The Law of the Sea

Definition of the Continental Shelf

An Examination of the Relevant Provisions
of the United Nations Convention
on the Law of the Sea

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INTRODUCTION

The United Nations Office of Legal Affairs, through its Division for Ocean Affairs and the Law of the Sea, has a major responsibility to encourage the development of State practice in a manner consistent with the relevant provisions of the 1982 United Nations Convention on the Law of the Sea. To this end, and to provide assistance to States in their examination of some of the highly technical provisions of the Convention, the Office has been conducting a series of studies on certain specific subjects and has published them in concise booklets. The studies are undertaken with the assistance of a representative group of experts on the specific subject-matter under consideration, on the basis of drafts prepared by the Secretariat.

The present study is part of the series and focuses on the definition of the continental shelf—particularly on the methods of establishing its outer limit. The Office convened from 10 to 12 March 1993 a Group of Technical Experts on the Definition of the Continental Shelf. The names of the experts, who served in their personal capacities, are listed in appendix II to the present study. The Office gratefully acknowledges their valuable contribution to the preparation of the study.

The definition and the various methods for the coastal State to establish the outer limits of its continental shelf are set out in article 76 of the Convention. In addition, the Third United Nations Conference on the Law of the Sea adopted a "Statement of Understanding" concerning a specific method applicable to such special features as those in the southern part of the Bay of Bengal.

An important aspect of the process of establishing the outer limit of the continental shelf is the role of the Commission on the Limits of the Continental Shelf, which shall be set up by the States Parties within 18 months after the entry into force of the Convention. Under the Convention, the coastal State shall establish the outer limits of its continental shelf where it extends beyond 200 miles from the baseline from which the breadth of the territorial sea is measured on the basis of the recommendations of the Commission ("mile" throughout this paper refers to the international nautical mile of 1,852 metres). Accordingly, the present study also examines various aspects of the Commission's activities. Without prejudice to the work of the Commission, an attempt has been made to identify some of the issues that will have to be addressed by the Commission when considering the submissions of coastal States.

The Convention requires each coastal State Party intending to establish the limits of its continental shelf beyond 200 nautical miles from the baseline to submit the proposed limits to the Commission as soon as possible, but in any case within 10 years of the entry into force of the Convention for that State.

It is hoped that this study will be of use in clarifying some of the highly technical aspects of the relevant provisions of the Convention and also serve as a guide for coastal States when establishing the outer limits of their continental shelves. It is further hoped that the future Commission on the Limits of the Continental Shelf will also benefit from its findings, which have been produced with the participation of experts in the same disciplines as those required of Commission members, i.e., geology, geophysics or hydrography.

In order to facilitate uniform understanding of relevant terms, a glossary of technical terms, prepared by the International Hydrographic Bureau, is appended to the present study (appendix I). Also included is a select bibliography on the subject-matters covered by the study (appendix III).

I. HISTORICAL BACKGROUND

1. On 28 September 1945, President Harry S. Truman of the United States of America issued a proclamation declaring that the United States Government "regards the natural resources of the subsoil and seabed of the continental shelf beneath the high seas but contiguous to the coasts of the United States as appertaining to the United States, subject to its jurisdiction and control."[1] An accompanying press release of the Government explained:

> "Generally, submerged land which is contiguous to the continent and which is covered by no more than 100 fathoms (600 feet) of water is considered as the continental shelf."[2]

2. The Truman Proclamation was almost immediately followed by similar claims by a number of other States. These, however, were not necessarily the same in scope and content as the Proclamation, especially with respect to the character of the superjacent waters as high seas. The 1958 United Nations Conference on the Law of the Sea attempted to formulate an agreed legal definition of the continental shelf, and adopted the following in article 1 of the Convention on the Continental Shelf:

> "For the purpose of these articles, the term 'continental shelf' is used as referring . . . to the seabed and subsoil of the submarine areas adjacent to the coast but outside the area of the territorial sea, to a depth of 200 metres or, beyond that limit, to where the depth of the superjacent waters admits of the exploitation of the natural resources of the said areas; . . ."

This definition contained the criteria of adjacency to the coast and of "exploitability", which were soon questioned in view of their imprecise and open-ended nature.

3. The need to establish clear outer limits to the continental shelf jurisdiction was particularly felt when the General Assembly of the United Nations adopted in 1970 the historic Declaration of Principles Governing the Seabed and the Ocean Floor, and the Subsoil Thereof, beyond the Limits of National Jurisdiction (resolution 2749 (XXV)), in which the Assembly declared, *inter alia*, that "the seabed and ocean floor, and the subsoil thereof, beyond the limits of national jurisdiction, . . . as well as the resources of the area, are the common heritage of mankind."

4. The need for a new internationally agreed definition of the outer limits of the continental shelf was stressed at the meetings of the Committee on the Peaceful Uses of the Seabed and Ocean Floor beyond the Limits of National Jurisdiction (the Seabed Committee) and at the Third United Nations Conference on the Law of the Sea. It was generally agreed that the establishment of an international regime for the deep seabed and the necessity to eliminate the ambiguities and uncertainties of the definition in the Geneva

Convention on the Continental Shelf inevitably required a precise definition of the outer limits of the continental shelf.

5. The first negotiating text of the Conference circulated in 1975, i.e., the Informal Single Negotiating Text, contained the following new definition of the continental shelf:

> "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 from which the breadth of the territorial sea is measured where the outer edge of the continental margin does not extend up to that distance." [3]

This provision, which eventually became article 76, paragraph 1, of the United Nations Convention on the Law of the Sea without change, contains three important features: First, it reaffirms the legal concept of the continental shelf and its link with the physical fact of the natural prolongation, enunciated in 1969 by the International Court of Justice in the *North Sea Continental Shelf* cases.[4] Secondly, it establishes a link between the continental shelf as a legal concept and the continental margin as a geomorphological concept. Thirdly, it introduces the criterion of distance enabling a coastal State, regardless of whether there is a natural prolongation in the physical sense, to claim a continental shelf up to 200 miles from the baselines from which the breadth of the territorial sea is measured. In 1985, the International Court of Justice in the *Libyan Arab Jamahiriya/ Malta* case stated that "[t]he concepts of natural prolongation and distance are therefore not opposed but complementary . . ."[5]

6. This definition, however, was still considered by many delegations as incomplete in the sense that it did not define "continental margin", nor specify a way of locating its outer limit. Moreover, there was no specific indication that the term "continental margin" was used in its true scientific sense.[6] A number of informal proposals were made in this regard.[7] Two of them, one by Professor H.D. Hedberg of the United States and the other by a geologist, Mr. P.R.R. Gardiner of Ireland, emerged to be the most promising and formed the bases for the final agreement on this aspect of the definition.

7. Hedberg argued in 1973[8] that the most logical and natural basis for defining the boundary between national and international jurisdiction was the base of the continental slope, marking the critical dividing line between that part of the ocean floor pertaining to the land areas and that part of the ocean floor which properly belonged to the oceanic domain. Because of inherent uncertainties in determining an exact base-of-slope (base-of-continent) line, however, he proposed that a boundary zone of a uniform and internationally agreed width, measured oceanward from the most landward reasonable limit of the uncertain interval in which the base of slope or its projection might lie, should be established by an International Marine Boundary Commission, and that within such boundary zone a precise political boundary should be proposed by the coastal State itself and submitted to the Commission for approval.[9]

8. While recognizing the merits of the Hedberg formula, Gardiner found that it would exclude from the continental margin the outer part of the continental rise, and this was inconsistent both with the accepted scientific definition and the concept of natural prolongation of the land mass.[10] On the basis of the recognition that continental rises were normally composed of a wedge of sediments that thinned out seaward at the foot of the continental slope, he proposed in March 1976 that the outer limit of the rise could be defined in direct proportion to the thickness of rise sediments and suggested that, for the purpose of the future convention on the law of the sea, the outer limit of the rise should be fixed at any one point to be located where the thickness of sediment was at least 1 per cent of the shortest distance between it and the foot of the slope.[11]

9. This formula (also known as the Irish formula), according to Gardiner, included the following significant points: any outer limit drawn according to the formula would always fall significantly within the continental margin; it took into account the physical reality of global variations in the geographical breadth and thickness of continental rises; coastal State claims would be restricted *naturally*; and the greater a coastal State's continental shelf outer limit was in distance from the foot of the slope, the thicker the rise sediments would have to be along the borderline with the international area. This last element is important because it is known that conditions suitable for hydrocarbon accumulations can occur where sediments are thicker than 1 kilometre, and these would fall within the international area wherever the limits based on this proposal were more than 54 miles (100 kilometres) beyond the foot of the slope.[12] The 1 per cent figure was chosen so that coastal States would retain under their jurisdiction a significant part of the continental rise.

10. The Irish delegation circulated an informal paper containing both its formula and a modified Hedberg formula in the Second Committee of the Conference in April 1976.[13] That paper contained provisions which subsequently became the bases for paragraphs 3, 4, and 7 to 9 of article 76 of the Convention.

11. While negotiations continued with this new Irish formula, which later became paragraph 4 (a) (i) and (ii) of article 76, concerns were raised as to whether the foot of the slope itself was a reliable criterion and could be easily identified without controversy.[14] In 1978, a compromise was developed according to which the outer limits of the continental shelf shall not extend beyond 100 miles from the 2,500-metre isobath, or not beyond 350 miles from the baselines from which the breadth of the territorial sea is measured.

12. In April 1979, the Chairman of the Second Committee proposed the inclusion of this compromise and the Irish formula into article 76 of the Informal Composite Negotiating Text. Having received widespread support, these new provisions were incorporated in the revision of the Negotiating Text.[15] Two points, however, were still left pending: one concerning the treatment of submarine ridges and the other concerning the suggestion of Sri Lanka on the unique features of the Bay of Bengal.

13. With respect to ridges, there was a concern that submarine ridges might be used by some States to extend their continental shelf jurisdiction to the middle of the ocean. A compromise was found on this issue by making distinctions between "oceanic ridges" on the deep ocean floor, "submarine ridges" and "submarine elevations", and by excluding oceanic ridges from the definition of the continental margin, but agreeing that on submarine ridges the outer limits of the shelf shall not exceed 350 miles from the baselines and that this limitation would not apply to "submarine elevations which are the natural components of the continental margin, such as its plateaux, rises, caps, banks and spurs",[16] in which case the criterion of 100 miles from the 2,500-metre isobath would also apply. This was reflected in the second revision of the Informal Composite Negotiating Text prepared in April 1980,[17] and eventually became paragraph 6 of article 76 of the Convention.

14. The Sri Lankan suggestion called for an exception to the application of the Irish formula in the southern part of the Bay of Bengal, where the application of that formula would lead to inequitable results. The Conference, at its 141st plenary meeting on 29 August 1980, decided[18] that the statement of understanding on an exceptional method of delimitation of the continental shelf applicable to certain specific geological and geomorphological conditions would be incorporated as an annex to the Final Act.[19] (The text of the statement of understanding is reproduced in annex II to the present study.)

II. AN OVERVIEW OF THE MAIN PROVISIONS ON THE CONTINENTAL SHELF

15. The provisions of Part VI of the Convention, consisting of articles 76 to 85, are devoted to the definition of the continental shelf and the establishment of the basic rights and duties of the coastal States with respect to the continental shelf and its resources. With regard to the legal regime governing the continental shelf resources, the Convention virtually reproduces the provisions of the 1958 Convention. (The text of Part VI is reproduced in annex I.)

16. According to article 77, the coastal State has sovereign rights over the continental shelf for the purpose of exploring it and exploiting its natural resources. These rights are exclusive and "do not depend on occupation, effective or notional, or on any express proclamation". The coastal State also has the exclusive right to authorize and regulate drilling on the shelf for all purposes (article 81).

17. Article 80 provides that the rules governing artificial islands, installations and structures in the exclusive economic zone as contained in article 60 shall also be applicable to the continental shelf.

18. The exercise of the coastal State's rights over the continental shelf, however, must not "infringe or result in any unjustifiable interference with navigation and other rights and freedoms of other States" (article 78). Further, it must respect the rights of all States to lay submarine cables and pipelines on the continental shelf, and may not impede the laying or maintenance of such cables and pipelines, subject to the coastal State's rights to take reasonable measures for the exploration and exploitation of the shelf and its resources and for the prevention and control of pollution from pipelines (article 79). However, the delineation of the course for the laying of pipelines on the continental shelf is subject to the consent of the coastal State.

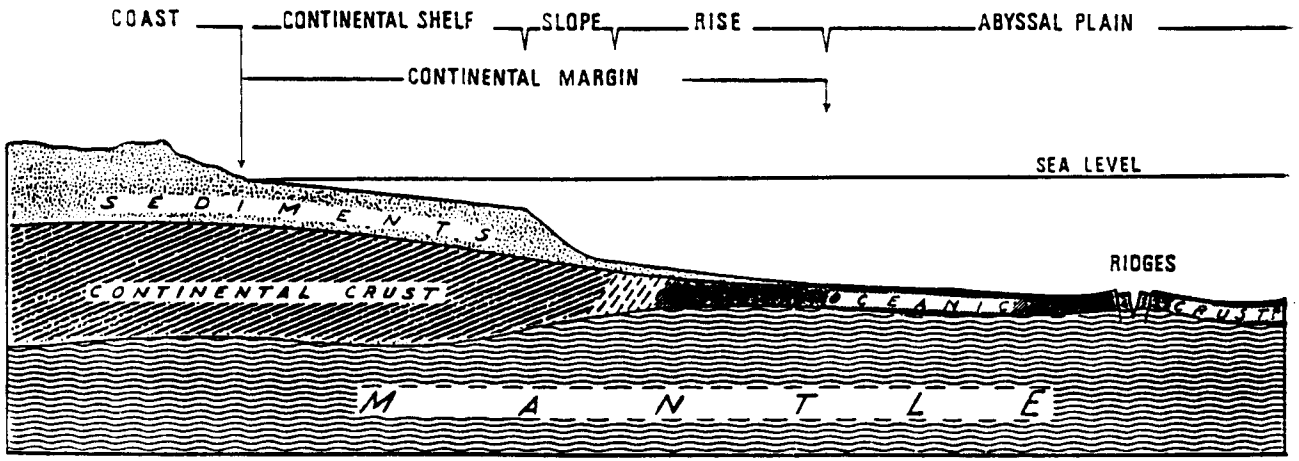
19. The Convention contains a unique system of revenue sharing with respect to the exploitation of the non-living resources of the continental shelf beyond 200 miles from the baselines. Payments and contributions in kind shall be made by the coastal State exploiting such resources with respect to all production at a site after the first five years of production at that site. For the sixth year, the rate of payment or contribution shall be 1 per cent of the value or volume of production at the site. The rate shall increase by 1 per cent for each subsequent year until the twelfth year and shall remain at 7 per cent thereafter. A developing State which is a net importer of a mineral resource produced from its continental shelf is exempt from making such payments or contributions in respect of that mineral resource. The payments or contributions shall be made through the International Seabed Authority, to be distributed to the Parties to the Convention on the basis of equitable sharing criteria, taking into account the interests and needs of developing States (article 82).

20. In cases where the continental margin extends beyond 200 miles, the coastal State may delineate its continental shelf to a breadth greater than 200 miles, in accordance with the criteria specified in article 76. From the map illustrating the various formulae for the definition of the continental shelf that was prepared at the request of the Third United Nations Conference on the Law of the Sea,[20] about 30 States[21] have been identified as possibly having continental shelves extending beyond 200 nautical miles. It should be noted that the scale of this map is very small, at 1:30 million, and that the available bathymetric data are of poor quality in certain parts of the world. Consequently, the list of these States should not be considered definitive.

21. In establishing the limits of the continental margin, a number of highly complicated technical questions may arise. These questions relate, among others, to such notions as natural prolongation of the land territory, sedimentary rock thickness, foot of the continental slope and submarine ridges. In addition, the determination of the limits of the continental shelf will depend on the use of technological means, the accuracy of which may have to be assessed.

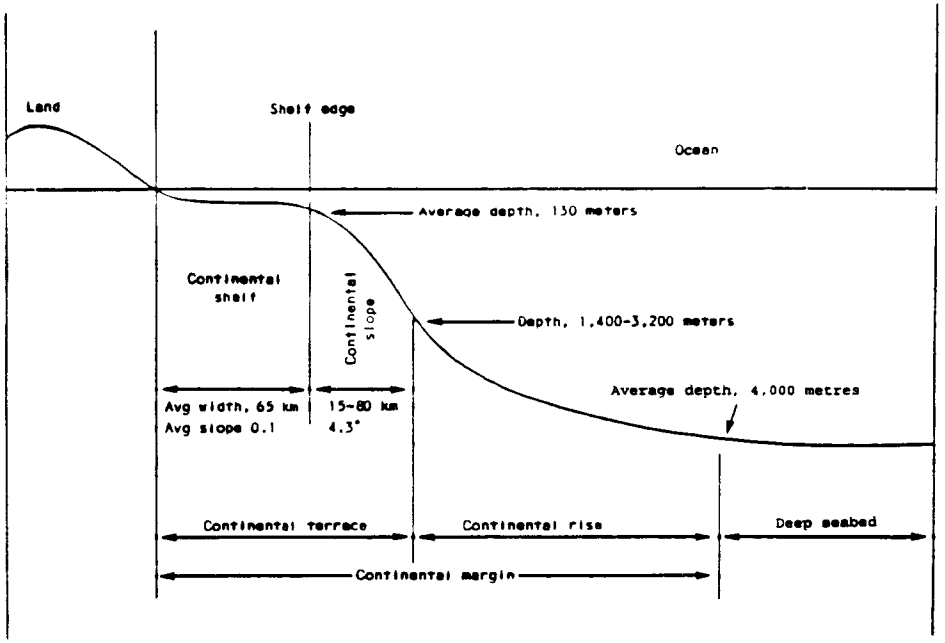
22. Before discussing in detail the contents of article 76, two figures are reproduced below for ease of understanding scientific terms and concepts. Figure 1 gives a schematic profile of the continental margin and the abyssal plain; figure 2 is an illustrative diagram of the continental margin, with an indication of the average widths and depths of its geomorphological components.

Figure 1



Source: G.P. Francalanci, "Geological interpretation of article 76 of the United Nations Convention on the Law of the Sea", in International Hydrographic Organization, *Proceedings of the Seminar on the Technical Aspects of the Law of the Sea*, Monaco, 15 May 1990 (IHO Special Publication No. 56), p. 23.

Figure 2



Source: V.E. McKelvey, "Interpretation of the UNCLOS III definition of the continental shelf", in D.M. Johnston and N.G. Letalik, eds., *The Law of the Sea and Ocean Industry: New Opportunities and Restraints*. Proceedings of the 16th Annual Conference of the Law of the Sea Institute, Halifax, Nova Scotia, 1982 (Honolulu, 1984), p. 466.

III. ARTICLE 76 OF THE UNITED NATIONS CONVENTION ON THE LAW OF THE SEA

23. The United Nations Convention on the Law of the Sea, in article 76, gives the *legal* definition of the continental shelf. The article consists of 10 paragraphs which could be generally grouped as follows:

(1) Definitions and terminology—paragraphs 1, 2 and 3;

(2) Application of terms and methods for establishing the outer limits of the legal continental shelf (margin) beyond 200 miles from the baselines—paragraphs 4, 5, 6 and 7;

(3) Role of the Commission on the Limits of the Continental Shelf—paragraph 8;

(4) Depositary functions of the Secretary-General of the United Nations in respect of charts and other information on the outer limits of the continental shelf—paragraph 9;

(5) A saving clause concerning delimitation of the continental shelf between States—paragraph 10.

Each of these groups of provisions will be discussed below, except for the role of the Commission on the Limits of the Continental Shelf, which will be taken up in a separate section.

A. DEFINITIONS AND TERMINOLOGY

24. *Paragraphs 1 to 3* of article 76 read:

"1. 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 from which the breadth of the territorial sea is measured where the outer edge of the continental margin does not extend up to that distance.

"2. The continental shelf of a coastal State shall not extend beyond the limits provided for in paragraphs 4 to 6.

"3. The continental margin comprises the submerged prolongation of the land mass of the coastal State, and consists of the seabed and subsoil of the shelf, the slope and the rise. It does not include the deep ocean floor with its oceanic ridges or the subsoil thereof."

25. These paragraphs contain two definitions, i.e., those of the continental shelf and of the continental margin. They also include the concept of the natural prolongation of the land territory and use such technical terms as "slope", "rise" and "oceanic ridge".

26. The second group of paragraphs (paras. 4-7) contain additional terms: "foot of the continental slope", "submarine elevation", "plateau",

"cap", "bank" and "spur". Although these terms could be more or less clearly defined *per se*, the technical nature of article 76 makes it more appropriate to discuss their meaning within the context of their practical application, i.e., in the analysis of these paragraphs under Subsection B.

1. *Continental shelf*

27. Article 76 refers to "continental shelf" as a special juridical—and not a geomorphological—term which applies to the area of the seabed, beyond the territorial sea, falling under the sovereign rights of the coastal State for the purpose of exploring it and exploiting its natural resources.

28. *Paragraph 1* states that a coastal State's "continental shelf" is the "natural prolongation of its land territory to the outer edge of the continental margin . . ." Thus "margin" becomes the key word. It extends to the continental rise and does not include the deep ocean floor with its oceanic ridges (para. 3).

29. The term "continental shelf" is used by geologists generally to mean that part of the continental margin which is between the shoreline and the shelf break or, where there is no noticeable slope, between the shoreline and the point where the depth of the superjacent water is approximately between 100 and 200 metres. However, this term is used in article 76 as a juridical term. The concept was adopted by the 1958 United Nations Conference on the Law of the Sea, where there was a preoccupation to cover situations where there was no geological continental shelf; reliance was thus placed on the criteria of adjacency and exploitability in the 1958 Convention on the Continental Shelf.[22]

30. In spite of attempts in the Seabed Committee and at the Third United Nations Conference on the Law of the Sea to subsume the legal concept of the continental shelf within that of the exclusive economic zone, the former concept as incorporated in the 1958 Convention survived in the 1982 Convention with the modification of its definition as formulated in paragraph 1 of article 76.

2. *Continental margin*

31. In the 1982 Convention the term "continental margin" is used in its geomorphological sense.

32. *Paragraph 3* of article 76 defines the "continental margin" as comprising the submerged prolongation of the land mass of a coastal State and consisting of the seabed and subsoil of the continental shelf (in the physical sense), the continental slope and the continental rise, but does not include the deep ocean floor with its oceanic ridges or the subsoil thereof.

33. Typically, most continental margins consist of three elements: the shelf, the slope and the rise (see figures 1 and 2). The continental shelf is that part of the seabed adjacent to the continent which forms a kind of large submerged terrace, the average surface of which generally dips gently seaward. The breadth of the shelf depends on the geological evolution of the adjacent continent. The continental shelf extends seaward to the continental slope, which is characterized by a marked increase in gradient. The foot of the

continental slope, the junction with the continental rise, is identified on a typical margin by a marked decrease in slope. The continental rise is underlain by a succession of sediments, primarily derived from the land.

34. The foot of the slope commonly lies close to the outer edge of the continent, that is, near the place where the crust changes from continental to oceanic. Although continental crust is compositionally distinct from oceanic crust, the boundary between the two crustal types is often not clearly defined, sometimes lying under a thick layer of sedimentary rocks and sometimes being gradational, or with one type of crust underlying the other.

35. This simple categorization of margin morphology into shelf, slope and rise is rarely found in practice owing to the variety of geomorphological forms of the continental margin resulting from different tectonic settings. Continental margins are of two types: "rifted" ("passive") and "convergent" ("active").

36. The process that creates "rifted" continental margins commonly results in large areas of crust being down-faulted and subsided to create marginal plateaux and continental outliers. This will lead to a margin morphology complicated by significant changes in slope.

37. On "convergent" continental margins, there is no continental rise. The outer limit of continental crust is generally marked by a deep trench. Many volcanic islands have no shelf, but rather a slope that plunges to the deep seabed. The common definitions of shelf, slope and rise do not therefore apply in such settings.

B. APPLICATION OF TERMS AND METHODS FOR ESTABLISHING THE OUTER EDGE OF THE CONTINENTAL SHELF

38. While the components of the continental margin are listed in paragraph 3 of article 76, the precise legal meaning of the outer edge of the continental margin and the methods for its determination are provided in paragraphs 4 to 6 of the same article.

Paragraphs 4 to 7 of article 76 read:

"4. (a) For the purposes of this Convention, the coastal State shall establish the outer edge of the continental margin wherever the margin extends beyond 200 nautical miles from the baselines from which the breadth of the territorial sea is measured, by either:

"(i) a line delineated in accordance with paragraph 7 by reference to the outermost fixed points at each of which the thickness of sedimentary rocks is at least 1 per cent of the shortest distance from such point to the foot of the continental slope; or

"(ii) a line delineated in accordance with paragraph 7 by reference to fixed points not more than 60 nautical miles from the foot of the continental slope.

"(b) In the absence of evidence to the contrary, the foot of the continental slope shall be determined as the point of maximum change in the gradient at its base.

"5. The fixed points comprising the line of the outer limits of the continental shelf on the seabed, drawn in accordance with paragraph 4 (a) (i) and (ii), either shall not exceed 350 nautical miles from the baselines from which the breadth of the territorial sea is measured or shall not exceed 100 nautical miles from the 2,500 metre isobath, which is a line connecting the depth of 2,500 metres.

"6. Notwithstanding the provisions of paragraph 5, on submarine ridges, the outer limit of the continental shelf shall not exceed 350 nautical miles from the baselines from which the breadth of the territorial sea is measured. This paragraph does not apply to submarine elevations that are natural components of the continental margin, such as its plateaux, rises, caps, banks and spurs.

"7. The coastal State shall delineate the outer limits of its continental shelf, where that shelf extends beyond 200 nautical miles from the baselines from which the breadth of the territorial sea is measured, by straight lines not exceeding 60 nautical miles in length, connecting fixed points, defined by coordinates of latitude and longitude."

39. The following steps may be required for a coastal State to determine the outer limit of its continental shelf under paragraphs 4 to 6:[23]

1. Determine:
   - —the baselines from which the territorial sea is measured (in accordance with Part II of the Convention);[24]
   - —200 miles from the baselines;
   - —foot of slope: the point of maximum change in gradient at its base;
   - —the points where the ratio $x = \frac{\text{thickness of sedimentary rocks}}{\text{distance to foot of slope}} = 0.01$;
   - —60 miles beyond the foot of slope;
   - —350 miles from the baselines;
   - —2,500-metre isobath;
   - —100 miles beyond the 2,500-metre isobath.
2. (a) Where the outer edge of the continental margin does not extend up to 200 miles from the baselines, a coastal State may claim up to 200 miles;
   (b) Where the outer edge of the continental margin extends beyond 200 miles from the baselines, a coastal State may claim up to *either*:
   - —60 miles beyond the foot of the slope, or
   - —the points where $x = 0.01$.

3. The points comprising the line of the outer limits drawn in accordance with 2 (b) above must lie within:
   - —350 miles from the baselines, or
   - —100 miles from the 2,500-metre isobath.

4. However, in the case of submarine ridges, only the 350-mile limit applies unless they are submarine elevations that are natural components of the continental margin.

40. The key element in these paragraphs for the determination of the outer limits of the continental shelf is the identification of the foot of the continental slope. Except in cases where submarine ridges influence the continental shelf definition, the other factors, i.e., 60 miles from the slope and the sediment thickness, and the further limiting factors, i.e., the 350-mile limit and the 100 miles from the 2,500-metre isobath, determine the limit of the continental shelf in their relationship to the foot of the continental slope.

41. For the purpose of applying article 76, it is recommended that all countries adopt a common horizontal datum in the World Geodetic System (WGS) series such as WGS 84 or subsequent WGS Datum. Vertical datums must be considered when establishing the territorial-sea baseline, but in the measurement of the 2,500-metre isobath, the possible differences in vertical datums will be insignificant when compared with the potential errors caused by the imprecise knowledge of the velocity in the acoustic depth measurement. All distances referred to in article 76 are distances along the shortest route on the chosen horizontal datum and must be geodetically calculated. It should be noted that when a State submits the particulars of its continental-shelf limits before the Commission on the Limits of the Continental Shelf (in accordance with Annex II of the Convention on the Law of the Sea), the geodetic parameters used for the purposes of article 76 should be included in the submission.

1. *The foot of the continental slope*

42. The first step in applying the two formulae mentioned in paragraph 4 of article 76 is to identify the foot of the continental slope. According to *paragraph 4 (b)*, the foot of the continental slope shall be determined, in the absence of evidence to the contrary, "as the point of maximum change in the gradient at its base".

43. Normally the maximum change in gradient at the base of the continental slope occurs either at the point where the rise and slope join, or where a trench exists, along the axis of such trench (see paras. 33-37 above).

44. Determining the position of the foot of the continental slope can be difficult even in the case of "passive margins" having a regular progression from shelf to slope to rise, as is the case, for example, for the coasts of Africa and the east coasts of North and South America. Normally, the procedure would be to establish the gradient at regular intervals down the slope and thence locate the position of maximum change. However, the sediments which form the rise are often fine-grained and the gradient of the rise often has a gently curved surface, so that the changes in gradient are small and continuous. In such situations it may be difficult to decide accurately that one particular point on that profile marks the position of maximum change.

45. Alternatively, irregularities in the sea floor may mean that there are several locations at which the change in gradient is a local maximum. In such a case, the phrase "at its base" is the operative one, but there may still be uncertainty as to the significance of, for example, a local maximum change

in the rise compared with a more regionally significant maximum change closer to the continent.

46. On "convergent" margins, such as those which are found around the Pacific Ocean, tectonic processes increase the likelihood of local changes in slope. Where there is a rapid and very evident change in slope between the sediments overlying the two tectonic regimes converging at the trench, application of the "foot of slope" criterion is more straightforward.

47. *Paragraph 4 (b)* states that the above-mentioned rule for determining the foot of the slope applies "in the absence of evidence to the contrary". Since the paragraph explicitly refers to the change in surface gradient, i.e., to the morphology of the surface, this phrase implies that structural evidence may be introduced as an alternative basis for determining the location of the "foot of the slope".

48. *Paragraph 4 (a)* offers two separate formulae for establishing the outer edge of the continental margin. While it is not explicitly stated whether the State may use only one of the formulae for the whole length of its wide margin or may use both of them so that the widest area of the margin could be claimed, clearly nothing in the article prohibits a State from using one formula for a portion of its margin and another formula for other portions. In fact, this seems to be the case with respect to all other methods mentioned in article 76.

2. *The sediment-thickness formula*

49. The first formula, contained in *paragraph 4 (a) (i)*, is based on the thickness of sedimentary rocks, which is at least 1 per cent of the shortest distance from the outermost fixed point to the foot of the slope. This is illustrated by figure 3.

50. The method of locating the point where the sediment thickness is 1 per cent is illustrated in figure 4. Sediment thickness beneath the continental margin is plotted against distance from the foot of the slope. This profile intersects a line with a slope of 1 per cent at the distance from the foot of the slope at which the 1 per cent rule applies.

51. The thickness of sediment can be determined directly by drilling, which is a very costly process, particularly in deep water, and only gives spot values; or by seismic profiling, which is less expensive, more expeditious and gives a better understanding of sediment distribution, but needs velocity calibration. Regardless of the approach used, a series of technical issues arises in the application of the sediment-thickness formula which have long been recognized by geoscientists. These relate to the determination of the sediment/basement interface, the calculation of sediment thickness and the variability of sediment distribution. The future Commission on the Limits of the Continental Shelf will have to address each of these issues.

52. There can be significant uncertainties in distinguishing "true" crystalline basement, particularly in the zone of complex geology that occurs in the transition from continental to oceanic crust near the outer edge of a continental margin. For example, deeper sediment could easily be masked by younger extrusive and intrusive igneous bodies, and thick, layered basalt/

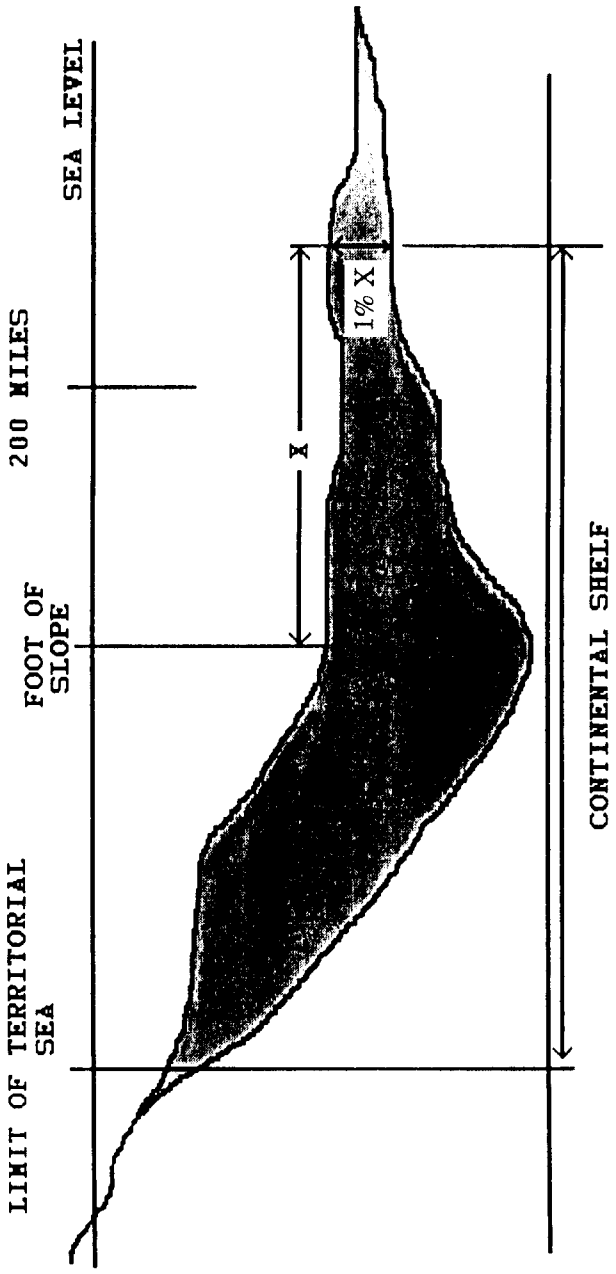
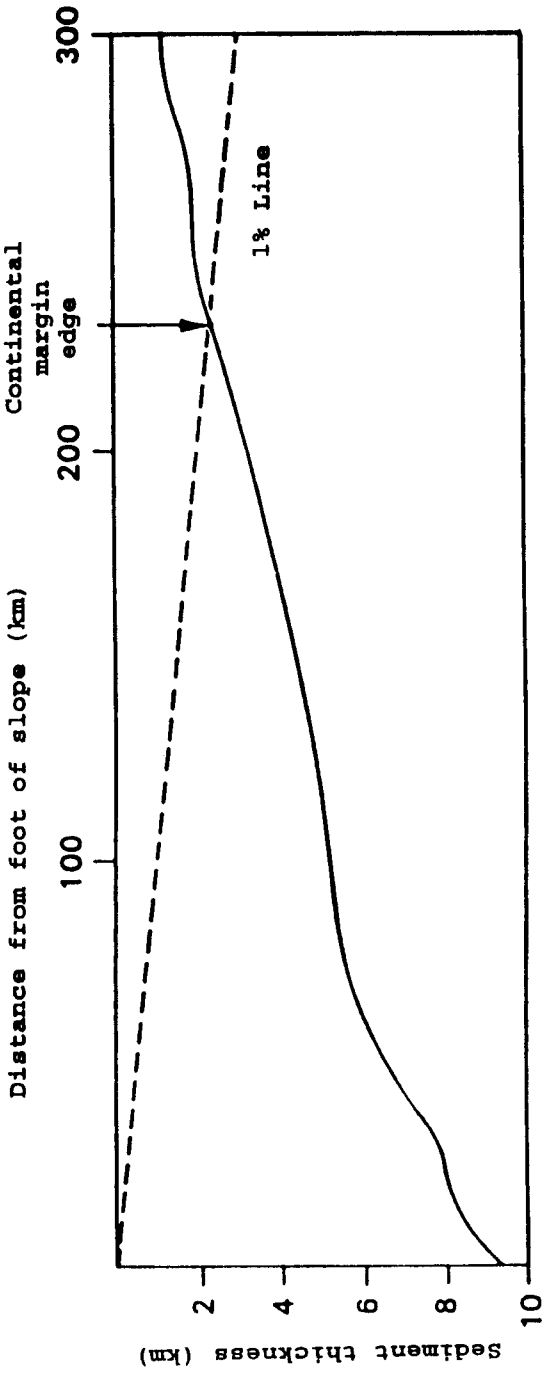


Figure 3. Continental shelf as defined in accordance with article 76, paragraph 4 (a) (i)

Figure 4



Source: D.J. McMillan, "The extent of the continental shelf: Factors affecting the accuracy of a continental margin boundary", *Marine Policy*, vol. 9 (1985), p. 150.

volcaniclastic sequences could be confused with underlying "true" basement. Such features are known to occur on the outer edges of continental margins. Also, when better seismic technology is applied, and the resolution and penetration of the technique improve, "basement" may be seen to be deeper than previously interpreted.[25] This has implications for the type of seismic system that countries may need to use to be able to best apply the sediment thickness formula.

53. Determination of sediment thickness from seismic profiles requires knowledge of the propagation velocity of the seismic signal through the sedimentary section. This velocity can be calculated during the processing of multichannel seismic data, but because of uncertainties involved in the procedure, inaccuracies in the calculated sediment thickness could typically be 10 per cent. For example, if the sediment thickness formula is to be applied at a distance of 60 miles (111 kilometres) from the foot of the slope, 1.11 kilometres of sediment is required. A 10 per cent error in the measurement of this thickness amounts to 110 metres, which translates into 11 kilometres (6.0 miles) in distance. Thus, it appears that the future Commission on the Limits of the Continental Shelf may also have to consider ways of dealing with potential errors in establishing the location of the outer edge of the continental margin under paragraph 4 (a) (i) of article 76.

54. Variations in the distribution of sediments on continental margins can make linear representation of a specific thickness very difficult, and therefore problems may arise when applying paragraph 4 (a) (i). For example, in some cases sediment thickness changes too gradually to provide the basis for a reasonably shaped boundary,[26] and in other cases basement is so rugged and sediment distribution so variable that it would be difficult to locate the 1 per cent sediment thickness point, and thus construct a single, simple boundary.[27]

3. *Limit of 60 miles from the foot of the slope*

55. The second formula for establishing the outer edge of the continental margin is spelled out in *paragraph 4 (a) (ii)* of article 76. Once the foot of the slope is identified, it is then a mechanical act to measure 60 miles seaward, although questions relating to geodesy may cause some technical difficulties. This method, which is illustrated in figure 5, is certainly much more economical than the first one.

4. *Limit of 350 miles from the baselines or 100 miles from the 2,500-metre isobath*

56. *Paragraph 5* of article 76 sets clear cut-off points for the outer limit of a continental shelf. Whichever technical approach is taken, in accordance either with subparagraphs (a) (i) or (ii) of paragraph 4, by the coastal State to define the boundary, it cannot extend beyond 350 miles from the baselines from which the territorial sea is measured or beyond 100 miles from the 2,500-metre isobath (see figures 6 and 7).

57. As previously discussed, the geodetic calculation of distance and the location of positions many miles offshore has reached a high state of

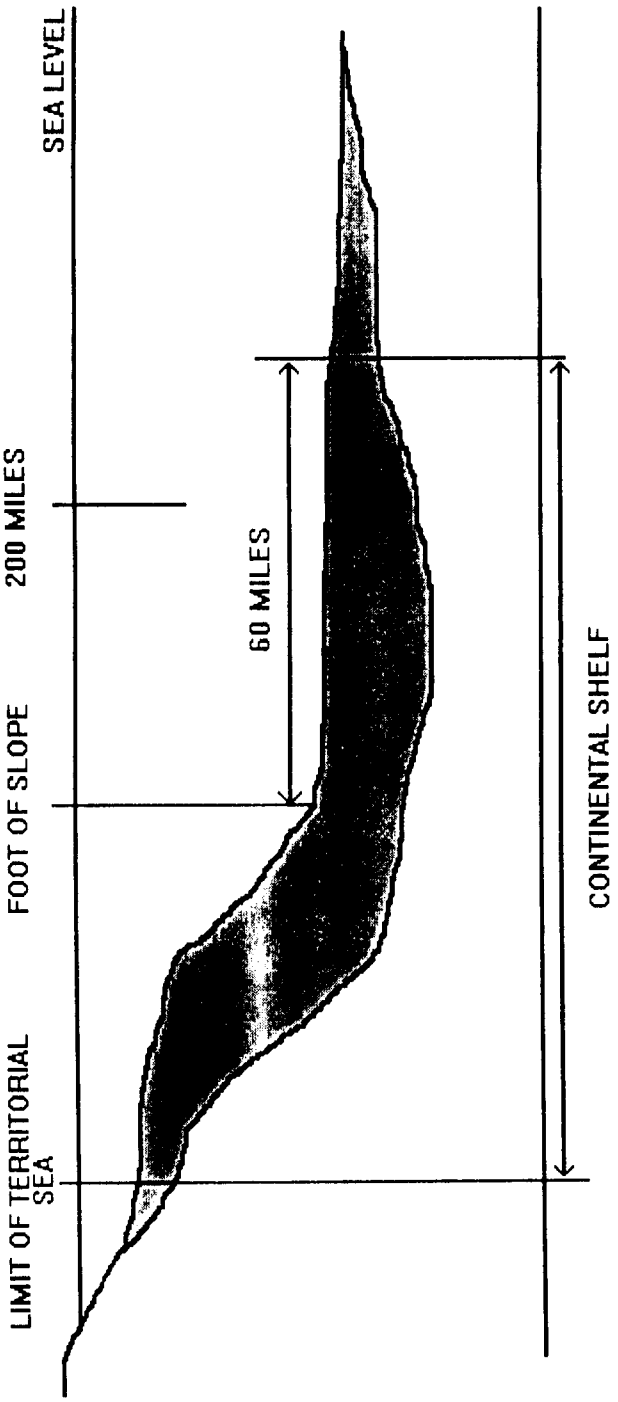


Figure 5. Continental shelf as defined in accordance with article 76, pararagraph 4 (a) (ii)

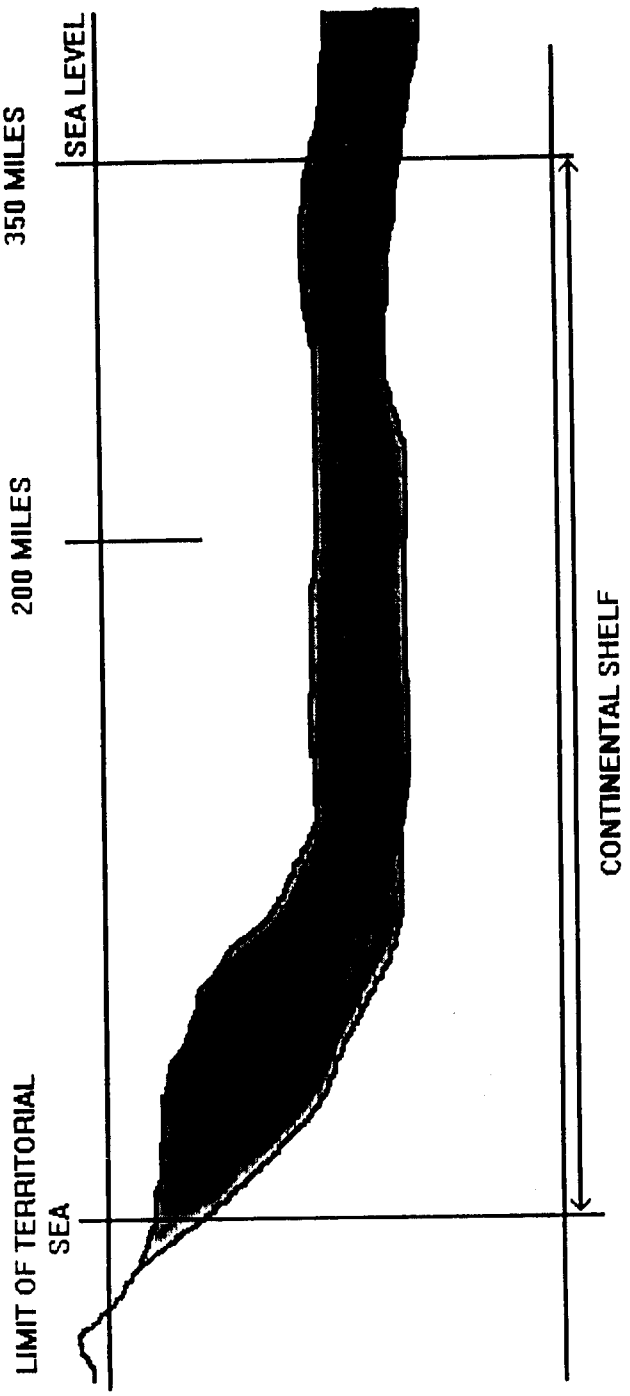


Figure 6. Maximum limit of continental shelf as permitted under article 76, paragraph 5

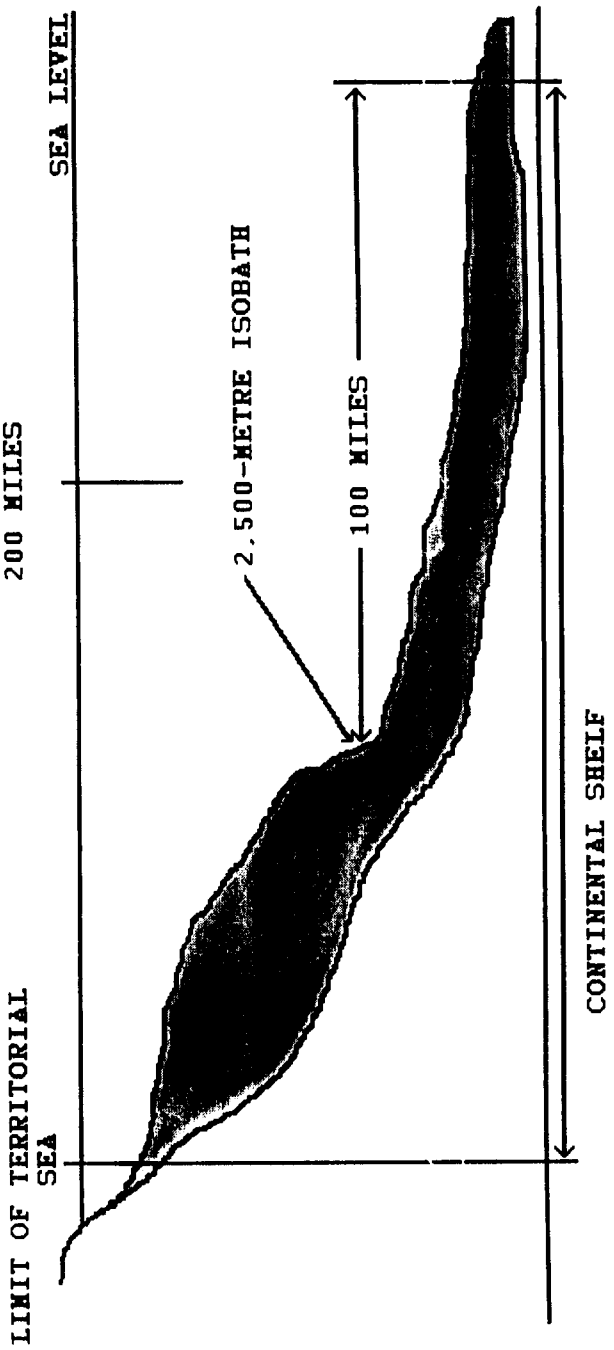


Figure 7. Alternative maximum limit of continental shelf as permitted under article 76, paragraph 5

refinement using modern computational methods and satellite positioning systems, respectively. The measurement of depths of 2,500 metres is a much more difficult matter as acoustical science has moved more slowly. Hydrographers consider that, provided they have a reasonable knowledge of the density structure of the water column, they can at present measure depths to ±1 per cent. Although ±1 per cent of 2,500 metres is only 50 metres, and greater accuracy may be achieved in the future, it is to be realized that these depths normally occur in areas of the ocean where the slope of the sea floor is often less than 1 degree. This could result in a horizontal offset in the position of the boundary of the order of several miles.[28] It should also be noted that off certain coasts there might be a number of 2,500-metre isobaths closer to or further from the shore owing to irregularities in the topography of the seabed. The Commission would have to consider this question.

5. *Submarine and oceanic ridges and other submarine elevations*

58. *Paragraph 3* refers to the deep ocean floor with its "oceanic ridges", stating that they are not included in the submerged prolongation of the land mass of the coastal State. This, through reference to paragraph 1, makes clear that these oceanic ridges are not to be considered part of the continental shelf.

59. *Paragraph 6* introduces the term "submarine ridges". This must be considered a more generic term than oceanic ridges and includes both the latter and ridges which have their origin in the continental margin but may extend into the area of the deep ocean floor. The provisions of paragraph 6 do not apply to submarine elevations that are natural components of the continental margin, such as "plateaux, rises, caps, banks and spurs".

60. Submarine ridges may be formed in a variety of ways, including:

—Ridges formed by the "normal" sea-floor spreading process (mid-oceanic ridges), which creates new oceanic crust and results in separation of the continents (continental drift). These ridges, such as the Mid-Atlantic Ridge, generally occur near the centre of the world's ocean basins, and can be both active and extinct. They constitute the most important, continuous feature of the deep ocean floor;

—Ridges formed along transform faults and created as an inherent part of the "normal" sea-floor spreading process. These ridges are aligned roughly perpendicular to the mid-oceanic spreading ridges, and thus to the adjacent continental margin, and may extend from the boundary between continental and oceanic crust, to the spreading ridge itself. An example of this type of ridge is the Guinea Ridge;

—Ridges formed by later tectonic activity resulting in uplift of "normal" oceanic crust, an example being the Owen Fracture Zone;

—Ridges formed by volcanic activity related to the movement of crust over a hot spot. These ridges are commonly composed of coalescing volcanic features or seamounts and generally occur

on oceanic crust. They usually cut across the trends of various sea-floor features formed during the sea-floor spreading process. Such features are relatively common in the Indian and Western Pacific oceans, an example being the Hawaii-Emperor chain;

—Ridges formed by excessive volcanism generally thought to be related to broad areas of anomalously hot mantle. This process more commonly forms broad features such as plateaux and rises, but could be envisaged to form ridges in certain situations. It can be considered a subset of the hot-spot ridges described above. An example of such a ridge is the Ontong-Java Plateau;

—Ridges associated with active plate boundaries and the formation of island arc systems. They could occur as active and inactive (remnant) volcanic arcs, and forearc and back-arc ridges. Such ridges commonly reflect different stages in the progressive development of island arc systems, and may result from variations in factors such as the rate and direction of convergence, and from the nature of the plate being subducted. This type of ridge is quite common in the Western Pacific Ocean. The Izu-Ogasawara Ridge is an example of such a ridge;

—Ridges formed by rifting (extension and thinning) of continental crust. This process commonly forms broader features, such as marginal plateaux and rises, but sometimes creates narrow slivers of continental crust ("ribbon continents") separated by oceanic or highly extended continental crust. Such features are probably best represented in the South-West Pacific region, an example being the Norfolk Ridge.

61. The first three types of ridges mentioned above are composed of "normal" oceanic basaltic rocks. The ridges related to hot-spot activity and anomalously hot zones are commonly composed of basaltic rocks that are similar to mid-ocean ridge basalts, but are different in detail, particularly in their isotopic composition. The other ridge types, except perhaps for some back-arc ridges, have no relationship to oceanic-type crust.

62. Paragraph 5 allows two options for defining the outer limits of the continental shelf drawn in accordance with paragraph 4 (a) (i) and (ii), either an outer limit of 350 miles from the baselines or an outer limit that is not to exceed 100 miles from the 2,500-metre isobath. Paragraph 6 states that on submarine ridges the second alternative is not permitted unless the submarine elevations concerned happen to be natural components of the continental margin. This paragraph must be read in conjunction with paragraph 3. Moreover, geologists consider that, although not specified in the Convention, the continental margin is composed of continental crust and overlying sediments, primarily of terrestrial origin, and does not include oceanic crust.

63. The problem then becomes one of determining whether a submarine ridge is an oceanic ridge in the deep ocean floor. If it is such a ridge, then according to paragraph 3 the terms of article 76 do not apply.

6. *Straight lines not exceeding 60 miles*

64. *Paragraph 7* somewhat simplifies the task of defining the outer limits of the continental shelf by allowing the use of straight lines as long as 60 miles. This may help some coastal States by permitting them to bridge natural indentations either in the bathymetry or sediment thickness rather than follow the sometimes meandering path of the precisely measured feature. This may also permit a less detailed sampling over the margin, with a possible reduction of the costs involved in the collection and interpretation of the data.

7. *Illustration of the various criteria for determining the outer limits of the continental shelf*

65. The outer limit of the continental shelf, as determined by the various criteria in article 76, is illustrated in figure 8.

C. DEPOSITARY FUNCTIONS OF THE SECRETARY-GENERAL

66. *Paragraph 9* of article 76 reads:

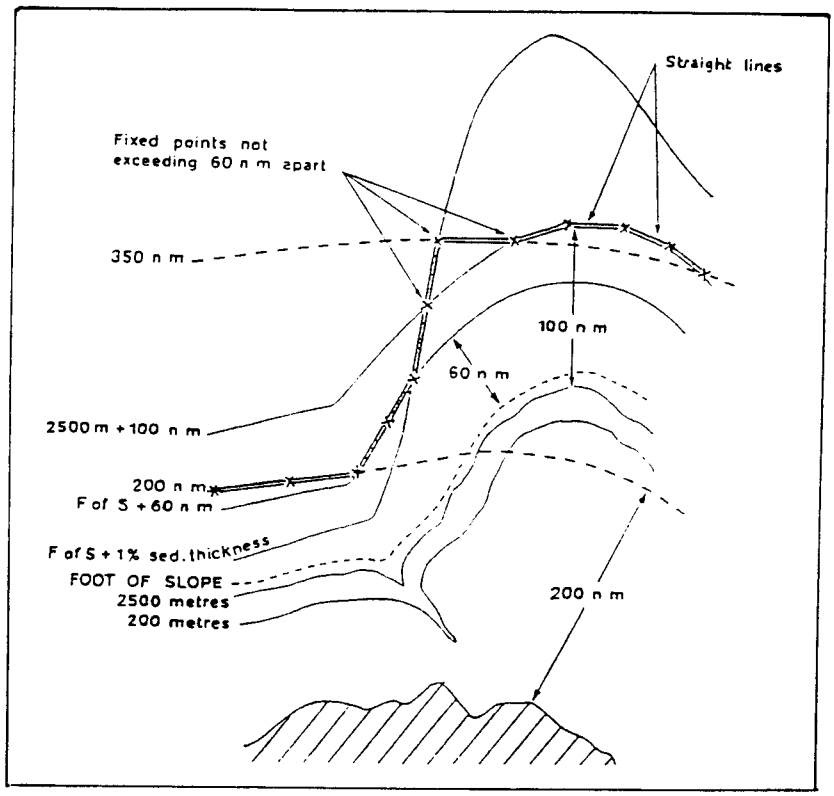
> "9. The coastal State shall deposit with the Secretary-General of the United Nations charts and relevant information, including geodetic data, permanently describing the outer limits of its continental shelf. The Secretary-General shall give due publicity thereto."

67. Once a coastal State has established the outer limits of its continental shelf beyond 200 miles from the baselines from which the territorial sea is measured, on the basis of the recommendations of the Commission on the Limits of the Continental Shelf, and in the case of the continental shelf not exceeding 200 miles without recourse to the Commission, it is required to deposit with the Secretary-General of the United Nations the charts describing such outer limits together with information relevant thereto, including geodetic data. The outer limits thus established on the basis of the Commission's recommendations "shall be final and binding", in accordance with paragraph 8.

68. It may be noted that paragraph 9, unlike several other similar clauses in the Convention, does not require coastal States to deposit lists of geographic coordinates. Presumably the requirement to include geodetic data infers the inclusion of geographical coordinates, which are required in other articles of the Convention and also includes the geodetic parameters which are needed to define these coordinates precisely. Article 84 (2) expressly states that, where appropriate, lists of geographical coordinates showing the outer limits of the continental shelf shall be deposited with the Secretary-General of the United Nations.

69. The charts and relevant information to be deposited are to be distinguished from the supporting scientific data which a coastal State must submit to the Commission under paragraph 8. In the former case, the infor-

Figure 8



Source: From the Royal Society Publication, *A Guide to the Provisions of the 1982 United Nations Convention on the Law of the Sea Relating to Marine Scientific Research*, p. 25. Reproduced in International Hydrographic Organization, *A Manual on Technical Aspects of the United Nations Convention on the Law of the Sea, 1982*, 2nd edition (Monaco: International Hydrographic Bureau, 1990), p. 110.

mation is quite limited; it refers to the results of the process of establishing the limits. In the latter case, as discussed below, the information includes the supporting data that form the basis of the outer limit of the continental shelf as submitted by the coastal State.

70. The coastal State is also obliged to deposit a copy of such charts, showing the outer limit lines of the shelf, or a list of geographical coordinates, specifying the geodetic datum, with the Secretary-General of the International Seabed Authority (article 84 (2)).

D. SAVING CLAUSE REGARDING DELIMITATION

71. *Paragraph 10* of article 76 reads:

"10. The provisions of this article are without prejudice to the question of delimitation of the continental shelf between States with opposite or adjacent coasts."

72. This provision is self-explanatory, stating simply that article 76 does not prejudice the question of delimitation of the continental shelf between States. The question of delimitation of the continental shelf between States with opposite or adjacent coasts, which is outside the scope of the present study, is dealt with in article 83.

IV. SPECIFIC METHOD TO BE USED IN ESTABLISHING THE OUTER EDGE OF THE CONTINENTAL MARGIN

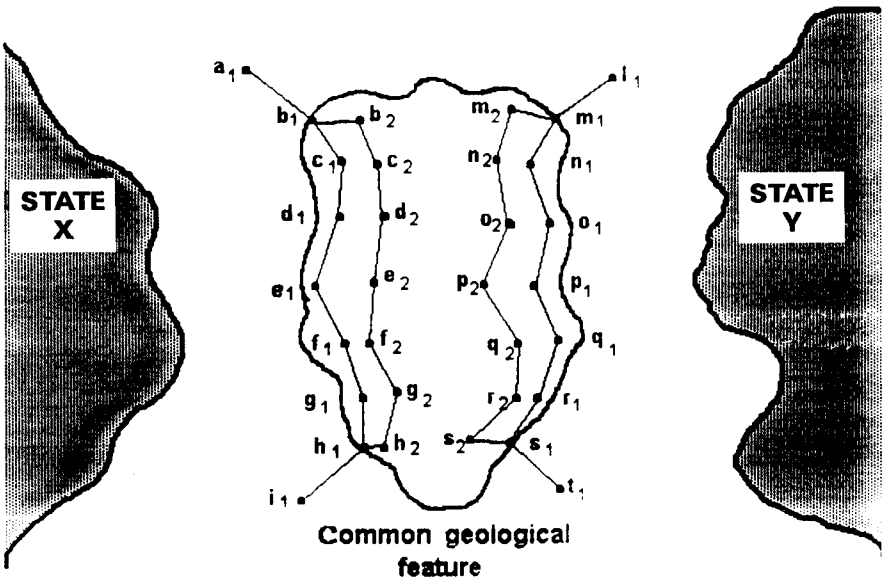
73. During the Third United Nations Conference on the Law of the Sea, Sri Lanka suggested an exception to the application of the provisions of article 76 in the southern part of the Bay of Bengal because of the unique geomorphological features of the seabed, and the Conference decided to incorporate the suggestion in a "Statement of Understanding Concerning a Specific Method to be Used in Establishing the Outer Edge of the Continental Margin" annexed to the Final Act. In that Bay, where the Ganges submerged delta is situated, the thickness of sedimentary rocks on the seabed is believed to vary from 18 kilometres in the north to 8 kilometres in the middle, and tapering to 3 and, later, 1 kilometre in the southern part of the Bay.[29] It was pointed out by some experts in 1976 that in the case of the Ganges submerged delta, the actual break in the slope occurred rather close to the shore, whereas the fan, which represented natural prolongations of the continental sediments, extended hundreds of kilometres southward beyond Sri Lanka.[30]

74. In the Statement, the Conference requests the Commission on the Limits of the Continental Shelf to be governed by the terms of this Statement when making its recommendations with regard to the southern part of the Bay of Bengal. The Statement relates to those continental margins where the 200-metre isobath occurs not more than 20 miles offshore and there is a greater proportion of the sedimentary rock lying beneath the rise. It then points out the inequity that would result from the application of article 76, paragraph 4 (a), which would exclude more than half of the margin from the legal continental shelf. Hence it recognizes that the outer edge of the margin may be established by straight lines not exceeding 60 miles in length connecting fixed points, at each of which the thickness of sedimentary rock is not less than 1 kilometre.

75. The Statement goes on to provide that where a State establishes the outer edge of its continental margin by this method, the same method may also be utilized by a neighbouring State for delineating the outer edge of its continental margin "on a common geological feature, where its outer edge would lie on such feature on a line established at the maximum distance permissible in accordance with article 76, paragraph 4 (a) (i) and (ii), along which the mathematical average of the thickness of sedimentary rock is not less than 3.5 kilometres". This may be illustrated by figure 9.

76. In this illustration, State X applies article 76, paragraph 4 (a) (i) and (ii), and obtains the line a_1, b_1, c_1, . . . h_1, i_1. If the average sediment thickness along each straight section on the common geological feature, b_1, c_1, d_1, etc., is found to be not less than 3.5 kilometres, State X may extend the boundary by adopting the line connecting points b_1, b_2, c_2, . . . h_2, h_1, at each

Figure 9



of which the sediment thickness is not less than 1 kilometre. If State X chooses the latter line, then State Y is permitted to choose similarly the line connecting points m_1, m_2, n_2 . . . s_2, s_1, at each of which the sediment thickness is not less than 1 kilometre.

77. Although the Statement does not mention States by name, the reference to "the southern part of the Bay of Bengal" has been interpreted to include India and Sri Lanka.[31]

78. In the Statement, the Conference requested the Commission on the Limits of the Continental Shelf to "be governed by the terms" of the Statement when making recommendations on matters related to the establishment of the outer edge of the continental margins of such States in the southern part of the Bay of Bengal. Under the terms of Annex II to the Convention, which forms an integral part of the Convention (article 318), the Commission is mandated to make recommendations "in accordance with" article 76 and the Statement (article 3 (1) (a) of annex II).

V. COMMISSION ON THE LIMITS OF THE CONTINENTAL SHELF

79. *Paragraph 8* of article 76 reads:

"Information on the limits of the continental shelf beyond 200 nautical miles from the baselines from which the breadth of the terriorial sea is measured shall be submitted by the coastal State to the Commission on the Limits of the Continental Shelf set up under Annex II on the basis of equitable geographical representation. The Commission shall make recommendations to coastal States on matters related to the establishment of the outer limits of their continental shelf. The limits of the shelf established by a coastal State on the basis of these recommendations shall be final and binding." (The text of Annex II is reproduced in annex III to the present study.)

80. The Convention provides for the establishment of the Commission on the Limits of the Continental Shelf, consisting of 21 experts in the field of geology, geophysics or hydrography, "as soon as possible but in any case within 18 months after the date of [its] entry into force". The members, serving in their personal capacities, will be elected by States Parties to the Convention from among their nationals, "having due regard to the need to ensure equitable geographical representation" (Annex II, article 2).

81. A coastal State which intends to establish the outer limits of its continental shelf beyond 200 miles from the baselines is required to submit information regarding such limits to the Commission as soon as possible but in any case within 10 years of the Convention's entry into force for that State. Such information must contain "particulars" of these limits and "supporting scientific and technical data" (Annex II, article 4).

82. The Commission examines the data and other material submitted by the coastal State and makes recommendations in accordance with article 76 and the Statement of Understanding discussed in the preceding section. Such recommendations are on "matters related to the establishment of the outer limits" of the continental shelf.

83. The technical data supporting the coastal State's outer limit are likely to be of a varied and complex nature, and will probably include bathymetric, acoustic and seismic data. The data submitted to the Commission must be relevant to the outer limit claimed and the Commission must be satisfied that the data submitted truly reflect the geological/geomorphological conditions claimed. The Commission may have to study the quality of such data, including geodetic datum and geodetic calculations establishing the outer limit. If needed, the Commission, in accordance with Annex II, article 3, paragraph 2, may cooperate with competent international organizations, with a view to exchanging scientific and technical information which would be helpful in discharging the Commission's responsibilities.

84. The Commission may also have to establish rules of procedure, where appropriate, to guarantee the confidentiality of the data submitted by the coastal State.

85. Another function of the Commission is to provide scientific and technical advice if requested by the coastal State concerned during the preparation of such data (Annex II, article 3). This function, for which the requesting State must bear the cost (article 2 (5)), may assume great importance and use, particularly for developing States, given the highly technical nature of the task involved in the process of determining the limits of their continental shelves.

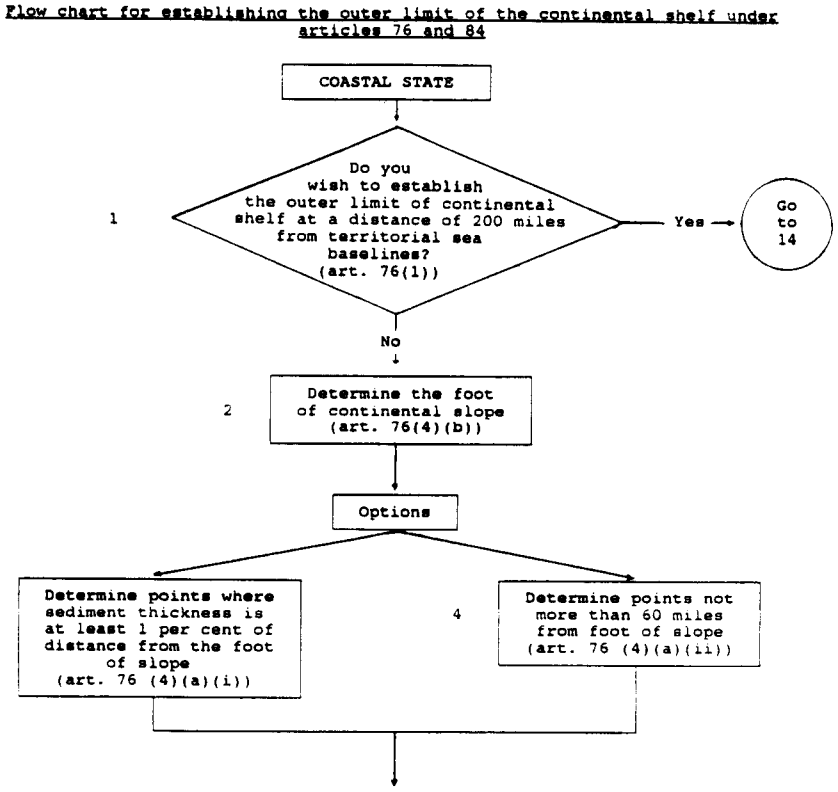
86. The limits of the continental shelf established on the basis of the Commission's recommendations "shall be final and binding". The limit thus established will become obligatory *erga omnes*.[32] The Commission's "recommendations" form the basis of the limits of the continental shelf established by the coastal State if it is to be final and binding. The Commission does not establish the limit.

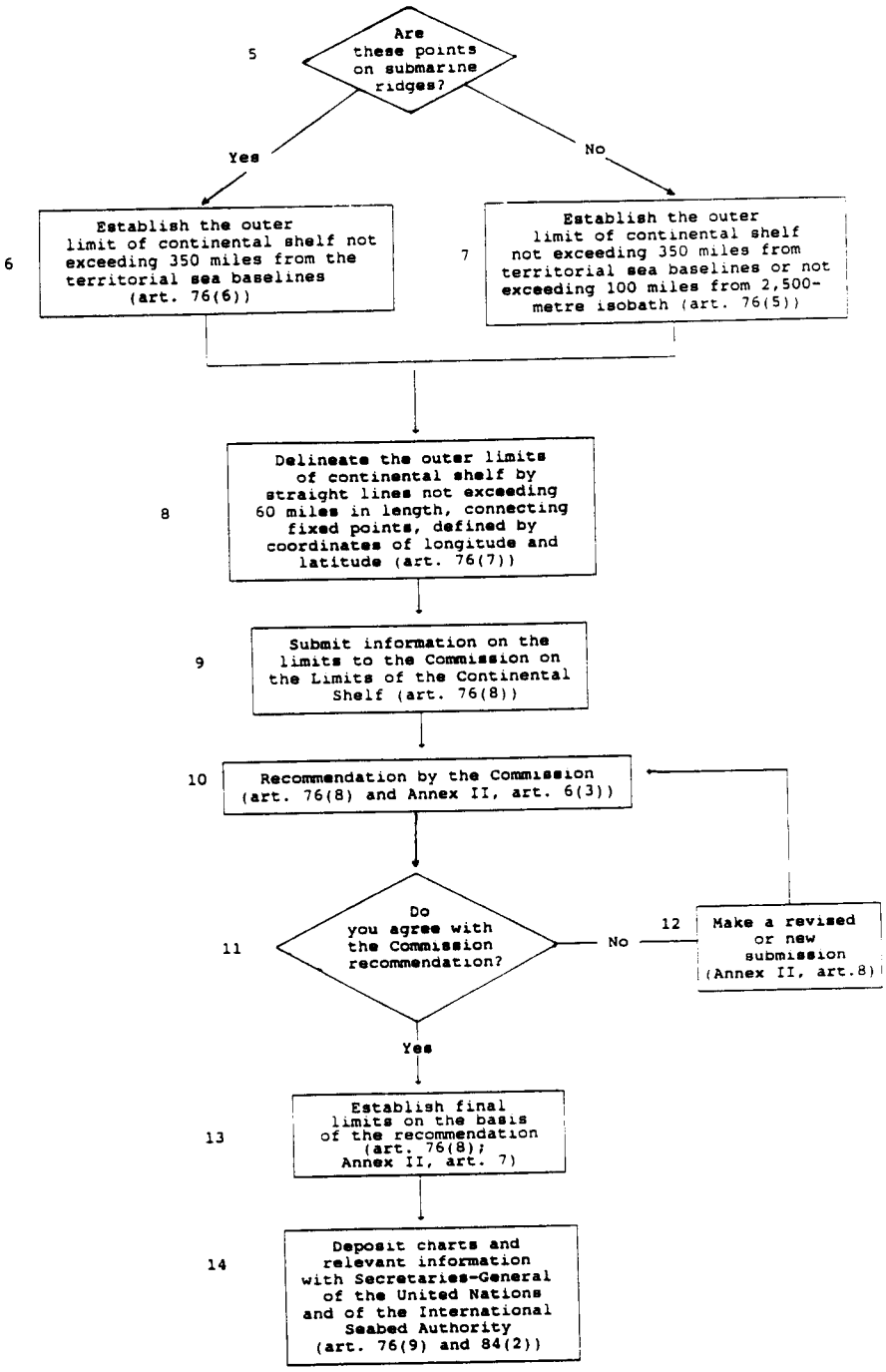
87. It is assumed that the Commission and the coastal State concerned will do their best to ensure that the Commission does not make recommendations that are not likely to be accepted by the coastal State.[33] Moreover, the coastal State is given the right, and the obligation, to make a revised or new submission to the Commission whenever it disagrees with the recommendations (Annex II, article 8). Further uncertainties arise, however, when disagreement continues to exist between the coastal State and the Commission. The Commission is not a legally oriented body and is not empowered to settle disputes; nor does the Convention, under Part XV, Section 2, provide for compulsory dispute settlement for article 76 issues.

88. It may be noted that the location of the outer limits of the continental shelf is, naturally, the boundary between the seabed areas subject to national jurisdiction for certain purposes and "the seabed and ocean floor and subsoil thereof, beyond the limits of national jurisdiction" (the "Area"). This is why the coastal States are required to deposit a copy of the charts or lists of geographical coordinates of the outer limits of their continental shelves with the Secretary-General of the International Seabed Authority, which is responsible for organizing and controlling activities in the Area. The Convention does not give the Authority a role to play in the delimitation or delineation of that limit.[34]

VI. SUMMARY OF THE PROCEDURE FOR ESTABLISHING THE OUTER LIMITS OF THE CONTINENTAL SHELF

89. The entire procedure for a coastal State to establish the outer limits of its continental shelf under article 76 of the Convention may be shown schematically in the following flow chart:




5
Are these points on submarine ridges?
Yes
No
6
Establish the outer limit of continental shelf not exceeding 350 miles from the territorial sea baselines (art. 76(6))
7
Establish the outer limit of continental shelf not exceeding 350 miles from territorial sea baselines or not exceeding 100 miles from 2,500-metre isobath (art. 76(5))
8
Delineate the outer limits of continental shelf by straight lines not exceeding 60 miles in length, connecting fixed points, defined by coordinates of longitude and latitude (art. 76(7))
9
Submit information on the limits to the Commission on the Limits of the Continental Shelf (art. 76(8))
10
Recommendation by the Commission (art. 76(8) and Annex II, art. 6(3))
11
Do you agree with the Commission recommendation?
No
12
Make a revised or new submission (Annex II, art.8)
Yes
13
Establish final limits on the basis of the recommendation (art. 76(8); Annex II, art. 7)
14
Deposit charts and relevant information with Secretaries-General of the United Nations and of the International Seabed Authority (art. 76(9) and 84(2))

[1]*Department of State Bulletin*, vol. 13 (1945), p. 485. Reproduced in United Nations Legislative Series, *Laws and Regulations on the Regime of the High Seas* (ST/LEG/SER.B/1) (United Nations publication, Sales No. 1951.V.2), p. 39.

[2]Ibid.

[3]*Official Records of the Third United Nations Conference on the Law of the Sea*, vol. IV (United Nations publication, Sales No. E.75.V.10), document A/CONF.62/WP.8/ Part II, article 62.

[4]*I.C.J. Reports 1969*, p. 3.

[5]*I.C.J. Reports 1985*, p. 33, para. 34.

[6]P.R.R. Gardiner, "Reasons and methods for fixing the outer limit of the legal continental shelf beyond 200 nautical miles", *Revue iranienne des relations internationales*, Nos. 11-12 (1978), p. 152.

[7]For a description of these proposals, see ibid., pp. 153-162.

[8]See Hollis D. Hedberg, "The national-international jurisdictional boundary on the ocean floor," *Ocean management*, vol. 1 (1973), pp. 83-118. See also his "Relation of political boundaries on the ocean floor to the continental margin", *Virginia journal of international law*, vol. 17, No. 4 (1977), pp. 57-75.

[9]Ibid., p. 72.

[10]Gardiner, op.cit., p. 156.

[11]Ibid., p. 158.

[12]Ibid., pp. 158-159.

[13]The text of the combined Gardiner and Hedberg formula, not published as a United Nations document, is reproduced in Gardiner, op. cit., p. 168, figure 4. The Irish delegation submitted the essence of the Gardiner formula in a "blue paper" circulated informally at the summer session of the Conference in 1976. The text of this "blue paper" was subsequently reproduced in the *Official Records of the Third United Nations Conference on the Law of the Sea*, vol. IX (United Nations publication, Sales No. E.79.V.3), document A/CONF.62/C.2/L.98, note 11. See also R. Platzöder, *Third United Nations Conference on the Law of the Sea: Documents* (Dobbs Ferry, N.Y.: Oceana, 1983), vol. IV, p. 465.

[14]S.P. Jagota, *Maritime Boundary* (Dordrecht, Boston, Lancaster: M. Nijhoff, 1985), p. 39.

[15]A/CONF.62/WP.10/Rev.1 (28 April 1979), article 76.

[16]Jagota, op. cit., p. 40. See also Ted L. McDorman, "The new definition of 'Canada Lands' and the determination of the outer limit of the continental shelf", *Journal of Maritime Law and Commerce*, vol. 14 (1983), p. 205. For definitions of these submarine features, see *The Law of the Sea: Baselines. An Examination of the Relevant Provisions of the United Nations Convention on the Law of the Sea* (United Nations publication, Sales No. E.88.V.5), appendix I.

[17]A/CONF.62/WP.10/Rev.2 (11 April 1980), article 76, para. 6.

[18]*Official Records of the Third United Nations Conference on the Law of the Sea*, vol. XIV (United Nations publication, Sales No. E.82.V.2), Summary records of meetings, Plenary meetings, 141st meeting, para. 44.

[19]Ibid., vol. XVII (United Nations publication, Sales No. E.84.V.3), document A/CONF.62/121, para. 36.

[20]A/CONF.62/C.2/L.98/Add.1, prepared by the Secretariat in 1978 with the assistance of experts from the Lamont-Doherty Geological Observatory, the International Hydrographic Organization (IHO) and the Intergovernmental Oceanographic Commission (IOC).

[21]Angola, Argentina, Australia, Brazil, Canada, Denmark, Ecuador, Fiji, France, Guinea, Guyana, Iceland, India, Indonesia, Ireland, Japan, Madagascar, Mauritius, Mexico, Micronesia (Federated States of), Myanmar, Namibia, New Zealand, Norway, Portugal, Russian Federation, Seychelles, South Africa, Spain, Suriname, United Kingdom of Great Britain and Northern Ireland, United States of America and Uruguay.

[22]J.R.V. Prescott, "An analysis of the geographical terms in the United Nations Convention on the Law of the Sea" (paper prepared for the Group of Technical Experts on Baselines

convened by the United Nations Office for Ocean Affairs and the Law of the Sea in September 1987), p. 143.

[23]Adapted from A.J. Kerr and M.J. Keen, "Hydrographic and geologic concerns of implementing article 76", *International Hydrographic Review*, vol. LXII, No. 1, January 1985, p. 144.

[24]See *The Law of the Sea: Baselines. An Examination of the Relevant Provisions of the United Nations Convention on the Law of the Sea*, op. cit.

[25]P.A. Symonds and J.B. Willcox, "Definition of the continental margin using United Nations Convention on the Law of the Sea (article 76), and its application to Australia", *Bureau of Mineral Resources, Australia, Record*, 1988/38, (1988), p. 9.

[26]See, e.g., Hollis D. Hedberg, "Ocean boundaries for the law of the sea", *Marine Technology Society Journal*, June 1976, p. 6; Hedberg, op. cit., note 6.

[27]Kerr and Keen, op. cit., p. 146.

[28]Ibid., p. 143.

[29]Jagota, op. cit., p. 39.

[30]Robert D. Hodgson and Robert W. Smith, "The informal single negotiating text (Committee II): A geographical perspective", *Ocean Development and International Law*, vol. 3 (1976), p. 256.

[31]Jagota, op. cit., p. 40. See also Nirmala Chandrahasan, "Sri Lanka's shelf and the boundary delimitation with India", *Indian Yearbook of International Affairs*, vol. 19 (1986), p. 499.

[32]J.C. Lupinacci, "El régimen de la plataforma continental en la Convención sobre el Derecho del Mar", in P.M. Arana, ed., *Trabajos presentados a la Conferencia Internacional sobre Recursos Marinos del Pacífico*, Viña del Mar, Chile, 1983, p. 556.

[33]Bernard H. Oxman, "The Third United Nations Conference on the Law of the Sea: The Ninth Session (1980)", *American Journal of International Law*, vol. 75 (1981), p. 231.

[34]McDorman, op. cit., p. 207. See also observations of the Court of Arbitration in the Case concerning the delimitation of maritime areas between Canada and France, Decision of 10 June 1992, *International Legal Materials*, vol. 31 (1992), p. 1145, paras. 78 and 79.

ANNEX I

United Nations Convention on the Law of the Sea

PART VI

CONTINENTAL SHELF

Article 76

Definition of the continental shelf

1. 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 from which the breadth of the territorial sea is measured where the outer edge of the continental margin does not extend up to that distance.

2. The continental shelf of a coastal State shall not extend beyond the limits provided for in paragraphs 4 to 6.

3. The continental margin comprises the submerged prolongation of the land mass of the coastal State, and consists of the seabed and subsoil of the shelf, the slope and the rise. It does not include the deep ocean floor with its oceanic ridges or the subsoil thereof.

4. (a) For the purposes of this Convention, the coastal State shall establish the outer edge of the continental margin wherever the margin extends beyond 200 nautical miles from the baselines from which the breadth of the territorial sea is measured, by either:

   (i) a line delineated in accordance with paragraph 7 by reference to the outermost fixed points at each of which the thickness of sedimentary rocks is at least 1 per cent of the shortest distance from such point to the foot of the continental slope; or

   (ii) a line delineated in accordance with paragraph 7 by reference to fixed points not more than 60 nautical miles from the foot of the continental slope.

   (b) In the absence of evidence to the contrary, the foot of the continental slope shall be determined as the point of maximum change in the gradient at its base.

5. The fixed points comprising the line of the outer limits of the continental shelf on the seabed, drawn in accordance with paragraph 4 (a) (i) and (ii), either shall not exceed 350 nautical miles from the baselines from which the breadth of the territorial sea is measured or shall not exceed 100 nautical miles from the 2,500 metre isobath, which is a line connecting the depth of 2,500 metres.

6. Notwithstanding the provisions of paragraph 5, on submarine ridges, the outer limit of the continental shelf shall not exceed 350 nautical miles from the baselines from which the breadth of the territorial sea is measured. This paragraph does not apply to submarine elevations that are natural components of the continental margin, such as its plateaux, rises, caps, banks and spurs.

7. The coastal State shall delineate the outer limits of its continental shelf, where that shelf extends beyond 200 nautical miles from the baselines from which the breadth of the territorial sea is measured, by straight lines not exceeding 60 nautical miles in length, connecting fixed points, defined by coordinates of latitude and longitude.

8. Information on the limits of the continental shelf beyond 200 nautical miles from the baselines from which the breadth of the territorial sea is measured shall be submitted by the coastal State to the Commission on the Limits of the Continental Shelf set up under Annex II on the basis of equitable geographical representation. The Commission shall make recommendations to coastal States on matters related to the establishment of the outer limits of their continental shelf. The limits of the shelf established by a coastal State on the basis of these recommendations shall be final and binding.

9. 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.

10. The provisions of this article are without prejudice to the question of delimitation of the continental shelf between States with opposite or adjacent coasts.

Article 77

Rights of the coastal State over the continental shelf

1. The coastal State exercises over the continental shelf sovereign rights for the purpose of exploring it and exploiting its natural resources.

2. The rights referred to in paragraph 1 are exclusive in the sense that if the coastal State does not explore the continental shelf or exploit its natural resources, no one may undertake these activities without the express consent of the coastal State.

3. The rights of the coastal State over the continental shelf do not depend on occupation, effective or notional, or on any express proclamation.

4. The natural resources referred to in this Part consist of the mineral and other non-living resources of the seabed and subsoil together with living organisms belonging to sedentary species, that is to say, organisms which, at the harvestable stage, either are immobile on or under the seabed or are unable to move except in constant physical contact with the seabed or the subsoil.

Article 78

Legal status of the superjacent waters and airspace and the rights and freedoms of other States

1. The rights of the coastal State over the continental shelf do not affect the legal status of the superjacent waters or of the airspace above those waters.

2. The exercise of the rights of the coastal State over the continental shelf must not infringe or result in any unjustifiable interference with navigation and other rights and freedoms of other States as provided for in this Convention.

Article 79

Submarine cables and pipelines on the continental shelf

1. All States are entitled to lay submarine cables and pipelines on the continental shelf, in accordance with the provisions of this article.

2. Subject to its right to take reasonable measures for the exploration of the continental shelf, the exploitation of its natural resources and the prevention, reduction and control of pollution from pipelines, the coastal State may not impede the laying or maintenance of such cables or pipelines.

3. The delineation of the course for the laying of such pipelines on the continental shelf is subject to the consent of the coastal State.

4. Nothing in this Part affects the right of the coastal State to establish conditions for cables or pipelines entering its territory or territorial sea, or its jurisdiction over cables and pipelines constructed or used in connection with the exploration of its continental shelf or exploitation of its resources or the operations of artificial islands, installations and structures under its jurisdiction.

5. When laying submarine cables or pipelines, States shall have due regard to cables or pipelines already in position. In particular, possibilities of repairing existing cables or pipelines shall not be prejudiced.

Article 80

Artificial islands, installations and structures on the continental shelf

Article 60 applies *mutatis mutandis* to artificial islands, installations and structures on the continental shelf.

Article 81

Drilling on the continental shelf

The coastal State shall have the exclusive right to authorize and regulate drilling on the continental shelf for all purposes.

Article 82

Payments and contributions with respect to the exploitation of the continental shelf beyond 200 nautical miles

1. The coastal State shall make payments or contributions in kind in respect of the exploitation of the non-living resources of the continental shelf beyond 200 nautical miles from the baselines from which the breadth of the territorial sea is measured.

2. The payments and contributions shall be made annually with respect to all production at a site after the first five years of production at that site. For the sixth year, the rate of payment or contribution shall be 1 per cent of the value or volume of production at the site. The rate shall increase by 1 per cent for each subsequent year until the twelfth year and shall remain at 7 per cent thereafter. Production does not include resources used in connection with exploitation.

3. A developing State which is a net importer of a mineral resource produced from its continental shelf is exempt from making such payments or contributions in respect of that mineral resource.

4. The payments or contributions shall be made through the Authority, which shall distribute them to States Parties to this Convention, on the basis of equitable sharing criteria, taking into account the interests and needs of developing States, particularly the least developed and the land-locked among them.

Article 83

Delimitation of the continental shelf between States with opposite or adjacent coasts

1. The delimitation of the continental shelf between States with opposite or adjacent coasts shall be effected by agreement on the basis of international law, as referred to in Article 38 of the Statute of the International Court of Justice, in order to achieve an equitable solution.

2. If no agreement can be reached within a reasonable period of time, the States concerned shall resort to the procedures provided for in Part XV.

3. Pending agreement as provided for in paragraph 1, the States concerned, in a spirit of understanding and cooperation, shall make every effort to enter into provisional arrangements of a practical nature and, during this transitional period, not to jeopardize or hamper the reaching of the final agreement. Such arrangements shall be without prejudice to the final delimitation.

4. Where there is an agreement in force between the States concerned, questions relating to the delimitation of the continental shelf shall be determined in accordance with the provisions of that agreement.

Article 84

Charts and lists of geographical coordinates

1. Subject to this Part, the outer limit lines of the continental shelf and the lines of delimitation drawn in accordance with article 83 shall be shown on charts of a scale or scales adequate for ascertaining their position. Where appropriate, lists of geographical coordinates of points, specifying the geodetic datum, may be substituted for such outer limit lines or lines of delimitation.

2. The coastal State shall give due publicity to such charts or lists of geographical coordinates and shall deposit a copy of each such chart or list with the Secretary-General of the United Nations and, in the case of those showing the outer limit lines of the continental shelf, with the Secretary-General of the Authority.

Article 85

Tunnelling

This Part does not prejudice the right of the coastal State to exploit the subsoil by means of tunnelling, irrespective of the depth of water above the subsoil.

ANNEX II

Final act of the Third United Nations Conference on the Law of the Sea

ANNEX II. STATEMENT OF UNDERSTANDING CONCERNING A SPECIFIC METHOD TO BE USED IN ESTABLISHING THE OUTER EDGE OF THE CONTINENTAL MARGIN

The Third United Nations Conference on the Law of the Sea,

Considering the special characteristics of a State's continental margin where: (1) the average distance at which the 200 metre isobath occurs is not more than 20 nautical miles; (2) the greater proportion of the sedimentary rock of the continental margin lies beneath the rise; and

Taking into account the inequity that would result to that State from the application to its continental margin of article 76 of the Convention, in that, the mathematical average of the thickness of sedimentary rock along a line established at the maximum distance permissible in accordance with the provisions of paragraph 4 (a) (i) and (ii) of that article as representing the entire outer edge of the continental margin would not be less than 3.5 kilometres; and that more than half of the margin would be excluded thereby;

Recognizes that such State may, notwithstanding the provisions of article 76, establish the outer edge of its continental margin by straight lines not exceeding 60 nautical miles in length connecting fixed points, defined by latitude and longitude, at each of which the thickness of sedimentary rock is not less than 1 kilometre,

Where a State establishes the outer edge of its continental margin by applying the method set forth in the preceding paragraph of this statement, this method may also be utilized by a neighbouring State for delineating the outer edge of its continental margin on a common geological feature, where its outer edge would lie on such feature on a line established at the maximum distance permissible in accordance with article 76, paragraph 4 (a) (i) and (ii), along which the mathematical average of the thickness of sedimentary rock is not less than 3.5 kilometres,

The Conference requests the Commission on the Limits of the Continental Shelf, set up pursuant to Annex II of the Convention, to be governed by the terms of this Statement when making its recommendations on matters related to the establishment of the outer edge of the continental margins of these States in the southern part of the Bay of Bengal.

ANNEX III

United Nations Convention on the Law of the Sea

ANNEX II. COMMISSION ON THE LIMITS OF THE CONTINENTAL SHELF

Article 1

In accordance with the provisions of article 76, a Commission on the Limits of the Continental Shelf beyond 200 nautical miles shall be established in conformity with the following articles.

Article 2

1. The Commission shall consist of 21 members who shall be experts in the field of geology, geophysics or hydrography, elected by States Parties to this Convention from among their nationals, having due regard to the need to ensure equitable geographical representation, who shall serve in their personal capacities.

2. The initial election shall be held as soon as possible but in any case within 18 months after the date of entry into force of this Convention. At least three months before the date of each election, the Secretary-General of the United Nations shall address a letter to the States Parties, inviting the submission of nominations, after appropriate regional consultations, within three months. The Secretary-General shall prepare a list in alphabetical order of all persons thus nominated and shall submit it to all the States Parties.

3. Elections of the members of the Commission shall be held at a meeting of States Parties convened by the Secretary-General at United Nations Headquarters. At that meeting, for which two thirds of the States Parties shall constitute a quorum, the persons elected to the Commission shall be those nominees who obtain a two-thirds majority of the votes of the representatives of States Parties present and voting. Not less than three members shall be elected from each geographical region.

4. The members of the Commission shall be elected for a term of five years. They shall be eligible for re-election.

5. The State Party which submitted the nomination of a member of the Commission shall defray the expenses of that member while in performance of Commission duties. The coastal State concerned shall defray the expenses incurred in respect of the advice referred to in article 3, paragraph 1 (b), of this Annex. The secretariat of the Commission shall be provided by the Secretary-General of the United Nations.

Article 3

1. The functions of the Commission shall be:

   (a) to consider the data and other material submitted by coastal States concerning the outer limits of the continental shelf in areas where those limits extend beyond 200 nautical miles, and to make recommendations in accordance with article 76 and the Statement of Understanding adopted on 29 August 1980 by the Third United Nations Conference on the Law of the Sea;

   (b) to provide scientific and technical advice, if requested by the coastal State concerned during the preparation of the data referred to in subparagraph (a).

2. The Commission may cooperate, to the extent considered necessary and useful, with the Intergovernmental Oceanographic Commission of UNESCO, the International Hydrographic Organization and other competent international organizations with a view to exchanging scientific and technical information which might be of assistance in discharging the Commission's responsibilities.

Article 4

Where a coastal State intends to establish, in accordance with article 76, the outer limits of its continental shelf beyond 200 nautical miles, it shall submit particulars of such limits to the Commission along with supporting scientific and technical data as soon as possible but in any case within 10 years of the entry into force of this Convention for that State. The coastal State shall at the same time give the names of any Commission members who have provided it with scientific and technical advice.

Article 5

Unless the Commission decides otherwise, the Commission shall function by way of subcommissions composed of seven members, appointed in a balanced manner taking into account the specific elements of each submission by a coastal State. Nationals of the coastal State making the submission who are members of the Commission and any Commission member who has assisted a coastal State by providing scientific and technical advice with respect to the delineation shall not be a member of the subcommission dealing with that submission but has the right to participate as a member in the proceedings of the Commission concerning the said submission. The coastal State which has made a submission to the Commission may send its representatives to participate in the relevant proceedings without the right to vote.

Article 6

1. The subcommission shall submit its recommendations to the Commission.

2. Approval by the Commission of the recommendations of the subcommission shall be by a majority of two thirds of Commission members present and voting.

3. The recommendations of the Commission shall be submitted in writing to the coastal State which made the submission and to the Secretary-General of the United Nations.

Article 7

Coastal States shall establish the outer limits of the continental shelf in conformity with the provisions of article 76, paragraph 8, and in accordance with the appropriate national procedures.

Article 8

In the case of disagreement by the coastal State with the recommendations of the Commission, the coastal State shall, within a reasonable time, make a revised or new submission to the Commission.

Article 9

The actions of the Commission shall not prejudice matters relating to delimitation of boundaries between States with opposite or adjacent coasts.

APPENDIX I

*Glossary of technical terms**

Atoll

A ring-shaped reef with or without an island situated on it surrounded by the open sea, that encloses or nearly encloses a lagoon.

An atoll is usually formed on the top of a submerged volcano by coral polyps.

Where islands are situated on atolls, the territorial-sea baseline is the seaward low-water line of the reef as shown by the appropriate symbol on charts officially recognized by the coastal State (art. 6).

For the purpose of computing the ratio of water to land when establishing archipelagic waters, atolls and the waters contained within them may be included as part of the land area (art. 47 (7)).

Back arc

The region adjacent to a subduction-related volcanic arc, on the opposite side of the arc to the trench and subducting plate.

Bank

With reference to article 76 (6).

A submarine elevation located on a continental margin over which the depth of water is relatively shallow.

Baseline

The line from which the outer limits of a State's territorial sea and certain other outer limits of coastal State jurisdiction are measured.

The term refers to the baseline from which the breadth of the territorial sea, the outer limits of the contiguous zone (art. 33 (2)), the exclusive economic zone (art. 57) and, in some cases, the continental shelf (art. 76) are measured. It is also the dividing line between internal waters and territorial seas.

The type of the territorial sea baseline may vary depending on the geographical configuration of the locality, etc.

The "normal baseline" is the low-water line along the coast (including the coasts of islands) as marked on large-scale charts officially recognized by the coastal State (arts. 5 and 121 (2)).

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 (art. 6).

Where a low-tide elevation is situated wholly or partly at a distance not exceeding the breadth of the territorial sea from the mainland or an island, the low-water line on that elevation may be used as part of the baseline (art. 13).

Straight baselines are a system of straight lines joining specified or discrete points on the low-water line, usually known as straight baseline turning points, which may be used only 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 (art. 7 (1)).

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*Prepared by the International Hydrographic Bureau. References to articles are those of the United Nations Convention on the Law of the Sea.

Archipelagic baselines are straight lines joining the outermost points of the outermost islands and drying reefs which may be used to enclose all or part of an archipelago which forms all or part of an archipelagic State (art. 47).

Basement

The crystalline component of the Earth's crust beneath the sedimentary rocks, extending downward to the Mohorovicic discontinuity. In many places the rocks of the complex are igneous and metamorphic and of Precambrian age, but in some places they are Palaeozoic, Mesozoic or even Cenozoic. Also termed: basement rock; basal complex; fundamental complex; basement complex.

Basepoint

A basepoint is any point on the baseline. In the method of straight baselines, where one straight baseline meets another baseline at a common point, one line may be said to "turn" at that point to form another baseline. Such a point may be termed a "baseline turning point" or simply "basepoint".

Cap

With reference to article 76 (6).

A submarine feature with a rounded cap-like top. Also defined as a plateau or flat area of considerable extent, dropping off abruptly on one or more sides.

Continental margin

As defined in article 76 (3) as follows: "The continental margin comprises the submerged prolongation of the land mass of the coastal State, and consists of the seabed and subsoil of the shelf, the slope and the rise." It does not include the deep ocean floor, and includes the provinces such as the continental shelf, continental slope and continental rise.

Continental rise

A submarine feature which is that part of the continental margin lying between the continental slope and the deep ocean floor, simply called the "rise" in the Convention.

It usually has a gradient of 0.5° or less and a generally smooth surface consisting of sediment.

Continental shelf

See: *Shelf.*

Continental slope

That part of the continental margin that lies between the shelf and the rise. Simply called the "slope" in article 76 (3).

The slope may not be uniform or abrupt, and may locally take the form of terraces. The gradients are usually greater than 1.5°.

Convergent margin

A continental margin created in a zone where two opposing elements are approaching each other and interacting, such as a volcanic arc and the deep ocean floor, or a volcanic arc and a rifted continental margin.

Deep ocean floor

The surface lying at the bottom of the deep ocean with its oceanic ridges, beyond the continental margin.

The continental margin does not include the deep ocean floor with its oceanic ridges or the subsoil thereof.

Foot of the continental slope

"In the absence of evidence to the contrary, the foot of the continental slope shall be determined as the point of maximum change in the gradient at its base" (art. 76 (4) (b)).

It is the point where the continental slope meets the continental rise or, if there is no rise, the deep ocean floor.

To determine the maximum change of gradient requires adequate bathymetry covering the slope and a reasonable extent of the rise, from which a series of profiles may be drawn and the point of maximum change of gradient located.

The two methods laid down in article 76 (4) for determining the outer limit of the continental shelf depend upon the foot of the continental slope.

Fore arc

The region between a subduction-related trench and a volcanic arc. Also termed: Frontal arc.

Installation (offshore)

Man-made structure in the territorial sea, exclusive economic zone or on the continental shelf usually for the exploration or exploitation of marine resources. Installations may also be built for other purposes such as marine scientific research, tide observations, etc.

Offshore installations or artificial islands shall not be considered permanent harbour works (art. 11), and therefore may not be used as part of the baseline from which to measure the breadth of the territorial sea.

Where States may establish straight baselines or archipelagic baselines, low-tide elevations having lighthouses or similar installations may be used as basepoints (arts. 7 (4) and 47 (4)).

Artificial islands, installations and structures 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 exclusive economic zone or the continental shelf (art. 60 (8)).

Article 60 provides, *inter alia*, for due notice to be given for the construction or removal of installations, and permanent means for giving warning of their presence must be maintained. Safety zones, not to exceed 500 metres, measured from their outer edges, may be established. Any installations abandoned or disused shall be removed, taking into account generally accepted international standards.

Islands

As defined in article 121 (1).

Maritime zones of islands are referred to in article 121 (2).

Mantle (interior Earth)

The part of the Earth's interior below the crust and above the core (to a depth of 3,480 km), which is divided into the upper mantle and the lower mantle, with a transition zone between.

Oceanic plateau

A comparatively flat-topped elevation of the seabed which rises steeply from the ocean floor and is of considerable extent across the summit.

For the purpose of computing the ratio of water to land enclosed within archipelagic baselines, land areas may include, *inter alia*, waters lying within that part of a steep-sided oceanic plateau which is enclosed or nearly enclosed by a chain of limestone islands and drying reefs lying on its perimeter (art. 47 (7)).

Oceanic ridge

A long elevation of the deep ocean floor with either irregular or smooth topography and steep sides.

Such ridges are not part of the continental margin (art. 76 (3)).

Rifted margin

A continental margin created as a consequence of rifting and break-up of a continental mass, leading to spreading of the sea floor and the formation of a new ocean basin. Also termed: Divergent margin.

Rise

See: *Continental rise.*

Rock

Consolidated lithology of limited extent.

There is no definition given in the Convention. The term is used in article 121 (3): "Rocks which cannot sustain human habitation or economic life of their own shall have no exclusive economic zone or continental shelf."

Seabed

The top of the surface layer of sand, rock, mud or other material lying at the bottom of the sea and immediately above the subsoil.

The seabed may be that of the territorial sea (art. 2 (2)), archipelagic waters (art. 49 (2)), the exclusive economic zone (art. 56), the continental shelf (art. 76), the high seas (art. 112 (1)) or the area beyond the limits of national jurisdiction (the Area) (arts. 1 (1) and 133). It may be noted, however, that in reference to the surface layer seaward of the continental rise, article 76 uses the term "deep ocean floor" rather than seabed.

Sedimentary rock

Rock formed by the consolidation of sediment that has accumulated in layers. (The term "sedimentary rock" is used in art. 76 (4) (a) (i).)

The sediments may consist of rock fragments or particles of various sizes (conglomerate, sandstone, shale), the remains or products of animals or plants (certain limestones and coal), the product of chemical action or of evaporation (salt, gypsum, etc.) or a mixture of these materials.

Shelf

Geologically an area adjacent to a continent or around an island extending from the low-water line to the depth at which there is usually a marked increase of slope to greater depth.

Slope

See: *Continental slope.*

Spur

A subordinate elevation, ridge or rise projecting outward from a larger feature.

The maximum extent of the outer limit of the continental shelf along submarine ridges is 350 nautical miles from the baselines. This limitation, however, "does not apply to submarine elevations that are natural components of the continental margin, such as plateaux, rises, caps, banks and spurs" (art. 76 (6)).

Straight baseline

See: *Baseline.*

Straight line

Mathematically the line of shortest distance between two points in a specified space or on a specified surface.

Submarine ridge

An elongated elevation of the sea floor, with either irregular or relatively smooth topography and steep sides.

On submarine ridges the outer limit of the continental shelf shall not exceed 350 nautical miles from the territorial sea baselines. This does not apply in the case of submarine elevations that are natural components of the continental margin of a coastal State (art. 76 (6)).

Subsoil

All naturally occurring matter lying beneath the seabed or deep ocean floor.

The subsoil includes residual deposits and minerals as well as the bedrock below.

The Area and a coastal State's territorial sea, archipelagic waters, exclusive economic zone and continental shelf all include the subsoil (arts. 1 (1), 2 (2), 49 (2), 56 (1) (a) and 76 (1)).

Superjacent waters

The waters overlying the seabed or deep ocean floor.

The Convention refers to the superjacent waters over the continental shelf and those superjacent to the Area in articles 78 and 135 respectively. Article 56 also refers to the waters superjacent to the seabed in the exclusive economic zone.

Transform fault

A strike-slip fault-like feature characteristic of mid-oceanic ridges and along which ridge segments are offset. Analysis of transform faults is based on the concept of sea-floor spreading.

APPENDIX II

List of participants in the Meeting of the Group of Technical Experts on the Definition of the Continental Shelf

United Nations Headquarters
10-12 March 1993

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Capitán de Navío (RE)
Dirección de Asuntos Especiales
Ministerio de Relaciones Exteriores, Comercio Internacional y Culto
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