

THE EFFECTS OF A RISING SEA LEVEL ON MARITIME LIMITS AND BOUNDARIES

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1. INTRODUCTION

The sea level is rising. One of the causes of this phenomenon is the so-called 'greenhouse effect'. This concept refers to the rising of the temperature of the atmosphere as a result of the increase of the concentration of carbon dioxide and several other gases in the atmosphere. One of the consequences of this rise in temperature is the melting of land ice, in particular glaciers and the ice-caps of Greenland and perhaps Antarctica. This melting water enters the ocean, which results, in combination with the expansion of sea water as a consequence of its higher temperature, in a rising of the sea level.¹

The greenhouse effect probably also entails other negative consequences for the global biosphere, such as an increased chance of tropical cyclones, storm depressions and abundant rainfall for some parts of the globe and droughts for others, as well as changes in flora and fauna. Apart from the greenhouse effect, other sources of atmospheric pollution also threaten the quality of life on earth, resulting in damage to the ozone layer, the creation of tropospheric ozone and acid rain. These dangers to the environment have recently attracted much attention. A large number of international meetings, scientific and governmental, have already been held. It has become clear that *preventive* measures are urgently needed, and that international co-operation is required for the taking of such measures. Much work is presently being undertaken within the framework of the WMO/UNEP Intergovernmental Panel on Climate Change (IPCC). Public international law plays a part in this context,

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1. J.G. Titus, 'The Causes and Effects of Sea Level Rise', in H.G. Wind, ed., *Impact of Sea Level Rise on Society* (1987) pp. 104-125; S.H. Schneider, 'The Greenhouse Effect: Science and Policy, *Science* (1989) pp. 771-781; J.D. Milliman, 'Sea Levels: Past, Present and Future, *Oceanus* (1989) pp. 40-44.

in particular the relatively recent field of international environmental law. That role, however, will not be discussed in this article.²

The present article mainly concerns the (potential) consequences of the greenhouse effect for the sea level. It can be expected that some of these consequences will occur in any case, within the next century. Even if the production of carbon dioxide and other harmful gases is substantially reduced within a short period of time, the effects of the present situation will remain noticeable over a long period. Estimates about the extent of the effects (as far as the rise in the sea level is concerned) vary substantially: from 40 centimeters to 1.5 meters (and even more) in the next one hundred years. That may not seem much. There are, however, also other causes of sea level rise. In addition to a rise in an absolute sense, as a consequence of the increase of the volume of sea water caused by the greenhouse effect, the sea level often rises in a relative sense. This is the result of phenomena on a regional or local scale, and therefore varying in extent according to the geographical area involved. Examples of such phenomena are earth-crust movements like collapses and compacting. These phenomena may result in an additional sea level rise (locally) of several decimeters or more.³

It will be clear that such permanent, substantial rises of sea level can have serious negative effects for low-lying coastal areas and islands. In particular, coastal areas lacking any (or any appreciable) shoreline protection are threatened: the sea slowly advances landward, islands disappear or become uninhabitable. Preventive measures are expensive and very often not practicable. In areas where shoreline protection does exist, additional measures will often still have to be taken.⁴ Also the Netherlands will inevitably have to defend itself in due time against this phenomenon. But the greatest problems will occur elsewhere in the world: the low-lying and densely populated river deltas in Bangla Desh, India, Burma, Thailand, Vietnam, Cambodia and China. And, in particular, the archipelagic States in the Pacific, Indian and Atlantic Oceans, consisting of atolls and low-lying islets, such as Kiribati, Tuvalu, Tokelau, the Marshall Islands, the Maldives and the Bahamas. Most atolls and islets of these countries do not protrude above sea level for more than one meter; the highest natural point is generally less than three meters above sea level. However, almost 500,000 people live on these atolls and islets.⁵ The par-

2. For an overview, see V.P. Nanda, 'Trends in International Environmental Law', *California Western International Law Journal* (1989-1990) pp. 187-206.

3. Titus, loc. cit. n. 1; Schneider, loc. cit. n. 1; Milliman, loc. cit. n. 1. It should be noted that earth crust movements may also lead to a relative *dropping* of the sea level. Also, as a result of biological processes (formation of coral) an atoll may keep pace with the rising sea level. These aspects will not be dealt with in this article.

4. J.E. Bardach, 'Global Warming and the Coastal Zone', *Climatic Change* (1989) pp. 117-150. L. Rodgers-Miller and J.E. Bardach, 'In Face of a Rising Sea', *Ocean Yearbook* (1988) pp. 177-190.

5. 'Greenhouse Effect Experts Predict Devastation in Asia', *International Herald Tribune*, 31 December 1988/1 January 1989, p. 2; 'The Greenhouse Effect. Say Goodbye to Kiribati, the

ticular concerns of the latter States have been clearly expressed in the 'Malé Declaration' on Global Warming and Sea Level Rise, adopted at the Small States Conference on Sea Level Rise held at Malé, 14-18 November 1989.⁶

Understandably, up until now all attention concerning the consequences of sea level rise for human society has concentrated on this imminent loss of land and the possibilities to take preventive measures (or at least measures to minimize the loss).⁷

This imminent loss of land is also relevant from the point of view of public international law. In extreme situations it will even endanger the continued existence of a State. This issue will be briefly dealt with at the end of this article. It was certainly no exaggeration that during the environmental conference held in London in March 1989 the representative of Kiribati referred to the greenhouse effect as 'a threat to the very existence of my country'.⁸

This article, however, focuses on an aspect of sea level rise to which so far very little attention has been paid, viz., the effects of sea level rises on the location of maritime limits and boundaries and, as a consequence of this, on the extent of sea areas under the jurisdiction of coastal States.⁹

As will be shown, for a number of countries the sea level rise is more a problem concerning the potential loss of sea areas rather than the loss of land areas.

Before starting to analyse this issue it is necessary to first briefly explain a few relevant concepts of the international law of the sea. This involves in the first place the concept of the 'baseline', i.e., the line from which in principle the breadth of the sea areas in which coastal States are entitled to exercise jurisdiction is measured. Subsequently, for an adequate understanding of the issues attention will briefly be paid to the regimes of the various maritime zones under coastal State jurisdiction.

When discussing these concepts of the international law of the sea, reference will mainly be made to the provisions of the UN Convention on the

Marshall Islands, Tokelau, Tuvalu, the Great Barrier Reef', *Pacific Islands Monthly* (April/May 1989) pp. 17-21. Specifically on the Maldives: 'Maldives Face Extinction', *The Indian Ocean Review* (1988) no. 4, p. 11; 'The Idyllic Islands of the Indian Ocean: The Maldives', *ibid.*, pp. 12-13.

6. Text in *Environmental Policy and Law* (1990) pp. 58-59. See also the *Conference Statement* of the International Conference on Global Warming and Climate Change: Perspectives from Developing Countries. New Delhi, February 21-23, 1989, 19 pp.

7. See the contributions in Wind, ed., op. cit. n. 1; Bardach, op. cit. n. 4.

8. *The Times*, March 6, 1989, p. 3.

9. Two papers have recently been published:

E. Bird and V. Prescott, 'Rising Global Sea Levels and National Maritime Claims', *Marine Policy Reports* (1989) pp. 177-196.

D. Freestone and J. Pethick, 'International Legal Implications of Coastal Adjustments under Sea Level Rise: Active or Passive Policy Responses?', in UNEP/WMO/USACE/EPA/NOAA, *Changing Climate and the Coast. Report to the Intergovernmental Panel on Climate Change from the Miami Conference on Adaptive Responses to Sea Level Rise and Other Impacts of Global Climate Change*, vol. 1 (May 1990) pp. 237-256.

Law of the Sea of 1982, hereinafter referred to as the Law of the Sea Convention.¹⁰ Although this Convention has not yet entered into force,¹¹ most of the provisions contained therein which are relevant for examining the issues under consideration can in essence be regarded as reflecting rules of present customary international law in this field, which in principle is binding upon all States.¹²

2. THE BASELINE

States bordering the ocean are entitled to exercise certain forms of jurisdiction over sea areas contiguous to their coasts in several zones. These zones are situated landward or seaward of a line which is called the 'baseline'. The zones on the seaward side of the baseline may in most cases extend to a certain distance, measured from this line. The location of that baseline is thus decisive.

The normal baseline is constituted by the *low-water line* along the coast.¹³ The reference to the coast here includes the coast of islands.¹⁴ The low-water line refers here to the one marked on large-scale charts officially recognized by the coastal State.¹⁵ There are many kinds of low-water lines; that highly technical issue, however, will not be dealt with here.¹⁶ In the case of islands situated on atolls or of islands having fringing reefs, the baseline is the seaward low-water line of the reef, as shown by the appropriate symbol on charts officially recognized by the coastal State.¹⁷

In certain, exceptional situations, however, a coastal State is entitled to employ, instead of the low-water line, another line as the baseline. In those cases the line is referred to as the *straight baseline*, since it involves imaginary lines connecting appropriate fixed geographical points. This method of straight baselines may be employed by the coastal State in localities where the coastline is deeply indented and cut into, or if there is a fringe of islands along the coast in its immediate vicinity.

10. UN Doc. A/CONF. 62/122; ILM (1982) p. 1261.

11. Art. 308 of the Law of the Sea Convention provides that it will enter into force 12 months after the date of deposit of the sixtieth instrument of ratification or accession. In August 1990 the Convention had been ratified by 44 States.

12. See on this issue, R.R. Churchill and A.V. Lowe, *The Law of the Sea*, 2nd edn. (1988) pp. 4-17.

13. Art. 5 of the Law of the Sea Convention (all further references in these footnotes to treaty articles are from the Law of the Sea Convention, unless expressly stated otherwise). On the baseline, see Churchill and Lowe, op. cit. n. 12, pp. 26-50.

14. Art. 121, para. 1.

15. Art. 5.

16. On this issue, see: D.P. O'Connell, *The International Law of the Sea*, vol. 1 (1982) pp. 173-183; D.C. Kapoor and A.J. Kerr, *A Guide to Maritime Boundary Delimitation* (1986) pp. 16-18.

17. Art. 6.

The drawing of straight baselines must not depart to any appreciable extent from the general direction of the coast, and the sea areas lying within the lines must be closely linked to the land domain. Straight baselines may not be drawn to and from low-tide elevations, unless lighthouses or similar installations which are permanently above sea level have been built on them or except in instances where the drawing of baselines is and from such elevations has received general international recognition. In determining particular straight baselines the coastal State may take account of economic interests peculiar to the region concerned, the reality and the importance of which are clearly evidenced by long usage.¹⁸

Another situation in which straight baselines may be drawn involves a coastline which is highly unstable, because of the presence of a delta and other natural conditions. In such a case the appropriate points may be selected along the furthest seaward extent of the low-water line and, notwithstanding subsequent regression of the low-water line, the straight baselines shall remain effective until changed by the coastal State.¹⁹ This provision, which has particular significance for the problem of sea level rise, will be specifically referred to below.

Straight baselines may furthermore be drawn across the mouths of rivers which flow directly into the sea and,²⁰ provided certain conditions are met, between the natural entrance points of a bay when the distance between those points does not exceed 24 nautical miles.²¹

Finally, there is one other situation in which straight baselines may be drawn, and which is of great importance for the issue under consideration, viz., that of mid-ocean archipelagos. An archipelagic State (i.e., a State constituted wholly by one or more archipelagos)²² may draw straight archipelagic baselines joining the outermost points of the outermost islands and drying reefs of the archipelago, provided that within such baselines are included the main islands and an area in which the ratio of the area of the water to the area of the land (including atolls) is between 1 to 1 and 9 to 1. The length of such baselines may, apart from a few exceptions, not exceed 100 nautical miles.²³

18. Art. 7.

19. Art. 7, para. 2. On the *travaux préparatoires* and the significance of this provision, see T. Scovazzi, 'La linea di base retta', in T. Scovazzi, ed., *La linea di base del mare territoriale* (1986) pp. 120-127.

20. Art. 9.

21. Art. 10.

22. Art. 46 defines an archipelago as 'a group of islands, including parts of islands, interconnecting waters and other natural features which are so closely interrelated that such islands, waters and other natural features form an intrinsic geographical, economic and political entity, or which historically have been regarded as such'.

23. Art. 47.

3. MARITIME ZONES

This section will provide a brief exposition of the regime of the various maritime zones in which coastal States, according to the rules of public international law, are entitled to exercise some form of jurisdiction. These areas can be divided into two categories.

The first category includes sea areas under the sovereignty of the coastal State. These are the maritime internal waters, the archipelagic waters and the territorial sea.

The second category includes the sea areas in which coastal States exercise limited, functional jurisdiction. These are the contiguous zone, the continental shelf, the exclusive economic zone and the (exclusive) fisheries zone.

The *maritime internal waters* include the waters landward of the baseline which have open connection with the ocean.²⁴ These waters fall under the territorial sovereignty of the coastal State, in the same way as its land territory.²⁵

The *archipelagic waters* constitute the waters enclosed by the archipelagic baselines mentioned above. These areas equally fall under the sovereignty of the coastal State (the archipelagic State),²⁶ with the proviso, however, that this State must respect certain rights of passage for foreign vessels, similar to those in the territorial sea.²⁷ Examples of archipelagic States are the Bahamas, the Seychelles, the Maldives, Indonesia, the Philippines, Kiribati, Fiji and the Marshall Islands.

The *territorial sea* includes the area seaward of the baseline, with a breadth not exceeding 12 nautical miles (approximately 22 kilometers).²⁸ It should be noted that, in cases of low-tide elevations, their low-water line only counts as a baseline of the territorial sea if the low-tide elevations are situated wholly or partly at a distance not exceeding 12 nautical miles from the mainland or an island.²⁹

The sovereignty of the coastal State extends to its territorial sea.³⁰ There exists, however, an important limitation on this sovereignty: ships of all States enjoy the right of innocent passage through the territorial sea.³¹ In those parts of the territorial sea which constitute an international strait, international shipping may exercise an even further-reaching right of transit passage.³²

24. Art. 8, para. 1.

25. Art. 2, para. 1. A limitation of this sovereignty (the right of innocent passage) may exist in some parts of maritime internal waters according to Art. 8, para. 2.

26. Art. 49.

27. Arts. 52-54.

28. Art. 3.

29. Art. 13.

30. Art. 2, para. 1.

31. Arts. 17-32.

32. Arts. 34-44.

The *contiguous zone* is an area beyond and contiguous to the territorial sea, in which the coastal State may exercise the control necessary to prevent any infringement of its customs, fiscal, immigration or sanitary laws and regulations within its territory or territorial sea, and to punish any infringement of these laws and regulations committed within its territory or territorial sea. The contiguous zone may not extend beyond 24 nautical miles from the baseline.³³

Completely new is the rule that in this area the coastal State also has a certain authority over objects of an archaeological and historical nature located on the seabed.³⁴

The *continental shelf* of a coastal State comprises the seabed and subsoil of the submarine areas that extend beyond its territorial sea throughout the natural prolongation of its land territory to the outer edge of the continental margin, or to a distance of 200 nautical miles from the baselines where the outer edge of the continental margin does not extend up to that distance.³⁵ The outer limit of the continental margin, which is defined in the Law of the Sea Convention in a highly complicated way, can in some cases be located at a distance of several hundred nautical miles beyond the 200-mile line.³⁶

The coastal State exercises sovereign rights over the continental shelf for the purpose of exploring it and exploiting its natural resources.³⁷ In practice these natural resources are mostly oil and gas.

The *exclusive economic zone* (EEZ) is an area, beyond and adjacent to the territorial sea, up to 200 nautical miles (approximately 370 kilometers) from the baseline.³⁸ In this zone the coastal State has sovereign rights for the purpose of exploring and exploiting, conserving and managing the natural resources, both living and non-living. The zone comprises the waters, the seabed and its subsoil. The sovereign rights of the coastal State also include other activities for the economic utilization of the zone, such as the production of energy from the water, currents and winds. In addition, the coastal State has in its EEZ certain jurisdiction with regard to the establishment and use of artificial islands, installations and structures, the conduct of marine scientific research, and the protection and preservation of the marine environment. In the EEZ, however, all States enjoy freedom of navigation.³⁹

33. Art. 33.

34. Art. 303, para. 2.

35. Art. 76, para. 1.

36. Art. 76, paras. 2-8.

37. Art. 77. Para. 4 of this article defines the natural resources of the continental shelf as the mineral and other non-living resources of the seabed and subsoil, as well as the living organisms belonging to sedentary species. In addition, the coastal State has jurisdiction with respect to marine scientific research (Art. 246 et seq.) and with respect to artificial islands and installations (Art. 80 jo. Art. 60).

38. Arts. 55 and 57. In the area up to 200 nautical miles, the EEZ and the continental shelf thus coincide.

39. Art. 56. The content and scope of these rights and jurisdiction of the coastal State, and of the rights of other States, are further defined in Arts. 58-73, 246 et seq. (marine scientific research) and Part XII (protection and preservation of the marine environment).

Finally, mention should be made of the (*exclusive*) *fisheries zone*. Geographically it concerns the same area as the EEZ (i.e., a zone extending up to 200 nautical miles from the baseline), but the coastal State's jurisdiction within the zone is limited to the exploration and exploitation of the living resources.⁴⁰

Beyond these maritime zones within which coastal States have certain jurisdiction is the *high seas*.⁴¹ There, the principle of the high freedom of the seas still applies.⁴² For the exploration and exploitation of the natural resources of the seabed and subsoil of the high seas (beyond the continental shelf; now referred to as the International Seabed Area), an entirely new legal regime is provided for by the Law of the Sea Convention. This regime is based on the principle that these resources (mainly the so-called 'manganese nodules') are to be considered the common heritage of mankind.⁴³ These areas, however, are not directly relevant for the problem of sea level rise.

As stated above, the maritime zones referred to may extend up to a certain maximum distance from the baseline, e.g., 12 or 200 nautical miles. Those maximum distances can obviously only be reached when there are no opposite coastal States situated at a distance of less than 24 or 400 nautical miles, respectively. If such opposite coastal States are present, then the coastal States involved will have to reach agreement on the delimitation of their respective areas. If agreement has been reached this is usually recorded in a delimitation treaty. The negotiations preceding such a treaty are often complex and protracted, because many factors may be involved and the interests may be great. If no agreement is reached, the governments concerned may decide to have the boundary determined by a third party, such as an Arbitration Tribunal or the International Court of Justice.⁴⁴

The provisions in the Law of the Sea Convention on the delimitation of the territorial sea on the one hand, and the EEZ and continental shelf on the other, are not identical. For the delimitation of the territorial sea it is provided that, failing agreement between the coastal States involved to the contrary, neither of the two States is entitled to extend its territorial sea beyond the median line between the baselines of the two States, except in cases where it is necessary by reason of historic title or other special circumstances to delimit the territorial sea of the two States in a way which is at variance therewith.⁴⁵

40. The concept of an '(exclusive) fisheries zone' is not included in the Law of the Sea Convention. It has been developed in the past two decades in customary international law.

41. Art. 86.

42. Art. 87 *et seq.*

43. Part XI of the Law of the Sea Convention.

44. Churchill and Lowe, *op. cit.* n. 12, pp. 153-163. O'Connell, *op. cit.* n. 16, vol. II, chapters 16-18. J.R.V. Prescott, *The Maritime Political Boundaries of the World* (1985) pp. 81-106.

45. Art. 15.

The delimitation of the EEZ or the continental shelf between two States must be effected by agreement, on the basis of international law, in order to achieve an equitable solution.⁴⁶ If the States concerned cannot reach agreement and engage a third party, the latter therefore has to apply principles and rules which result in an equitable boundary delimitation.⁴⁷ Pending the establishment of the boundary the States concerned should, in a spirit of understanding and co-operation, make every effort to enter into provisional arrangements of a practical nature and, during this transitional period, should not jeopardize or hamper the reaching of a final agreement. Such interim arrangements are without prejudice to the final delimitation.⁴⁸

4. THE EFFECTS OF SEA LEVEL RISE ON MARITIME LIMITS AND BOUNDARIES

4.1 Introductory remarks

When analyzing the (potential) effects of sea level rise on maritime limits and boundaries, a distinction should be made between, on the one hand, situations where a delimitation agreement between the coastal States is in force for the sea area concerned or a boundary has been established through a decision of the International Court of Justice or an Arbitral Tribunal, and, on the other hand, situations where there is no delimitation agreement in force.

First, the situations where a delimitation agreement is lacking will be dealt with. The consequences of the application of the general rules concerning baselines in the case of sea level rise will be examined. The location of most maritime boundaries has not yet been fixed by treaty, although in some of those cases there is no disagreement between the States involved about where the boundary should be.⁴⁹

After this examination it is appropriate to briefly consider the interests involved: what are the practical consequences of shifting maritime boundaries?

Subsequently, the possibilities which exist for coastal States to prevent or reduce the potentially negative effects of sea level rise on the location or extent of sea areas under their jurisdiction will be examined.

Finally, the situations in which for the sea area involved a delimitation agreement is in force or a boundary has been established through international arbitration or adjudication will be dealt with.

46. Arts. 74, para. 1 and 83, para. 1.

47. B. Kwiatkowska, 'The ICJ Doctrine of Equitable Principles Applicable to Maritime Boundary Delimitation and its Impact on the International Law of the Sea', in A. Bloed and P. van Dijk, eds., *Forty Years International Court of Justice: Jurisdiction, Equity and Equality* (1988) pp. 119-158.

48. Arts. 74, para. 3 and 83, para. 3.

49. At present there exist approximately 100 maritime delimitation treaties which are in force.

4.2 Situations without delimitation agreement

4.2.1 Application of the general rules

First, the consequences of the application of the general international legal rules concerning the *normal baseline*, i.e., the low-water line, will be examined. As a consequence of sea level rise, this line is shifting landward or, in cases of low-lying islands and low-tide elevations, may even disappear completely.

The horizontal distance over which the baseline shifts in a landward direction obviously depends on the gradient of the land surface in the area involved: the lesser the gradient, the greater the distance. In some areas a rise in the sea level of half a meter can shift the baseline for tens of kilometers.

Because of the landward shift of the baseline, the outer limits of the territorial sea and EEZ will also shift landward accordingly.⁵⁰ The extent (area) of these sea areas remains the same; only the location of the inner and outer limits changes.

As far as the continental shelf is concerned the consequences are less clear. The Law of the Sea Convention contains a remarkable provision in Article 76, paragraph 9, which reads as follows:

'The coastal State shall deposit with the Secretary-General of the United Nations charts, and relevant information, including geodetic data, *permanently* describing the outer limits of its continental shelf. The Secretary-General shall give due publicity thereto' (emphasis added).

As far as the continental shelf's outer limit extending beyond 200 nautical miles is concerned, this provision is not that remarkable, since in that case the outer limit is primarily determined by geological and morphological factors which are not affected by sea level rise. That outer limit thus remains. The breadth of the continental shelf, however, increases since the outer limit of the territorial sea has shifted landward (the continental shelf in the legal sense starts beyond the territorial sea). When, however, it is the outer limit of the continental shelf extending exactly to 200 nautical miles that is involved, this provision is remarkable for it would also fix that boundary, notwithstanding possible later regressions of the baseline. This is the more remarkable since such a provision has not been included for the outer limit of the EEZ, even though the regime of the EEZ includes jurisdiction over seabed resources.

It is not clear if this provision was originally meant to apply exclusively to the continental shelf extending beyond 200 nautical miles, and that the effect

There exist 400 (potential) maritime boundaries. See E.D. Brown, *Sea-Bed Energy and Mineral Resources and the Law of the Sea*, vol. III (1986) pp. III. 4.19-33.

50. These conclusions apply *mutatis mutandis* to the contiguous zone and the (exclusive) fisheries zone. These two zones will not be mentioned separately in the following expositions.

just mentioned therefore is unintentional. More probable is that this provision was intended to permanently fix the boundary between the continental shelf and the international seabed area, in view of the legal security which is of great importance for the holders of concessions for mining activities.^{50a} In this connection there are no convincing reasons for treating a continental shelf limit beyond 200 nautical miles any differently from a 200-nautical mile continental shelf limit. It would seem unjust if, for example, an outer limit located because of geological or morphological factors at 210 nautical miles from the baseline would become fixed, whereas a 200-nautical mile limit would not be. Thus the effect of this provision is that also the 200-nautical mile outer limit of the continental shelf, in case of regression of the baseline, remains unchanged and that the breadth of the shelf increases.⁵¹ An area of seabed which formerly came under the regime of territorial sea then comes under the regime of the continental shelf.

A totally different situation occurs when an island or a low-tide elevation disappears entirely. In such a case it is possible that the extent of the territorial sea and EEZ decreases. Whether or not, and to what extent, that will be the case, depends on the geographical configuration.⁵² Especially in the case of islands the extent of the sea area lost can be substantial.⁵³ The farther the disappeared island was located from a remaining baseline (the coast of the mainland or of a remaining other island), the greater the loss of sea area. The extent of the loss is determined, among other factors, by the area of the (former) island, but even in cases of the smallest islets substantial areas may be involved. For example: if the islet was situated at a distance of 24 nautical miles from the remaining baseline, the extent of the territorial sea may decrease by approximately 1500 square kilometers.⁵⁴ The extent of the EEZ may even decrease by approximately 8,000 square kilometers.⁵⁵ If the islet was situated at a distance of 200 nautical miles from the remaining baseline, then the loss

50a. See B.H. Oxman, 'The Third United Nations Conference on the Law of the Sea: the Ninth Session (1980)', AJIL (1981) p. 230.

51. The consequence that as a result of this the outer limits of the continental shelf and the EEZ will be located separately should in itself not raise any objections: this is already the case with the continental shelf extending beyond 200 nautical miles. Should the outer limit recede, the seabed area involved would become included in the international seabed area.

Art. 76, para. 9 is a typical treaty provision and raises a number of questions. For example: what would be the consequences if the coastal State did not deposit the charts and relevant information? The drafters of this provision will probably not have thought about a rising sea level, and particularly not about significant changes in the location of the baseline.

52. For example, a concave or convex coastline, and the presence of other islands and low-tide elevations.

53. In the case of disappearing low-tide elevations there may only be effects when they were located at a distance of less than 12 nautical miles from the mainland or an island. Had they been located farther than 12 nautical miles, they would not have generated a territorial sea.

54. The area of a circle with a radius of 12 nautical miles is 1,548 square kilometers.

55. The exact extent of the loss depends on the location of the remaining baselines.

of the EEZ-area can amount to over 215,000 square kilometers.⁵⁶ In an extreme case, when the islet was located farther than 400 nautical miles, the loss of the EEZ-area would even amount to 431,000 square kilometers.⁵⁷ Such cases are not purely theoretical; they may occur in particular in the Pacific Ocean.⁵⁸

It should be emphasized, however, that the losses of EEZ-area just mentioned may not occur in all cases, because the islet involved already before its disappearance did not generate an EEZ. Although every island has its own territorial sea, according to Article 121, paragraph 3 of the Law of the Sea Convention rocks which cannot sustain human habitation or economic life of their own have no EEZ or continental shelf. The term 'rock' in this provision should not be taken literally; presumably it is intended to cover all naturally formed areas of land permanently above the sea level of certain minimal dimensions. Whether or not this provision, which is new, can already be considered part of existing customary international law is difficult to determine. The main problem in this connection is that the two conditions referred to in the provision, viz., (1) no possibility of sustained human habitation, and (2) no possibility of economic life of its own, can be interpreted in rather different ways because they have been rather obscurely phrased. These various possible interpretations will not be discussed here. To answer the question if this provision is already part of customary international law, a detailed survey of State practice would be necessary.⁵⁹

It should be noted that in the future the following phenomenon may occur: an island, as a result of a rising sea level, will fall within the scope of this provision and therefore, although it will not yet have disappeared entirely, it will still lose its EEZ.

A remarkable situation again arises with respect to the limits of the continental shelf in the case of a disappearing island. As a consequence of the provision in Article 76, paragraph 9 of the Law of the Sea Convention already mentioned, the outer limit of the continental shelf may be permanently fixed.

56. This is the area of a half circle with a radius of 200 nautical miles. Also in this case the exact extent of the loss depends on the location of the remaining baselines.

57. The area of a circle with a radius of 200 nautical miles is 431,014 square kilometers.

58. It is also possible that, as a result of sea level rise, the island becomes a low-tide elevation. Should it be located beyond 12 nautical miles from the mainland or an island, then the effect would be identical to the complete disappearance of an island. Should it be located within 12 nautical miles it will continue to serve as baseline.

59. J.M. van Dyke and R.A. Brooks, 'Uninhabited Islands: Their Impact on the Ownership of the Ocean's Resources', *Ocean Development and International Law Journal* (1983) pp. 265-300. J.M. van Dyke, J. Morgan and J. Gurrish, 'The Exclusive Economic Zone of the Northwestern Hawaiian Islands: When do Uninhabited Islands Generate an EEZ?', San Diego LR (1988) pp. 435-494. B. Kwiatkowska and A.H.A. Soons, 'The Entitlement to Maritime Areas of Rocks which Cannot Sustain Human Habitation or Economic Life of Their Own', 21 NYIL (1990) (in press).

Once the outer limit of the continental shelf has been established at a distance of 200 nautical miles (or even more) from an island, which island then subsequently disappears entirely, the coastal State would maintain sovereign rights over a seabed area (which may be of considerable extent), while the object which generated these sovereign rights no longer exists.

So far, the situations considered involved those in which neighbouring coastal States were absent. Should they be present, however, but no delimitation agreements are in force, the shifting of the baseline as a result of sea level rise may still cause changes to the outer limit. This will, for example, be the case when two coastal States are situated less than 24 nautical miles from each other. If no delimitation agreement has been concluded, and special circumstances are absent, the boundary will be the median line.⁶⁰ This median line will shift somewhat when the baselines of both States have shifted in an asymmetrical way as a result of sea level rise. When two States are located less than 400 nautical miles opposite each other, the same could apply to the boundary between their respective EEZs and continental shelves, but here the median line plays a much less prominent role than in the case of the territorial sea.⁶¹ The situation in such cases can be very complex, and the circumstances are unique in every case. Therefore it is impossible to arrive at any general conclusions.

We now turn to cases where the baseline is not formed by the low-water line, but by *straight baselines*. These straight baselines connect points located on the mainland, on islands along the coast and, in exceptional cases, on low-tide elevations (viz., when lighthouses or similar installations which are permanently above sea level have been built on them or in instances where this has received general international recognition). The question which arises here is whether, in case the points established by the coastal State have permanently become located below the surface of the sea as a result of sea level rise,⁶² the coastal State is obliged to substitute those points by new ones which do meet the applicable criteria. The same question arises with respect to the baseline drawn across the mouth of rivers and bays and, in the case of archipelagos, the archipelagic baselines drawn by the archipelagic State.

Before answering this question it is useful to deal briefly with the special provision included in the Law of the Sea Convention for the particular situation of a coastline which is highly unstable because of the presence of a delta and other natural conditions. Here, situations are involved where the coastline is permanently changing, sometimes regressing (landward), sometimes pro-

60. Art. 15.

61. Arts. 74 and 83.

62. In cases where a point was located on an island which through sea level rise has become a low-tide elevation, but on which no lighthouse or similar installation is present, it could be argued that a situation of 'international recognition' as referred to in Art. 7, para. 4, is involved.

gressing (seaward). The coast of Bangla Desh is a good example.⁶³ Article 7, paragraph 2 in such cases offers the coastal State the opportunity at a certain moment to draw straight baselines between fixed points along the furthest seaward extent of the low-water line. The article further provides that, notwithstanding subsequent regression of the low-water line, the straight baselines remain effective until changed by the coastal State.⁶⁴ The intention of this provision was that the outer limit of the maritime zones (territorial sea, EEZ) of the coastal State concerned does not change permanently. Sea level rise would in such situations have an accelerating effect on the regression of the low-water line, but the straight baselines drawn would prevent this from having (for the time being) any effect on the seaward limits of the maritime zones concerned.

The provision that these straight baselines remain effective until changed by the coastal State raises the question whether the coastal State is obliged to do this at some point in time, in order to bring them in accordance with the changed factual situation, or whether the coastal State is entirely free in deciding to change or not to change the baselines. It is submitted that it was not the intention of this provision to grant the coastal State a discretionary power in this respect. If that were the case the reference in the provision to subsequent change by the coastal State would not have been necessary. This reference implies that the coastal State is supposed to make the necessary changes, for example when the discrepancy between the former and the new situation has become quite substantial or when through various causes the instability of the coastline has been substantially reduced. The coastal State has, however, been left a certain degree of freedom to decide when (and therefore also: how frequently) it will effect the changes. Whether this original intention will actually be implemented may be doubtful. The consequences thereof will be further discussed below.

Returning now to the other straight baselines, it is submitted that under the present rules of international law the coastal State is also supposed to replace the former points which disappeared under the sea surface by new ones which are in compliance with the applicable criteria.⁶⁵ Here, too, it will have to be awaited to see if this will actually be done.

When coastal States adapt their straight baselines this will generally mean that the extent of their maritime internal waters decreases. The same applies to the extent of archipelagic waters. The territorial sea and EEZ areas will generally not decrease, but they will shift landward. The outer limit of the con-

63. Scovazzi, *op. cit.* n. 19.

64. *Ibid.* See also Prescott, *op. cit.* n. 44, p. 70. This provision has not yet been applied in practice. Bangla Desh has established a baseline in 1972 using points located seaward of the low-water line.

65. Also in other respects the baselines and sea areas enclosed should still comply with the other criteria listed in Art. 7, para. 3.

tinental shelf remains unchanged. In the case of neighbouring coastal States the same conclusions apply as those indicated above when discussing the consequence of shifts in the low-water line.

4.2.2 *The interests involved*

It is now appropriate to briefly consider the interests involved in changes in the location of maritime limits and boundaries. A distinction can be made between a shift of the limit or boundary line, and a decrease in the extent of the sea area.

Shifting of the limit or boundary is of particular importance with respect to the exercise of jurisdiction. For activities at sea it is essential to know in which maritime zone they take place: the regimes differ, sometimes only in detail, sometimes substantially. To give a few examples:

When, as a result of sea level rise, the outer limit of the territorial sea shifts landward this can mean that in the sea area concerned the regime of the EEZ is substituted for that of the territorial sea. For international navigation this would entail the replacement of the right of innocent passage by the freedom of navigation: national legislation of the coastal State can only be applied to a very limited extent to foreign vessels. Warships of other States will have a greater flexibility of movement there. The powers of the coastal State with respect to wrecks are more limited.

Archaeological and historical objects, which because of the regression of the baseline are no longer situated within the contiguous zone (up to 24 nautical miles), can no longer be protected by the coastal State.

Landward shifting of the outer limit of the EEZ may mean that the jurisdiction of the coastal State with respect to fishing, the conduct of marine scientific research and the protection of the marine environment would be replaced by the regime of the freedom of the high seas. It is, however, also possible that those activities will then be conducted in the EEZ of another (neighbouring) coastal State, thus being subject to different national legislation.

The *decrease of the extent* of sea areas under the jurisdiction of a coastal State mainly has repercussions for the economic interests of the State concerned, in particular fishing interests. (Should the outer limit of the continental shelf not have been permanently fixed, the great economic interests associated with the exploitation of oil and gas would also be involved.) Among other things, this may mean less income from fishing licenses, but also less possibilities for the coastal State to take conservation and management measures with respect to the fish stocks in the area involved (even though its own fishermen keep on fishing there).

A decrease in the extent of sea areas may especially occur in the case of archipelagic States and other States with islands along the coast. Such a decrease may involve areas of several tens of thousands of square kilometers or even several hundred thousand square kilometers. Coastal States would not wish to

see that happen, and will undoubtedly attempt to prevent this from happening. The remaining part of this article will deal with the question whether or not, and if so, which, possibilities would exist for this purpose.

4.2.3 *Artificial conservation of the baseline*

The most obvious means to prevent or reduce the negative effects of sea level rise is the artificial conservation of the baseline. As far as the *low-water line* is concerned, this means the construction or reinforcement of sea defences (shoreline protection). This is at the present time already being done frequently. Further sea level rises will necessitate large financial investments. For many countries of the world, however, the costs associated with the conservation of the entire present low-water line may turn out to be unsurmountable (quite apart from the huge technical problems involved).⁶⁶

Artificial conservation of the coastline, including that of islands, is fully permitted under public international law: this is proved by abundant State practice. One marginal note may still be made here, with respect to extreme situations. In Article 121, paragraph 1 of the Law of the Sea Convention an island is defined as 'a *naturally formed* area of land, surrounded by water, which is above water at high tide' (emphasis added). One could argue that islets, which would have disappeared entirely as a result of sea level rises but have been maintained exclusively by artificial means, no longer comply with the requirement of being 'naturally formed'. They will have become 'artificial' islands.⁶⁷ According to Article 60, paragraph 8 of the Law of the Sea Convention artificial islands in the EEZ do not possess the status of islands. They have no territorial sea of their own, and their presence does not affect the delimitation of the territorial sea, the EEZ or the continental shelf.

It is submitted, however, that this provision, apart from the fact that it relates to the EEZ, is concerned exclusively with newly constructed artificial islands. The artificial conservation of an island once formed by nature does not result in its losing its international legal status of 'island'.⁶⁸ This is also the case if the artificial conservation was exclusively intended to preserve the baseline for the purpose of maritime delimitation. Maintaining sea areas may for one coastal State (for example, the Maldives) represent an equivalent and legitimate interest as compared to another coastal State (for example, the Netherlands) maintaining its land territory.⁶⁹

66. See the contributions in Wind, ed., op. cit. n. 1.

67. On artificial islands, see N. Papadakis, *The International Legal Regime of Artificial Islands* (1977); A.H.A. Soons, *Artificial Islands and Installations in International Law*, Occasional Paper No. 22, Law of the Sea Institute (University of Rhode Island), July 1974, 30 pp.

68. Papadakis, op. cit. n. 67, pp. 91-97.

69. The same conclusion could arguably apply with respect to low-tide elevations, although this would not seem practicable (and would be very expensive).

It is also submitted that the artificial conservation of an islet exclusively for the purpose of preventing it from degenerating, as a result of sea level rise, to the status of 'rock' as provided in Article 121, paragraph 3 of the Law of the Sea Convention (and thus no longer generating an EEZ) should be considered as permissible.⁷⁰

That some States are of this opinion may be concluded from the fact that several States (including Iceland and Japan) have recently invested great efforts and costs to reinforce islets and rocks located far offshore which were in danger of disappearing under water.⁷¹ As far as could be ascertained no protests have been made by other States against these actions.

In the case of *straight baselines* the question may be raised whether it is allowed to construct a lighthouse (or similar installation) on a disappearing island on which a connecting point for straight baselines is located, exclusively for the purpose of preserving the point for the drawing of straight baselines. It is submitted that, quite apart from the fact that it may be difficult to prove that the construction of a lighthouse is exclusively for this purpose, such action may be regarded as permissible.⁷²

4.2.4 *Historic waters*

As indicated previously, in many cases it will not be possible to artificially maintain the original baseline. Would there still be another possibility for coastal States to maintain their original sea areas, notwithstanding the regression of the baseline as a result of sea level rise?

It is conceivable that a coastal State, notwithstanding the landward shifting of the baseline, maintains the outer limits of its territorial sea and of its EEZ where they were originally located.⁷³ As a consequence, the breadth of its territorial sea would gradually become more than 12 nautical miles, and the outer limit of its EEZ would be located ever further than 200 nautical miles from the baseline.

70. This is totally different from artificially 'extending' a rock (Art. 121, para. 3) to become an island (Art. 121, para. 1); that situation will not be discussed here.

71. Iceland during 1985 reinforced the islet of Kolbeinsey, located approximately 60 nautical miles north of Iceland, which was about to disappear below sea level. Japan has recently artificially preserved, at enormous costs (240 million US dollars), two rocks (Okino-irishima, or Parece Vela) in the Western Pacific, hoping to preserve in this way approximately 400,000 square kilometers of EEZ. See A.L. Silverstein, 'Okinoirishima: Artificial Preservation of a Speck of Sovereignty', *Brooklyn JIL* (1990) pp. 409-431.

72. It would also seem permissible to artificially conserve a low-tide elevation as referred to in Art. 7, para. 4.

73. The outer limit of the continental shelf has already been fixed as a result of the provisions of Art. 76, para. 9.

In justifying its course of action the coastal State may wish to invoke historic rights in the sea area concerned where it already used to exercise sovereignty, or sovereign rights, as the case may be.

This involves the doctrine of so-called 'historic waters'. Since many years, public international law has recognized the possibility that the sovereignty a coastal State extends, in exceptional cases based on historic title, to an area of the sea which according to the general rules concerning baselines would not fall under its sovereignty, but under the regime of the high seas. Historic waters can be defined as waters over which the coastal State, in deviation of the general rules of international law, has been exercising sovereignty, clearly and effectively, without interruption and during a considerable period of time, with the acquiescence of the community of States. Such areas are governed by the regime of maritime internal waters.⁷⁴

In the case of sea level rise, however, the coastal State would be claiming a certain sea area as its territorial sea or EEZ. It therefore does not concern historic waters in the traditional sense, but it would involve a new category of historic waters. For such cases one could require, *mutatis mutandis*, that the following conditions be met: the coastal State should, right from the start of the regression of the baseline, continue to exercise in the area concerned, in the same way as it used to do before, sovereignty or sovereign rights, and this should be acquiesced in by the community of States.⁷⁵ Acquiescence by the community of States may be inferred from the absence of protests by interested States.

A number of objections can be made against the development of such a new category of 'historic waters'. In the first place, the qualification of 'historic' implies that the coastal State only acquires a legitimate title after the passing of a certain period of time since the changes in the baseline have occurred. Before that it possessed a legitimate title (i.e., distance from the baseline); that title no longer exists; thus, a new title has to come into existence. This causes a great measure of uncertainty with respect to the situation between the shifting of the baseline and the coming into existence of the new legitimate title. In addition, the length of the period of time required is not clear.

In the second place, it seems better to restrict the doctrine of 'historic waters' to its present contents. The issue of sea level rise differs too much from the original issue for which this doctrine was developed to now bring both under the same denominator. Among other things, different sorts of jurisdic-

⁷⁴ L.-J. Bouchez, *The Regime of Bays in International Law* (1964) pp. 199-302 (in particular p. 281); O'Connell, op. cit. n. 16, pp. 417-438.

⁷⁵ The coastal State will have to indicate expressly that it maintains the original limits. A problem could be caused by the fact that published charts may periodically indicate the changed low-water line (baseline). Art. 16, para. 2, requires coastal States to deposit a copy of these charts with the Secretary-General of the United Nations. In such cases the coastal State should thus explicitly comment on the new low-water line with respect to its function (or rather, non-function) as a baseline.

tion are involved (sovereignty over maritime internal waters, on the one hand, sovereignty over the territorial sea and sovereign rights plus jurisdiction in the EEZ, on the other). Actually, historic titles *sui generis* would rather be involved here.

The third and most important objection, however, is as follows. Traditionally, historic waters have been viewed as very exceptional deviations from the general rules for which, it is true, general criteria exist which have to be met, but where each time unique situations have been involved. In the case of sea level rise, however, a great number of similar situations are involved, which are predictable. It concerns a general category of geographic situations which should be treated equally. It would be unjust if in one case a coastal State does succeed to maintain its sea area in this way, whereas in another case the coastal State would not, even though the cause of the phenomenon is the same in both cases. Such a situation rather calls for the development of a general rule which in similar cases can be applied by all coastal States.

4.2.5 A new rule of customary international law

Another possibility therefore for coastal States to prevent imminent loss of sea areas as a result of sea level rise would be the development of a new general rule. The contents of such a general rule could be that coastal States are entitled, in the case of landward shifting of the baseline as a result of sea level rise, to maintain the outer limits of the territorial sea and of the EEZ where they were located at a certain moment in accordance with the general rules in force at that time. This new rule would in the first place have to be a rule of customary international law. It could also be included in a general treaty (for example, as an amendment of the Law of the Sea Convention).^{75a} A strong argument in support of the acceptance of such a rule of customary law is the provision in Article 76, paragraph 9, concerning the fixing of the outer limit of the continental shelf, which may serve as a precedent.

For such a rule of customary law to be created it is necessary that a number of coastal States in practice will apply this rule and that (potentially) affected (interested) States which have been given notice of this policy refrain from protesting. The more publicity is given to this practice, without causing any protests, the quicker the customary rule can come into being. Discussion, and preferably even acceptance, of the practice at the appropriate international fora can also contribute to this. At a certain point of time it will be possible to conclude that the rule has become generally accepted and has already become part of customary international law.

^{75a} The Convention can be amended by normal procedure, involving a diplomatic Conference, but only after 10 years from its entry into force (Art. 312). It can also be amended (even before that date) by a simplified (written) procedure in accordance with Art. 313. These procedures do not apply to provisions relating to activities in the international seabed area.

This process is somewhat similar to that of the creation of historic waters, but the difference is that in this case from a certain moment all coastal States may invoke the existence of this rule. At which exact point of time that will be difficult to state *in concreto*, but that is always the case with rules of customary international law.

4.3 Situations with a delimitation agreement

4.3.1 Application of the general rules

This section deals with a completely different situation, viz., that in which there is a delimitation agreement in force for the sea area concerned. This implies that two coastal States are situated either less than 400 nautical miles from each other (in which case the EEZ and/or continental shelf have been delimited), or less than 24 nautical miles from each other (in which case a territorial sea boundary is involved).

Such agreements may involve the formal establishment of the median line between the two coastal States as the boundary line (or a boundary line based on the median line). In many instances, however, another line has been established as the boundary, in particular because of special circumstances such as the geographical configuration of the coastlines or the presence of islands. Sometimes it involves a combination of both systems.⁷⁶ When the median line has been chosen as the boundary line, this may be incorporated in the boundary agreement in two ways. The method used most often is to establish the median line (at least, a boundary line based thereon) by way of lines drawn between points the exact location of which has been determined by geographical coordinates.⁷⁷ Another, much less frequently used method involves the mere reference in the agreement to the median line as forming the agreed-upon boundary line.⁷⁸

The question may arise what the consequences will be for the boundary lines established by these agreements of changes in the geographical configuration (especially the location of baselines) as a result of sea level rise – changes, therefore, of the original circumstances on which the agreed boundary was based.

76. Churchill and Lowe, *op. cit.* n. 12, pp. 153-161; Prescott, *op. cit.* n. 44, pp. 81-106; O'Connell, *op. cit.* n. 16, vol. II, chapters 16-18.

77. Agreement between the Government of the Kingdom of the Netherlands and the Government of the United Kingdom of Great Britain and Northern Ireland relating to the Delimitation of the Continental Shelf under the North Sea between the two Countries, London, 6 October 1965; *Trb.* 1965 No. 191

78. An example is provided by the maritime delimitation treaty between Tonga and France (Wallis and Futuna), 11 January 1980. See *The Law of the Sea. Maritime Boundary Agreements (1970-1984)*, United Nations (1987) pp. 273-275.

In cases where the delimitation agreement explicitly refers to the median line the boundary may shift as a result of sea level rise: asymmetrical changes of the baselines of both States will lead to changes in the location of the median line. The States concerned have deliberately opted for a (potentially) fluctuating boundary line.

In all other cases, where the boundary line has been fixed, it must in principle be concluded that changes in the geographical configuration as a result of sea level rise will not result in changes in the boundary line. 'In principle' means that there may be exceptions. Which circumstances may conceivably lead to the adjustment of an agreed boundary line?

4.3.2 Adjustment of boundaries established by agreement

It is obvious that the two coastal States concerned by mutual agreement may decide to adjust the boundary line. What is more interesting, however, is the question whether one of the two States may demand that an adjustment be made and, in the absence of agreement thereon, may unilaterally terminate the delimitation agreement. (The establishment of a new boundary is obviously only possible by mutual agreement.)

In the first instance, for the purpose of answering this question a distinction could be made between two situations. The first situation involves delimitation agreements which explicitly provide that the boundary is meant to be definitive, notwithstanding future changes in the baselines of the parties. To be equated with this situation are the cases where in another way (for example, from the *travaux préparatoires* or parliamentary debates on the delimitation agreement) the same intention of the parties can be explicitly determined. An example of such a case is the continental shelf delimitation agreement between the United Kingdom and the Netherlands of 1965, which in fact involves fixing the median line.⁷⁹ When in subsequent years the Netherlands baseline shifted seaward in some areas (through both natural and artificial processes, up to over 7 kilometers), this had no effect whatsoever on the location of the boundary of the continental shelf with the United Kingdom.

In such cases, it is submitted, one party to the delimitation agreement cannot unilaterally decide to terminate the agreement because of the shifting of a baseline.

The second situation concerns delimitation agreements which do not explicitly refer to the boundary line being definitive notwithstanding changes in the location of the baseline. Would there be any grounds which may be invoked to justify unilateral termination of a delimitation agreement? It is conceivable

79. See n. 77 *supra*. From the debates in the Dutch Parliament it appears that it was the explicit intention of the Parties to determine the boundary definitively. See Bijl. Hand.T.K. 1965/1966, 8409, No. 3.

that a State would wish to invoke a change of circumstances since the conclusion of the agreement. In exceptional cases it is possible for a State to invoke a fundamental change of circumstances in order to terminate a treaty; public international law makes this subject to the fulfilment of very stringent conditions.⁸⁰ In the first place, it should involve a change of circumstances which was not foreseen by the parties at the time of the conclusion of the treaty. It can be disputed whether sea level rises can in all cases be considered as an unforeseen circumstance. Furthermore, it should involve changes to the original circumstances the existence of which constituted an essential basis of the consent of parties to be bound by the treaty, and the effect of the changes should radically transform the extent of obligations still to be performed under the treaty. Thus, a very substantial change in the location of the baseline should be involved (for example, as a consequence of the complete disappearance of an island).

However, treaties establishing a boundary (which must be deemed to include maritime delimitation agreements) have explicitly been excluded from this possibility to invoke a fundamental change of circumstances.⁸¹ The main reason for this is that any possibility for calling into question boundary agreements would result in a permanent source of serious international political tension.⁸² It must therefore be concluded that in accordance with the present rules of international law a State is not entitled to invoke changed circumstances as a result of sea level rise in order to unilaterally terminate a delimitation agreement. Theoretically it is conceivable that in the future a new rule of customary international law will develop which creates an exception for invoking fundamental changes as a result of sea level change, but it is submitted that this is not very likely.

It is also conceivable that a coastal State which is confronted with the disappearance of an island near its shore, which belonged to a neighbouring State and which under a delimitation agreement generated a considerable area of sea to the detriment of the former State, would consider the disappearance of that island as the loss of the object that was indispensable for the execution of (part of) the delimitation agreement and therefore considers itself no longer bound to perform its obligations under the agreement.⁸³ Such a position would seem very difficult to defend since it remains very well possible for this State to continue to respect the boundary line of the delimitation agreement.

80. See Art. 62, para. 1, of the Vienna Convention on the Law of Treaties of 1969 (hereinafter referred to as the Vienna Convention). This provision can be considered as reflecting customary international law.

81. Art. 62, para. 2 of the Vienna Convention.

82. K.H. Kaikobad, 'Some Observations on the Doctrine of Continuity and Finality of Boundaries', *BYIL* (1983) pp. 119-141. A. Wyrozumska, 'Treaties Establishing Territorial Regimes', *Polish YIL* (1986) pp. 261-265.

83. Cf., Art. 61 of the Vienna Convention.

It can therefore be concluded that sea level rise has no effects on maritime boundaries between two States when these boundaries have been fixed by treaty, unless the two States agree otherwise.

4.4 Boundaries established through arbitration or adjudication

A third category of situations concerns sea areas where the boundary line has been established by an arbitral decision or a judgment of the International Court of Justice. A number of such cases already exist. For example, in recent years Arbitral Tribunals have established maritime boundaries between France and the United Kingdom, between Guinea and Guinea-Bissau and between Guinea-Bissau and Senegal. The International Court of Justice has established maritime boundaries between Tunisia and Libya, between Malta and Libya and between the United States and Canada (Gulf of Maine).⁸⁴ In all instances the maritime boundary was established in a binding way at the joint request of both coastal States. In all instances the boundary line was fixed.

The question if it will in the future be possible for one of the two coastal States concerned to no longer accept the boundary line as binding because of changed circumstances in the geographical configuration as a result of sea level rise, and to demand negotiations on a new location of the boundary line, should be answered in the negative. The legal situation here is in essence the same as in the situation of boundaries established by agreement discussed in the previous paragraph.⁸⁵

5. THE EXTINCTION OF A STATE

This section will briefly deal with the most far-reaching and dramatic potential consequence of sea level rise: the physical disappearance of a State. This would seem far-fetched and purely hypothetical. Still, there are governments of island-States and archipelagic States, such as Kiribati and the Maldives, which are concerned about this issue⁸⁶ and have already discussed it at inter-governmental level. Of course, islets and atolls can be maintained artificially, but quite apart from the enormous costs associated therewith other factors are also involved, such as the exhaustion of potable water and the decline of the surface which may undo those efforts almost completely. At a certain point of time, because of various social considerations it may be considered better to move the entire population to areas not threatened by sea level rise, including areas belonging to the territory of another State.⁸⁷

84. Kapoor and Kerr, op. cit. n. 16, pp. 89-100. See also the literature referred to in nn. 47 and 76 *supra*.

85. See n. 82 *supra*.

86. 'Maldives Face Extinction', *The Indian Ocean Review* (December 1988) p. 11.

87. *International Herald Tribune*, 31 December 1988/1 January 1989, p. 2.

One possibility would be for the threatened State to take over, by treaty of cession (e.g., by purchase) territory from another State (which could be a distant one). Another possibility is that the entire population emigrates to one or more other States.

In the first case, the State continues to exist, since the conditions set by international law for the existence of a State are still met: (1) territory; (2) population; (3) government; and (4) capacity to enter into international relations.⁸⁸ A question may still arise with respect to the sea areas which were generated by the disappeared (or at least completely uninhabitable) islands. On the basis of the expositions in the preceding section, these areas may still belong to the State concerned.

In the second case, in which the entire population has emigrated and is situated in the territory of one or more other States, the second condition mentioned for the existence of a State (viz., a population) is no longer met. A 'population in exile' does not seem to be sufficient for this purpose.⁸⁹ If in addition there is no island territory left it can be concluded that the State no longer exists. Since the State has ceased to exist, also the limits and (possible) boundaries of its former sea areas will have lapsed.⁹⁰ The areas will thereafter either belong to the high seas and the international seabed area, or to the maritime zones of neighbouring States which are situated at a distance of less than 200 (*casu quo* 12) nautical miles of the former State. Delimitation agreements that may have been concluded by the former State are terminated because one of the parties has ceased to exist without there being a successor State.

There is, however, a much more attractive solution for the problems resulting from the complete emigration of a population, and that is to establish (by treaty) a fusion of the 'disappearing' State and another (neighbouring) State. In that way the remaining uninhabitable islands may still generate maritime areas for the new State, and also the pre-existing maritime delimitation treaties may remain effective. Alternatively, the same results can be achieved by letting the 'disappearing' State join another State. Only the latter State will then continue to exist, but it will include the remaining maritime territory of the 'disappearing' State.

88. N.M. Shaw, *International Law*, 2nd edn. (1986) pp. 126-130. J.H.W. Verzijl, *International Law in Historical Perspective*, vol. II (1969) pp. 62-131.

89. Cf., however, the position of the Sovereign Order of Malta, as a precedent for retaining *sui generis* international legal personality by an entity no longer qualifying as a State: Shaw, *op. cit.* n. 88, p. 152; Verzijl, *op. cit.* n. 88, pp. 28-32.

90. One could think of an entity, charged with the management of the sea areas involved for the benefit of the 'population in exile', as a *sui generis* subject of international law.

6. CONCLUSIONS

The conclusions that may be drawn from the preceding observations are the following.

In the first place, the existence of fixed maritime boundaries is of great importance. Maritime boundaries can be fixed through delimitation agreements or decisions of Arbitral Tribunals or the International Court of Justice. The boundary between the continental shelf and the international seabed area can be fixed unilaterally by the coastal State. Sea level rises will leave fixed maritime boundaries unaffected, unless the coastal States otherwise agree. Coastal States which may expect negative effects for the location of their baselines as a result of sea level rise therefore are well advised to try to arrive at fixed maritime boundaries soon. Incidentally, chances are of course that the neighbouring State concerned is fully aware of this and is therefore not in a hurry to negotiate.

Next, it can be concluded that, in the absence of fixed boundaries, artificial conservation of baselines deserves consideration. In view of the costs associated therewith a careful selection will have to be made of the locations where this should be done. This selection is one which is totally different from the choices which have to be made with respect to the construction or reinforcement of sea defences in order to prevent other negative effects of sea level rise, such as loss of land territory. In that case a balancing is involved of the costs against the revenues of the social activities taking place on the land territory. In the case of artificial works for the purpose of conservation of baselines a balancing is involved of the costs against the revenues which the sea area that may be lost can generate.

A less expensive, but probably also less dependable means for these States to prevent negative consequences as a result of sea level rise for the extent of their maritime zones is to contribute towards the creation of a new rule of customary international law which allows coastal States in case of sea level rise to maintain the original outer limits of their maritime zones. This requires an explicit policy of the coastal States concerned in this field, as indicated above: they will have to maintain their former limits in practice and will have to attempt to gain approval for this practice in the relevant international fora. This will seem to be an acceptable aspiration, in particular in view of the discrepancy which otherwise would occur between the situation of these States and the situation of States which have been able, in some way or another, to fix their maritime boundaries.

In this connection it is recommended that in the studies which will be conducted for the governments of the coastal States most threatened by sea level rise, on the social consequences of sea level rise for their countries, attention will also be paid to the aspect of the changes of baselines and the potential loss of sea area. That would make it possible for those governments to already conduct an adequate policy also on this issue in the earliest stages of their efforts to cope with this important phenomenon.

Finally, it should be stressed that this article contains only a general overview of some of the problems involved and their possible solutions: the issues will have to be studied in much more detail in the years to come.