/Netherlands*) I.C.J. Reports 1969, p. 3, para. 96.

45 See (n 20).

46 Proposal for the establishment of a new committee on baselines, para. 2; available at http://www.ila-hq.org/images/ILA/DraftReports/DraftReport_Baselines.pdf; accessed on 4 May 2019.

consequently 'if the legal baseline changes with human-induced expansions of the actual low-water line to seaward, then it must also change with contractions of the actual low-water line to landward'.[47] The Baselines Committee therefore took the view that:

> … the existing law of the normal baseline applies in situations of significant coastal change caused by both territorial gain and territorial loss. Coastal States may protect and preserve territory through physical reinforcement, but not through the legal fiction of a charted line that is unrepresentative of the actual low-water line.[48]

Consequently, the Baselines Committee concluded that: '… extreme circumstances [landward changes of the baseline] could result in total territorial loss and the consequent total loss of baselines and of the maritime zones measured from those baselines …'[49] However, as observed by the ILA Baselines Committee, 'The existing law of the normal baseline does not offer an adequate solution to this potentially serious problem'.[50] Changes to baselines resulting from loss of features upon which baselines are charted would result in the reduction of the size of maritime entitlements provided by EEZs, which are of great economic and ecological value to coastal States, and in particular to SIDS which are dependent upon the oceans and their resources. The reduction or even complete loss of the marine resources that are part of the EEZ could be catastrophic for many of the SIDS.

In light of the serious ramifications of sea-level rise, the ILA Baselines Committee recommended the establishment of a new committee to study the broader issues relating to loss of territory due to sea-level rise.[51] Based on this recommendation, in 2012 the ILA established the International Law and Sea-Level Rise Committee 'to study the possible impacts of sea-level rise and the implications under international law of the partial and complete inundation of state territory, or depopulation thereof, in particular of small island and

47 ILA, *Baselines under the International Law of the Sea*, Sofia Report 28 (2012); available at http://www.ila-hq.org/images/ILA/DraftReports/DraftReport_Baselines.pdf; accessed 4 December 2018.

48 *Ibid.*, at p. 30.

49 *Ibid.*, at p. 31.

50 *Ibid.*

51 *Ibid.*

low-lying states …'.[52] The Sea-Level Rise Committee first examined issues related to the law of the sea and in particular the question of status of baselines.

On the issue of baselines the Sea-Level Rise Committee identified two approaches *de lege ferenda*:

a. The first approach proposes that 'coastal States maintain (or 'freeze') their *existing baselines*, established in accordance with the LOSC, in their current position, as marked on 'large scale charts officially recognised by the coastal State'…';
b. The second approach proposes that "coastal States maintain their existing defined *outer limits* of their maritime zones measured from baselines established in accordance with the LOSC, notwithstanding physical changes in the coastline and basepoints brought about by sea level rise (emphasis added).[53]

The focus of this article is not to discuss the substance of these options. Rather, the question is whether these measures—either of maintaining existing baselines or that of maintaining the outer limits of their maritime zones measured from baselines established in accordance with the LOSC—can be classified as adaptation measures to climate change? Moreover, it asks whether this legal measure of adaptation to sea-level rise would also apply to the case where the island is completely inundated and becomes submerged. In other words, in the case of islands that are transformed from above-water features at high tide as defined under Article 121 (1) to either a low-tide elevation as defined in Article 13 or entirely submerged, would maintaining the baseline allow the coastal State to preserve the land 'legally' – even if this is a fiction? What implications would this have for the principle that 'land dominates the sea' famously articulated by the ICJ in the *North Sea Continental Shelf case*?[54] Is it possible that a new principle could be recognized that allows island States to maintain baselines and maritime boundaries and thus preserve the status of an island under Article 121(1) of the LOSC?

Article 121 provides that:

52 ILA Resolution 1/2012 adopted at the 75th Conference of the International Law Association held in Sofia, Bulgaria, 26 to 30 August 2012; available at http://ilareporter.org.au/wp-content/uploads/2015/07/Source-2-Baselines-Resolution.pdf; accessed on 4 May 2019. The scope of topics covered by the International Law and Sea-Level Rise Committee in addition to law of the sea included statehood under international law and forced migration and human rights, in particular persons displaced in the context of sea-level rise.

53 ILA, International Law and Sea-Level Rise, Sydney Report (2018), 12; available at http://www.ila-hq.org/index.php/committees?id=157; accessed on 4 May 2019.

54 See (n 45).

1 An island is a naturally formed area of land, surrounded by water, which is above water at high tide.
2 Except as provided for in paragraph 3, the territorial sea, the contiguous zone, the exclusive economic zone and the continental shelf of an island are determined in accordance with the provisions of this Convention applicable to other land territory.
3 Rocks which cannot sustain human habitation or economic life of their own shall have no exclusive economic zone or continental shelf.

The difference between an 'island' and 'rock' lies in whether the feature is 'capable of sustaining human habitation or economic life on its own'. An island gets the full panoply of maritime entitlements, whereas rocks implicitly receive only a territorial sea at most. In this regard, it is interesting to note that in the *South China Sea* arbitral award, the Tribunal looked to historical evidence of human habitation and economic life on the Spratly Islands and the implications such evidence had for establishing the *natural capacity* of features for purposes of Article 121(3) of the LOSC.[55] In examining the status of the Spratly Islands under Article 121, the Tribunal found 'no indication that anything fairly resembling a stable human community has ever formed on the Spratly Islands. Rather, the islands have been a temporary refuge and base of operations for fishermen and a transient residence for labourers engaged in mining and fishing'.[56] In addition, the Tribunal stated that it saw 'no evidence that would suggest that the historical absence of human habitation on the Spratly Islands is the product of intervening forces or otherwise does not reflect the limited capacity of the features themselves.[57]

If past evidence of habitability and economic activities is relevant to the determination of the status of an offshore feature, including intervening forces, such as, perhaps, sea-level rise due to climate change, would this provide a legal basis for maintaining the island status of offshore features which have become uninhabitable due to the adverse consequences of climate change? In other words, is it the principle that 'once an island always an island'? Could this in combination with the principle of preservation (maintenance) of baselines or outer limits be recognized as adaptation measures and allow island states to maintain sovereignty rights over the natural resources in their maritime

55 *The South China Sea Arbitration* (*The Republic of Philippines* v. *The People's Republic of China*) Award (12 July 2016) PCA 2013–19 (Final Award), para. 621. For an overview of the Final Award, see L Reed and K Wong, 'Marine Entitlements in the South China Sea: The Arbitration Between the Philippines and China' (2016) 110(4) *American Journal of International Law* 746–760.

56 *Ibid.*

57 *Ibid.*, para. 622.

zones? These are questions that will need to be analysed. The work of the ILA is an important contribution but has not yet determined whether these valuable maritime entitlements can legally survive either partial or full inundation resulting from sea-level rise.

Artificial Islands as Measures of Adaptation

Although not a new idea, the construction of artificial islands as a measure of adaptation is gaining popularity.[58] There was an idea at one time to build artificial islands from plastic debris collected from the Pacific Gyre.[59] However, more recently, in response to climate-change-induced sea-level rise, the Republic of Maldives has commenced a major island-building project at significant cost. The concept of floating cities may very well become the new reality as low-lying coastal States and SIDS seek ways to adapt to the rising sea-level and maintain their legal, political and economic existence. A new term has even been coined for artificial island construction: 'seasteading'.[60] It is a concept that seeks to establish sustainable permanent settlements in the seas.[61] The Seasteading Institute is a non-profit organization based in San Francisco. It is partnered with Blue Frontiers, a Singapore-based start-up company, which is responsible for fund-raising. In January 2017, the Institute concluded a Memorandum of Understanding with French Polynesia for a 'seasteading' pilot project that would construct floating islands.[62] The project foresaw creating a special 'sea zone' in the French Polynesian lagoons which would have a special regulatory framework. The project has proven controversial and it appears that it will not be pursued.[63]

Regardless of the status of the French Polynesian project, it is clear that the goal of 'seasteading' represents an ambitious attempt to address sea-level rise and loss of territory through technological solutions. However, the

58 For examples of early proposals to construct artificial islands for different purposes see CW Walker, 'Jurisdictional Problems created by Artificial Islands' (1973) 10 *San Diego Law Review* 638–663.

59 J Bryant-Tokalau, 'Artificial and Recycled Islands in the Pacific: Myths and Mythology of "Plastic Fantastic"' (2011) 120 *The Journal of the Polynesian Society* 71–86.

60 See https://www.seasteading.org/; accessed on 4 May 2019.

61 See https://www.blue-frontiers.com/en/seasteads; accessed on 4 May 2019.

62 See http://20xut21weba50ivlniw6igeb-wpengine.netdna-ssl.com/wp-content/uploads/2017/01/Memorandum-of-Understanding-MOU-French-Polynesia-The-Seasteading-Institute-Jan-13–2017.pdf (French and English); accessed 18 March 2019.

63 'Hundreds march in Tahiti against building of floating islands', RNZ Pacific, 9 April 2018, available at https://www.radionz.co.nz/international/pacific-news/354491/hundreds-march-in-tahiti-against-building-of-floating-islands; accessed 4 May 2019.

compatibility of such projects, especially if the intention is to replace disappearing islands with artificial islands, with international law raises questions.

The status of islands, including artificial islands, has long occupied the agenda of international law, dating as far back as the *Fur Seal Arbitration*, when the British Attorney-General Sir Charles Russell argued that a lighthouse considered to be an artificial island was entitled to its own territorial sea.[64] In its 1956 Articles on the Law of the Sea, the International Law Commission, in the Commentaries to Article 10 on Islands, excluded from the definition of islands:

> Elevations which are above water at low tide only. Even if an installation is built on such an elevation and is itself permanently above water—a lighthouse, for example—the elevation is not an "island" as understood in this article;[65]

and

> Technical installations built on the sea-bed, such as installations used for the exploitation of the continental shelf … The Commission nevertheless proposed that a safety zone around such installations should be recognized in view of their extreme vulnerability. It does not consider that a similar measure is required in the case of lighthouses.

Under the LOSC there is no definition of an 'artificial island'. The LOSC simply refers to the right of coastal States to establish and use artificial islands, installations and structures (Article 56) in their EEZ, as part of the exercise of their sovereign rights. It also refers to the right of all States to construct artificial islands and other installations permitted under international law, as part of freedom of the high seas.[66] The LOSC clearly states that artificial islands, installations and structures are not entitled to generate any maritime entitlements, such as a territorial sea, contiguous zone, continental shelf or exclusive economic zone.[67] Consequently, the construction of artificial islands alone

64 DHN Johnson, 'Artificial Islands' (1951) 4 *The International Law Quarterly* 203–215, 205.

65 ILC, 'Articles concerning the Law of the Sea with commentaries' (1956) vol. II *Yearbook of the International Law Commission*, 265–301, 270; available at http://legal.un.org/ilc/texts/instruments/english/commentaries/8_1_8_2_1956.pdf; accessed 4 May 2019.

66 Subject to Part IV of the LOSC. Article 87(d).

67 The International Law Commission in 1954 entertained the possibility of artificial islands beyond the territorial sea of a coastal States that were formed by for example, 'sand or rubble' as possibly having their own territorial sea if not objected to by other States. In addition, the International Law Commission also discussed a proposal to give

cannot provide the legal rights that a naturally formed island under Article 121 provides. This is clear. The question is whether the combination of the preservation of existing baselines and construction of habitable artificial islands, or floating cities, could serve as a legal measure of adaptation to sea-level rise? Setting aside issues such as cost and durability, there are also legal questions, especially in relation to islands. Article 121 defines an island as being 'naturally formed'. The question is whether this condition applies at all stages, or whether it is a formational element which can be fortified through artificial means in order to preserve its current status. The question of island-building is a delicate one, especially in cases where uninhabitable 'rocks' are being enlarged so as to support habitation and economic activities in accordance with Article 121. However, the question here is different: whether artificial means of fortification can be used to preserve the habitability of an island that clearly meets the requirements of Article 121.

The Arbitral Tribunal in the *South China Sea* case made clear that the determination of the natural capacity of a feature to 'sustain human habitation or an economic life of their own' was an objective standard. The query was not whether such a feature was *actually* capable of sustaining human habitation or an economic life of its own, but whether it had the *natural* capacity to do so without external additions or modifications intended to increase its capacity to sustain human habitation or an economic life of its own.[68] This effectively excludes the possibility for subsequent artificial construction activities or externally provided supplies to build island capacity, which did not originally have the natural capacity to support human habitation. However, the Tribunal added a twist to its formulation, stating that a high-tide feature that is currently uninhabited or lacking economic life of its own would not automatically be classified as a rock if there was historical evidence to establish past human habitation or economic activity. Missing from the Tribunal's analysis, however, is any guidance as to what temporal limitation exists, if any, on the use of historical evidence to assess the natural capacity of a maritime feature. However, in this time of sea-level rise, as certain features lose high-tide land territory in the future, the question arises whether the use of historical evidence for

'island' status to dwellings built on piles in the ocean as villages, but this was ultimately rejected because it would have extended the territorial waters of the nation involved. See (1954) vol. I *Yearbook of the International Law Commission* 91; See also MK Morris and JW Kindt, 'The Law of the Sea: Domestic and International Considerations Arising from the Classification of Floating Nuclear Power Plants and Their Breakwaters as Artificial Islands' (1979) 19 *Va. J. Int'l L.* 299–320, 304.

68 *South China Sea Arbitral Award* (n 55), para. 541.

assessing human habitation capacity would work to maintain their status as an island regardless of loss of territory.

Harbour Works, Coastal Protection, Land Reclamation

It is important, however, to distinguish the construction of *artificial islands* from harbour works, island or coastal protection/fortification or building coastal defenses, including land reclamation, which are also important adaptation measures. Although artificial islands *de novo* or those constructed upon low-tide elevations do not generate maritime zones and entitlements, artificial means of preserving or even extending the coastal area of an existing island do not transform the area into an artificial island, although such activities can have an impact on existing baselines. Notable examples of extensive land reclamation activities include Singapore[69] and the Netherlands, where some 17 percent of the latter's coast is manmade.[70]

Article 11 LOSC, which repeats Article 8 of the 1958 Convention on the Territorial Sea and Contiguous Zone,[71] expressly allows the use of 'outermost *permanent* harbour works which form an integral part of the harbour system are regarded as forming part of the coast' to be used in determining the breadth of the territorial sea. Although no definition is provided as to what is included as 'harbour works', Article 11 LOSC makes clear the exclusion of off-shore installations and artificial islands.[72] In 1987 the Secretariat for the United Nations Office for Ocean Affairs and Law of the Sea convened a Group of Experts on Baselines to prepare a draft report on the application of the provisions of the LOSC on baselines. The report of the Group of Experts included a glossary of terms where a definition of 'harbour works' was provided as 'Permanent man-made structures built along the coast which form an integral part of the

69 T Koh and J Lin, 'The Land Reclamation Case: Thoughts and Reflections' (2006) 10 *Singapore Yearbook of International Law* 1–7.

70 See also C Carlton, 'Problems Relating to Non-Natural and Man-Made Basepoints under UNCLOS' in CR Symmons (ed), *Selected Contemporary Issues in the Law of the Sea* (Brill | Nijhoff, Leiden, 2011) 31–66, 43–44.

71 1958 Convention on the Territorial Sea and Contiguous Zone (Geneva, 29 April 1948, in force 10 Sept. 1964)516 *UNTS* 205.

72 For a detailed discussion see ILA, Baselines Committee, Sofia Report (n 48), Baselines under the International Law of the Sea, 75 *Int'l L. Ass'n Rep. Conf.* 385 (2012) (referring to UN Office of Ocean Affairs and Law of the Sea, Baselines: An Examination of the Relevant Provisions of the United Nations Convention on the Law of the Sea, [1989] p. 56); http://www.un.org/Depts/los/doalos_publications/publicationstexts/The%20Law%20of%20the%20Sea_Baselines.pdf; accessed on 4 May 2019; see also Carlton (n 65) at p. 31.

harbour system such as jetties, moles, quays or other port facilities, coastal terminals, wharves, breakwaters, sea wall etc'.[73]

In its discussion on coast-protective works as artificial means to preserve the baseline, the ILA Baselines Committee noted an ambiguity in the LOSC as to whether coast-protective works formed an 'integral part' of a harbour system, but that in practice such coast-protective works have been accepted as forming part of the coast.[74] Moreover, the Committee concluded that although the LOSC expressly required that harbour works be an integral part of the harbour system, there is 'no authority to suggest that coast-protective works must be associated with harbours in order to qualify as part of the coast and, therefore the normal baseline. To the contrary, Soons—referring to 'artificial conservation of the baseline' - writes that '[a]rtificial conservation of the coastline, including that of islands, is fully permitted under public international law: this is proved by abundant State practice'.[75] Carlton supported this, writing that:

> [d]ykes, levees, berms and seawalls are also used as defences against erosion from the sea. Where these constructions abut directly onto the sea they effectively form part of the State's coast. In these circumstances it is also considered that they form a legitimate part of the State's coastline and can be used as territorial sea basepoints.[76]

The ICJ gave additional support in the *Romania* v. *Ukraine* case, where it concluded that the Sulina Dyke was acceptable as a territorial sea basepoint but ultimately did not use it for delimitation.[77]

The ILA Baselines Committee concluded, after an examination of state practice and expert views, 'that existing international law recognizes harbour works as described above, any coast protective work which extends above the chart datum, and any human-induced extension of the natural coast, as part of the coast for the purposes of Article 5. As such, the normal baseline moves, sometimes seaward, with the resulting changes in coastal configuration'.[78]

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73 UN Office of Ocean Affairs and Law of the Sea, *Baselines: An Examination of the Relevant Provisions of the United Nations Convention on the Law of the Sea* (UN, New York 1989), 56.

74 ILA, Baselines Committee, Sofia Report (n 48) at p. 27.

75 *Ibid.*, at pp. 27–28 citing AHA Soons, 'The Effects of a Rising Sea Level on Maritime Limits and Boundaries' (1990) 37(2) *Neth. Int'l L. Rev.* 207–232, 216–18, 222.

76 Carlton (n 65) at p. 43.

77 Maritime Delimitation in the Black Sea (*Romania v Ukraine*) (Judgment 3 February 2009) ICJ Reports 2009, p. 61.

78 ILA, Baselines Committee, Sofia Report (n 48), at p. 28.

Protection and Preservation of the Marine Environment and Sea-level Rise

The use of artificial means to protect islands and low-lying coastal areas raise two contradictory facets of the obligation of States to protect and preserve the marine environment as codified in Article 192 of the LOSC. In the 2016 *South China Sea* Arbitral Award, the Tribunal provided a detailed interpretation of the obligation of States to protect and preserve the marine environment under Part XII of the LOSC. In that case the Tribunal found that China, by engaging in massive island construction activities in the Spratly Islands, had violated its obligation to protect and preserve the marine environment contrary to Article 192. In addition, the pollution resulting from dredging activities was in violation of Article 194 (1), and the damage to the coral reefs was a violation of Article 194 (5) for the protection of rare or fragile ecosystems as well as the habitat of depleted, threatened or endangered species and other forms of marine life.[79]

The Tribunal further explained that the obligation to 'protect' the marine environment involves protection from *future* damage and that the obligation to 'preserve' means to *maintain* or *improve* the existing condition of the marine environment.[80] Although the factual situation in the *South China Sea* case concerned massive island construction activities on offshore features, most of which the Tribunal concluded were either low-tide elevations or rocks under the LOSC, the situation for existing islands and low-lying coastal areas presents a different facet of the obligation to protect and preserve the marine environment, including its fragile ecosystems and habitats of depleted, threatened or endangered species and other forms of marine life. Furthermore, the Tribunal also explained that the obligation to protect and preserve the marine environment under Article 192 is informed by other applicable rules of international law that includes other international conventions, such as the Convention on International Trade in Endangered Species (CITES)[81] and the Convention on Biological Diversity (CBD).[82]

79 *Ibid.*, para. 983.

80 *The South China Sea Arbitration* (n 55), para. 941.

81 *Ibid.*, at para. 952, where the Tribunal stated that the 'Tribunal considers that the general obligation to "protect and preserve the marine environment" in Article 192 includes a due diligence obligation to prevent the harvesting of species that are recognized internationally as being at risk of extinction and requiring international protection'.

82 Convention on International Trade in Endangered Species (Washington D.C., 3 March 1973, in force 1 July 1975) 993 *UNTS* 243; *Ibid.*, at para. 945, citing the *Chagos Marine Protected Area* case in which the Tribunal in its interpretation of Article 194(5) 'confirms

The rising levels of the sea will have significant impacts on fragile coastal ecosystems and habitats, such as mangroves, sea turtles, and birds. Consequently, in light of the various obligations under the LOSC as well as other international conventions, such as CITES and the CBD, it appears that there is an obligation for States to take the necessary measures to prevent future damage and preserve existing rare or endangered ecosystems, habitats and species. These obligations under international law must be further coupled with that of the climate-change regime. Recalling that the ultimate objective of the UNFCCC in Article 2 includes, *inter alia*, the stabilization of greenhouse gases 'at a level and within a time frame sufficient to allow ecosystems to adapt naturally to climate change …' further underscores the importance and place of adaptation and taking the necessary measures to meet this objective.

However, the issue becomes more complex as many of the States that will suffer the adverse impacts from sea-level rise are the SIDS and low-lying coastal States who belong to the group of either developing or least developed countries and thus are not able to finance the high costs required for adaptation measures necessary to protect and preserve coastal areas. The financial aspects of adaptation exceed the scope of this article. However, it suffices to observe that the existing climate-change regime includes clear obligations for developed States to support developing States' adaptation to the adverse impacts of climate change. This obligation is spelled out in Article 9 of the Paris Agreement,[83] as well as in the Warsaw Loss and Damage Mechanism codified in Article 8 of the Paris Agreement,[84] which specifically includes slow-onset events.

Conclusion

The challenge many States, in particular SIDS and other developing countries with low-lying coastal areas, will face from sea-level rise cannot be understated. Responding to sea-level rise will require practical as well as legal solutions. Technically speaking, 'adaptation' to climate change is a concept under

that Part XII is "not limited to measures aimed strictly at controlling marine pollution", which, although "certainly an important aspect of environmental protection … is by no means the only one'". See *Chagos Marine Protected Area Arbitration* (*Mauritius* v. *United Kingdom*), Award (18 March 2015), paras. 320, 538.

83 Convention on Biological Diversity (Rio de Janeiro, 5 June 1992, in force 29 Dec. 1993) 1760 *UNTS* 79; see (n 41).

84 See (n 40).

the climate-change regime. However, if we are to respond effectively to this global challenge, adaptation to climate change must necessarily involve other branches of international law. We need to adopt an integrated approach that will include legal measures from different legal disciplines, such as the law of the sea and the climate-change regime, which are the focus of this article. In fact, international law itself must be seen as an adaptive measure.

Questions examined in this article are by no means exhaustive of the multiple adaptation challenges States are facing and will continue to face. The focus has been on the very challenging problem related to sea-level rise faced by SIDS with the inundation of offshore features. The inundation of baselines that serve as the basis for measuring maritime zones, and in particular the EEZ, place at risk existing sovereign rights over living and non-living marine sources, which are of tremendous economic value to the coastal State. Unlike the provisions under the LOSC which provide for permanency of the continental shelf under Article 76, according to experts, such as the ILA Baselines Committee, baselines used for the EEZ are ambulatory. The ILA Committee on International Law and Sea-Level Rise proposed a solution *de lege ferenda* for maintaining baselines or outer limits of maritime zones that were established in accordance with the LOSC.[85] This proposal was adopted in 2018 by the ILA, endorsing the Sea-Level Committee's proposal that baselines and the outer limits of maritime zones of a coastal or an archipelagic State that have been properly determined in accordance with the 1982 LOSC not be recalculated due to sea-level rise, including those delimited by international agreement or by decisions of international courts or arbitral tribunals.[86]

Without delving into the legal aspects of this solution, the question for purposes of this article is whether this would also constitute an adaption measure under the climate-change regime together with other responses to preserve the island status, as defined under Article 121 of the LOSC, of currently inhabited islands.

The UNFCCC and the Paris Agreement make clear the importance of adaptation to the adverse consequences of climate change. One can easily read in the language of Article 4 of the UNFCCC the clear obligation for all Parties to cooperate 'in preparing for adaptation to the impacts of climate change; develop and elaborate appropriate and integrated plans for coastal

85 See (n 54).

86 Resolution 5/2018, adopted at the 78th Conference of the International Law Association, held in Sydney, Australia, 19–24 August 2018; available at http://www.ila-hq.org/images/ILA/Resolutions/ILAResolution_5_2018_SeaLevelRise.pdf; accessed 4 May 2019.

zone management …' as including adaptive measures for coastal fortification, island preservation and maybe even construction of artificial islands. Moreover, under Article 7 of the Paris Agreement, the Parties have agreed upon a global goal

> *of enhancing adaptive capacity*, strengthening resilience and reducing vulnerability to climate change, with a view to contributing to sustainable development and ensuring an adequate adaptation response in the context of the temperature goal referred to in Article 2' (emphasis added). Recall that the temperature goal referred to in Article 2 is the implementation of the ultimate goal of the UNFCCC which is to be achieved '… within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.

Adaptation measures cannot be limited to planting mangrove trees to build coastal resilience, but should be viewed within the broader context of the ultimate objective of the UNFCCC that includes, in addition to the natural adaptation of ecosystems, ensuring food production and the economic development of States. If these can best be achieved through taking adaptive measures, such as in maintaining baselines or outer limits of maritime boundaries to preserve maritime zones and maritime entitlements, is there than an obligation of State Parties to the UNFCCC to support these both politically as well as financially, the latter applying in particular to the developed country Parties? The author thinks so. Article 8 of the UNFCCC specifically requires that Annex II Parties are required to give full consideration to what actions are necessary under the UNFCCC, including actions related to funding, insurance and the transfer of technology, to meet the specific needs and concerns of developing country Parties arising from the adverse effects of climate change.

There is also support in international law and the law of the sea for coastal States to use man-made fortification measures to preserve existing coastal areas. Such measures, such as adding artificial elements to natural elements to preserve an island, will not alter the status of the feature as an island under Article 121 of the LOSC. In other words, an island will not transform into an artificial island that is not entitled to any maritime zone. This distinction is important for disappearing islands as the prospects of artificial fortification become increasingly vital to preserving not only the land territory but also the livelihoods and culture of the communities which have resided for centuries on these islands. In addition, based on the *South China Sea* Arbitral Award,

which looked to historical evidence of the natural capacity of an offshore feature, 'once an island always an island' further makes it important to look to adaptive measures that will physically preserve the land and the rights that are appurtenant to that land. In conclusion, international law must itself adapt and provide adaptive means for States to respond to the serious challenges created by sea-level rise.