Summary

This lecture is devoted to the explanation of the legal framework for the delineation of the outer limits of the extended continental shelf.

In particular, the lecture:

Examines in detail the concept of the continental shelf by:

Analyzing the historical development of the legal concept and regime of the continental shelf;

-Describing the difference between the legal and scientific concepts of the continental shelf;

-Explaining which sciences are required for the implementation of the Convention;

-Highlighting the position and status of the continental shelf in relation to the other maritime zones, especially the exclusive economic zone;

Explains the method for the delineation of the outer limits of the “legal” continental shelf in relation to the “scientific” continental margin, which involves:

-The identification of the foot of the continental slope;

-The delineation of the formulae lines which are used to identify the outer edge of the continental margin in relation to the foot of the continental slope;

-The delineation of constraint lines which are used to identify the limit beyond which the continental shelf cannot extend;

-The use of formulae lines and constraint lines to delineate the outer limits of the continental shelf;

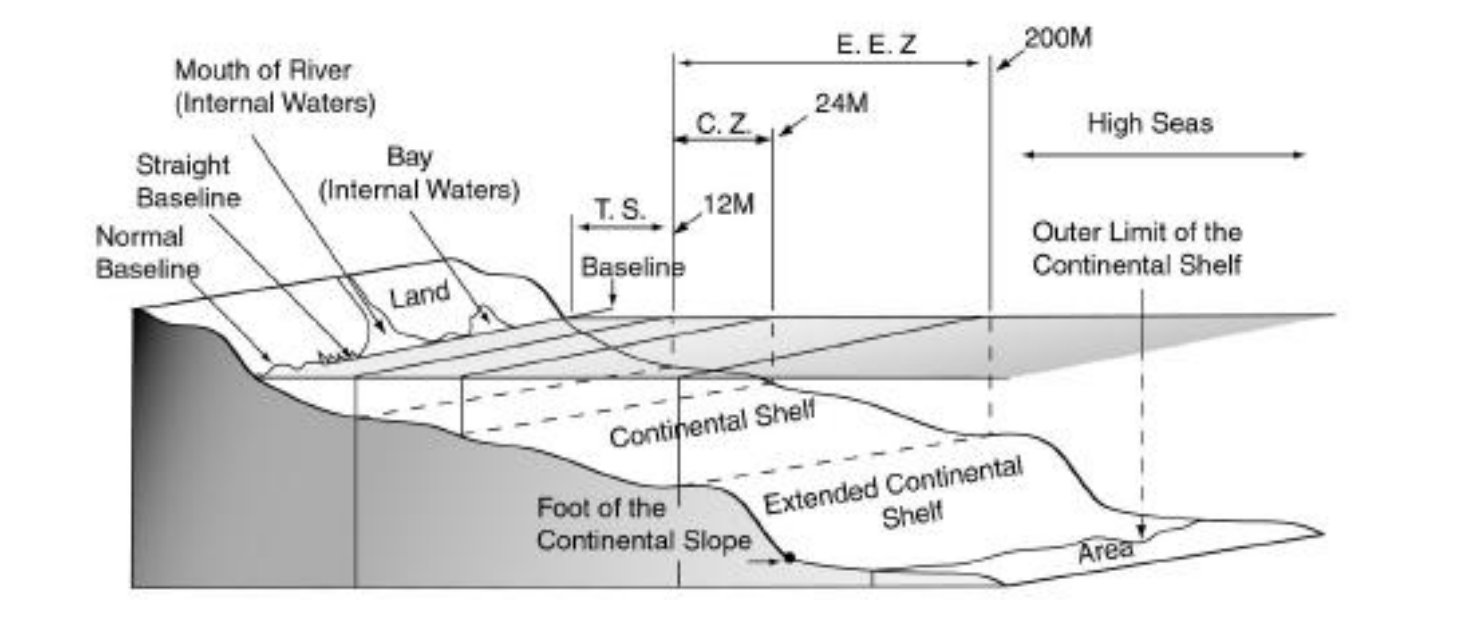


Figure I.1 Types of baselines and maritime zones

The continental shelf regime

The regime prescribed for the continental shelf is contained in Part VI (articles 76 to 84) and Annex II of UNCLOS. It prevails over the1958 Convention on the Continental Shelf. At this lecture we will focus on the 1982 provisions and reference to the 1958 regime will be made only to illustrate the historic development of the legal concept of the continental shelf.

Distinction between the scientific and legal concepts of the continental shelf

Before analyzing the legal regime of the continental shelf, it is paramount to stress from the beginning that the concept of the continental shelf contained in UNCLOS does not correspond with the scientific concept of the continental shelf. In order to establish a legal regime that could address the interests of both States with very large continental shelves and those with small continental shelves, the drafters of UNCLOS had to elaborate a legal definition that – even though obviously based on the scientific one – could not coincide with it. For this reason, it is important to distinguish the two concepts and to clarify that in the lecture we will address only the issues related to the legal concept of the continental shelf.

The scientific concept of the continental shelf

The earth's top layer is made up of the continental crust and the oceanic crust.

The continental crust is very thick and relatively light, while the oceanic crust is thin and considerably heavier. As a result, continents float on top of the oceanic crust, like a cork on water. This marked difference in buoyancy, thickness and relative elevation is the underlying reason for the global distribution of land and water. The thick buoyant continents support the vast areas of emerged land, while the heavy and low-lying oceanic crust forms the floor of the huge ocean basins that accommodate the world's seawater.

Moving from the shore to the deep ocean floor, the characteristics of the seabed change as a result of the lateral distribution of continental and oceanic crust.

The continental shelf is the relatively flat and shallow (the edge of the shelf is usually between 1,200 and 3,500 metres of depth) submerged part of the continent. A thick layer of sediments that may contain hydrocarbon resources usually covers it. The continental shelf extends from the shore to the top of the continental slope.

The continental slope is the section of the seabed bordering the continental shelf. It is rather steep and brings the water depth from a few hundred metres, at the edge of the shelf, down to anywhere between 3,500 and 5,500 metres at the foot of the continental slope. In general, the continental slope is formed near the edge of the continental mass where the continental crust thins considerably and merges with the oceanic crust. The foot of the continental slope is usually found close to the actual zone of transition between the two types of crust.

The continental rise, a feature of many coastal States, is an area of very gentle dip between the foot of the continental slope and the deep ocean floor. The typical continental rise is a wedge-shaped layer of sediments derived from the shelf areas and accumulated next to the base of the slope – in many places prograding partly onto the oceanic crust.

The continental shelf, slope and rise together constitute the continental margin (see **figure I.3).**

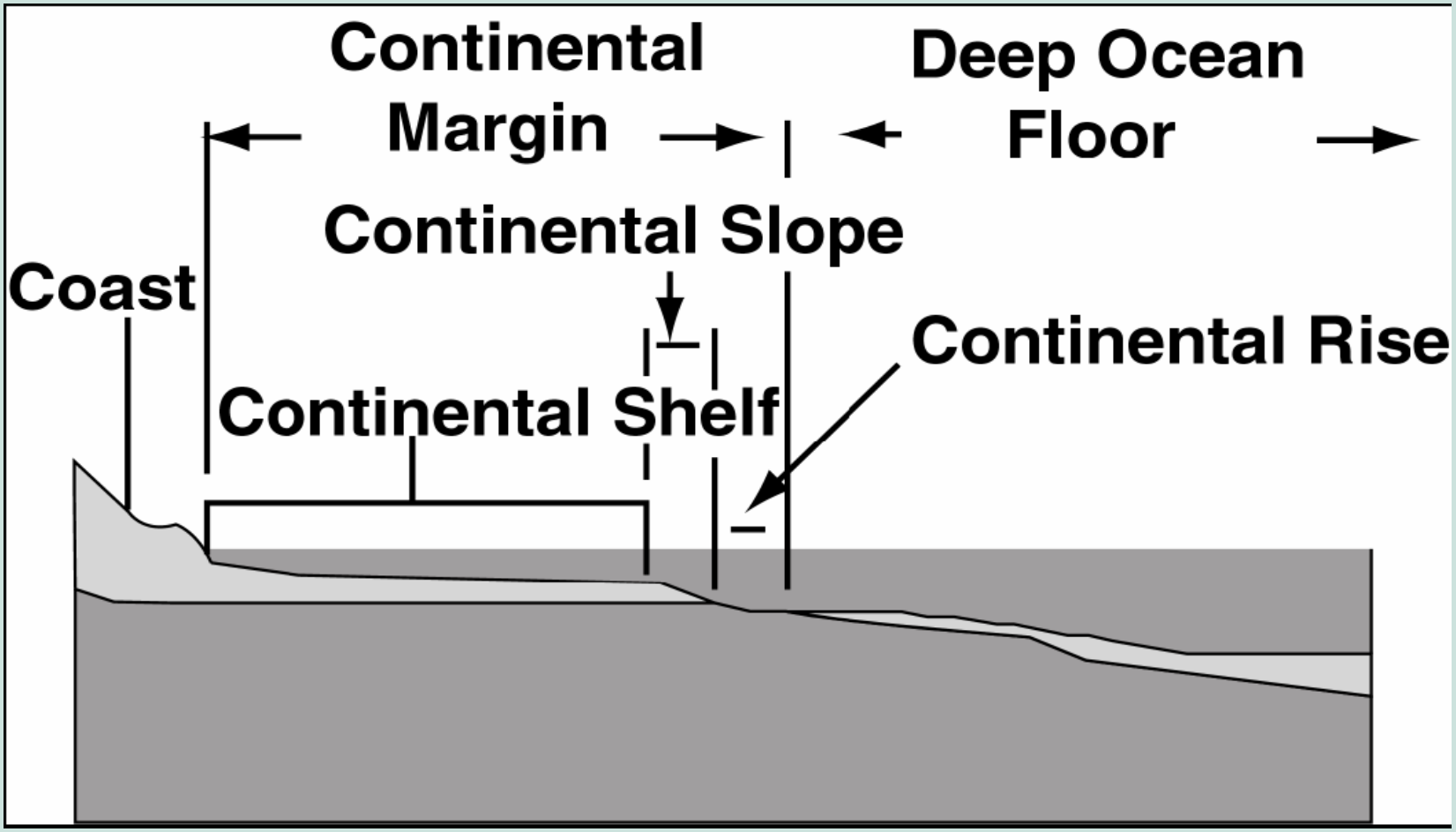


Figure I.3 The continental margin and its components (shelf, slope, rise)

At this point, it is important to draw attention to the difference between the scientific concepts of “continental shelf” and “continental margin,” because UNCLOS defines the legal continental shelf in relation to the scientific continental margin (not to the scientific continental shelf). From a scientific point of view, as seen above, the continental shelf is one of the sections of seabed that constitute the continental margin.

The legal concept of the continental shelf: origins

Historically, the seabed and subsoil lying beyond the territorial sea – due to their relative inaccessibility – had been the object of only sporadic economic activities. Such activities did not interfere with the freedoms of the high seas since they did not take place on the surface of the sea (for instance: exploitation of sedentary fisheries located on the seabed beyond the territorial sea, like pearl banks, oyster beds, chank or sponge fisheries; mining of the seabed through tunnelling from the shore).

Over time, scientific and technological advances led to the discovery of substantive mineral resources (oil and gas, in particular) underwater and an economically viable prospect for their future exploitation. As a result of these developments, State practice became increasingly shaped by the interest of coastal States to affirm their rights to the continental shelf beyond the territorial sea, as well as by the interest of seafaring countries to prevent interference with the traditional freedoms of the high seas, which could be caused, for instance, by the multiplication of derricks for the exploitation of offshore oil deposits. The current legal regime of the continental shelf (and the exclusive economic zone) represents a careful balance between these divergent interests.

1945 Truman Proclamation

The “continental shelf doctrine” is usually traced back to the 1945 Proclamation by the U.S. President Henry Truman, according to which:

> “*[…] the Government of the United States regards the natural resources of the subsoil and sea bed 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.*”

The rights of the coastal State, according to the Proclamation, were inherent. They automatically derived from the adjacency of the continental shelf to the coastal State. In other words, they did not depend on effective and uncontested occupation, as would have been necessary for all new territorial claims prior to this Proclamation.

The Proclamation did not contain a definition of the continental shelf. However, since its preamble stated that “the continental shelf may be regarded as an extension of the land mass of the coastal nation and thus naturally appurtenant to it”, it is possible to conclude that the Proclamation did not refer to the scientific concept of the continental shelf, but rather to that of continental margin, thus marking the first time a dichotomy between the scientific and legal concepts of continental shelf appeared: the legal regime envisaged by the Proclamation for the continental shelf applied beyond the areas scientifically defined as continental shelf. In other words: the “legal” continental shelf was broader than the “scientific” continental shelf.

The legal concept of the continental shelf: the 1958 Convention

Because of its customary nature, international law can be developed through unilateral acts such as the Truman Proclamation; provided that they are followed by similar acts by other States or that they do not encounter objections from other States. The Truman Proclamation paved the way for numerous other declarations, decrees or proclamations by coastal States. These, however, varied in extent and content to such a degree as to prevent the emergence of a clear and uniform customary norm.

The marked interest in the exploitation of the seabed and its subsoil demanded a clear legal regime. For this reason, when the United Nations organized the 1958 Conference on the Law of the Sea in Geneva, it included, on the basis of the preparatory work carried out by the International Law Commission, the continental shelf on its agenda.

The 1958 Conference adopted four conventions including the Convention on the Continental Shelf (hereafter: the 1958 Convention). This Convention provided that coastal States have sovereign rights over the continental shelf, even though only for the purpose of exploring and exploiting it. In the 1958 Convention the term "continental shelf" referred:

> *"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"* (article 1).

The "depth or exploitability" criterion contained in this article constitutes a legal definition of the continental shelf which differs from the scientific one examined above. In particular, the "exploitability" criterion contained therein could lead to the inclusion of areas that in scientific terms would be part of the continental slope or rise.

The 1969 North Sea Continental Shelf Cases (International Court of Justice)

With the adoption of the 1958 Convention the continental shelf doctrine was destined to exercise increasing influence. Less than 25 years after the Truman Proclamation, the concept that all coastal States are entitled to a continental shelf beyond their territorial sea had become part of international customary law (even though the exact geographical scope of such entitlement would only be determined in the 1982 Convention.

In 1969 in the North Sea Continental Shelf cases, the International Court of Justice affirmed:

> *"[…] that the rights of the coastal State in respect of the area of continental shelf that constitutes a natural prolongation of its land territory into and under the sea exist ipso facto and ab initio, by virtue of its sovereignty over the land, and as an extension of it in an exercise of sovereign rights for the purpose of exploring the seabed and exploiting its natural resources. In short, there is here an inherent right. In order to exercise it, no special legal process has to be gone through, nor have any special legal acts to be performed. Its existence can be declared (and many States have done this) but does not need to be constituted. Furthermore, the right does not depend on its being exercised."*

The legal concept of the continental shelf: the rationale behind the current regime

The “depth or exploitability” criterion contained in the 1958 Convention received strong criticism because, combined with the advancement of technologies allowing the exploration and exploitation of the ocean floor, the criterion would ultimately lead to the inclusion of the entire ocean floor under coastal States’ jurisdiction.

To ensure a final and binding delineation of boundaries, the 1982 Convention replaced that criterion with the “continental margin or distance” criterion. To understand the current definition of the “continental shelf”, therefore, it is logical to analyze the concept of the continental margin first:

Definition of continental margin

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 (article 76, paragraph 3).

This paragraph of article 76 of the 1982 Convention defines the continental margin by:

- Specifying its physical components (continental shelf, slope and rise); and
- Expressly excluding adjacent features (deep ocean floor with its oceanic ridges of the subsoil thereof), which belong to the Area.

This definition makes no reference to the scientific distinction between continental and oceanic crust, examined earlier. The continental margin is simply defined in terms of the prolongation of the landmass of the coastal State.

Having examined the definition of continental margin it is now possible to elaborate on the legal definition of continental shelf:

Definition of 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*

(i) *throughout the natural prolongation of its land territory to the outer edge of the continental margin, or*

(ii) *to a distance of 200 M 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* (article 76, paragraphs 1 and 2).

Submerged prolongation of the land mass vs. natural prolongation of land territory

The definitions of continental margin and continental shelf use two expressions that need to be clarified in order to avoid confusion between them:

- The continental margin definition refers to the submerged prolongation of the land mass of the coastal State; and

- The continental shelf definition refers to the natural prolongation of the land territory of the coastal State.

What is the difference? As used in article 76, “land mass” and “continental margin” are scientific (geomorphological) concepts, whereas “land territory” and “continental shelf” are legal concepts.

As explained above, one of the fundamental components of a State, together with its population and government, is its territory. The land territory is the emerged part whereas the continental shelf is the submerged part or, as the definition puts it, the natural prolongation of the land territory.

The legal concepts of territory and continental shelf, however, are defined with reference to the scientific concepts of land mass and continental margin. In other words, the two definitions combined declare that:

(i) the continental shelf constitutes the submerged prolongation of its land territory; and

(ii) the territory of a coastal State extends under water;

(iii) the outer limit of such prolongation is measured **with reference** to the submerged prolongation of the land mass, i.e. the “continental margin”.

The continental margin is just a yardstick, **a reference**, for the determination of the “legal” continental shelf. Depending on the various geomorphological circumstances the “legal” continental shelf can be wider or narrower than the continental margin.

Continental shelf vs. extended continental shelf

- States with continental shelves up to 200 M (see figure I.4);
- States with continental shelves extending beyond 200 M (see figure I.5).
- This difference has very important operational consequences. Article 76, paragraph 4(a), in fact, establishes a specific requirement that only applies to the second scenario:

> *For the purposes of this Convention, the coastal State shall establish the outer edge of the continental margin wherever the margin extends beyond 200 M from the baselines from which the breadth of the territorial sea is measured.*

Thus, entitlement to the continental shelf is based on the title of the coastal State over the land or, more precisely, on possession by the territory concerned of a coastline. In the case of the continental shelf, the basis of entitlement is distance from the coast or natural prolongation of the land territory to the outer edge of the continental margin. The entitlement of a State exists by the sole fact that this basis of entitlement is present and does not require the establishment of outer limit lines. **This is confirmed by article 77 (3) of the Convention, which provides that the rights of the coastal State over the continental shelf do not depend on the occupation of any express proclamation.** The fact that article 76 contains both a general definition of the continental shelf and rules to define specific outer limits confirms that entitlement to the continental shelf is not dependent on the establishment of outer limits (International Las Association, ILA, report – 2006, p.2).

In other words, the relationship between the entitlement to the continental shelf and the establishment of its outer limit is the following:

Under the Convention, a coastal State is entitled to a continental shelf even if the State concerned has not established the outer limits of its continental shelf. However, the absence of outer limits does not entitle the coastal State to exercise sovereign rights beyond the outer limits of the continental shelf provided for in article 76 of the Convention.

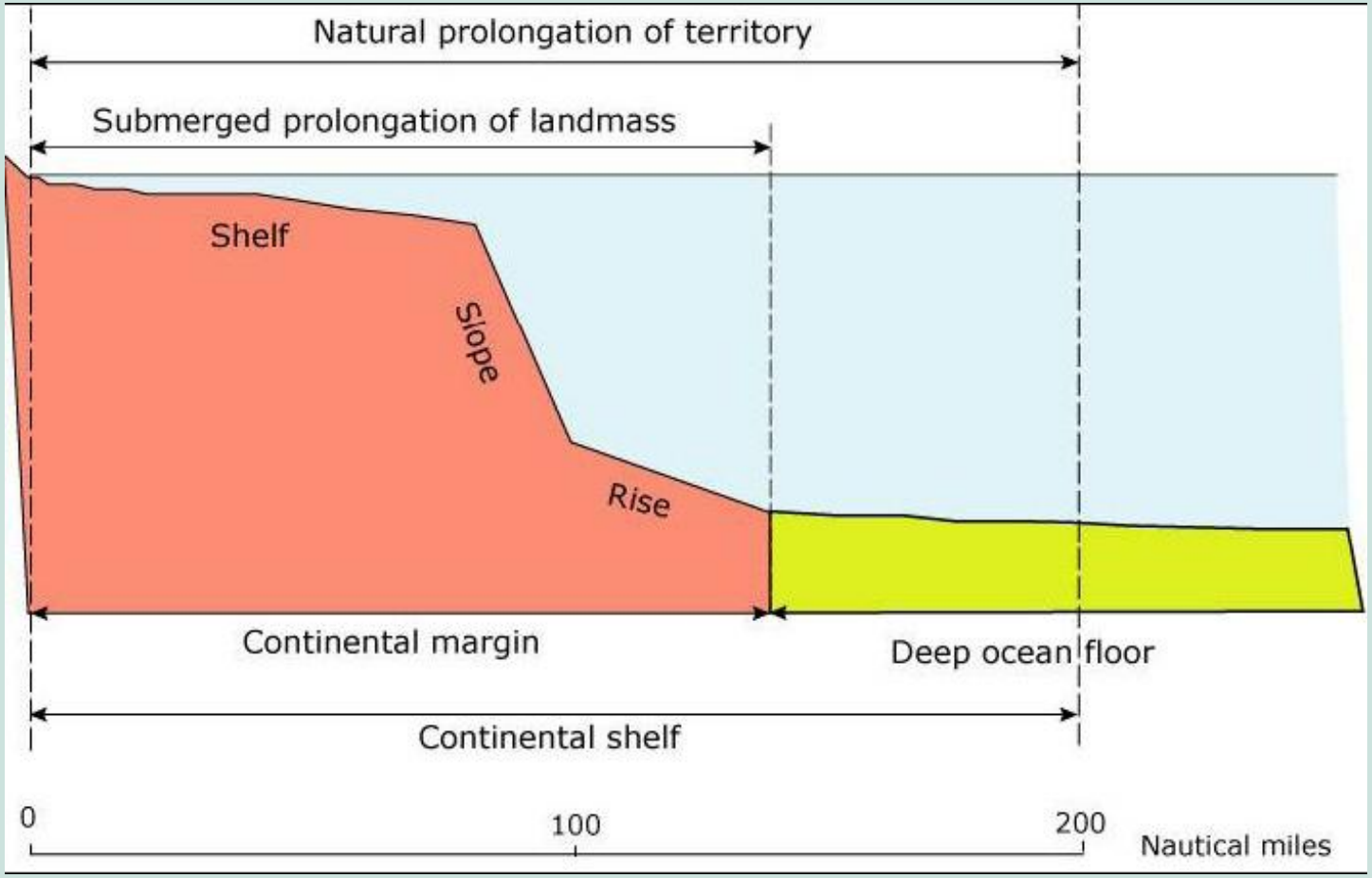


Figure I.4 Continental shelf extending less than 200 M

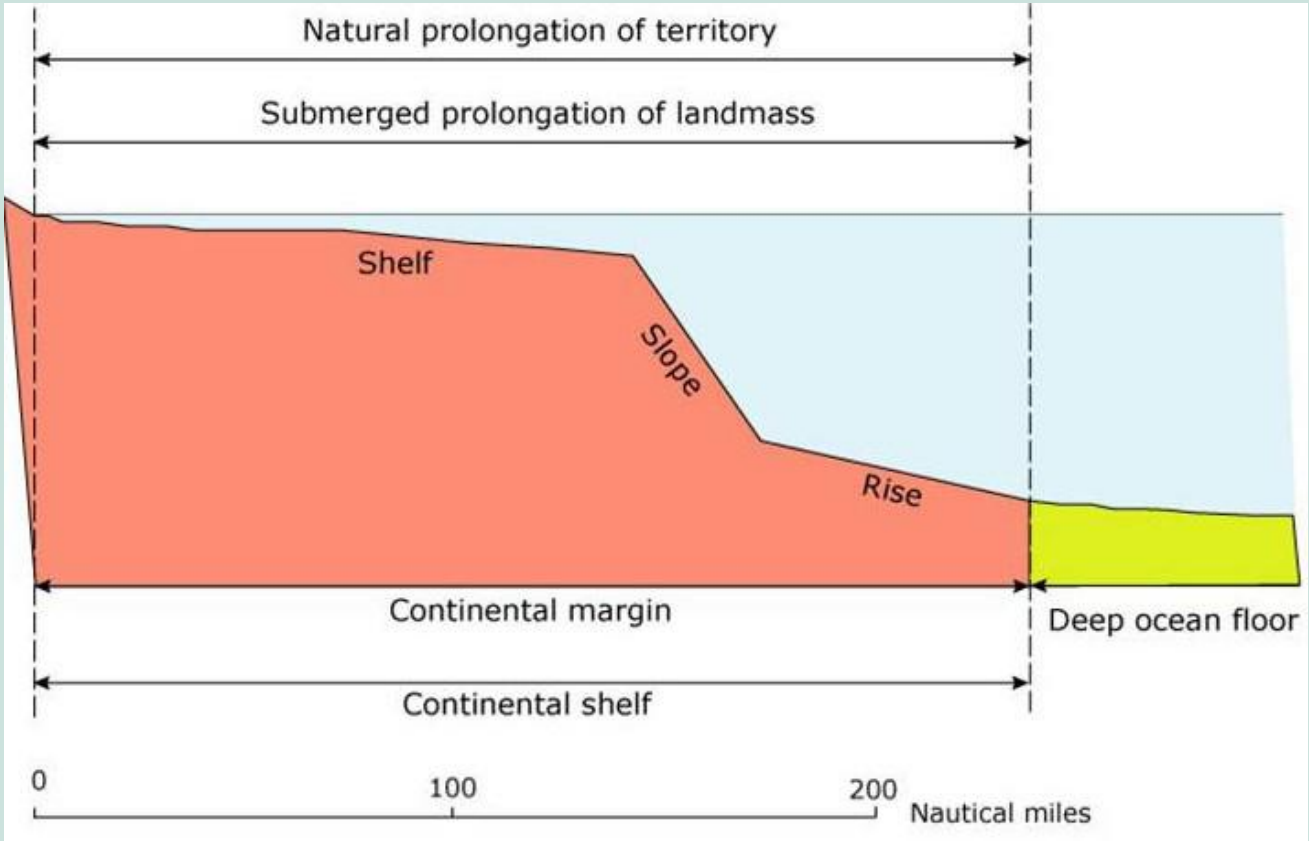
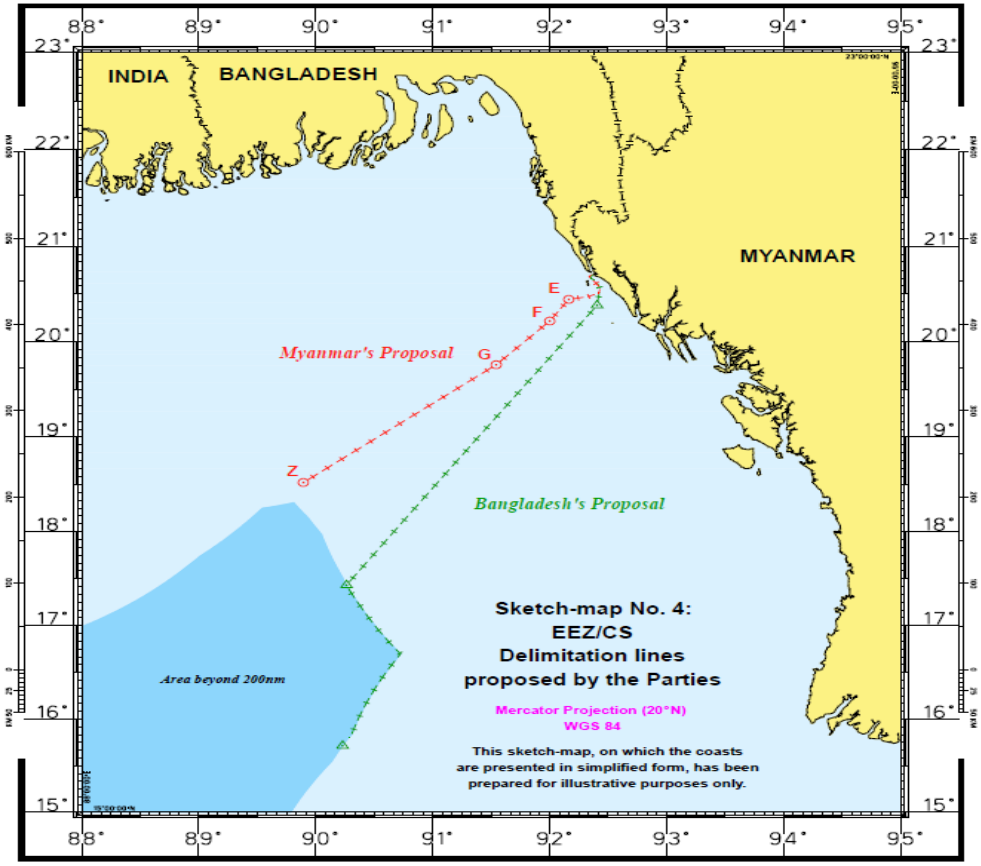


Figure I.5 Extended continental shelf

Commentary - There is another consideration that should be kept in mind to better understand provisions of paragraphs 1 to 3 of article 76 of the Convention. As noted above, article 76 (1) of the Convention defines the continental shelf by reference to two alternative bases for entitlement: natural prolongation and distance from the coast. In the former case the article provides that the "continental shelf of a coastal State comprises the seabed and the 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". Two elements in this definition have to be considered to establish the scope of application of the term "natural prolongation". On the one hand, the definition refers to the land territory, from which the natural prolongation extends. On the other hand, the definition limits the seaward extent of the natural prolongation by reference to the outer edge of the continental margin. **The relationship between these two elements might seem to be problematical in, for instance, as case in which the land territory and its natural prolongation are oceanic in origin.** The reference to natural prolongation of the land territory indicates that in such a case submarine areas of oceanic origin, which are sufficiently linked to the land territory of oceanic origin are its natural prolongation. However, in such a case there is no continental margin in the geoscientific sense. This requires further consideration of the definition of the term continental margin under the Convention. **Article 76 (3) provides that the continental margin comprises the submerged prolongation of the land mass of the coastal State, without any qualification of the nature of the land mass.**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Myanmar's Proposal
Bangladesh's Proposal
Area beyond 200nm
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Sketch-map No. 4:
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proposed by the Parties
Mercator Projection (20°N)
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are presented in simplified form, has been
prepared for illustrative purposes only.
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415. Bangladesh submits that pursuant to article 76 of the Convention, it has an entitlement to the continental shelf beyond 200 nm. It further submits that Myanmar enjoys no such entitlement because its land territory has no natural prolongation into the Bay of Bengal beyond 200 nm. Therefore, according to Bangladesh, there is no overlapping continental shelf beyond 200 nm between the Parties, and it alone is entitled to the continental shelf claimed by both of them. Bangladesh thus submits that any boundary in this area must lie no further seaward from Myanmar's coast than the 200 nm "juridical shelf" provided for in article 76.

416. In respect of its own entitlement to the continental shelf beyond 200 nm, Bangladesh asserts that “the outer continental shelf claimed by Bangladesh is the natural prolongation of Bangladesh’s land territory by virtue of the uninterrupted seabed geology and geomorphology, including specifically the extensive sedimentary rock deposited by the Ganges-Brahmaputra river system”. To prove this, Bangladesh provided the Tribunal with scientific evidence to show that there is a geological and geomorphological continuity between the Bangladesh land mass and the seabed and subsoil of the Bay of Bengal. In addition, Bangladesh submits that the extent of its entitlement to the continental shelf beyond 200 nm, established by the so-called Gardiner formula based on sediment thickness, extends well beyond 200 nm.

417. Bangladesh argues that Myanmar is not entitled to a continental shelf beyond 200 nm because it cannot meet the physical test of natural prolongation in article 76, paragraph 1, which requires evidence of **a geological character connecting the seabed and subsoil directly to the land territory.** According to Bangladesh, there is overwhelming and unchallenged evidence of a “fundamental discontinuity” between the landmass of Myanmar and the seabed beyond 200 nm. Bangladesh contends that **the tectonic plate boundary between the Indian and Burma Plates is manifestly “a marked disruption or discontinuance of the seabed” that serves as “an indisputable indication of the limits of two separate continental shelves, or two separate natural prolongations”.**

419. In summing up, Bangladesh states:

- That by reason of the significant geological discontinuity which divides the Burma plate from the Indian plate, Myanmar is not entitled to a continental shelf in any of the areas beyond 200 [nm].
- That Bangladesh is entitled to claim sovereign rights over all of the bilateral shelf area beyond 200 [nm] claimed by Bangladesh and Myanmar [...].
- That, vis-à-vis Myanmar only, Bangladesh is entitled to claim sovereign rights over the trilateral shelf area claimed by Bangladesh, Myanmar and India [...]

420. Myanmar rejects Bangladesh's contention that Myanmar has no entitlement to a continental shelf beyond 200 nm. While Myanmar does not contradict Bangladesh's evidence from a scientific point of view, it emphasizes that **the existence of a geological discontinuity in front of the coast of Myanmar is simply irrelevant to the case.** According to Myanmar, **the entitlement of a coastal State to a continental shelf beyond 200 nm is not dependent on any "test of natural geological prolongation". What determines such entitlement is the physical extent of the continental margin, that is to say its outer edge, to be identified in accordance with article 76, paragraph 4, of the Convention.**

421. Myanmar points out that it identified the outer edge of its continental margin by reference to the Gardiner formula, which is embodied in article 76, paragraph 4(a)(i), of the Convention. The Gardiner line thus identified is well beyond 200 nm, and, consequently, so is the outer edge of Myanmar’s continental margin. Therefore Myanmar is entitled to a continental shelf beyond 200 nm in the present case. It has accordingly submitted the particulars of the outer limits of its continental shelf to the Commission pursuant to article 76, paragraph 8, of the Convention.

423. Myanmar argues that Bangladesh has no continental shelf beyond 200 nm because “[t]he delimitation of the continental shelf between Myanmar and Bangladesh stops well before reaching the 200-[nm] limit measured from the baselines of both States. In these circumstances, the question of the delimitation of the continental shelf beyond this limit is moot and does not need to be considered further by the Tribunal”.

Meaning of natural prolongation

424. With respect to the question of the Parties' entitlements to the continental shelf beyond 200 nm, Bangladesh has made considerable efforts to describe the geological evolution of the Bay of Bengal and its geophysical characteristics known as the Bengal depositional system. Bangladesh points out in particular that the Indian plate, on which the entire Bengal depositional system is located, slides under the adjacent Burma plate close to and along the coast of Myanmar, thus resulting in the Sunda Subduction Zone. According to Bangladesh, this subduction zone, which marks the collision between the two separate tectonic plates, represents the most fundamental geological discontinuity in the Bay of Bengal.

426. Bangladesh argues that “natural prolongation of its land territory” in article 76, paragraph 1, refers to the need for geological as well as geomorphological continuity between the land mass of the coastal State and the seabed beyond 200 nm. Where, as in the case of Myanmar, such continuity is absent, there cannot be entitlement beyond 200 nm**. In Bangladesh’s view, “[n]atural prolongation beyond 200 [nm] is, at root, a physical concept [and] must be established by both geological and geomorphological evidence”. It cannot be based on the geomorphology of the ocean floor alone but must have an appropriate geological foundation.** Bangladesh argues that the ordinary meaning of the words “natural prolongation” in their context clearly supports such interpretation. It maintains that this interpretation is also supported by the jurisprudence, as well as the Scientific and Technical Guidelines and the practice of the Commission.

427. Myanmar disputes Bangladesh's interpretation of natural prolongation. According to Myanmar, "[n]atural prolongation, as referred to in article 76(1) of UNCLOS is not, and cannot be made to be, a new and independent criterion or test of entitlement to continental shelf" beyond 200 nm. **In Myanmar's view, natural prolongation is a legal term employed in the specific context of defining the continental shelf and carries no scientific connotation.** Under article 76, paragraph 1, of the Convention**, the controlling concept is not natural prolongation but the "outer edge of the continental margin", which is precisely defined by the two formulae provided in article 76, paragraph 4.** Myanmar is of the view **that "article 76 (4) of UNCLOS controls to a large extent the application of article 76 as a whole and is the key to the provision".** Myanmar argues that this interpretation is confirmed by the practice of the Commission as well as the object and purpose of the provision and the legislative history. For this reason, according to Myanmar, such scientific facts as the origin of sediment on the seabed or in the subsoil, the nature of sediment and the basement structure or tectonics underlying the continents are not relevant for determining the extent of entitlement to the continental shelf under article 76.

Arguments of the Tribunal

Article 76 defines the continental shelf. In particular, paragraph 1 thereof defines the extent of the continental shelf, and subsequent paragraphs elaborate upon that. Paragraph 1 reads as follows:

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 [nm] 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.

429. Under article 76, paragraph 1, of the Convention, the continental shelf of a coastal State can extend either to the outer edge of the continental margin or to a distance of 200 nm, depending on where the outer edge is situated. **While the term "natural prolongation" is mentioned in this paragraph, it is clear from its language that the notion of "the outer edge of the continental margin" is an essential element in determining the extent of the continental shelf.**

430. **Paragraphs 3 and 4 of article 76 of the Convention, further elaborate the notion of the outer edge of the continental margin.** In particular, paragraph 4 of that article introduces specific formulae to enable the coastal State to establish precisely the outer edge of the continental margin. It reads as follows:

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 [nm] 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 [nm] 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.

431. By applying article 76, paragraph 4, of the Convention, which requires scientific and technical expertise, a coastal State will be able to identify the precise location of the outer edge of the continental margin.

432. By contrast, no elaboration of the notion of natural prolongation referred to in article 76, paragraph 1, is to be found in the subsequent paragraphs. **In this respect, the Tribunal recalls that, while the reference to natural prolongation was first introduced as a fundamental notion underpinning the regime of the continental shelf in the *North Sea cases, it has never been defined.***

433. The Tribunal further observes that during the Third United Nations Conference on the Law of the Sea the notion of natural prolongation was employed as a concept to lend support to the trend towards expanding national jurisdiction over the continental margin.

434. **Thus the notion of natural prolongation and that of continental margin under article 76, paragraphs 1 and 4, are closely interrelated. They refer to the same area.**

435. Furthermore, one of the principal objects and purposes of article 76 of the Convention is to define the precise outer limits of the continental shelf, beyond which lies the Area. **The Tribunal therefore finds it difficult to accept that natural prolongation referred to in article 76, paragraph 1, constitutes a separate and independent criterion a coastal State must satisfy in order to be entitled to a continental shelf beyond 200 nm.**

437. For these reasons, the Tribunal is of the view that the reference to natural prolongation in article 76, paragraph 1, of the Convention, should be understood in light of the subsequent provisions of the article defining the continental shelf and the continental margin. **Entitlement to a continental shelf beyond 200 nm should thus be determined by reference to the outer edge of the continental margin, to be ascertained in accordance with article 76, paragraph 4. To interpret otherwise is warranted neither by the text of article 76 nor by its object and purpose.**

438. The Tribunal therefore cannot accept Bangladesh's contention that, by reason of the significant geological discontinuity dividing the Burma plate from the Indian plate, Myanmar is not entitled to a continental shelf beyond 200 nm.

439. Not every coast generates entitlements to a continental shelf extending beyond 200 nm. …

443. Notwithstanding the overlapping areas indicated in the submissions of the Parties to the Commission, **the Tribunal would have been hesitant to proceed with the delimitation of the area beyond 200 nm had it concluded that there was significant uncertainty as to the existence of a continental margin in the area in question.**

444. In this regard, the Tribunal notes that the Bay of Bengal presents a unique situation, as acknowledged in the course of negotiations at the Third United Nations Conference on the Law of the Sea. As confirmed in the experts' reports presented by Bangladesh during the proceedings, which were not challenged by Myanmar, the sea floor of the Bay of Bengal is covered by a thick layer of sediments some 14 to 22 kilometres deep originating in the Himalayas and the Tibetan Plateau, having accumulated in the Bay of Bengal over several thousands of years (see Joseph R. Curray, "The Bengal Depositional System: The Bengal Basin and the Bay of Bengal", 23 June 2010; Joseph R. Curray, "Comments on the Myanmar Counter-Memorial, 1 December 2010", of 8 March 2011; and Hermann Kudrass, "Elements of Geological Continuity and Discontinuity in the Bay of Bengal: From the Coast to the Deep Sea", of 8 March 2011).

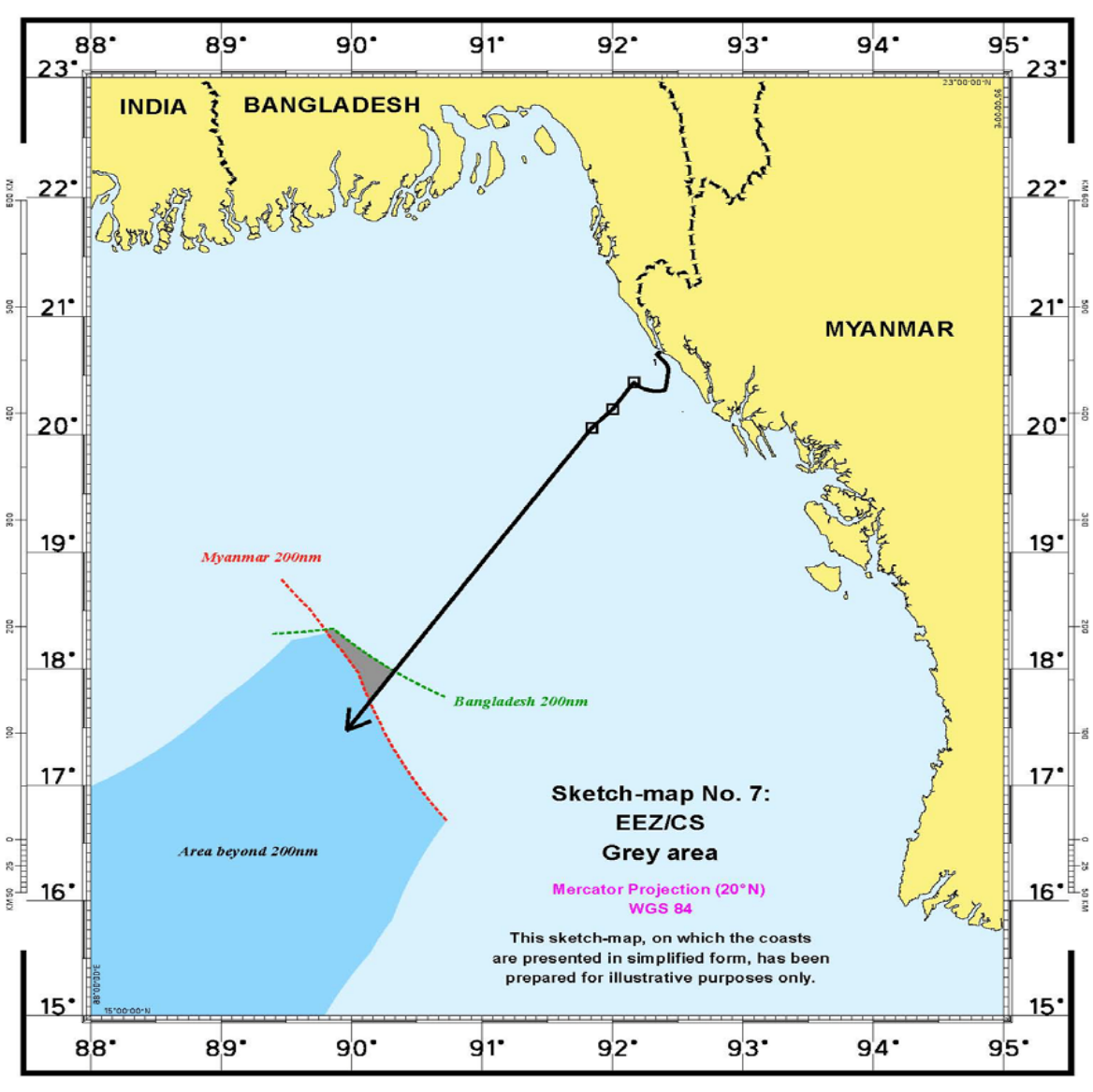
445. The Tribunal notes that as the thick layer of sedimentary rocks covers practically the entire floor of the Bay of Bengal, including areas appertaining to Bangladesh and Myanmar, in their submissions to the Commission, both Parties included data indicating that their entitlement to the continental margin extending beyond 200 nm is based to a great extent on the thickness of sedimentary rocks pursuant to the formula contained in article 76, paragraph 4(a)(i), of the Convention.

446. In view of uncontested scientific evidence regarding the unique nature of the Bay of Bengal and information submitted during the proceedings, the Tribunal is satisfied that there is a continuous and substantial layer of sedimentary rocks extending from Myanmar’s coast to the area beyond 200 nm.

447. The Tribunal will now turn its attention to the significance of the origin of sedimentary rocks in the interpretation and application of article 76 of the Convention. **The Tribunal observes that the text of article 76 of the Convention does not support the view that the geographic origin of the sedimentary rocks of the continental margin is of relevance to the question of entitlement to the continental shelf or constitutes a controlling criterion for determining whether a State is entitled to a continental shelf.**

448. The Tribunal is not convinced by the arguments of Bangladesh that Myanmar has no entitlement to a continental shelf beyond 200 nm. The scientific data and analyses presented in this case, which have not been contested, do not establish that Myanmar's continental shelf is limited to 200 nm under article 76 of the Convention, and instead indicate the opposite.

449. The Tribunal accordingly concludes that both Bangladesh and Myanmar have entitlements to a continental shelf extending beyond 200 nm. The submissions of Bangladesh and Myanmar to the Commission clearly indicate that their entitlements overlap in the area in dispute in this case.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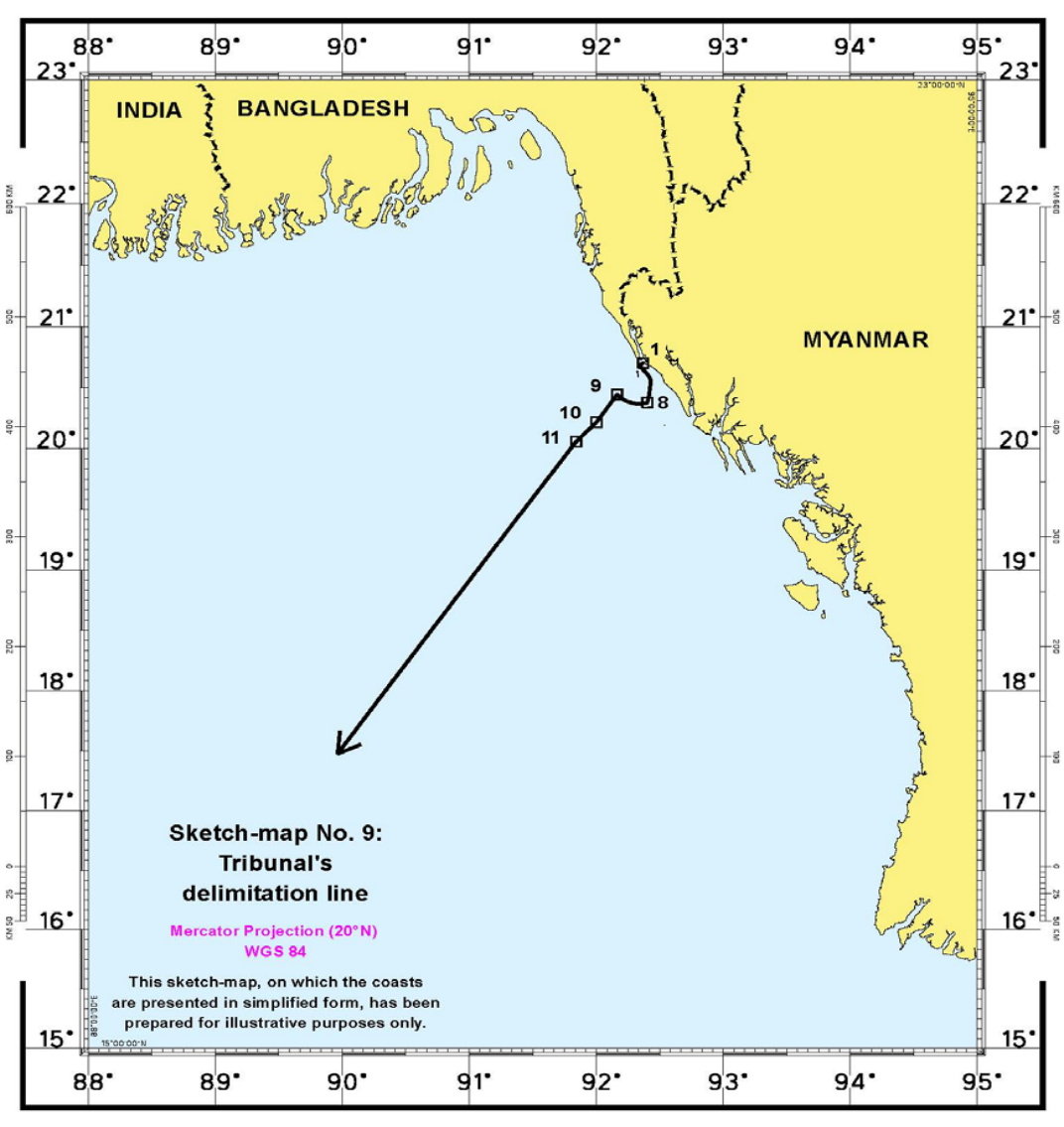
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Sketch-map No. 9:
Tribunal's
delimitation line
Mercator Projection (20° N)
WGS 84
This sketch-map, on which the coasts
are presented in simplified form, has been
prepared for illustrative purposes only.

The limits of the continental shelf beyond 200 nautical miles are to be established in accordance with article 76, paras, 4 and 9. The application of these provisions may place a part of the natural prolongation of the land territory beyond the outer limits of scientific continental shelf.

It is concluded by some scholars in this regard that:

Article 76 (1) of the Convention refers to the natural prolongation of the land territory to define the continental shelf. To establish which areas are comprised by the reference to natural prolongation, the starting point is the land territory. The connection between the land territory and the natural prolongation can be geomorphological and /or geological. One of the implications of the definition of the continental shelf is that the continental shelf may consist of areas that are either continental and /or oceanic in origin (ILA report – 2006, p.3)

CHARACTERISTICS OF THE CONTINENTAL SHELF'S LEGAL REGIME (articles 76-84; Annex II)

The legal regime of the continental shelf can be summarized as follows:

Breadth:

- up to 200 M, measured from the baselines, or
- for States with margins wider than 200 M, up to the outer edge of the continental margin which is identified by reference to the formulae lines:
  - Sediment thickness line (1%)
  - 60 NM from the foot of the continental slope
- but in any event not beyond the limits identified by reference to the constraint lines:
  - 350 M from the baselines from which the breadth of the territorial sea is measured, or to
  - 100 M from the 2,500 metre isobath;

Entitlement: depending on the breadth of the continental shelf:

- Continental shelves up to 200 NM: the coastal State does not need to establish the continental shelf.

- Continental shelves extending beyond 200 NM: for the portion up to 200 miles the coastal State does not need any proclamation; for the remaining part, the coastal State needs to establish the outer limits of the continental shelf with the assistance of the Commission, in accordance with the criteria which will be examined in this module.

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Content of the legal regime: the coastal State has

- sovereign rights for the purpose of exploring the continental shelf and exploiting its natural resources. These rights are:

- Exclusive (even 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); and
- Independent from occupation, effective or notional, or on any express proclamation on the part of the coastal State (article 77, paragraphs 2-3).

- Jurisdiction with regard to the

- establishment and use of artificial islands, installations and structures (article 80);
- drilling on the continental shelf (article 81);
- cables and pipelines connected to its exploration and exploitation or to the operations of artificial islands, installations and structures (article 79);
- marine scientific research (article 246); and
- protection and preservation of marine environment (article 208).

Definition of the continental shelf's "natural resources"

- mineral resources;
- other non-living resources of the seabed and subsoil; and
- living organisms belonging to sedentary species (i.e. at the harvestable stage, these organisms either are immobile on or under the seabed or are unable to move except in constant physical contact with the seabed or the subsoil).

Differences between the legal regimes of the continental shelf and the exclusive economic zone

As seen above:

- the continental shelf regime applies to the seabed and its subsoil up to, at least 200 M from the baselines, and
- the exclusive economic zone regime applies to the seabed and its subsoil up to 200 M, as well as to the water column.

Both the continental shelf regime and the exclusive economic zone regime are

- applicable to the ocean floors up to 200 M;
- geared towards the economic interests of the coastal States; and
- based on the idea of adjacency to the coast.

In order to avoid confusion between them, it is necessary to examine how they coexist and interact by highlighting their differences:

Breadth:

(i) the continental shelf regime can extend beyond the 200 M if the geophysical configuration allows;

(ii) the exclusive economic zone cannot extend beyond 200 M.

Entitlement: whereas

(i) the continental shelf inherently belongs to the coastal State,

(ii) the exclusive economic zone must be proclaimed by it. In other words, all coastal States have a continental shelf while they may or may not have an exclusive economic zone (in such a case, the waters above the continental shelf falls under the high seas regime).

Scope:

(i) the continental shelf regime only applies to the seabed, its subsoil and their resources;

(ii) the exclusive economic zone regime extends also to the water column and its resources.

Content of the legal regime

Exploitation of resources:

(i) *living resources*: coastal States have the obligation to share the surplus of the living resources that they are allowed to catch in the exclusive economic zone with other States, whereas they do not have such an obligation with regard to the sedentary species of the continental shelf;

(ii) *non-living resources*: coastal States must make payments or contributions in kind (up to 7% of the value or volume of their production) through the ISA with respect of the exploitation of the non-living resources of their continental shelves beyond 200 M; in general, the continental shelf regime is more elaborate with regard to their exploitation.

Pollution: broader jurisdiction in the exclusive economic zone than in the continental shelf.

Marine scientific research: broader jurisdiction in the exclusive economic zone than in the continental shelf

APPLICATION OF ARTICLE 76
Operational definition of continental shelf

Operational aspects of the delineation of the continental shelf's outer limits beyond 200 NM defined in paragraphs 4-7 of article 76.

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 M 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 M 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 M from the baselines from which the breadth of the territorial sea is measured or shall not exceed 100 M 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 M 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 M from the baselines from which the breadth of the territorial sea is measured, by straight lines not exceeding 60 M in length, connecting fixed points, defined by coordinates of latitude and longitude.

A four-step process

First, *the coastal State must delineate the outer edge of its continental margin applying the set of rules contained in article 76, paragraph 4 (Formulae Lines).*

Second, *it must demonstrate that its continental shelf extends throughout the natural prolongation of its submerged land territory to the outer edge of the continental margin beyond 200 NM (Test of Appurtenance).*

Third, *provided that the Test of Appurtenance has been satisfied, it must verify that the formulae lines do not go beyond the limits defined in article 76, paragraphs 5 and 6 (Constraint Lines).*

And finally*, it must delineate the outer limits of its continental shelf by utilizing the formulae and constraint lines.*

STEP 1: Formulae lines

Article 76, paragraph 4(a), contains two formulae for the identification of the outer edge of the continental margin. As they rely on the concept of the foot of the continental slope, i.e. the point where the continental slope ends and the continental rise begins, it is useful to first examine how this is defined by UNCLOS:

> *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* (article 76, paragraph 4(b)).

Due to the complexity of the seabed, it can be rather difficult to identify the foot of the continental slope. The drafters of UNCLOS provided two methods to simplify this task, developing, once more, a legal concept which may not coincide with its scientific counterpart.

Maximum change in gradient and evidence to the contrary
Maximum change in gradient

According to the provision just examined, the normal method used for identifying the foot of the continental slope is to find the point of **maximum change in the gradient** at the **base** of the continental slope. Since the slope may contain a number of points with similar changes in gradient, UNCLOS requires:

- First, defining the area of the base of the slope;
- Second, calculating the gradient changes within the base of the slope;
- And finally, identifying the point of maximum change in gradient.

Evidence to the contrary

In certain cases, the maximum change in the gradient may not be helpful in identifying the foot of the continental slope. This may occur, for instance, when:

- The curvature of the seabed along the base of the continental slope is constant. In this case, the maximum change in the gradient encompasses not only a point, but a region; or
- The irregular topography of the seabed reveals a number of points sharing the highest change in the gradient at the base of the continental slope.

In these cases, UNCLOS offers the possibility of resorting to a second method that entails the introduction of other evidence as an alternative for determining the location of the foot of the continental slope at its base. UNCLOS does not prescribe the application of a specific scientific methodology to define the location of the foot of the continental slope when evidence to the contrary to the general rule is invoked. The coastal State will have to rely on the best geological and geophysical evidence available.

Commentary

The two approaches to determining the foot of the slope contained in article 76 (4) (b) allow drawing some conclusions in this respect. The determination of the foot of the slope as the maximum change in gradient may not always accurately establish the foot of the slope and that foot of the slope is not defined solely by geomorphological characteristics. There may be difficulties with the determination of the location of the base of the slope. Furthermore, the area in which the foot of the slope is located may be characterized by a transition from predominantly continental crust to predominantly oceanic crust. Under the evidence to the contrary rule the foot of the slope may be placed in this zone of transition.

The reference to two criteria to determine the foot of the slope makes it necessary to establish their relationship. The *Virginia Commentary* observes in this respect that

“the phrase in the absence of evidence to the contrary implies that there may be special circumstances requiring the application of alternative means for determining the foot of the continental slope”.

The Scientific and Technical Guidelines of the Commission on the Limits of the Continental Shelf suggest that as a rule it will be possible to define the foot of the slope by establishing the maximum change in gradient and that the provision concerning evidence to the contrary is complementary to this general rule (note 25 at paras 6.1.1).

Interpreting evidence to the contrary rule as a residual rule would imply that a coastal State making a submission would have to prove that there are circumstances which make the maximum change in gradient rule inapplicable and the only if that is the case a coastal State may apply the evidence to the contrary rule. The wording of article 76 (4) (b) indicates a different relationship between the two rules. **The maximum change in gradient rule is applicable in the absence of evidence to the contrary. If the latter type of evidence on the location on the foot of the slope exists, the maximum change in gradient rule is not applicable.**

In concluding it may be stated the following

Article 76 (4) (b) of the Convention provides that 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. The reference to these two approaches to determine the foot of the slope indicates that the foot of the sloe can be determined on the basis of geomorphological and /or geological characteristics.

Article 76 (4) (b) does not establish a precedence between the two approaches contained in it. A coastal State may opt to present evidence to the contrary to locate the foot of the slope, or, if such evidence is not available, present evidence on the maximum change of gradient at the foot of the slope.

Types of Formulae Lines

Having examined the concept of the foot of the continental slope, it is now possible to proceed with the description of the formulae lines contained in article 76, paragraph 4(a), the outer envelope of which identifies the outer edge of the continental shelf. Both lines are determined with reference to the position of the foot of the continental slope just examined to establish the outer edge of the continental margin

Sediment thickness formula

The first formula line is based on the sediment thickness formula, which is often referred to as the “Irish Formula” or “Gardiner Formula” (after the name of the geologist who first proposed it, P.R. Gardiner). It is defined by article 76, paragraph 4(a) (i) as:

(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* (see figures I.6 and I.7 below).

To draw this line the coastal State must:

- Identify the foot of the continental slope;
- Measure the thickness of the sedimentary rocks over its continental rise;
- Identify fixed points where the sediment thickness is at least 1% of the shortest distance between such point and the foot of the continental slope; and
- Connect these fixed points.

Figure I.6: Sediment thickness line (Scientific and Technical Guidelines)

Figure I.7: Sediment thickness line – bird’s eye view (Scientific and Technical Guidelines)

This method is suitable when there are substantial volumes of sediments deposited over the continental rise, a circumstance that may occur if the outer edge of the continental margin is at a considerable distance from the foot of the continental slope. In the UNCLOS system the practical solution offered in this case is that the outer edge of the continental shelf is identified along points where the thickness of the sediments is 1% of the distance back to the foot of the continental slope: for example, a fixed point of this kind located at 130 kilometres from the foot of the continental slope will have to sit over sediments 1.3 kilometres thick.

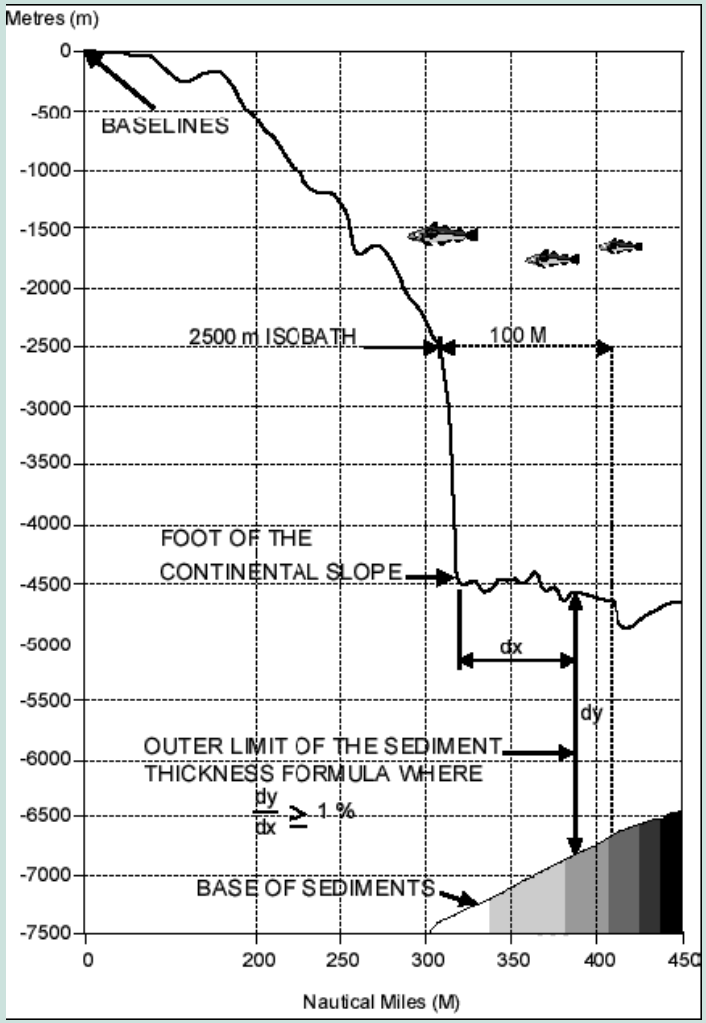

Figure I.6 Sediment thickness line (Scientific and Technical Guidelines)

Figure I.7 Sediment thickness line – bird's eye view (Scientific and Technical Guidelines)

Distance formula

The second formula line is based on what is often referred to as “Distance Formula” or “Hedberg Formula” (named after its author H.Hedberg). It is defined by article 76, paragraph 4(a) (ii) as:

(i) *a line delineated in accordance with paragraph 7 by reference to fixed points not more than 60 M from the foot of the continental slope* (see figures I.8 and I.9).

Figure I.8: Foot of the continental slope plus 60 M line (Scientific and Technical Guidelines)

Figure I.9: Foot of the continental slope plus 60 M line – bird’s eye view (Scientific and Technical Guidelines)

This method is much simpler to apply, as the coastal State only has to:

- Identify the foot of the continental slope;
- Determine arcs at a distance of not more than 60 M from the foot of the continental slope.

This method may prove suitable where the thickness of the sediments is not sufficient to establish the edge of the continental margin beyond 60 M from the foot of the continental slope.

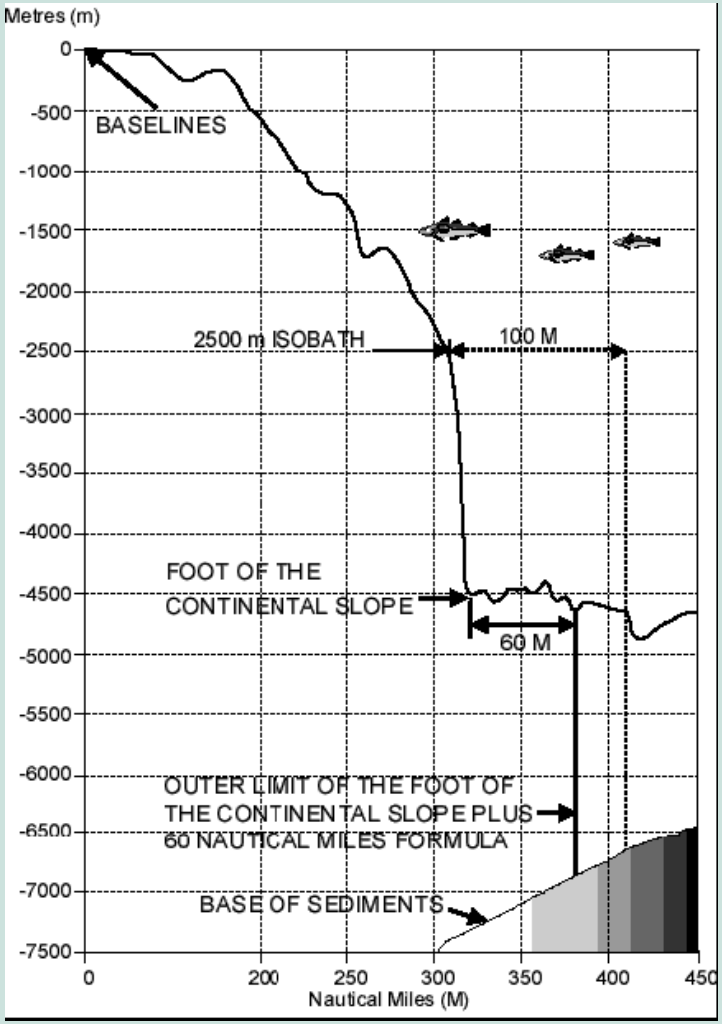

Figure I.8 Foot of the continental slope plus 60 M line (Scientific and Technical Guidelines)

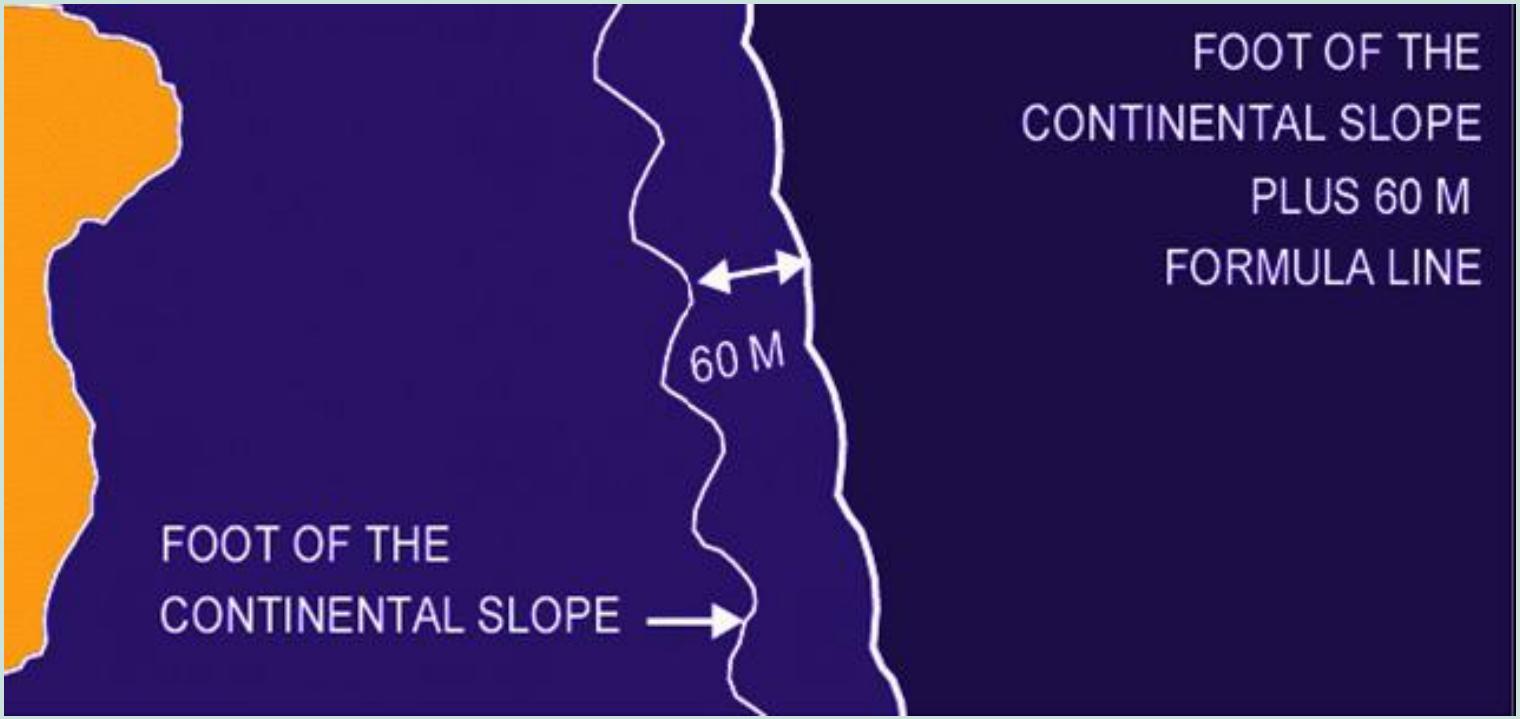

Figure I.9 Foot of the continental slope plus 60 M line – bird's eye view (Scientific and Technical Guidelines)

Outer envelope of the formulae lines

The use of the inclusive disjunction ‘or’ in article 76, paragraph 4 as a connective between the two formulae examined above implies that the compound is true so long as at least one of the components is true. In other words, the limit of the continental shelf can be extended:

- To a 1% sediment thickness line delineated by reference to fixed points;
- to a line delineated by reference to fixed points at a distance of 60 M from the foot of the continental slope;
- **or to both.**

If the formulae lines intersect, their outer envelope determines the maximum potential extent of entitlement over the continental shelf by a coastal State, as illustrated in the figure below.

Figure I.10: Outer envelope of the formulae lines (Scientific and Technical Guidelines)

This envelope, however, is still subject to the spatial constraints described below under “Step 3”, in order to produce the delineation of the outer limits of the continental shelf.

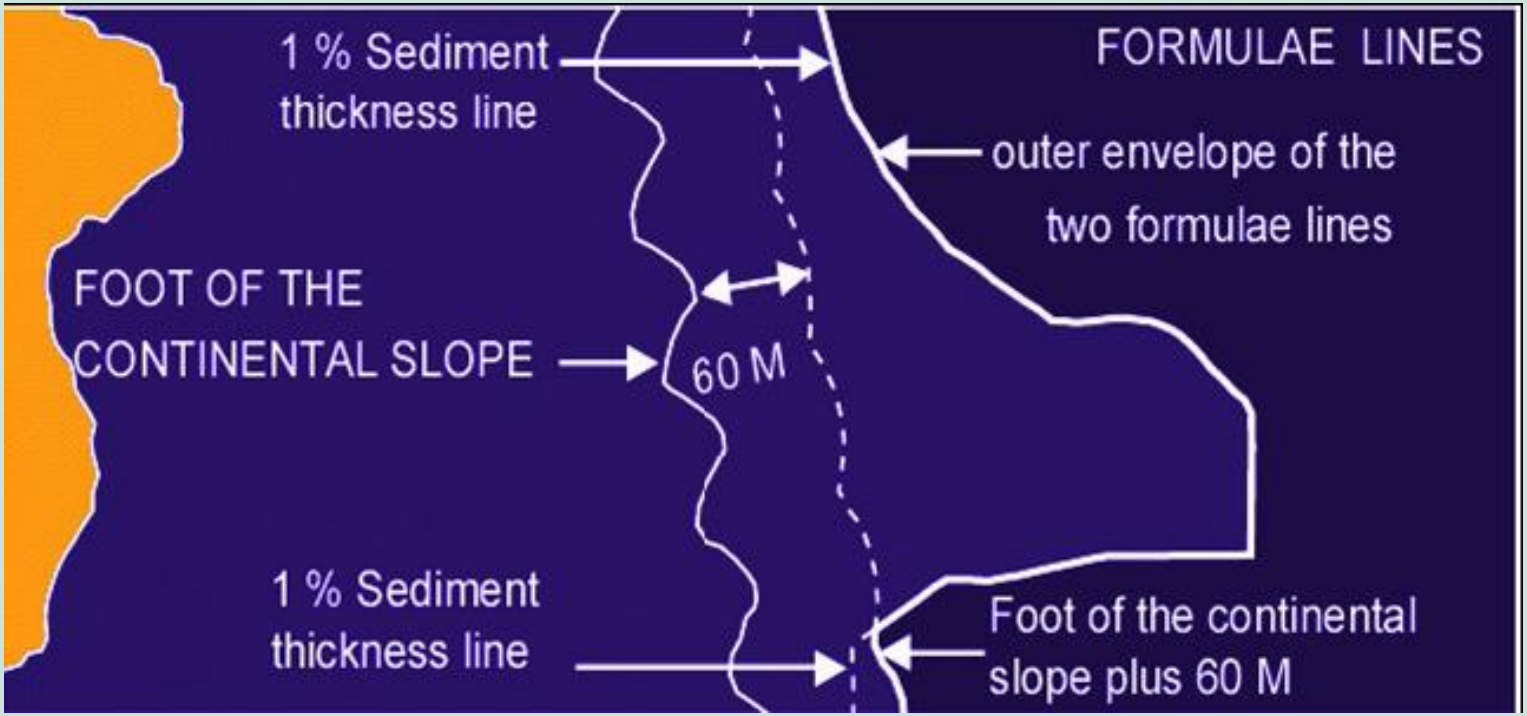

Figure I.10 Outer envelope of the formulae lines (Scientific and Technical Guidelines)

The "Bengal Rule"

UNCLOS envisages an exception to the application of the rules relating to the formulae lines. It is contained in **the Statement of Understanding Concerning a Specific Method to Be Used in Establishing the Outer Edge of the Continental Margin (Annex II, Final Act of the Third United Nations Conference on the Law of the Sea)** (hereafter: "Statement of Understanding").

During the drafting of UNCLOS it was noted that in certain areas, even though a very thick accumulation of sediments extended hundreds of kilometres seaward, the foot of the continental slope was very close to the baselines. In such cases, the formulae lines (which, as we have seen, are based on the foot of the continental slope) would lie close to the baselines, a circumstance that would put coastal States with continental shelves having those characteristics at a disadvantage.

To address this issue, the drafters negotiated an exception which applies where:

- The average distance at which the 200-metre isobath occurs is not more than 20 NM; and
- The greater proportion of the sedimentary rock of the continental margin lies beneath the rise.

If both these conditions are met, the coastal State may establish the outer edge of its continental margin through a ‘modified sediment thickness formula’: **by straight lines not exceeding 60 M 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**. In other words, instead of using the thickness of the sediment in relative terms (with regard to the distance from the fixed points to the foot of the continental slope) as it is normally done, this exception relies on the thickness in absolute terms (the sediments must be at least 1 kilometre thick).

To avoid inequalities and disputes with neighbouring States as a result of the application of such exception, the Statement of Understanding provides that:

> *[…] 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****.*

This exception is often referred to as the “Bengal Rule” because it was drafted to address the special characteristics of the Bay of Bengal, which is explicitly referred to in the Statement of Understanding.

Even though this exception is not contained in the body of UNCLOS, but in the Statement of Understanding, the Commission is bound to take it into consideration by article 3, paragraph 1(a) of Annex II to UNCLOS, according to which:

> *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 M, 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.*

STEP 2
The Test of Appurtenance

After having delineated the formulae lines, the coastal State must demonstrate that the natural prolongation of its submerged land territory to the outer edge of its continental margin extends, at least in part, beyond 200 M. Only in such cases are coastal States entitled to an extended continental shelf.

The test of appurtenance is the process of determining whether a coastal State is legally entitled to delineate the outer limits of the continental shelf throughout the natural prolongation of its land territory:

- To the outer edge of the continental margin, or

- Only up to a distance of 200 M from the baselines, if the outer edge of the continental margin does not extend up to that distance

Outcomes of the test of appurtenance

The test of appurtenance has only two outcomes:

- If a coastal State can demonstrate that the outer edge of its continental margin, determined on the basis of the formulae lines described above (sediment thickness formula line or distance formula line), extends beyond 200 M from the baselines, it is entitled to delineate the outer limits of its extended continental shelf in accordance with article 76, paragraphs 4-10.

- If a coastal State cannot provide the above demonstration, the outer limits of its continental shelf are automatically delineated up to 200 M, as prescribed in article 76, paragraph 1. **In this case, the coastal State does not have an obligation to submit information on the limits of the continental shelf to the Commission, nor is the Commission called upon by UNCLOS to make recommendations on those limits.**

Figure I.11: Test of appurtenance satisfied (Scientific and Technical Guidelines)

In the figure above (I.11) both formulae lines satisfy the Test of Appurtenance. Only if either of the two formulae lines is placed as illustrated in figure I.11, can the coastal State proceed to the next step of the process: the delineation of constraint lines, described below.

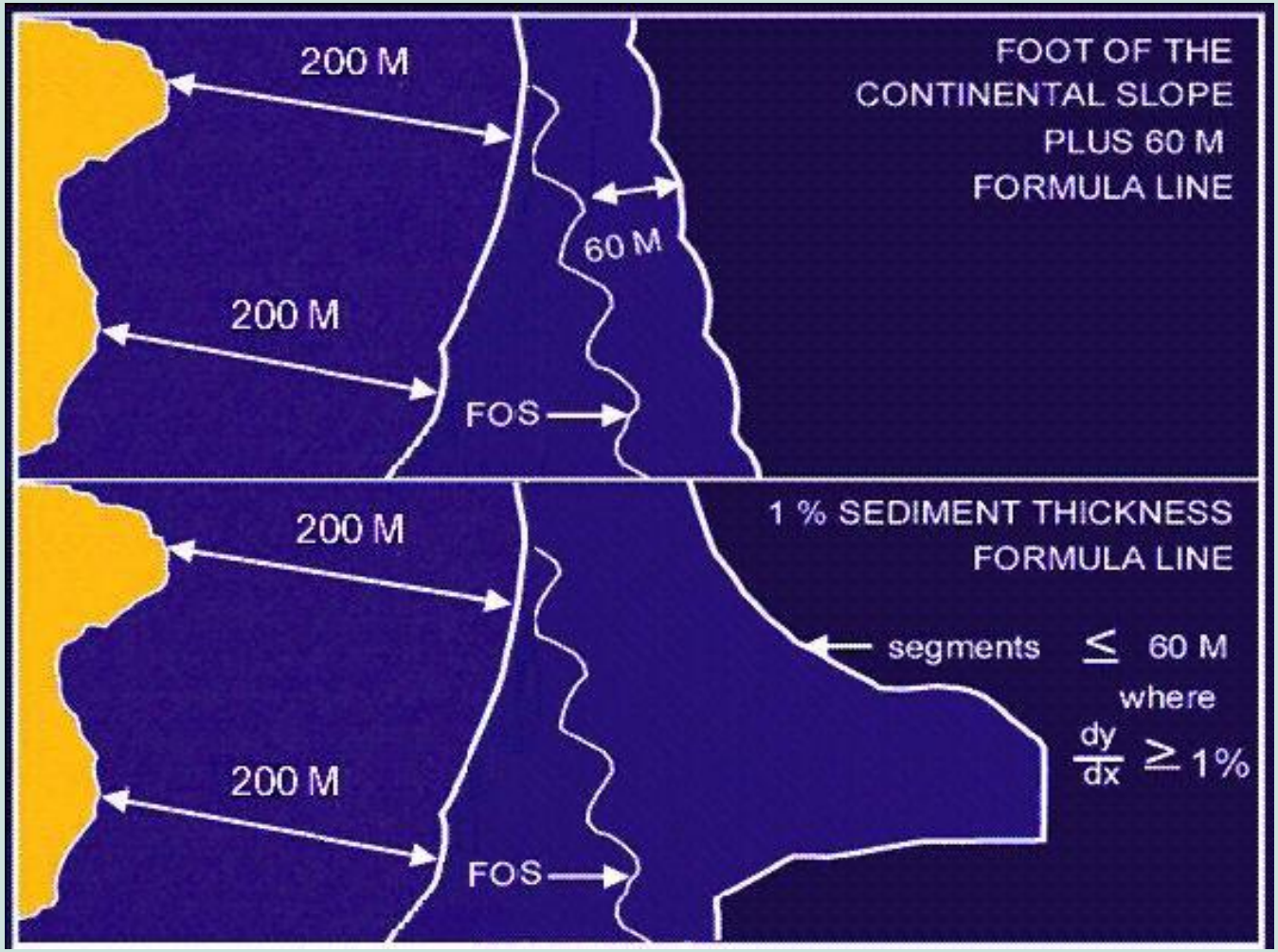

Figure I.11 Test of appurtenance satisfied (Scientific and Technical Guidelines)

STEP 3
Constraint lines

On the continental shelf of some States (excluding those for which the “Bengal Rule” applies), the formulae lines may lie at great distance from the baselines. To prevent such situations from creating severe inequalities with coastal States characterized by narrower continental shelves, the drafters of UNCLOS established constraints beyond which the outer limits of the continental shelf cannot be delineated. According to article 76, paragraph 5, the fixed points determined with reference to the foot of the continental slope (either through the sediment thickness or the distance formulae) cannot lie beyond the outer envelope of these two constraint lines:

- 350 M from the baselines from which the breadth of the territorial sea is measured, or
- 100 M from the 2,500 metre isobath.

(i) 350 M Constraint line

The first constraint line is simpler to draw since it is based on a distance criterion.

Figure I.12: 350 M constraint line – bird's eye view (Scientific and Technical Guidelines)

(i) 100 M from 2,500 m isobath constraint line

The second constraint, 100 NM from 2,500 m isobath, based on the depth criterion, however, accommodates cases where the physical extent of a continental margin clearly exceeds the 350 NM limit. The 2,500 m depth contour has the advantage of being situated on the continental slope and being relatively easy to identify by hydrographic surveying. In some areas, there may be more than one 2,500 isobath due to irregularities in the topography of the seabed (see the section "Selection of points for the delineation of the 100M limit" in Module III).

Figure I.13: 100 M from 2,500 m isobath constraint line – bird's eye view (Scientific and Technical Guidelines)

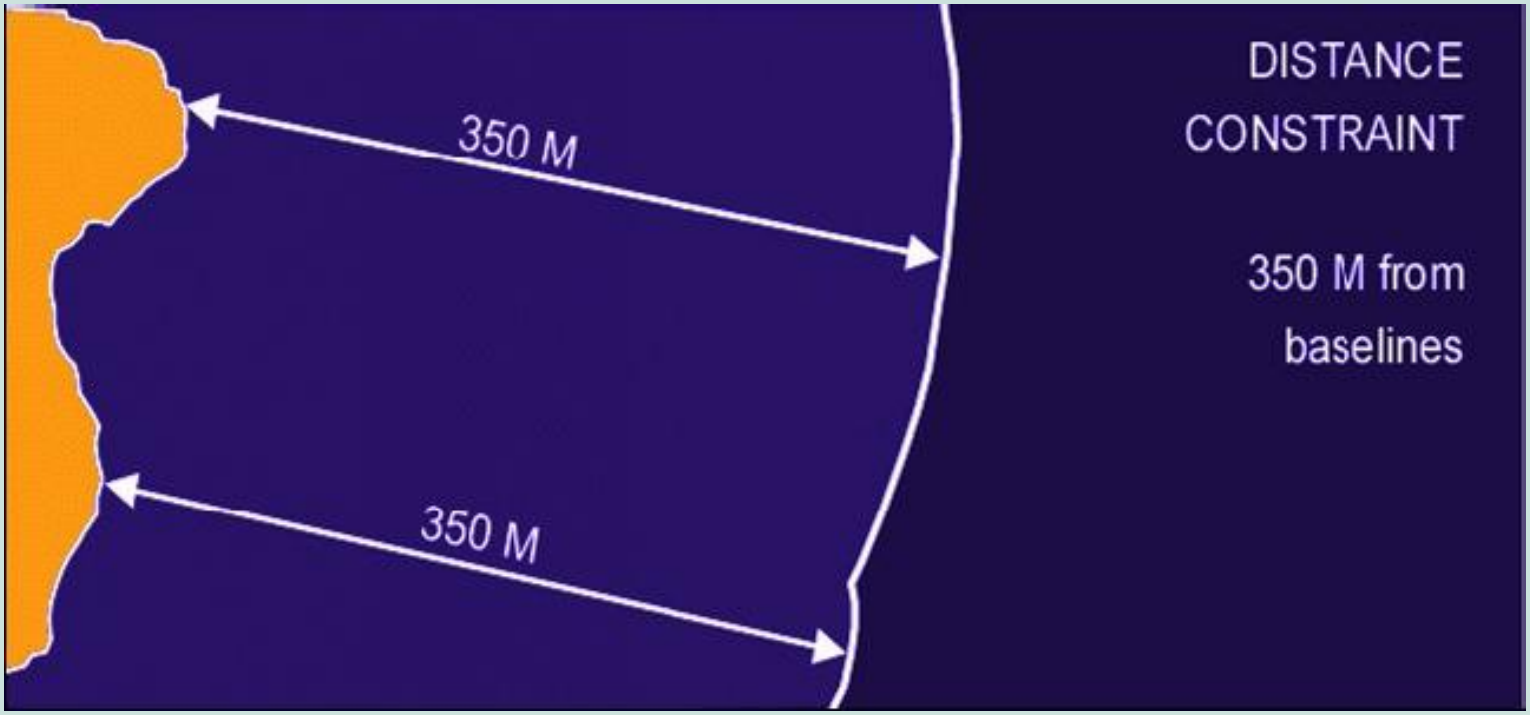

Figure I.12 350 M constraint line – bird's eye view (Scientific and Technical Guidelines)

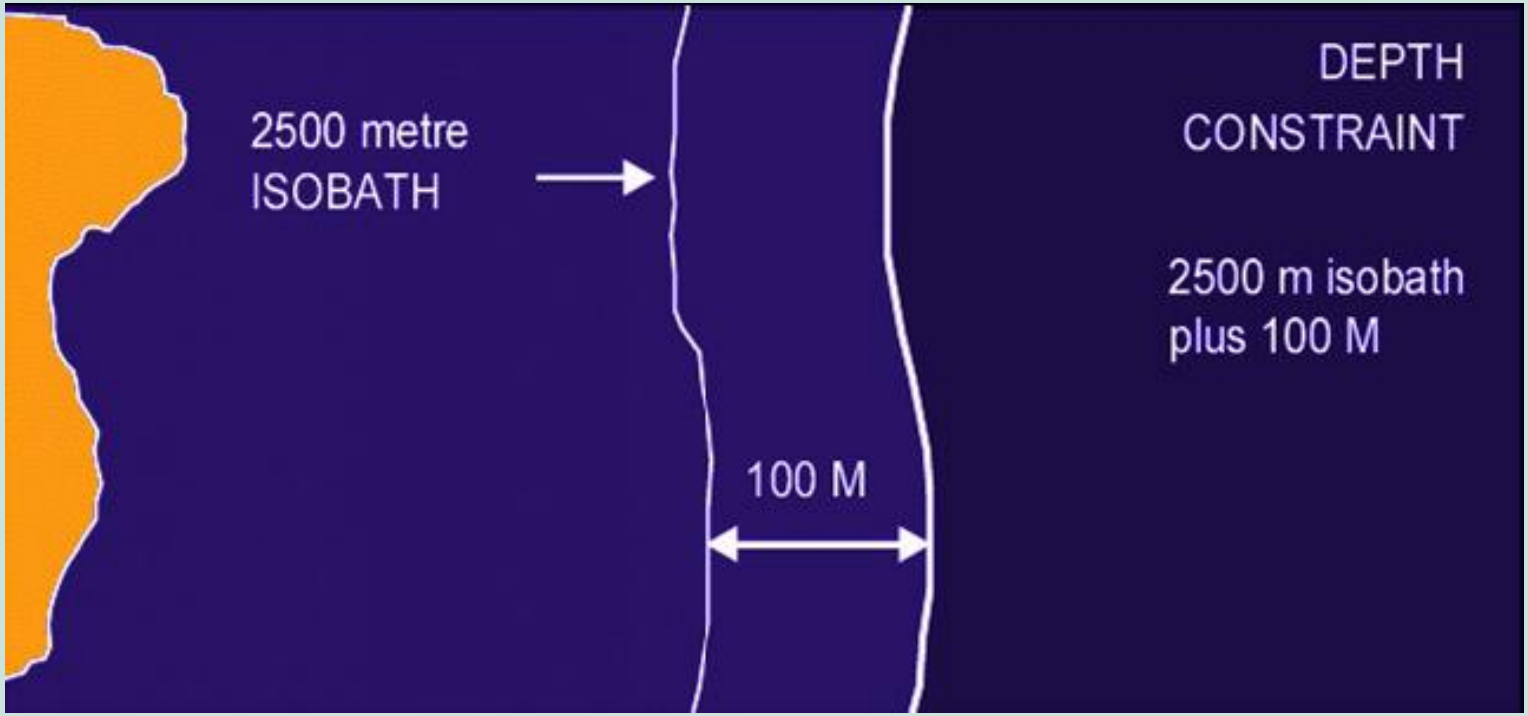

Figure I.13 100 M from 2,500 m isobath constraint line – bird's eye view (Scientific and Technical Guidelines)

Outer envelope of the constraint lines

Since article 75, paragraph 5, like in the case of the formulae lines, lists the two constraint lines examined above through an inclusive disjunction, the outer envelope of the constraint lines identifies the breadth beyond which the outer limits of the continental shelf of a coastal State cannot extend. In other words, the outer limits of the continental shelf can extend:

- Either by a line delineated by reference to fixed points at a distance of 350 nautical miles from baselines from which the breadth of the territorial sea is measured;
- Or by a line delineated by reference to fixed points at a distance of 100 nautical miles from the 2,500 metre isobath;
- **But not beyond both, if they intersect**.

Figure I.14: Outer envelope of the constraint lines – bird's eye view (Scientific and Technical Guidelines)

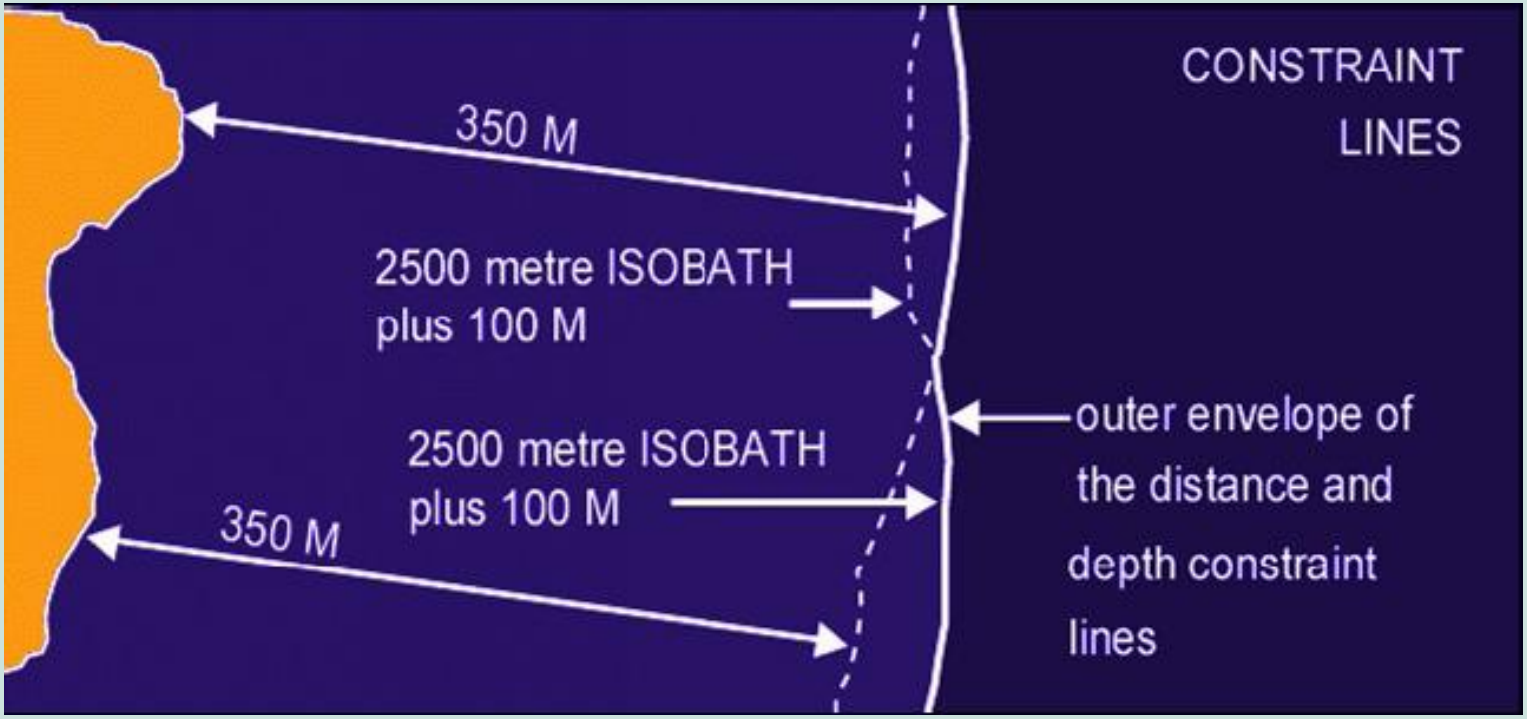

Figure I.14 Outer envelope of the constraint lines – bird's eye view (Scientific and Technical Guidelines)

Seafloor highs

In the presence of seafloor highs, UNCLOS provides certain exceptions regarding the constraint lines. Before examining these exceptions, it is necessary to consider what types of seafloor high UNCLOS considers.

Types of seafloor highs

Three categories of seafloor highs are referred to in article 76:

- Oceanic ridges of the deep ocean floor (article 76, paragraph 3);
- Submarine ridges (article 76, paragraph 6); and
- Submarine elevations that are natural components of the continental margin, such as its plateaux, rises, caps, banks and spurs (article 76, paragraph 3).

Article 76, however, neither defines ridges and elevations nor provides guidance on how to differentiate the categories listed above. Article 76 merely treats them differently, indicating which are relevant (and in what way), and which are not relevant for the delineation of the outer limits of the continental shelf.

Status of seafloor highs

- Not relevant:

- Oceanic ridges of the deep ocean floor are explicitly excluded from the continental margin, like the rest of the deep ocean floor (article 76, paragraph 3).

- Relevant:

- **Submarine ridges** are relevant for the delineation of the outer limits of the continental shelf, **but on such ridges the outer limits of the continental shelf are subject to only one constraint: they cannot exceed 350 M from the baselines. This exception prevents the application of the 100M from the 2,500m isobath constraint line on such ridges**, where the bathymetry is more favourable, from leading to the delineation of outer limits which lie too far from the shore (article 76, paragraph 6).
- **Submarine elevations** are also relevant in the delineation of the outer limits of the continental shelf, but **they are not subjected to the limitations provided for the submarine ridges.** That means that on submarine elevations **the "100- nautical-miles from the 2,500 metre isobath" constraint line can prevail over of the "350 M"** constraint line if it lies seawards of it (article 76, paragraph 6).

Commentary

The issue of submarine highs is one of the most complicated and at the same time most important issues in article 76 of the Convention because depending on how these highs are defined, continental shelf of a coastal State may be either significantly bigger or smaller.

The term “submarine ridge” contained in article 76 (6) is not defined in article 76. Article 76 (3) employs the term “oceanic ridge” and provides that the continental margin does not include the deep ocean floor with its oceanic ridges or the subsoil thereof. As submarine ridges under article 76 (6) can be included in the outer limits of the continental shelf, this term has to have a different meaning from the term oceanic ridges employed in paragraph 76 (3).

The interpretation of article 76 (3) and 76 (6) has to take into account the object and purpose of article 76 as a whole. Article 76 (1) indicates that the continental shelf is the natural prolongation of the land territory to the outer edge of the continental margin. This indicates that in order to establish what parts of the sea-bed and its subsoil are part of the deep ocean floor and its oceanic ridges it is first has to be established what parts of the sea-bed and subsoil are part of the natural prolongation as defined in article 76 (1). The reference to the deep ocean floor and its oceanic ridges cannot lead to the exclusion of areas which form part of that natural prolongation of the land territory and meet the other criteria of article 76 which define the continental shelf. **Ridges of an oceanic origin that are not a part of the natural prolongation of the land territory cannot be used to extend the continental shelf beyond 200 nautical miles.**

This interpretation of articles 76 (3) and 76 (6) presupposes that article 76 does not distinguish between land territory which is continental in origin and land territory which is oceanic in origin, as may, for instance, be the case for certain islands. Article 76 (1) indicates that the continental shelf extends throughout the natural prolongation of the coastal State's land territory to the outer edge of the continental margin. Thus, the starting point for defining this natural prolongation is the land territory**. If the land territory is oceanic in origin so is the natural prolongation extending from this land territory.** The term continental margin in article 76 (3) is similarly defined as comprising the submerged prolongation of the land mass of the coastal State. The provision on submarine ridges in article 76 (6) has dual purpose. **On the one hand, it clarifies that a submarine ridge is a natural prolongation of the land territory. On the other hand, such a natural prolongation cannot be used to extend the continental shelf beyond 350 nautical miles.**

The drafting history of article 76 (6) lend support to the interpretation that the provision on submarine ridges is intended to cover ridges of an oceanic origin. The article on the continental shelf in the first revision of the Informal Composite Negotiating Text did not contain a precursor to paragraph 6 and the last part of what was to become paragraph 3 did not contain a reference to oceanic ridges. A footnote to paragraph 3 stated that general understanding had been reached to the effect that there would be additional discussion and "a mutually acceptable formulation to be included in article 76 will be drawn up". The search for this mutually acceptable formulation was pursued during the resumed eighth session (1979) of the Conference. A number of proposals were made to limit the continental shelf on oceanic ridges to 350 nautical miles. At the ninth session (1980) of the Conference a compromise on this issue was reached which led to the present formulation of paragraph 3 and the inclusion of paragraph 6 in article 76. A number of delegations commented on this draft proposal. These observations, although most of them are not very specific, lend support to the view that the new provision of submarine ridges and submarine elevations clarified that certain features that might or might not be considered to be included in the definition as it stood at that time, would be included in the definition of the continental shelf by this amendment.

Article 76 (3) of the Convention provides that the continental margin does not include the deep ocean floor with it oceanic ridges or the subsoil thereof. Article 76 (6) of the Convention provides that on submarine ridges the outer limit of the continental shelf shall not exceed 350 nautical miles from the baselines. Article 76 (6) does not apply to submarine elevations that are natural components of the continental margin. The use of these three different terms in articles 76 (3) and 76 (6) indicates that these have separate meaning. Any submarine feature can be subsumed under one of these terms.

The term “submarine ridges” in article 76 (6) of the Convention is applicable to ridges that are (predominantly) of oceanic origin and are the natural prolongation of the land territory of a coastal State.

The term “submarine elevations that are natural components of the continental margin” is applicable to features which, although at some point in time were not a part of the continental margin or have become detached from the continental margin, through geological processes are or have become so closely linked to the continental margin as to become a part of it.

STEP 4
Delineation of the outer limits of the continental shelf

At this point the coastal State has all the elements necessary to delineate the outer limits of the continental shelf. These will be drawn on the basis of the formulae lines and within the limits set by the constraint lines.

In all likelihood, the outer limit of the extended continental shelf will be a composite line constituted of sections taken from either of the two formulae lines and from either of the two constraint lines (see figure I.15 below, which builds upon figures I.10 and I.14 above). In other words, the outer limit of the extended continental shelf will be the inner envelope of two lines: the outer envelope of the formulae lines, and the outer envelope of the constraint lines.

Figure I.15: Composite outer limits of the continental shelf– bird's eye view (Scientific and Technical Guidelines)

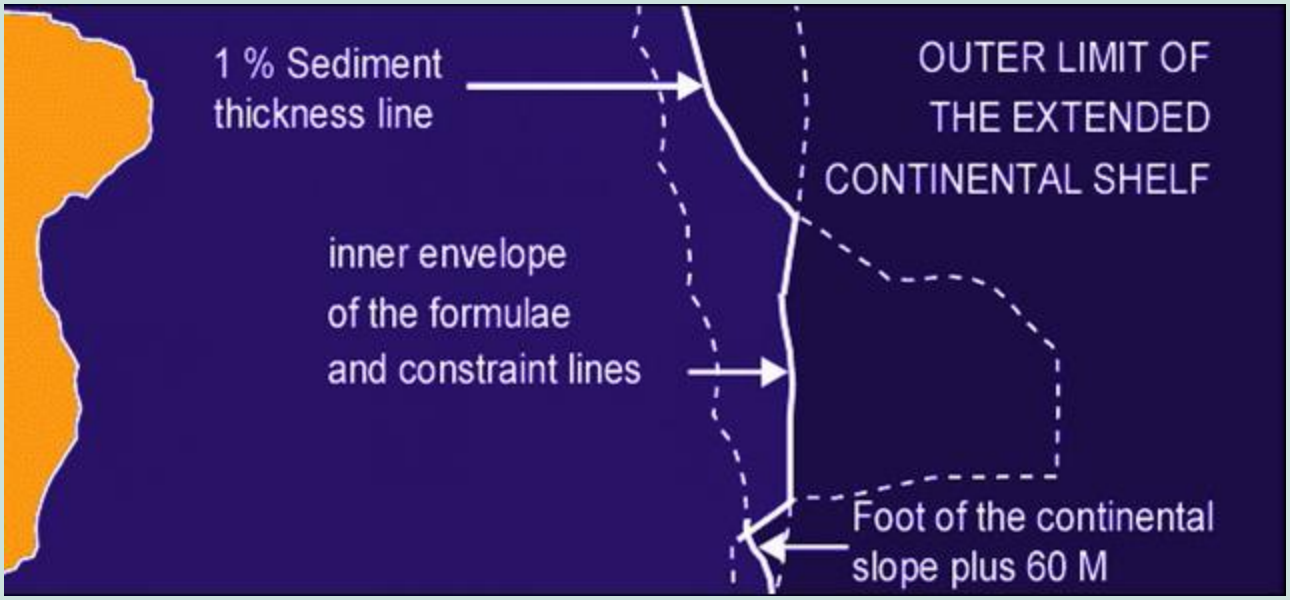

Figure I.15 Composite outer limits of the continental shelf–bird's eye view (Scientific and Technical Guidelines)

Requirements of the final line

Article 76, paragraph 7, contains several requirements concerning the outer limits of the continental shelf. These should be made of straight lines not exceeding 60 M in length, connecting fixed points (determined with reference to the foot of the continental slope through the sediment thickness or the distance formulae), and defined by coordinates of latitude and longitude.

In practice, this provision may help certain coastal States to bridge natural indentations either in the bathymetry or sediment thickness, simplifying the configuration of the outer limits of their continental shelf.

It may be useful at this point to explain the difference between the test of appurtenance and the full delineation of the outer limits of the continental shelf:

For the test of appurtenance:

the coastal State has simply to delineate the outer edge of its continental margin, determined on the basis of the formulae lines (sediment thickness formula line or distance formula line), and show that it lies beyond 200 M.

For the actual delineation of the outer limits of the continental shelf:

the coastal State has to delineate the outer edge of its continental margin, determined on the basis of the formulae lines (sediment thickness formula line or distance formula line) and has to compare these lines with the constraints lines (determined also with regard to seafloor highs, if present) to ensure that nowhere does the outer limit of the continental shelf lie seaward of these constraints. Subsequently, it has to carry out the delineation described under point 9 above.

Additional general observations

A number of relatively small areas beyond 200 nautical miles are wholly surrounded by 200 nautical mile zones of one or a limited number of coastal States. Some of these areas probably are continental shelf in their entirety. In such a case there is no outer limit of the continental shelf and a coastal State cannot delineate the outer limits of its continental shelf in accordance with article 76(7). Consequently, a coastal State cannot submit information on outer limits delineated in accordance with article 76(7) to the CLCS. Such areas are commonly referred to as donut holes. This raises the question how a coastal State is to implement its obligations under article 76 in respect of an area wholly surrounded by 200 nautical mile zones.

Article 76(4) provides that “the coastal State shall establish the outer edge of the continental margin wherever the margin extends beyond 200 nautical miles”. This obligation is applicable to all of the continental margin beyond 200 nautical miles and does not provide for any exceptions. This obligation is to be implemented by applying the criteria contained in article 76(4) to 76(7). In a case in which an area beyond 200 nautical miles is wholly surrounded by 200 nautical mile zones, the application of these criteria will either result in outer limit lines of the continental shelf beyond 200 nautical miles or a finding that all of the area concerned is located inside the outer edge of the continental margin as defined in article 76(4) to 76(7).

Article 76(8) addresses the submission of information to the Commission. A coastal State is obliged to submit information “on the limits of the continental shelf beyond 200 nautical miles”. The obligation to submit information is formulated broadly. It is not limited to submitting information on the outer limits of the continental shelf delineated in accordance with articles 76(4) to 76(7).40 The obligation of the coastal State under article 76(4) indicates that in a case where the continental margin extends beyond 200 nautical miles but cannot be delineated by straight lines in accordance with article 76(4) to 76(7) a coastal State is required to submit information establishing that all of the area concerned is located inside the outer edge of the continental margin as defined in accordance with article 76(4) to 76(7).

Conclusion

A coastal State has to submit information to the Commission on an area beyond 200 nautical miles that is wholly surrounded by 200 nautical mile zones if its continental margin extends into such an area. This obligation also applies in a case in which all of the area is part of the continental shelf and there are no outer limits delineated in accordance with articles 76(7).

Conclusions of the Tribunal

374. The right of the coastal State under article 76, paragraph 8, of the Convention to establish final and binding limits of its continental shelf is a key element in the structure set out in that article. In order to realize this right, the coastal State, pursuant to article 76, paragraph 8, is required to submit information on the limits of its continental shelf beyond 200 nm to the Commission, whose mandate is to make recommendations to the coastal State on matters related to the establishment of the outer limits of its continental shelf. The Convention stipulates in article 76, paragraph 8, that the “limits of the shelf established by a coastal State on the basis of these recommendations shall be final and binding”.

407. It is clear from article 76, paragraph 8, of the Convention that the limits of the continental shelf beyond 200 nm can be established only by the coastal State. Although this is a unilateral act, the opposability with regard to other States of the limits thus established depends upon satisfaction of the requirements specified in article 76, in particular compliance by the coastal State with the obligation to submit to the Commission information on the limits of the continental shelf beyond 200 nm and issuance by the Commission of relevant recommendations in this regard. It is only after the limits are established by the coastal State on the basis of the recommendations of the Commission that these limits become “final and binding”.