

# Reflecting on the Legal-Technical Interface of Article 76 of the LOSC: Tentative Thoughts on Practical Implementation

Nuno Marques Antunes<sup>1</sup>, Portuguese Hydrographic Office, marques\_antunes@hotmail.com

Fernando Maia Pimentel<sup>2</sup>, Portuguese Hydrographic Office, hidrografia@hidrografico.pt

## ABSTRACT

The extension of continental shelf jurisdiction beyond 200 nautical miles is primarily governed by Article 76 of the 1982 *United Nations Convention on the Law of the Sea* (LOSC). The fact that this provision incorporates technical-scientific elements (geological, geomorphological and geophysical) which are essential to its application *in concreto*, and the fact that under the terms of the LOSC the *Commission on the Limits of the Continental Shelf* (CLCS) is to be constituted by experts in the field of geology, geophysics or hydrography, appears to have obscured (to some degree at least) one crucial point: Article 76 is still a legal provision, and it should be understood as such. Whilst suggesting that, in spite of its technical input, this provision has to be interpreted and applied within *the framework of the entire legal system prevailing at the time of its interpretation*, and in accordance with the tenets of juridical hermeneutics, the authors seek to illustrate what impact this approach might have upon the understanding of the legal-technical interface of Article 76. In this context, emphasis is placed on two specific issues that might emerge in the practical implementation of the said provision: the determination of the *foot of the slope*; and the distinction between *oceanic ridges*, *submarine ridges*, and *submarine elevations*. An attempt is made to devise an understanding that reconciles both the legal and the technical-scientific requirements, and to test such an approach in hypothetical scenarios. A further question must necessarily be addressed in this respect: that of the technical-scientific margin of discretion conferred upon the CLCS. This issue, in turn, leads to an investigation into how the work of the CLCS might be legally contextualised.

## 1. Introduction

Amongst the issues that occupied the negotiators of the *United Nations Convention on the Law of the Sea – 1982* (LOSC)<sup>3</sup>, the establishment of limits on the maritime jurisdiction of coastal states was one of the most important. Particular attention was devoted at the time to the definition of the outer limits of the continental shelf. The reference made in Article 1 of the 1958 Convention on the Continental Shelf to the ‘exploitability criterion’ opened the door to claims which, together, could place the whole of the deep seabed under national jurisdiction. As states had set out to establish a common heritage of mankind comprising the deep ocean floor, the resources of which would be exploited to the benefit of all, the ‘exploitability criterion’ had to be replaced in international law. Indeed, one of the key goals of the negotiation underway for 9-odd

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(1) Cdr. (Portuguese Navy), Law Degree (Lisbon), MA (Durham, UK), Ph.D. (Durham, UK) – member of the *Committee on the Legal Issues of the Outer Continental Shelf* (CLIOCS), of the International Law Association (ILA). The views expressed in this article are those of the author. They do not necessarily reflect either the views of the Government of Portugal and the Portuguese Navy, or those of CLIOCS.

(2) Cdr. (Portuguese Navy), MSc (Monterey) – member of the *Commission on the Limits of the Continental Shelf* (CLCS). The views expressed in this article are those of the author. They do not necessarily reflect either the views of the Government of Portugal and the Portuguese Navy, or those of the CLCS.

(3) The United Nations Convention on the Law of the Sea was signed in Montego Bay (Jamaica), on 10 December 1982, and entered into force on 16 November 1994. By 31 October 2003, 142 states (of which 17 are landlocked states) had ratified or acceded to the LOSC.

years was the limitation of the extension of the maritime zones of coastal states<sup>4</sup>. With respect to the continental shelf, this was achieved through Article 76, a provision whose relevance need therefore hardly be stressed.

One aspect of Article 76 that makes it so unique is the fact that the definition of the outer limit of the continental shelf beyond 200 M resorts heavily to scientific-technical terminology. Its substantive rules incorporate several terms ‘imported’ from the geo-sciences, giving rise to a number of important questions concerning interpretation. How are these terms to be read? Does the fact that they were ‘imported’ into a legal instrument change their typical scientific-technical content? If doubts remain as to how they are to be understood, how is the issue to be dealt with? In order to assist states in the process of establishing such outer limits beyond 200 M, the LOSC created the *Commission on the Limits of the Continental Shelf* (CLCS)<sup>5</sup>. Although apparently a scientific-technical body, the fact is that the CLCS has to interpret Article 76 if it is to apply it *in concreto*. Does this mean that the CLCS is a body competent to undertake legal interpretations? The fact that the *Scientific and Technical Guidelines* (Guidelines) do embody an interpretation of Article 76 seems to answer this question in the affirmative<sup>6</sup>. What, then, is the legal status of these Guidelines as far as states are concerned?

The questions raised by Article 76 are innumerable and, most certainly they cannot be all addressed in an article of this kind. Whilst presenting an overall perspective on how Article 76 is viewed by the authors, the following notes cover four main issues that are deemed to be relevant for understanding it. The first of these issues concerns the legal nature of Article 76, and how a legal provision is to be interpreted. A second issue to be dealt with is that of the legal-scientific interface created by the utilisation of various scientific-technical terms. Of all the questions posed by Article 76 in respect of its implementation, two seem to have acquired great relevance: the determination of the foot of the continental slope (FOS), and the treatment to be given to ridges and ridge-like features. These are the third and fourth issues addressed in this article. No attempt was made here to examine specific settings. We sought to formulate some lines of thought that could be used as basis for implementing Article 76.

## 2. Article 76: Its ‘Legal Nature’ and Its Interpretation

### 2.1. Interpretation of Treaty Provisions

The title of this section might raise some eyebrows. It is uncommon to refer to the ‘legal nature’ of a conventional provision; as if such a provision could have any nature other than legal. This reference, however, is justified by the fact that the legal nature of Article 76 appears to have been obscured (to some extent at least) by two issues. First, this provision incorporates technical-scientific elements (of a geological, geophysical, and geomorphological nature) that are essential to its application *in concreto*. Secondly, the CLCS – a body that has a central role to play in the process of delineation of the outer limits of the continental shelf beyond 200 M – is exclusively constituted by technical-scientific experts (geologists, geophysicists and hydrographers). One of our goals, therefore, is to emphasise that, as a legal provision, Article 76 must be interpreted in accordance with juridical hermeneutics, i.e. the canons of treaty interpretation.

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(4) For a brief overview of the historical evolution of the legal rules concerning the outer limits of the continental shelf, cf. Ulf-Dieter Klemm, “Continental Shelf, Outer Limits”, in Rudolf Bernhardt *et al.* (eds.) *Encyclopedia of Public International Law*, Volume One (1992), p.804, at pp.804-805.

(5) The Commission on the Limits of the Continental Shelf, set up under Annex II of the LOSC, consists of 21 experts in the fields of geology, geophysics and hydrography. The second election of the members of the CLCS (who are to serve in their individual capacity) took place on 23 April 2002, during the Twelfth Meeting of the States Parties. The two-fold function of the CLCS is established in Article 3 of Annex II of the LOSC: (a) to consider the data and other material submitted by coastal states; (b) to provide scientific and technical advice to coastal states that require it.

(6) Cf. Document CLCS/11, 13 May 1999. In para.1.3., it is stated that, with the Guidelines, the Commission aimed to clarify its interpretation of scientific, technical and legal terms contained in the LOSC.

Underlying the aforementioned point is a key question the answer to which is far from having been given conclusively: To what extent does the legal nature of Article 76 bear on the scientific-technical implementation of this provision? Or to put it in another way, to what degree – if any – is the interpretation of the scientific-technical terms incorporated in this provision ‘shaped’ by the fact that we are dealing with a legal provision? And if these terms are so ‘shaped’, given that the CLCS is a body of scientific-technical experts, how should this ‘shaping’ be achieved – especially in view of the fact that the wording of Article 76 represents a compromise between the many proposals advanced during the *Third United Nations Conference on the Law of the Sea* (“Third Conference”)? Equally, inasmuch as it seems doubtless that the CLCS enjoys a margin of discretion in some scientific-technical assessments, how are such discretionary powers to be understood on the legal plane?

A detailed account of the theory of treaty interpretation is beyond the scope of this piece<sup>7</sup>. Notwithstanding this, some brief, contextualising notes are necessary.

Treaty interpretation has been theorised under three schools of thought. Objectivists place emphasis on the text. Subjectivists highlight the intention of the parties. And the teleological view relies on the object and purpose of a treaty. Elements of all three theories are present in the rules of interpretation contained in the *Vienna Convention on the Law of Treaties* (VCLT)<sup>8</sup>. According to Article 31(1), “treaties shall be interpreted in good faith in accordance with the ordinary meaning to be given to the terms of the treaty in their context and in the light of its object and purpose”. The textual element is not only the starting point for the interpretation, but also the best evidence of the intention of the parties. Interpreters are nevertheless entitled to seek the precise meaning of the wording by reference to not only the context, but also the object and purpose of the treaty. As for the intention of the parties as a means to ‘overrule’ the text (usually by recourse to *travaux préparatoires*), it is relevant only when the interpretation in accordance with Article 31 either “leaves the meaning ambiguous or obscure”, or leads to a “manifestly absurd or unreasonable” result<sup>9</sup>. All in all, it appears that the objectivist approach has somewhat prevailed, the text being the fulcrum of treaty interpretation.

As in other instances in international law, the guidance provided by case law in respect of treaty interpretation cannot be neglected. For example, it is important to bear in mind what the International Court of Justice (ICJ) affirmed in the 1971 *Namibia* Advisory Opinion: “[A]n international instrument has to be interpreted and applied within *the framework of the entire legal system prevailing at the time of the interpretation*”<sup>10</sup>. This perspective was endorsed in the *Aegean Sea* Case some years later<sup>11</sup>. A restrictive approach to treaty interpretation might lead to question this *dictum*. This view, however, would refer only to bilateral treaties. In the case of quasi-universal, quasi-legislative instruments, this *dictum* must be endorsed, as it reflects the context in which their provisions evolve. In other words, the provisions of the LOSC must be interpreted in light of the whole of the *corpus juris*.

The interpretation of Article 76, whilst abiding by these rules, must also make allowances for other considerations. First, any interpretation thereof must deal with the scientific-technical

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(7) On treaty interpretation, cf. e.g. Anthony Aust, *Modern Treaty Law and Practice* (2000), pp.184-206; Nguyen Quoc Dinh, Patrick Daillier, and Alain Pellet, *Droit International Public* (1999), pp.250-263. It must be noted that the application of a legal provision must be preceded by the interpretation thereof, i.e. by the ‘discovery’ of the norm(s) embodied in the wording. In effect, the process of application of the law may be described as a decision-making process that consists of going back and forth between ‘facts’ and norms. Cf. Friedrich V. Kratochwil, *Rules, Norms, and Decisions: On the Conditions of Practical and Legal Reasoning in International Relations and Domestic Affairs* (1989), p.240.

(8) These rules may be taken as expression of customary international law; cf. ICJ, *Case Concerning the Territorial Dispute (Libya v Chad)*, judgment of 3 February 1994, ICJ Rep. (1994) 4, at p.19.

(9) VCLT, Art.32.

(10) ICJ, *Legal Consequences for States of the Continued Presence of South Africa in Namibia (South West Africa) Notwithstanding Security Council Resolution 276 (1970)*, Advisory Opinion of 26 January 1971, ICJ Rep. (1971) 4, at p.31, emphasis added.

(11) ICJ, *Aegean Sea Continental Shelf Case – Jurisdiction (Greece v Turkey)*, judgment of 19 December 1978, ICJ Rep. (1978) 4, at p.34.

concepts that it incorporates. All scientific developments that have occurred since the time of its drafting thus have to be weighed in its interpretation and application. Inescapably, the legal interpretation of the Article 76 involves a margin of discretion, the scope of which stems from legal factors (which are present in any legal interpretation) and from scientific-technical factors relating to the use of the concepts abovementioned. Secondly, the LOSC is a quasi-universal treaty negotiated through a peculiar package-deal, ‘consensual’ process, in which the substantive discussion occurred often off the record. The reality is that, in many instances, the ‘intention of the parties’ (i.e. ‘intention common to all parties’) is difficult to ascertain (or even non-existent), as the compromise reached resorted to a wording sufficiently vague to accommodate virtually contradictory standpoints. Here, the interpretation must resort to other elements in order to determine the *ratio legis* of the norm. As there is little doubt that some provisions of Article 76 were deliberately left vague, this point has the utmost relevance for their interpretation.

With respect to treaty interpretation, no hard and fast rules exist. No rule of interpretation can, on its own, be applied satisfactorily to all cases. More often than not, the interpretation of treaty provisions is about weighing-up against each other the result of the application of various interpretative tools. The ‘letter’ of the law and its context, the ‘spirit’ of the law, the history behind the wording, the intentions of the drafters, as well as other factors (mostly of a methodological nature), all bear on the interpretation, which thus becomes a process of harmonisation of the various elements.

## 2.2. Interpretation of Article 76: Preliminary Aspects

Legal interpretation is essential to answer an important question concerning Article 76. Is there any prevalence between the different provisions? Can it be affirmed that some paragraphs prevail over other paragraphs, thus circumscribing its possible effect? This question is relevant insofar as it has been suggested that paragraphs 1 and 3 have prevalence over paragraphs 4 to 6; and that the interpretation of the latter is subject to the dictates of the former. Smith and Taft, for instance, argue that paragraphs 1 and 3 provide “the essence of the definition of the continental shelf”, and that all considerations concerning the application of paragraph 6 “must be within the legal framework of Article 76, paragraphs 1 and 3”<sup>12</sup>.

Inasmuch as the starting point of interpretation must be the text of the treaty, one ought to start by enquiring whether there are any textual elements that support such an understanding. The answer must be given in the negative. Nothing in Article 76 appears to point to the conclusion that paragraphs 1 and 3 have ‘prevalence’ over other paragraphs (notably paragraphs 4 to 6). On the contrary, there are reasons to suggest that all paragraphs are to be interpreted in light of each other, as required by the principle of integration<sup>13</sup>. For example, paragraph 1 refers to the “outer edge of the continental margin” – a notion which is left undefined – as the limit for the natural prolongation of coastal states. How the outer edge of the continental margin is to be established is prescribed in paragraph 4(a). Implicitly, paragraph 1 makes a *renvoi* to paragraph 4. For all practical purposes, this means that the latter is ‘incorporated’ in the former. Significantly, when formulating the problem in Article 76, the CLCS Guidelines refer to paragraph 1, then to paragraph 4, and only after that to paragraph 3<sup>14</sup>. Equally significant is the fact that the CLCS, when describing the ‘test of appurtenance’ in the Guidelines, resorts to paragraph 4<sup>15</sup>. As the ‘test of appurtenance’ is applied before other considerations, there seems good reason to suggest that paragraph 4 cannot be, in absolute terms, subject to paragraph 3. The intertwined character of the paragraphs of Article 76 is further evidenced by the explicit *renvoi* made in paragraph 2 (which reinforces that of paragraph 1): the limits beyond which the continental shelf defined in

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(12) Robert W. Smith and George Taft, “Legal Aspects of the Continental Shelf”, in Peter J. Cook and Chris M. Carleton (eds.) *Continental Shelf Limits: The Scientific and Legal Interface* (2000), p.17, at pp.18, 20.

(13) In broad general terms, it may be said that the principle of integration requires treaties to be interpreted as a whole.

(14) Doc. supra n.6, paras.2.1.1., 2.1.2., 2.1.3..

(15) *Ibid.*, para.2.2.6..

paragraph 1 shall not extend are those fixed under paragraphs 4 to 6. These aspects amount to *prima facie* evidence that no ‘prevalence’ between paragraphs is stipulated – a standpoint in support of which further evidence will be offered below<sup>16</sup>.

Another matter concerns the fact that, in Article 76, there are terms that are characterised by a ‘legal-scientific dualism’. Some scientific-technical terms incorporated in this provision have acquired a meaning that departs from their geo-scientific, ordinary meaning. This is clearly acknowledged by the CLCS, which recognises that the LOSC “makes use of scientific terms in a legal context which at times departs significantly from accepted scientific definitions and terminology”<sup>17</sup>. Take the term ‘continental shelf’. In paragraph 1, it signifies ‘juridical continental shelf’: i.e. a maritime zone beyond the territorial sea attributed to coastal states under international law. As for the term ‘shelf’ in paragraph 3, although it has a meaning similar to the one it would have in a geo-scientific context (for it refers to an area extending from the limit of the land territory to the isobath of 200 metres approximately), it includes not only ‘continental shelves, but also ‘insular shelves’. And the very same can be said of the term ‘slope’ in the same paragraph. Hedberg’s view in this respect (which is illustrated in Figure 1) is conclusive: “the insular shelf and insular slope surrounding an island area are part of the island, *not of the ocean basin*”, i.e., the ocean domain is constituted only of the “*parts of the ocean floor beyond continental or insular slopes*”<sup>18</sup>.

The term ‘continental margin’ is equally not as straightforward as it might look at first glance. In paragraph 3, ‘continental margin’ is defined as consisting of the seabed and subsoil of the shelf, slope and rise, thus, appearing to be a geo-scientific concept. This term is understood differently in paragraph 4.a). The ‘outer edge of the continental margin’ as defined therein will coincide with the edge of the continental margin as defined in the previous paragraph only by chance. Geo-scientifically, the edge of the rise cannot be taken as the line that results from the maximisation of the ‘Gardiner-Hedberg rule’. In addition, the application of Article 76 will result in two types of situations: first, the ‘legal continental margin’ might not reach the edge of the continental rise (i.e. part of what is geo-scientifically speaking continental margin falls beyond state jurisdiction); second, the ‘legal continental margin’ might extend beyond the edge of the continental rise (i.e. part of what is geo-scientifically speaking deep ocean floor becomes legal continental shelf). To reconcile these dual-meanings within the same legal provision, therefore, we must distinguish clearly between geo-scientific concepts and legal concepts.

Further illustration of the terminological hesitations, and the ‘legal-scientific dualism’ of some terms, appears in terms such as ‘natural prolongation’, ‘FOS’, ‘oceanic ridge’, ‘deep ocean floor’. What is their precise scope and meaning? Arguably, they have a dual juridical-scientific meaning. The term ‘natural prolongation’ can be interpreted in a number of different ways. Even within the realm of law alone, its meaning is by no means straightforward. ‘Deep ocean floor’ in paragraph 3 cannot be seen as a geo-scientific term. For that would erode the operation of the formulae contained in paragraph 4. Similarly, in the case of the ‘FOS’, the application of subparagraph 4.(b) can lead to results different from those which would result if one were working in a geo-scientific context. In respect of the term ‘oceanic ridge’, its meaning within Article 76 differs arguably from that given to it in geo-scientific literature.

Knowing the answer to these questions in the abstract is, however, perhaps not the key issue. Much more relevant is establishing the meaning that is to be attributed to each of these terms in the interpretation and application of Article 76 to a concrete case.

By framing the problem in this fashion, the principles of legal interpretation are brought into the picture especially when the assessments to be made are intertwined with legal aspects. Account must be taken, most particularly, of the ‘principle of effectiveness’ (‘practical effect’):

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(16) Cf. *infra*, para.3.3..

(17) Doc. *supra* n.6, para.1.3..

(18) Hollis D. Hedberg, *National-International Jurisdictional Boundary on the Ocean Floor*, Occasional Paper of the Law of the Sea Institute, No. 16 (1972), p.5, emphasis added.

*ut magis valeat quam pereat*. It is presumed that, if it does not involve doing violence to its terms, all treaty provisions are to be construed in a manner enabling them to have appropriate effects<sup>19</sup>. Broadly speaking, they should be interpreted so that they produce appropriate, practical effects. Interpretations that lead to the conclusion that one provision bears no practical meaning, or has no practical effect, are to be rejected in favour of equally valid interpretations which attribute to the provision in question a practical meaning or effect.

So far as Article 76 and the ‘legal-scientific’ terminological dualism that it embodies are concerned, we would advance two central propositions. First, terms derived from geo-sciences are to be viewed with caution, as they may have two distinct meanings: a geo-scientific meaning and a juridical meaning. The debate regarding the contents of Article 76 should take place in this light. Second, all these terms are to be given an interpretation that, whilst subsumable in the wording of Article 76, confers on all provisions thereof a practical and coherent effect<sup>20</sup>.

### 3. The Interface between Law and Science

#### 3.1. Fundamental Canons

The implementation of Article 76 is an interdisciplinary exercise, which is neither strictly legal, nor strictly scientific-technical: it evolves within a legal-scientific interface. In probably most cases, the two types of questions – legal and scientific-technical – can be treated separately. But there are issues in which legal and scientific-technical aspects are so intertwined that a strict compartmentalisation between them becomes virtually impossible. Legal and scientific assessments have to be made in light of each other. Views restricted to either a legal perspective, or to a scientific-technical perspective, cannot fully reflect the *ratio juris* of Article 76. These can be seen as ‘hybrid’ legal-scientific questions.

Hence, we would argue that, in Article 76, there are three types of issues to be addressed: legal, scientific-technical, and ‘hybrid’ legal-scientific<sup>21</sup>. The following examples illustrate each of these types of questions. To ascertain the meaning of the expression “final and binding” is a legal problem. To establish the width and location of the continent-ocean transition zone (COT) is a scientific problem. To determine whether a certain morphological feature is an oceanic ridge, a submarine ridge, or a submarine elevation is a ‘hybrid’ legal-scientific problem.

Legal and scientific considerations are arguably not to be seen on equal footing, however. Scientific-technical concepts and interpretations may not overrun the legal bounds imposed by Article 76. This fundamental canon places treaty interpretation at the heart of the implementation

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(19) ICJ, *Corfu Channel Case – Merits* (United Kingdom v Albania), judgment of 9 April 1949, ICJ Rep. (1949) 4, at p.24.

(20) The idea that the CLCS should only address scientific-technical matters is appealing only at first glance. For the sake of argument, let it be assumed that this was the case. Then, if a state would present a submission based on a certain (let it be assumed, unreasonable) legal argument, and put forward scientific data to be interpreted and applied in the light thereof, the CLCS would not be in a position to challenge and reject that legal argument – for that would be beyond the scope of its competence. This would leave the CLCS in the rather difficult position of having to choose between addressing the relevance of certain data in the light a legal argument with which it disagreed, or making no pronouncement on the issue (which appears far from reasonable).

(21) Inasmuch as the CLCS is a body composed of scientific and technical experts, it may appear odd to refer to legal questions. In reality, however, the implementation of Article 76 cannot take place outside a certain legal interpretation of this article. Cf. *infra*, text with n.27. As to the ‘legal powers’ of the CLCS, we would argue – on the basis of the ‘theory of implied powers’ – that the sphere of competence of any organisation (as the CLCS) contains all those powers which are absolutely necessary for it to discharge fully its duties, including powers which are not explicitly mentioned but without which it would become inoperative (*implied powers*). To a certain extent, this theory is a tool for interpreting the norms that establish the competence of an organisation. On the ‘theory of implied powers’, cf. e.g. Malcolm N. Shaw, *International Law* (1997), pp.915-918; Nguyen *et al.*, *supra* n.7, at pp.596-598. Another point seems to reinforce the idea that there is no difficulty in accepting the view that the CLCS has some legal implied powers of interpretation. Theoretically speaking, even the International Tribunal for the Law of the Sea (ITLOS) – a body whose function involves typically the interpretation of provisions of the LOSC – could be composed of 21 judges having no formal background in law. Cf. LOSC, Annex VI, Article 2. This provision is worded rather differently from Article 2 of the Statute of the International Court of Justice (ICJ). A lengthier debate, which for reasons of brevity cannot be had in this article, concerns whether legal interpretations of the CLCS are binding upon states. We would tend to answer this question in the negative. On this issue, cf. *infra*, text with n.28.

of this provision. The issue concerns the application of a legal provision to a concrete case. And the scientific-technical aspects must defer to the bounds established by law.

Practically speaking, what exactly does this mean? It is undisputed that the application of the scientific-technical concepts of Article 76 to a particular case entails a margin of scientific-technical discretion, but this discretion is limited by the legal interpretation of Article 76. Let it be assumed that a possible scientific-technical interpretation of one concept contradicts a legal prescription (regardless of whether this prescription is embodied in Article 76 or in the *corpus juris* as a whole). That scientific-technical interpretation would in principle have to be ruled out.

Consider the following example. The tidal datum utilised for determining the low-water (LW) line can, technically speaking, be defined in different ways. There is room for scientific-technical discretion. On the basis of the recommendations of the International Hydrographic Organisation (IHO), the CLCS established, in the provisional Guidelines, that all interpretations of the LW line would be “regarded as equally valid in a submission”, provided that none would “fall below the level of the lowest astronomical tide (LAT)”<sup>22</sup>. Whilst recognising that states could use different data, the CLCS nevertheless decided to limit the choice of LW datum to data above the LAT. This point was addressed in a workshop on the outer limits of the continental shelf, organised in March 1999 by the International Boundaries Research Unit (IBRU). In an exchange of views with the then Chairman of the CLCS, one of the authors argued that the CLCS was not in a position to set, through the Guidelines, a restriction on the freedom of choice of states as regards tidal data. Such a restriction, it was argued, did not find support either in the LOSC, or in general international law, which conferred on states a virtually absolute freedom of choice of tidal datum (a decision related only to considerations of safety of navigation and chart datum)<sup>23</sup>. The final version of the Guidelines does not refer to the LAT, and acknowledges that “there is a uniform and extended state practice which justifies multiple interpretations of the low water line” and accepting all data as equally valid in a submission<sup>24</sup>.

This example illustrates three points, which form the basic canons of the implementation of Article 76. First, it provides support for the proposition that the exercise of scientific-technical discretion cannot overstep the bounds set down by the LOSC and/or by general international law. Secondly, as a corollary, it shows that the scientific-technical discretion with which the CLCS is endowed is legally circumscribed. The CLCS may neither lay down guidelines which are not in conformity with the LOSC and general international law, nor resort to standards that restrict the freedom of states in a way that is unwarranted by the LOSC and general international law. Thirdly, this exemplifies the relevance of the *corpus juris* as a whole, as the framework for interpreting and applying a treaty. Not specifically a part of Article 76, the question of the tidal datum and its legal context does nevertheless influence the content of this provision.

These canons are essential for understanding the scientific-technical elements within their legal framework. Whilst the impact of these canons varies according to each specific issue, they form the wider bedrock upon which the implementation of Article 76 rests. The following notes reflect these canons, and set out an integrated approach to several issues.

### 3.2. *The CLCS and Its Composition*

Because of how Article 76 is viewed here (as a legal provision), and because of how we understand its implementation (by reference to certain fundamental canons), reference must be made to the institutional body created for assisting states in the implementation of Article 76 (the CLCS), in particular to its composition. In broad terms, the CLCS may be described as a body of experts in the field of geology, geophysics or hydrography. Its key functions with respect to the process of delineation of the outer continental shelf limit beyond 200 M are “to consider the data

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(22) Document CLCS/L.6, 4 September 1998, p.24.

(23) On this issue, cf. N. S. M. Antunes, *The Importance of the Tidal Datum on the Definition of Maritime Limits and Boundaries*, IBRU Maritime Briefing, Vol. 2(7) (2000), at pp.15-17 (cf. also pp.6-9).

(24) Doc. supra n.6, para.3.3.5..

and other material submitted by the coastal states”, and “to provide scientific and technical advice” during the preparation of the submission, at the request of these states<sup>25</sup>. Inherent in these functions, as rightly pointed out by Nelson<sup>26</sup>, is nevertheless a much more relevant function: that of interpretation and application of the LOSC, namely Article 76 (of which the Guidelines are in essence an interpretation).

Insofar as the Guidelines form an interpretation of Article 76, their conformity with this provision (as well as with the LOSC and general international law) is a *conditio* of their validity. For this reason, we expressed above the view that the scientific-technical assessments cannot at any point overstep the bounds of the *corpus juris*. In truth, this is implicitly acknowledged by the CLCS, when stating that the Guidelines are aimed at clarifying “its interpretation of scientific, technical and legal terms contained in the Convention”<sup>27</sup>. Most importantly, these Guidelines are not, and cannot be taken as, an authoritative interpretation of Article 76. For the CLCS does not hold in its sphere of competence the necessary powers. As observed by Permanent Court of International Justice, “the right of giving an authoritative interpretation of a legal rule belongs solely to the person or body who has the power to modify or suppress it”<sup>28</sup>. In other words, in the absence of a norm explicitly allowing a body to make authoritative interpretations of a legal rule, such interpretations can only be given by those bodies which have the power of *jus dare*. *Ejus est interpretari cujus est condere*.

Since there is no provision in the LOSC attributing such a competence to the CLCS, and since there is a well established presumption of international law that binding interpretations can only be made by those who have the power of *jus dare*, we must conclude that the CLCS cannot impose its interpretation of Article 76 on submitting states. This reinforces the idea that it is ultimately the state’s prerogative to establish its outer continental shelf limits. These limits stem from a unilateral act of the state, the work of the CLCS amounting to somewhat of a ‘technical homologation’<sup>29</sup>, i.e. to a scientific-technical legitimisation of the work undertaken.

Indeed, the CLCS seems to have been set up as a mechanism which is half way between, on the one hand, a body with powers that virtually would supersede the state in the delineation of its outer continental shelf limits and, on the other hand, the procedure of simply giving publicity to such limits (as happens with the 200 M limit)<sup>30</sup>. Briefly put, ‘technical homologation’ amounts to a technical approval of the work carried out by a state with a view to implementing Article 76 and to establishing the outer limits of the continental shelf beyond 200 miles.

The power conferred on CLCS is that of issuing recommendations in accordance with Article 76<sup>31</sup>. From a strict legal perspective, such recommendations are binding neither upon the

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(25) LOSC, Annex II, Articles 2(1), and 3(1). On the implied powers of the CLCS, cf. supra n.21.

(26) L. D. M. Nelson, “The Continental Shelf: Interplay of Law and Science”, in Nisuke Ando *et al.* (eds.) *Liber Amicorum Judge Shigeru Oda*, Vol. 2 (2002), p.1235, at p.1241.

(27) Doc. supra n.6, para.1.3..

(28) PCIJ, *Question of Jaworzina*, Advisory Opinion of 6 December 1923, *PCIJ Collection of Advisory Opinions*, Series B, No.8 (1923), p.6, at p.37. On the issue of ‘authoritative interpretation’ (*interpretation authentique*), which can only be given by the parties to a treaty, and the powers of international organisations as regards the interpretation of legal rules, cf. Nguyen *et al.*, supra n.7, at pp.251-257. ‘Authoritative interpretations’ must not be confused with the binding interpretations made by courts in specific cases. In this respect, it is interesting to draw a parallel with the position of ITLOS as regards the LOSC. According to its Statute, whenever the interpretation or application of the LOSC is in question, the Registrar shall notify all states parties. However, only when a party uses its right to intervene in the proceedings will the interpretation given by the judgment be binding upon it. Cf. LOSC, Annex VI, Article 32.

(29) N. S. M. Antunes, *Towards the Conceptualisation of Maritime Delimitation: Legal and Technical Aspects of a Political Process* (2003, forthcoming), p.328.

(30) J. F. Pulvenis, “The Continental Shelf Definition and Rules Applicable to Resources”, in René-Jean Dupuy and Daniel Vignes (eds.) *A Handbook on the New Law of the Sea*, Vol. 1 (1991), p.315, at 359.

(31) LOSC, Article 76(8), and Annex II, Article 3(1)(a). It should be noted that several states spelt out their reservations as regards the fact that the delineation of the outer limits of the continental shelf beyond 200 M was to be made “on the basis of” recommendations to be made by the CLCS, and the impact of such procedure on the substantive sovereign rights of coastal states under Article 76. For example, Canada noted that the CLCS was primarily an instrument that would provide the international community with reassurances that coastal states established their continental shelf limits in accordance with the



submitting state, nor upon third parties<sup>32</sup>. The question thus arises as to what happens if the CLCS and the submitting state have different interpretations of Article 76 (and the delineation process is stalled as a consequence). The answer to this question does not fall within the scope of this article. Too many alternatives on matters of fact would have to be considered to analyse this question comprehensively. Notwithstanding this, it may be said that such an answer is far from being straightforward. Even if the submitting state delineates its continental shelf limits beyond 200 M on the basis of the recommendations of the CLCS, third states may disagree with such limit (e.g. by holding a different interpretation of Article 76). Should this happen, a third state is perfectly entitled to protest the limit, or to reserve its position (if it deems the data provided to be insufficient for it to take a position on the limit).

It was mentioned above that, besides scientific-technical powers, the CLCS has other implied powers of a *legal* and of a *legal-scientific* nature. In this light, the composition of the CLCS (exclusively scientific-technical experts) raises various questions. The work of the CLCS evolves within a political-legal realm: that of maritime boundary-making. This is why, in spite of not endorsing all conclusions reached by McDorman, we understand a specific point that he makes: the CLCS “is a unique body constrained to speak a technical and scientific language yet involved in a process where the language that matters is that of politics”<sup>33</sup> (and law, we must add). Politics, and primarily law (because the CLCS must base its judgment on the LOSC), do mould the work of the CLCS, probably more than would be desirable for a body with no specific required expertise in these fields<sup>34</sup>.

At any rate, what truly matters is to realise that the fundamental role of the CLCS is the interpretation of Article 76 (even if that is ensconced in a scientific-technical discourse, which results from the terminology used therein), with a view to implementing it. Notwithstanding this, there are legal beacons that bound the exercise of scientific-technical discretion by the CLCS. Given this, it is surprising that neither was the necessary legal expertise reflected upon the CLCS composition, nor was any specific mechanism to overcome this limitation set up in the LOSC. To put it in Brown’s words, “[g]iven the fact that [the] principal task [of the CLCS] is to make recommendations on the basis of a complex legal instrument, [the fact that it does not include a lawyer or a specific mechanism to obtain legal advice] seems rather unfortunate”. It is indeed “cause for concern”<sup>35</sup>. As will be shown below, the full legal impact of certain statements made by the CLCS may not have been fully grasped<sup>36</sup>.

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provisions of Article 76, and that it had been assured that the formulation adopted could not be interpreted as giving the CLCS the function and power to determine the outer limits of the continental shelf of a coastal state; cf. Doc. A/CONF.62/WS/4, 13 Off. Rec. 101, at p.102, para.15. Similar reservations were raised by the representatives of, for example, the United Kingdom (13 Off. Rec. 25, para.15) and Australia (13 Off. Rec. 33, para.13).

(32) What will be “final and binding” are the limits established “on the basis of” the recommendations of the CLCS; cf. LOSC, Article 76(8), *in fine*. The meaning of “final and binding” may raise some controversy. As far as third states are concerned, we would argue that this limit will be no more binding than a 12-mile territorial sea limit or a 200-mile EEZ limit.

(33) Ted L. McDorman, “The Role of the Commission on the Limits of the Continental Shelf: A Technical Body in a Political World”, 17(3) *IJMC*L (2002) 301, at p.307.

(34) This does not mean, however, that members of the CLCS do not have legal and/or political backgrounds. At least one of the present 21 members of the CLCS has a legal background, besides the required scientific background.

(35) E. D. Brown, *Sea-Bed Energy and Minerals: The International Legal Regime – The Continental Shelf* (1992), p.31. This approach is endorsed by Nelson, *supra* n.26, at pp.1238, 1242. The comments made by the United States of America (USA) on the Provisional Guidelines raise this issue when observing that whereas the scientific qualifications of the Commission are known, the basis for its legal interpretations requires further consideration; cf. CLCS/CRP.15, 28 April 1999, para.12.

(36) It cannot be overemphasised that the issues relating to the composition of the CLCS and to its functioning, especially the impact of not including legal experts amongst the members of the CLCS, cannot be imputed to the CLCS itself, or to its members. All that the CLCS can do is to function within the legal framework devised by states during the Third Conference. This, however, cannot be an obstacle to academics, who may always examine relevant issues as they stand, and seek to identify points of difficulty or debate.

### 3.3. Definition of the Legal Continental Shelf

Discussion above in respect of the definition of the legal continental shelf has led us to question whether paragraphs 1 and 3 have any prevalence in Article 76. In evaluating evidence, we concluded provisionally that no such prevalence existed<sup>37</sup>. At this juncture, further evidence (related to the ‘legal-scientific’ interface) can be advanced in support of this argument.

Those authors who argue for the prevalence of paragraphs 1 and 3, within Article 76, in terms of the definition of continental shelf, take the view that paragraph 6 “does not purport to qualify the paragraphs 1 and 3”, and that “[t]here is no indication in the *travaux préparatoires* that [paragraph 6] has any known and accepted applicability”<sup>38</sup>.

This approach is, to say the least, highly debatable. The first argument against it concerns the practical concatenation of paragraphs 1, 3 and 4. Legally speaking, the continental shelf limit beyond 200 M is the outer edge of the continental margin, which is established by recourse to the Gardiner and the Hedberg formulae (which form the basis of the prior ‘test of appurtenance’). As aforesaid, the limit derived from these two formulae would follow the edge of the continental rise only by coincidence<sup>39</sup>. The ‘Gardiner-Hedberg line’ usually lies either beyond or inside the edge of the rise. Second, a restrictive interpretation of paragraph 3 would mean that the legal continental shelf is constituted exclusively by what is morphologically speaking shelf, slope and rise. Should this be the case, paragraph 4.(a) would become inoperative in the overwhelming majority of cases; for in virtually every situation it either attributes to states areas beyond the continental rise, or places within the Area parts of the morphological rise. Third, since ‘oceanic islands’ would be prevented from applying Article 76 in terms parallel to those applicable to ‘continental territories’, they would be discriminated *de facto*<sup>40</sup>. No ‘oceanic island’ has, strictly speaking, a continental shelf, slope and rise. Fourth, it must be remembered that the Gardiner and Hedberg formulae were adopted as basis for establishing the ‘boundary’ between areas under national jurisdiction and those beyond it *precisely because of the practical difficulties inherent in the geo-scientific determination of the limit of the natural prolongation of a state*<sup>41</sup>.

The rules of treaty interpretation provide further arguments against the unqualified nature of paragraph 3. Taking into account the principle *ut magis valeat quam pereat*, it should be presumed that paragraph 6 has some practical application. The *onus probandi* impends on those who argue against this view. In principle, all provisions of a legal instrument are deemed to have the same ‘hierarchical value’. It seems doubtless that merely stating that paragraph 3 cannot be qualified by paragraph 6, without further evidence, falls well short of meeting the said burden of proof. For nothing in the LOSC points to the prevalence of paragraph 3 over the other provisions in Article 76. As argued below, paragraph 6 appears indeed to have a practical, effective scope – therefore providing further evidence against the suggestion that paragraph 3 cannot be qualified.

To summarise, as the wording of Article 76 is characterised by a degree of ambiguity and obscurity that stems from its compromisory nature, the determination of its legal content requires a holistic interpretation. Consideration must be given not only to the text, and to the object and purpose of the LOSC, but also to all aspects of the preparatory work and the conclusion of the LOSC, the interrelationships between the different paragraphs, the methodological rules of treaty interpretation, logics and hermeneutics. This leads us to argue that paragraph 3 must be read *cum grano salis*. Its content merely refers to what is the typical case. By no means should it be seen

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(37) Cf. *supra*, para.2.2..

(38) Smith and Taft, *supra* n.12, at p.20.

(39) Cf. *supra*, text after n.18.

(40) The term ‘oceanic islands’ refers to islands whose landmass is composed by oceanic materials; and the term ‘continental territories’ refers to landmasses composed of continental materials.

(41) The legal-scientific dualism of the term ‘natural prolongation’ has been emphasised above. Its legal definition through the provisions of Article 76 forms simultaneously the basis and the bounds for the legal implementation of the concept. Geo-scientific interpretations of the concept, therefore, cannot depart from it. On possible ways in which ‘natural prolongation’ may be understood, cf. Philip A. Symonds *et al.*, “Characteristics of Continental Margins”, in Cook and Carleton (eds.), *supra* n.12, p.25, at p.55.

as an absolute prescription. Weight is lent to this proposition by the *travaux préparatoires*, in which China, for example, proposed that the word “generally” would be inserted in order to clarify that some situations around the world did not conform strictly to the description in paragraph 3<sup>42</sup>. A draft proposal by Australia equally evidences that the definition of continental margin in paragraph 3 could not mean, either legally, or morphologically, that the continental shelf was restricted to “shelf, slope and rise” in the strictest of senses; it added that the margin included all submarine elevations which are parts thereof<sup>43</sup>. The idea that paragraph 3 cannot be read too strictly appears to be endorsed also by the position taken by Denmark, whose representative stated that “the three geomorphological features mentioned in paragraph 3 as the elements of the continental margin, namely, the shelf, the slope and the rise, were to be considered as surface features of an underlying fundamental unity of the geological structure throughout the whole submarine area, which a coastal state could claim as its continental shelf, based on the concept of natural prolongation”<sup>44</sup>.

All things considered, it may be said that, as recognised in the study carried out under the auspices of the United Nations, the typical margin morphology to which paragraph 3 refers “is rarely found in practice owing to the variety of geomorphological forms of the continental margin resulting from the different tectonic settings”<sup>45</sup>. This approach is taken also in the CLCS Guidelines, which state that the “[s]imple subdivision of margins into shelf, slope and rise may not always exist owing to the variety of geological and geomorphological continental margin types resulting from different tectonic and geological settings”<sup>46</sup>.

#### 3.4. ‘Crustal Neutrality’ and the Continental Shelf Entitlement of Islands

An important aspect of the legal definition of continental shelf is ‘crustal neutrality’. The characterisation of the crust as continental or oceanic is, legally speaking, irrelevant for defining the natural prolongation of a state (i.e. the submerged prolongation of its landmass). During the Third Conference, some proposals made reference to the nature of the crust as the criterion for establishing the division between areas within and beyond national jurisdiction. Japan proposed, for example, the use of “the boundary between continental and oceanic crustal structures” for fixing the outer edge of the continental margin<sup>47</sup>. This crust-oriented approach to the definition of continental shelf did not find its way into the LOSC, which does not allude to it. The explanation resides in the fact that the boundary between the oceanic crust and the continental crust may not be clearly defined, thus creating delineating problems in those cases.

Nevertheless, it has to be recognised that areas of oceanic crust correspond tendentially to the concept of ‘deep ocean floor’. With this said, two explanations should be given. The first explanation relates to the adverb ‘tendentially’. It seeks to reflect the idea that, legally speaking, the deep ocean floor (i.e. the areas beyond national jurisdiction as defined by Article 76) may in specific areas include parts of continental crust. In other words, whilst constituted mostly by areas of oceanic crust, the legal concept of deep ocean floor may also include seabed and subsoil areas that are composed of continental crust.

The second explanation concerns a question that may be immediately prompted: Could it be said, conversely, that the continental shelf of a state is tendentially composed of continental crust? The answer would have to be given in the negative. If it were answered in the affirmative, it would entail that, in principle, only those states whose territory have a landmass composed of continental crust would benefit from the extension of the legal continental shelf under Article 76.

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(42) Doc. NG6/18, 20 August 1979, in Renate Platzöder (ed.) *Third United Nations Conference on the Law of the Sea: Documents*, Vol. IX (1983), p.384.

(43) *Ibid.*, Vol. IV, p.524. This reference to “submarine elevations” was eventually included in paragraph 6 of Article 76.

(44) Cf. 138th meeting, 14 Off. Rec. 61, para.149.

(45) United Nations, *The Law of the Sea: Definition of the Continental Shelf* (1993), p.11.

(46) Doc. supra n.6, para.5.1.3..

(47) Cf. Platzöder, supra n.42, Vol. IV, p.468. Cf. also, infra, n.76, as regards the proposal advanced by Japan.

In the absence of clear evidence demonstrating that this was the parties' intention, this view must be rejected.

The issue revolves mainly around the maritime entitlement of islands, and the treatment given to islands, in the LOSC and general international law. In effect, as the landmass of many islands is composed of oceanic material (mostly basaltic rocks), to state that the legal continental shelf 'is tendentially composed of continental crust' amounts to treat states whose territorial landmass includes islands of oceanic nature differently from states whose territorial landmass is of continental nature.

Three arguments lead us to argue that this is a far-fetched proposition. The first argument stems from the text of the LOSC. At no point can we find in Article 76 a reference to the origin or nature of either the landmass, or the submerged prolongation thereof. Inasmuch as the text is always the starting point of any interpretation, this amounts to *prima facie* evidence against the proposition in hand. The second argument to reject it flows from the principle of sovereign equality of states<sup>48</sup>. Restricting the scope of Article 76 on the basis of the nature of the landmass would counter this principle; unless there was a clear manifestation of consent to that effect. So far as we are aware, no such consent was ever given. The third argument that can be put forward relates to the interpretation of legal norms: *ubi lex non distinguit, nec interpretis distinguere debet*. Where the law makes no distinction, the interpreter should not distinguish either. Interpretations of norms that make distinctions that are unclear in the text should not be adopted without strong evidence of some other nature to support it. As nothing in Article 76 indicates that the natural prolongation of landmasses of continental nature is to be treated distinctively from the natural prolongation of landmasses of oceanic nature, there is a presumption in favour of treating both on equal footing. This presumption is reinforced by Article 121(2), which states that (with the exceptions provided for in paragraph 3) the maritime zones of islands are to be determined in accordance with the provisions of the LOSC *applicable to other land territory*. Besides the lack of elements to support the abovementioned distinction, there are in fact textual elements in the LOSC that declare the equality of treatment between islands and continental territories.

In short, 'crustal neutrality' is central to the interpretation of Article 76. The application of the scientific-technical concepts, therefore, must not overlook this point – which is part of the relevant legal framework. Corroborating this viewpoint, the CLCS recognises in the Guidelines that the "terms 'land mass' and 'land territory' are both neutral terms with regard to crustal types in the geological sense"<sup>49</sup>. Read in conjunction with the international legal regime of islands, this concept of 'crustal neutrality' entails the conclusion reached by Hedberg some 30-odd years ago: insular shelves and slopes are not part of the deep ocean floor, legally speaking<sup>50</sup>. Throughout his paper Hedberg retains this equivalence between continental slope and insular slope, which is paramount for understanding the *ratio legis* of Article 76<sup>51</sup>.

The treatment given to islands in the CLCS Guidelines is precisely one of the less than satisfactory points. Without prejudice of returning to this point at a later juncture, we most draw attention to the awkwardness of not finding in the Guidelines general references to the specific issues raised by islands, which Hedberg so clearly recognised<sup>52</sup>. His references to an *insular shelf*

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(48) This principle is one of the foundations of the United Nations; cf. United Nations Charter, Article 2(1).

(49) Doc. supra n.6, para.7.2.9..

(50) Cf. Hedberg, supra n.18, at p.5, emphasis added. Cf. also the citation in the text attached to n.18.

(51) See Figure 1 (at the end of the article), which is used by Hedberg to illustrate his perspective in this respect. It should be emphasised that, for purposes of Article 76, Hedberg can be taken as one of the "most highly qualified publicists" in the sense of Article 38(1)(c) of the Statute of the ICJ (being the said Article 38 "the most authoritative statement as to the sources of international law" – cf. Shaw, supra n.21, p.55). His paper may thus be seen as a subsidiary means for determining the rules within Article 76.

(52) The only specific references to islands appear in the context of the treatment of the problems involving ridges and submarine elevations; cf. Doc. supra n.6, paras.7.2 and 7.3..

and an *insular slope* convey the peculiar position in which islands are, which needs to be taken into account if the continental shelf entitlement of islands is to be properly implemented<sup>53</sup>.

#### 4. The Foot of the Continental Slope (FOS)

##### 4.1. Interpretation of Paragraph 4.(b) of Article 76

The location of the FOS is a major consideration within the implementation of Article 76. The establishment of the outer edge of the continental margin under both the Gardiner and the Hedberg formulae relies thereon. Once more, we are before a term of art of geo-sciences which has been imported into the conventional text. In this context, thus, the FOS is no longer a geo-scientific concept. It is a concept that evolves in the legal-scientific realm, and that is embedded in the wording of sub-paragraph 4.(b) of Article 76: “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”. This is the legal provision to be interpreted.

In the Guidelines, the CLCS understands the determination of the foot of the continental slope by means of the point of maximum change in the gradient at its base as a provision with the character of a general rule, posing two fundamental requirements: (a) the identification of the region defined as the base of the continental slope; and (b) the determination of the location of the point of maximum change in the gradient at the base of the continental slope<sup>54</sup>. Conversely, the CLCS affirms that the determination of the foot of the continental slope, when evidence to the contrary to the general rule is invoked, is a provision with the character of an exception to the rule<sup>55</sup>. These statements must be flagged and discussed, for they raise critical legal questions.

It was suggested above that the fact that the CLCS has no members with legal expertise could lead to difficulties. This is one of the instances in which that may be relevant. By framing the issue of the FOS in terms of a ‘general rule – exception’ relationship, the CLCS brought into the picture a key maxim of treaty interpretation: *exceptiones sunt strictissimae interpretationis; exceptiones non sunt extendenda*. Exceptions are interpreted restrictively; exceptions cannot be extended. Whether the CLCS was aware of the fact that, legally speaking, to classify something as an exception to the rule may have significant implications can only be speculated. But taking into account that no member of the CLCS is a legal expert, it is possible that this interpretative issue may have passed inadvertently unnoticed.

Does the interpretation of paragraph 4.(b) of Article 76 lead to the conclusion that the use of ‘evidence to the contrary’ amounts to an exception to a general rule of ‘maximum change in the gradient’ (which forms a higher legal principle)? We would have to answer this question in the negative.

Let us start by the text of paragraph 4.(b). Although it can be read as encompassing a ‘general rule – exception’ type of relationship, this is by no means the only possible reading. In a recent conference, one of the speakers compared the said provision with a statement similar to the following<sup>56</sup>: In the absence of mortgage payment, the bank will prosecute the householder. He went on to ask whether the ‘general rule’ foreseen here was really ‘prosecution by the bank’. In the ensuing debate, one of the authors took the view that the rule of ‘maximum change in the gradient’ (which places emphasis upon geomorphology) is one extremity of a *continuum* that has in the other extremity ‘evidence to the contrary’ (which relies primarily upon geology and

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(53) There are specific references to islands in the context of the problem of ridges (e.g. *ibid.*, paras.7.2.8.-7.2.9.), but they seem to be far from exhausting the scientific-technical challenges that islands may pose as far as the implementation of Article 76 is concerned.

(54) *Ibid.*, para.6.2.4..

(55) *Ibid.*..

(56) *Conference on Legal and Scientific Aspects on Continental Shelf Limits*, organised by the Law of the Sea Institute of Iceland, and held in Reykjavik, on 25-27 July 2003. Richard Haworth, Assistant Deputy Minister, Natural Resources Canada – paper entitled “Determination of the Foot of the Continental Slope by Means of Evidence to the Contrary to the General Rule”.

geophysics). Depending upon how the case is prepared, a state can resort to either of them, or adopt an approach in which the two are mixed. In line with this viewpoint, another participant said that the so-called rule ‘maximum change in the gradient’ is presented as a “default rule”<sup>57</sup>. Hence, as far as the textual element is concerned, there seems to be good reason to suggest that the determination of the FOS in Article 76 does not consecrate a ‘general rule – exception’ type of relationship.

Against seeing ‘evidence to the contrary’ as an exception is yet another maxim of legal interpretation: *exceptio firmat regulam in casibus non exceptis*. The exception affirms the rule in cases not excepted. In principle, the content of the general rule can be determined through the exception, since the latter amounts to a ruling whose *ratio legis* is opposite to that of the former. If there were a true legal exception in the case of ‘evidence to the contrary’, it would be likely that we could derive from it the contents of the general rule. This, however, is not the case, since ‘evidence to the contrary’ remains undefined as a class-situation. It comprises a bundle of different situations handled together for reasons of convenience, as is clear in the references in the Guidelines to the different scenarios that warrant the use of ‘evidence to the contrary’<sup>58</sup>.

Further, exceptions cannot form a basis for reasoning by analogy (for exceptions cannot be extended). This would mean that, if a state were successful in justifying its choice of FOS on the basis of evidence to the contrary, another state would not be able to resort to an analogy with that case to justify its own choice of FOS. In practical terms, such a perspective would place on states a heavy *onus probandi* as regards the location of the FOS outside the general rule. Is this approach acceptable in light of the terms of Article 76? Insofar as it represents a restriction to the powers of states as regards the means whereby states may found their case, it should be accepted only if, implicitly at least, states have consented thereto. This does not appear to have happened. Suffice it to say that one of the most debated issues nowadays concerns exactly the possibility of using precedents in a submission to the CLCS.

All things considered, the suggestion that the ‘maximum change in the gradient’ is a general tenor of the law, in relation to which ‘evidence to the contrary’ is a legal deviation, finds little objective support. As will be shown below through a series of hypothetical situations<sup>59</sup>, the approach that best reflects the *ratio legis* of paragraph 4.(b) is to see the ‘maximum change in the gradient’ and ‘evidence to the contrary’ as two equally valid alternatives. Notwithstanding the ‘default nature’ of the former, it is possible to resort to the latter without having to demonstrate the existence of exceptional circumstances. Further, between the two choices explicitly identified in Article 76 exists a *continuum* of possible analyses based on either or both of them. States only need to present reasonable evidence of the facts that warrant the use of alternative or combined means for determining the FOS<sup>60</sup>.

Attention must now be drawn to a key corollary of this approach. If ‘maximum change in the gradient’ and ‘evidence to the contrary’ are two equally valid alternatives for fixing the FOS, it is hard to understand why it should be necessary that the evidence that supports a FOS founded on the latter be *accompanied by the results of applying the rule of maximum change in the gradient*<sup>61</sup>. This approach lends undue weight to the ‘maximum change in the gradient’, indeed

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(57) Constance Johnson, Legal Specialist, Australian Department of Foreign Affairs and Trade.

(58) Doc. supra n.6, Section 6. What may be seen as a true legal exception (and even then with some caution) is the case of the southern Bay of Bengal, which is dealt with in Annex II of the Final Act, entitled “Statement of Understanding Concerning a Specific Method to be Used in Establishing the Outer Edge of the Continental Margin”. The rule is recourse to the parameters of Article 76; the exception is the non-use of such parameters in the case of the Bay of Bengal, due to equitable considerations. Whether this case could be used in reasoning by analogy can be heatedly debated.

(59) Cf. infra, para.4.4..

(60) “The phrase ‘in the absence of evidence to the contrary’ implies that there may be special circumstances [not exceptional circumstances] requiring the application of alternative means for determining the foot of the slope”; cf. Myron H. Nordquist *et al.* (eds.) *United Nations Convention on the Law of the Sea 1982: A Commentary* (hereinafter *Virginia Commentary*), Vol. II (1993), p.876.

(61) Doc. supra n.6, para.6.4.1.(iv), emphasis added.

unwarranted under Article 76. The examples given in the Guidelines for cases where ‘evidence to the contrary’ may be used demonstrate that the ‘maximum change in the gradient’ is often inconclusive for the determination of the FOS<sup>62</sup>. Why is it then necessary to provide information on the ‘maximum change in the gradient’ in such instances? Arguably, besides irrelevant, this information might blur, and unnecessarily complicate, the process of choice of the FOS under ‘evidence to the contrary’<sup>63</sup>.

#### 4.2. *Scientific-Technical Considerations*

The analyses necessary for the determination of the FOS rely on evidence of a different nature: morphological, geological and geophysical. Whereas the determination of the ‘maximum change of gradient’ is primarily a morphological analysis, recourse to ‘evidence to the contrary’ consists primarily of an exercise in geology and geophysics. This proposition is widely accepted and raises no major difficulties. With this said, however, attention must be drawn to three words that appear at the end of paragraph 4.(b): “at its base”. The importance of this expression is often unacknowledged. Most commentators recognise that the computation of the maximum change in the gradient along the slope leads to ambiguities in the positioning of the FOS. This, we would argue, is often due to the fact that the base of the slope is not defined beforehand.

Before the computation of the derivative of the gradient is carried out, its spatial domain of application must be defined. This means that the base of the slope has to be previously found, and that only the local maxima of the gradient derivative that lie within the base of the slope have to be analysed. As far as the definition of the physical region that corresponds to the legal concept of ‘base of the slope’ is concerned, morphological analysis may not be sufficient, and geological and geophysical analyses may become essential. These analyses can include studies on the geological composition of the relevant area, based on direct sampling or seismic methods, and on geomagnetic and gravimetric data.

In effect, there are a significant number of instances in which continental margins show saddles, terraces (or plateaus) and even mount-like features or ridge-like features that complicate the definition of the FOS. A careful analysis has therefore to be done, in order to define the base of the slope, i.e. the region where the continental slope meets the continental rise (or the deep ocean floor in cases in which the rise does not exist). The FOS will be determined within the area defined as the base of the slope.

Another point on the FOS-related issues concerns the presumptive idea that the FOS lies “near the place where the crust changes from continental to oceanic”<sup>64</sup>. Without seeking in any way to question this point, we wish to emphasise, first, that this is no more than a ‘rule of thumb’ and, second, that this ‘roughly correct but not scientifically accurate rule’ must be framed within the legal bounds established by Article 76. What relevance is given in this provision to the notion of COT? Although none is directly attributed thereto, it seems undoubted that the notion of COT underlies paragraph 3 (in effect reinforcing the suggestion that this provision cannot be read too literally<sup>65</sup>).

In extremely complex situations, a clear perspective of the geological constitution of the whole area under analysis may be needed. The definition of the areas of oceanic crust and of continental crust may be required in such cases, including, where necessary, the definition of the COT. Should the results of the application of the rule of maximum change in the gradient in the area of the base of the slope remain inconclusive, ‘evidence to the contrary’ will have to be used. The determination of the FOS in areas involving ridges and ridge-like features differs in no substantive way from the points made here.

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(62) *Ibid.*, paras.6.3.2.-6.3.3..

(63) For an illustration of how the interpretation adopted here as regards the determination of the FOS operates in practice, cf. *infra*, para.4.4..

(64) Doc. *supra* n.6, para.6.2.3., *in fine*.

(65) Cf. *supra*, para.3.3..

Equally important is to know how the COT can be used in practical terms for purposes of implementation of Article 76. The Guidelines state, for example, in relation to ‘rifted (non-volcanic) and sheared continental margins’, that because the COT can extend over several tens of kilometres, the CLCS “may consider the landward limit of the transitional zone as an equivalent of the foot of the continental slope in the context of paragraph 4”<sup>66</sup>. From a legal perspective, it is not totally clear why, generally speaking, preference should be given to the landward limit of the COT. The issue is particularly significant in that the result may be an undue restriction of the natural prolongation of the landmass. In extremely complex margins, the determination of the limit ‘continental crust – COT’ may be scientifically impossible (or be possible only if recourse is had to a very wide margin of discretion). As predictability and consistency are from a legal standpoint critical, in the absence of conclusive evidence as regards the location of the landward limit of the COT, two options may then be available to states. One option is to establish the FOS at the point of maximum change in gradient within the COT. The other option (which may be the only option if the previous approach leads to no clear result) is to use the seaward limit of the COT. No doubt, this will mean that part of the scientific deep ocean floor will be included in the legal continental margin. But if the opposite approach is adopted, then the situation is that parts of the natural prolongation of the state may be included in the legal deep ocean floor. In such a situation, perhaps the benefit should be given to the state. The inclusion of areas of the scientific deep ocean floor into the legal continental margin happens in any event in other instances (e.g. where there is no rise, or where the 60 M belt measured from the proxy-FOS based upon the landward limit of the COT is wider than the COT).

An open question concerns islands of oceanic origin; for there will be no COT involved. In geological and geophysical terms, as the island and the deep ocean floor around it are formed by the same (or similar) materials, there will be no transition between two regions of a different nature. In the case of oceanic islands located on a larger plateau well above the deep ocean floor, this plateau should be considered as a natural prolongation of the land territory. Therefore, the FOS should be located where the slope starting from this plateau meets the deep ocean floor (or the rise if it exists). In both these cases, the problem of determination of the FOS will consist, almost exclusively, of a morphological analysis.

#### 4.3. Brief Mathematical Points

It should be noted that Article 76 does not specify the mathematical method to be used. Nor does it establish any preference between two-dimensional or three-dimensional analyses. If a three-dimensional approach is chosen, several types of bathymetric models can be utilised, such as triangular irregular networks (TIN), regular grids (obtained from a TIN or from weighted averages, including Kriging), cubic bi-dimensional splines, and least squares interpolating surfaces. If we consider a three-dimensional model,  $z = f(x,y)$ , the gradient of the depth ( $m$ ) is given by  $\nabla z$  and its absolute value by

$$m = |\nabla z|.$$

The directional derivative of “ $m$ ”, along the direction of the gradient of the depth, is

$$m' = \nabla z \bullet \nabla m / m.$$

This derivative can be used in the definition of FOS points. But we can equally consider, instead, the derivative as the absolute value of the gradient of “ $m$ ”:

$$m' = |\nabla m|.$$

Hence, a choice must be made in respect of the bathymetric model and the mathematical method to compute the change in the gradient. Different combinations of bathymetric models and mathematical methods can lead to significantly different results.

The recourse to two-dimensional profiles to examine the location of the FOS points is also not free from difficulties. First, the profiles must be approximately perpendicular to the

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(66) Doc. supra n.6, para.6.3.10., *in fine*.



general direction of the isobaths. In many cases this is quite difficult to achieve, as the isobaths may be very irregular. Secondly, we must choose a method to smooth the original data, in order to prevent highly noisy values of the second derivative of the depth. Amongst the methods that can be utilised, we can identify linear filters based on spatial Fourier analysis, cubic splines, least squares or piecewise linear interpolation, and the Douglas-Peucker filter. Once more, different methods can lead to significantly different results.

Finally, whatever the data model and the mathematical method, it should be remembered that the final results depend on the subjective appraisal of the person that performs the analysis. A ‘discretion-free process’ of determination of the FOS is therefore virtually unattainable. This is a crucial point in terms of the relationship between the submitting state and the CLCS. In the ‘ping-pong process’ that may emerge in case of disagreement as regards the location of the FOS, both should be expected to proceed on the basis of good faith and reasonableness. These are key tenets in the implementation of legal provisions<sup>67</sup>.

#### 4.4. *Some Hypothetical Scenarios*

The following hypothetical scenarios attempt to illustrate the interpretation adopted here in terms of the determination of the FOS, notably as regards the recourse to ‘maximum change in the gradient’ and ‘evidence to the contrary’ as equally valid alternatives, and the use of combined means of determination of the FOS. In other words, the determination of the FOS does not seem to consist of a mere application of a rule, to which there are some exceptions. We would argue that it consists of an integrated assessment of all data available (morphological, geological and geophysical) in light of the broad guidelines laid down in Article 76(4)(b).

The example of Figure 2 is widely known, as it represents the traditional profile on which most of the work in the Third Conference relied<sup>68</sup>. It is the simplest of all possible examples, and it is less common in reality than it may be initially thought. The application of the provision of the FOS is relatively easy. Morphologically, the maximum change in the gradient occurs in the area that may be identified as the base of the slope. In addition, it is unlikely that evidence to the contrary supporting the identification of the FOS elsewhere can be found in such circumstances.

The case in Figure 3 is a variation of the previous profile, in which the maximum change in the gradient occurs well before the slope reaches its base. Since what matters in terms of paragraph 4.(b) is the maximum change in the gradient at the base of the slope, the FOS should be located at the point of maximum change in the gradient in the area in which the slope meets the rise. It should be noted that this decision was reached on the basis of morphological analysis alone, and that there was no recourse to evidence to the contrary.

Further difficulties emerge with the example in Figure 4, in which there is a ‘double-dip’ in the profile. Neither the maximum change in the gradient, nor the second (local) maximum change in the gradient occurs at the base of the slope. To further complicate the choice of the FOS, in the area where the slope seems to meet the rise (after the second dip) there is no clear maximum of change in the gradient. Here, help may be sought in geological and geophysical data, to identify the COT, with a view to narrowing down the possible choices of FOS. However, no straightforward answer appears to exist in this situation. Once more, this is not a case in which evidence to the contrary is being used to determine the FOS. The recourse to geological and geophysical data is meant to provide support to a choice of FOS based primarily upon morphological analysis.

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(67) The principle of good faith is explicitly mentioned in the LOSC, Art. 300. Also, it can be suggested that the *ratio* of reasonableness embodied in Art. 59 – the resolution of conflicts regarding the attribution of rights and jurisdiction in the EEZ, in cases not explicitly dealt with in the LOSC, are to be resolved “on the basis of equity and in the light of all the relevant circumstances” – could be applied to this case by analogy.

(68) The examples offered for consideration are roughly based on actual profiles that can be found in several offshore areas around the world. It cannot be overemphasised that these examples are stylised drawings in which the vertical scale has been clearly exaggerated. The horizontal scale is approximately 60 times smaller than the vertical scale.

As shown in Figure 5, in the case of oceanic islands, morphological analysis may equally give rise to difficult issues. In this situation, the insular slope has three local maxima of change in the gradient, and there seems to be no area identifiable as rise. The area of the base of the slope is also not distinct, which makes the choice of FOS that more complex. Further, since there is no major geological separation between the natural prolongation of the island and the deep ocean floor, geological and geophysical data are likely to be unhelpful. The international legal principles of reasonableness may become an important ingredient in the decision-making process concerning the determination of the FOS.

Although probably a rare occurrence, the profile represented in Figure 6 is by no means a merely theoretical situation. If the base of the slope is deemed to be located at the first maximum of change in the gradient, the choice of FOS would be relatively easy. If, on the other hand, we take into account the fact that this approach would mean that there would be a rather long rise, much steeper than usual, the determination of the FOS would become less simple. Part of what appears to be the rise may in effect be ‘slope’. In situations such as this, it could be advantageous to look deeper into the geological and geophysical data, in search for the COT. Should the COT be located significantly seawards of what was, at first glance, deemed to be the slope, i.e. closer to the end of what appeared to be the rise, perhaps the location of the FOS would have to be rethought (especially because the maximum change in the gradient occurs at the end of what may in fact be in fact a ‘two-segment’ slope). If this profile were associated with an oceanic island, the difficulties would become greater, as geological and geophysical data would offer little or no guidance.

The examples given in Figures 7 and 8 will be dealt with in conjunction. They are cases that illustrate some of the more complex situations that may be found. In both occurrences, the determination of the FOS is unlikely to be influenced in any measure by the maxima of change in the gradient that appear along the profile. None of these maxima has any relation with the base of the slope or the COT. The suggested FOS (even then with question marks) stem mainly from arguments of evidence to the contrary. Morphological data on its own offer little or no guidance. In terms of location of the FOS, the COT determined on the basis of geological and geophysical data points to a certain area at the bottom of the slope.

As for Figure 7, the suggested FOS was determined as the point of maximum change in the gradient within the COT. This rationale is not explicitly mentioned either in Article 76, or in the Guidelines. But it seems to be that which, *in concreto*, reflects the *ratio legis* of Article 76. Most interesting in this example is the fact that it appears to depart from two points in the Guidelines. First, the suggested FOS is much closer to the seaward limit of the COT, rather than the landward limit thereof<sup>69</sup>. Second, it questions the significance and utility of having to provide the results of applying the rule of maximum change in the gradient (especially as the base of the slope is difficult to identify)<sup>70</sup>.

Figure 8 also leads to question the relevance of providing information on the application of the rule of maximum change in the gradient. Unlike Figure 7, however, it offers support to the idea of using the landward limit of the COT as FOS. By analogy to the decision taken in respect of Figure 7, one could have recourse to the maximum change in the gradient that is closer to the landward limit of the COT. Notwithstanding this, it may be asked whether it is reasonable to choose as FOS the maximum change in the gradient located nearer to the seaward limit of the COT. Much would probably depend on the details *in concreto*, as both options seem to be equally valid in light of what is stated in paragraph 4.(b) of Article 76.

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(69) Doc. supra n.6, para.6.3.10., *in fine*, in which the CLCS states that “[s]ince the transitional zone can extend over several tens of kilometres, [it] may consider the landward limit of the transitional zone as an equivalent of the foot of the continental slope in the context of paragraph 4, provided that the submitted geophysical and geological data conclusively demonstrate that the submerged land mass of the coastal State extends to this point”.

(70) *Ibid.*, para.6.4.1.(iv), in which the CLCS states that “[i]f evidence to the contrary is presented as part of a submission, [it] will request that it be also accompanied by the results of applying the rule of maximum change in the gradient”.

## 5. Ridges and Ridge-like Features

### 5.1. The Emergence of Paragraph 6

Turning to the conventional provisions on ridges and ridge-like features, the first point to remember concerns the ‘wider picture’ behind these provisions. The development of Article 76 was, at the time, orientated to ensure that the continental shelf entitlement of coastal states would not encroach upon the concept of common heritage of mankind (which refers to the deep ocean floor). As noted at the outset, one essential goal of the process initiated with the Pardo speech in the United Nations was indubitably the replacement, in conventional law, of the ‘exploitability criterion’ as means for defining the jurisdiction of states over the continental shelf. The whole of Article 76, therefore, forms a compromise between two sets of interests: those of coastal states; and those relating to the common heritage of mankind.

The issue of ‘submarine ridges’ was intertwined with the issue of ‘the outer limit of the continental shelf’, two of the outstanding points with which Negotiating Group 6 (NG6) had to deal. In effect, paragraph 6 (the key provision on ridges and ridge-like features) emerged from the negotiations in NG6 and was worded in terms of a compromise drawn up in parallel with an addition to paragraph 3 (i.e. its second sentence). The compromisory wording of paragraph 6, in particular, is explicit not only in the Report of Chairman of the Second Committee, but also in some of the statements made by states during the Third Conference<sup>71</sup>.

To understand the compromise that was reached, it is necessary to look into some of the developments that took place in the 1979 session<sup>72</sup>. Early in 1979, the draft Article 76 contained no references to oceanic ridges, submarine ridges or submarine elevations<sup>73</sup>. Most substantive proposals in this respect were put forward subsequently in NG6. The Soviet Union proposed the following addition to the text to draft paragraph 5: “However, the limit of shelf containing *submarine oceanic ridges* shall not extend farther than the aforementioned 350-mile distance”<sup>74</sup>. The group of ‘margineers’, similarly, suggested that draft paragraph 5 should read: “However, this paragraph shall apply to *submarine oceanic ridges*, which are [...] long narrow *submarine elevations formed of oceanic crust*, in such a manner that the outer limit of the continental shelf in the areas of such ridges does not exceed the above 350 mile distance”<sup>75</sup>. Taking the opposite view, Bulgaria proposed an addition to paragraph 5 aimed at clarifying that the continental shelf would not be extended to *submarine oceanic ridges*; and Japan proposed the exclusion of *ridges formed of ocean crust* from the ‘claimable areas’ as defined in paragraph 3<sup>76</sup>. In view of these proposals, it can be argued that the compromise eventually reached on the wording of paragraphs 3 and 6 (which refers to submarine ridges, and does not refer to the nature of the crust) endorsed the proposals made by the Soviet Union and the group of ‘margineers’<sup>77</sup>.

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(71) The compromise wording appears in the “Report of the Chairman of the Second Committee”. It includes the addition of a second sentence in paragraph 3, and a new paragraph 5 *bis* (which eventually became paragraph 6); cf. Doc. A/CONF.62/L.51, 13 Off. Rec. 82. In relation to the statements made by states, cf. e.g. Argentina (13 Off. Rec. 17, para.89), Australia (13 Off. Rec. 33, para.13), Denmark (14 Off. Rec. 61, para.149), New Zealand (13 Off. Rec. 16, para.79), Norway (13 Off. Rec. 47, para.212), United Kingdom (13 Off. Rec. 25, para.15).

(72) A detailed account of the drafting history of Art. 76 is beyond the scope of this article. On this point, cf. Nordquist, *supra* n.60, p.837 *et seq.*

(73) Cf. Doc. A/CONF.62/L.37, 29 April 1979, 11 Off. Rec. 100-101. The paragraphs of draft Art. 76 in the said document were sequentially renumbered, and incorporated as draft Art. 76 in the ICNT/Rev.1; cf. Nordquist, *supra* n.60, pp.865-866.

(74) Cf. Doc. NG6/9, Platzöder, *supra* n.42, Vol. IX, p.379, emphasis added.

(75) Cf. Doc. NG6/11, Platzöder, *supra* n.42, Vol. IX, p.380, emphasis added. As it may become crucial for assessing key juridical questions, it is worth emphasising which the states were behind this proposal: Argentina, Australia, Canada, India, Ireland, New Zealand, Norway, United Kingdom, United States, and Uruguay

(76) Cf., respectively, Doc. NG6/14 and Doc. NG6/16, Platzöder, *supra* n.42, Vol. IX, pp.382-383, emphasis added.

(77) The wording of the second sentence of paragraph 3 stems verbatim from a draft proposal of the ‘Group of Margineers’, whose contents were supported by proposals put forward by other states (e.g. Australia, Soviet Union); cf. Platzöder, *supra* n.42, Vol. IV, pp.524. In this respect, cf. also the proposal advanced by the Soviet Union, and an anonymous proposal; cf. *ibid.*, at pp.524-525.

In the 1980 session, some states expressed their views in relation to the contents of the provision that became paragraph 6. Whilst drawing attention to the difficulty in assessing the full implications of the different geological concepts used in this paragraph, Denmark stated that it interpreted the concept of submarine elevations as meaning “submarine elevations that belong to fundamentally the same geological structure as the land territory of the coastal state”<sup>78</sup>. The stance taken by Iceland was that “the new provision regarding submarine ridges meant that the 350-mile limit criterion would apply to ridges which were a prolongation of the land mass of the coastal state concerned”<sup>79</sup>. The position taken by the United States, when stating that “features such as the Chukchi plateau [...] could not be considered a ridge and were covered by the last sentence of [paragraph 6]”<sup>80</sup>, reinforce also the substantive distinction (between oceanic ridges, submarine ridges and submarine elevations) embodied in the said provision.

These statements, we would contend, are patent evidence that states had a concrete idea of how the compromise text could affect the spatial extension of their sovereign rights. It is thus rather difficult to accept the proposition that paragraph 6 has no practical application<sup>81</sup>.

### 5.2. *The Interpretation of Paragraph 6: The Guidelines*

The question arises then as to how paragraph 6 should be interpreted. Following the rules of interpretation set out in the VCLT, the textual element must be taken as the starting point for the interpretation. Because the context of the terms used must also be considered, and because of the compromise which lies at its root, paragraph 6 must be considered together with the second sentence of paragraph 3. Objectively speaking, therefore, it seems indisputable that, in terms of seabed relief, Article 76 identifies explicitly three *nomen juris* – ‘oceanic ridges’, ‘submarine ridges’ and ‘submarine elevations’ – to which it attributes distinct legal consequences. Oceanic ridges may not be part of the legal continental shelf. Submarine ridges may be included within the legal continental shelf provided that the outer continental shelf limit does not extend beyond 350 M. Submarine elevations are features which may be legally treated as any other part of the geo-scientific continental margin.

With this in mind, there seems to be little doubt that the problem does not concern the identification of the rules in paragraphs 3 and 6. It concerns the identification, *in concreto*, of the seabed features that are subsumable in each of the three aforementioned class-situations. This could, and perhaps should, have been the object of the Guidelines issued by the CLCS, even if in the form of a very broad, yet practical, outline of the approach to be adopted. This, however, has not been the path eventually followed in the Guidelines (which offer no more than general pointers). The CLCS has ultimately decided to retain to itself a wide margin of discretion. It concluded that, due to the difficulties involved, it was “appropriate that the issue of ridges *be examined on a case-by-case basis*”<sup>82</sup>.

Whether this is the approach that best serves international law remains to be seen. It is once more interesting, nevertheless, to compare the differences between the provisional version and the final version of the Guidelines. The provisional version recognised the existence of two categories of ridges, to each of which corresponded a different legal regime. The term ‘oceanic ridge’ was viewed as including “all ridges located on the deep ocean floor which do not have any connection with the continental margin as defined in accordance with Article 76”; and the term ‘submarine ridge’ was interpreted as including “the ridges which coalesce with the continental margin as defined in accordance with paragraph 3 or extend from that continental margin towards the deep ocean floor”. Particularly notable was the stance taken with respect to islands located on ridges. It was stated that, in cases of ridges (including spreading ridges) with islands

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(78) Cf. 126th meeting, 13 Off. Rec. 17, at para.96.

(79) Cf. 128th meeting, 13 Off. Rec. 36, at para.58.

(80) Cf. 128th meeting, 13 Off. Rec. 43, at para.156.

(81) Cf. *supra*, text with n.38.

(82) Doc. *supra* n.6, para.7.2.11..

on them, “it would be impossible to consider that part of the ridge to belong to the deep ocean floor, and to fall under the category of oceanic ridges under Article 76”. It was further added that an island located on a ridge “should be considered as a land mass with the ridge in question being its submerged prolongation irrespective of the composition and the origin of the ridge”. The conclusion was that “[i]n this case the ridge [would fall] under the category of submarine ridges in accordance with paragraph 6 of Article 76”<sup>83</sup>.

The final version of the Guidelines, however, has not incorporated these considerations. While recognising the tripartite legal categorisation concerning seabed relief, the Guidelines stop short of trying to provide any definition. It is simply stated that the distinction between ‘oceanic ridges’ and ‘submarine ridges’ is unclear, that ‘submarine elevations’ and ‘submarine ridges’ seem to be also legally distinct, and that the distinction between these terms cannot be based on the denominations used in cartographic material and other relevant literature<sup>84</sup>. The fact that the term ‘oceanic ridge’ is used in scientific literature with different meanings is acknowledged, and it is noted that “the provisions of paragraphs 3 and 6 may create difficulties in defining ridges for which the criterion of 350 M in paragraph 6 may apply on the basis of the origin of the ridges and their composition”<sup>85</sup>. On the question of islands on ridges, the final version exercises again great restraint. It states that “it would be difficult to consider that those parts of the ridge belong to the deep ocean floor”, and that “[t]he terms ‘land mass’ and ‘land territory’ are both neutral terms with regard to crustal types in the geological sense”<sup>86</sup>.

### 5.3. *The Interpretation of Paragraph 6: A Proposal*

How, then, should paragraph 6 (and the intimately related paragraph 3) of Article 76 be interpreted? A first point that stems from the *travaux préparatoires* is that the term ‘submarine ridges’ seems to refer to ridges that are *composed of oceanic crust*. Evidence in this respect may be found in documents NG6/9 and NG6/11, which were draft proposals put forward by many of the states with direct interest in this matter<sup>87</sup>. Further, the term ‘submarine (*oceanic*) ridge’ was thought out as distinct from the term ‘oceanic ridge’, which can be inferred from the fact that the states behind the draft proposals that eventually led to paragraph 6 also advanced draft proposals for additions to paragraph 3 (which formed the basis for its final version<sup>88</sup>).

Authority for this interpretation can also be obtained in the textual element and in logics. As is known, the natural prolongation of a state may be formed of oceanic crust (e.g. the case of states whose territory includes oceanic islands)<sup>89</sup>. This explains why the LOSC has embodied a principle of crustal neutrality. In this light, it is possible to interpret the term ‘submarine ridge’ as a ridge, composed of oceanic crust, which forms the submerged natural prolongation of a state as defined in Article 76 (in particular as regards appurtenance, which is to be seen by reference to paragraph 4.(a)). Another type of submarine ridge encompasses ridges (again not continental in origin) that have merged with the continental margin, and now coalesce therewith. In both cases, there is a ‘continuity’ (or ‘quasi-continuity’) in the seabed relief that can be identified. Insofar as the relevant link is morphological, the geological origin of the seabed relief is less significant. The distinction between submarine ridges and oceanic ridges, therefore, is arguably not a matter of crustal type. It concerns the question of whether the seabed relief in question constitutes the submerged natural prolongation of a state on geomorphic grounds.

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(83) Doc. supra n.22, pp.48-49.

(84) Doc. supra n.6, paras.7.1.3.-7.1.8..

(85) *Ibid.*, paras.7.2.3.-7.2.6..

(86) *Ibid.*, paras.7.2.8.-7.2.9.. The changes introduced by the CLCS in the provisional version of the Guidelines appear to have been the result of comments made by states. The comments of the USA were particularly critical of the approach adopted in the provisional Guidelines. Cf. CLCS/CRP.15, supra n.35, at paras.34-39.

(87) Cf. supra, text relating to n.74 and n.75.

(88) Cf. supra, text relating to n.77.

(89) It should be noted that not all islands are oceanic in nature.

In contradistinction, submarine ridges and submarine elevations are to be differentiated, typically, by reference to crustal type. The seabed relief features (plateaux, rises, caps, banks and spurs of the continental margin) that “are *natural components* of the continental margin” are, in typical cases, composed of continental materials. Notwithstanding this, it should be taken into account that, according to paragraph 6, what seems to be required is that the seabed relief be part of the geological continental margin<sup>90</sup>; and that it is possible to conceive that a feature composed of oceanic materials (brought into the margin e.g. by accretion, lava flows, uplift of mantle) be part of the geological continental margin. To put it in another way, it may happen that the geological link between certain oceanic features and the continental margin is of such relevance that it justifies that such features be treated under the category of submarine elevations. The context provided by Article 76 appears to offer further evidence to support this view. The term ‘natural prolongation’ implies a geomorphic requirement. Hence, if the reference to ‘natural component’ is to have a substantive meaning distinct from that of ‘natural prolongation’, it must be translated into a geological requirement. Otherwise, ‘natural component’ would appear as somewhat of a hollow, tautological expression<sup>91</sup>.

The proposed interpretation appears to underlie the statements made by Denmark and Iceland during the Third Conference<sup>92</sup>. Further, this perspective was explicitly adopted in the provisional Guidelines, which stated that the terms used in Article 76 for ridges had to be considered in their legal sense and for the purpose of Article 76 had to be treated separately on the basis of provisions of that article rather than on the basis of scientific considerations. In effect, ‘oceanic ridge’, ‘submarine ridge’ and ‘submarine elevation’ are legal categories, created specifically for the purpose of a legal instrument: the LOSC. They cannot be read as strict scientific terminology. And although the final version of the Guidelines is not quite as explicit, it appears to follow implicitly this perspective<sup>93</sup>.

This interpretation is equally supported in literature. Saura Estapà endorses explicitly a distinction based on the nature of the crust<sup>94</sup>. Weight is also lent to the standpoint adopted here by the *Virginia Commentary* to the LOSC, which states that submarine ridges “can be described as ridges that are part of the natural prolongation of the land territory of a coastal state but are not natural components of the [geo-scientific] continental margin”. And it adds that “[s]uch ridges fall into two general categories: (i) ridges which, having their origin in the continental margin, project out into the area of the deep sea bed; and (ii) submarine ridges which are not linked to the continents, but which support chains of islands”<sup>95</sup>. Authority for this view may also be found in Verlaan’s conclusion that “claims on certain submarine ridges that are not continental submarine elevations” can be made<sup>96</sup>. Similarly, Pulvenis observes that “it may occur that the natural prolongation of the coastal State is composed wholly or partly not of a continental shelf but of an ocean ridge, the exposed part of which may correspond to the territory of the state”, and that “[i]t would have been unfair not to allow such states to extend their legal continental shelf to beyond 200 miles”<sup>97</sup>. This view on the question of islands seems to be also supported by previous studies

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(90) The term ‘continental margin’ seems to be used there in its geo-scientific context, a suggestion that is reinforced by the fact that the LOSC explicitly refers to such features as parts of the continental margin when using the adjective “its”. Indeed, it would be somewhat odd to speak of certain features as ‘natural components’ of the legal continental margin.

(91) In hermeneutical terms, if two different terms are utilised in a legal instrument, it is presumed that the drafters intended to express distinct notions.

(92) Cf. *supra*, text relating to n.78 and n.79.

(93) On the question of the distinction between legal and scientific terms, cf. *supra*, text between n.16 and n.20.

(94) Jaume Saura Estapà, *Delimitación Jurídica Internacional de la Plataforma Continental* (1996), p.52-54.

(95) Nordquist, *supra* n.60, at p.880.

(96) Philomène Verlaan, “New Seafloor Mapping Technology and Article 76 of the 1982 United Nations Convention on the Law of the Sea”, 21(5) (1997) *Marine Policy* 425, at p.428.

(97) Pulvenis, *supra* n.30, at p.354.

undertaken by Hedberg, who illustrates his notion of insular shelf and insular slope in the schematic Figure 1<sup>98</sup>, which excludes such areas from the deep ocean floor.

Further weight is lent to the proposed interpretation by documents published under the auspices of the IHO. The ‘deep ocean floor’ is defined therein as the surface lying at the bottom of the deep ocean. As for the distinction between ‘oceanic ridges’ and ‘submarine ridges’, these publications present the following definitions:

- ‘Oceanic ridge’ – a long elevation of the ocean floor with either irregular or smooth topography and steep sides; and
- ‘Submarine ridge’ – an elongated elevation of the sea floor, with either irregular or relatively smooth topography and steep sides which constitutes a natural prolongation of land territory.<sup>99</sup>

Amongst the arguments raised against this interpretation two deserve a closer look. The first argument, for example, was advanced by McKelvey. He argues “that no geologist or marine hydrographer would be likely to agree that the margin beyond 200 M could consist of an oceanic ridge merely because it is a natural prolongation of an island or land mass [as Article 76(3)] specifically excludes the deep ocean floor with its oceanic ridges”<sup>100</sup>. The second argument refers to the question of islands, and appears in the form of a question: “How can an island on an oceanic ridge of the deep ocean floor change the character of the ridge from either a legal or a scientific perspective?”<sup>101</sup>

Both arguments are insufficient to reject the interpretation adopted here. The first of them could only be relevant if one assumed that the problem evolved strictly in a scientific realm. This is clearly not the case. Further, the said argument takes for granted that all parts of the ‘geo-scientific deep ocean floor’ are parts of the ‘legal deep ocean floor’. Again, this is not so under the LOSC. Intertwined here is the terminological dualism that characterises Article 76<sup>102</sup>. As said, the implementation of Article 76 may end up attributing to states jurisdiction over areas of the ‘geo-scientific deep ocean floor’, thus excluding them from the ‘legal deep ocean floor’<sup>103</sup>. With respect to the second argument, the difficulties are similar. It is assumed at the outset that the ridge in question is part of the deep ocean floor. The crux of the matter, however, is that, for centuries, the law of the sea has been governed by one paramount principle: the land dominates the sea, referred elsewhere as the principle of maritime zoning<sup>104</sup>. Which areas of the ocean fall under state jurisdiction is a matter for the law to establish, by reference to the land territory of a state. Whether, legally speaking, a feature that is (geologically speaking) an oceanic ridge can be part of the natural prolongation of a state is a legal question the analysis of which must thus start from the land territory of that state<sup>105</sup>; not the other way around. Scientifically, it may be hard to conceive how a ridge can be a submarine ridge up to 350 M from the coast, and an oceanic ridge beyond that point. Legally however, this is perfectly possible, and raises no difficulties. There is therefore no question of changing the character of a ridge. A ridge, irrespective of its crustal

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(98) In order to facilitate the reading, all figures are presented in numerical order at the end of the article.

(99) IHO, *A Manual on Technical Aspects on the United Nations Convention on Law of the Sea* (1993), pp.12, 21, 26; IHO, *Hydrographic Dictionary* (1994), pp.61, 161, 234. Cf. also United Nations, *supra* n.45, pp.42-45. The definitions presented in these publications vary slightly. The definitions offered above contain the aspects of those definitions that were deemed to be relevant for the purposes of this article.

(100) V. E. McKelvey, “Interpretation of 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* (1982), p.465, at p. 469, cited in Philip A. Symonds *et al.*, “Ridge Issues”, in Cook and Carleton (eds.), *supra* n.12, p.285, at 303, and in Verlaan, *supra* n.96, at p.427.

(101) Symonds *et al.*, *supra* n.100, at p.303 (cf. pp.300-303).

(102) Cf. *supra*, text between n.16 and n.20.

(103) Cf. *supra*, text between n.38 and n.44, in which we conclude that Article 76(3) must be read *cum grano salis*.

(104) Cf. Antunes, *supra* n.29, at pp.195 *et seq.*.

(105) The attribution of maritime jurisdiction is a legal question, and cannot be turned into a strict scientific question. As to what constitutes the natural prolongation of the land territory of a state, cf. *supra*, para.3.4..

type, will have the legal character that is attributed to it in accordance with the principle of maritime zoning. For the land dominates the sea.

The fact that some commentators may reject this interpretation is not enough to sideline it. A legal text that results from a negotiated compromise, which could only be achieved through recourse to polysemic expressions and terms, will always leave some room for opinions against any specific interpretation. In truth, the compromisory nature of Article 76 provisions on ridges is by no means unique. This is also true with other provisions of the LOSC. In a recent decision on maritime delimitation, a tribunal has observed that “there has to be room for differences of opinion about the interpretation of articles which, in a last minute endeavour at the Third United Nations Conference on the Law of the Sea to get agreement on a very controversial matter, were consciously designed to decide as little as possible”<sup>106</sup>. Although this was noted in respect of the provisions on maritime delimitation, one would argue that, by analogy, this view is valid for all cases in which it is clear that the text resulted from a compromise.

The proposed interpretation is in the modest opinion of the authors that which best conforms to all elements that have to be taken into account in this respect. What ultimately matters is not so much the fact that Article 76 resorts to scientific-technical terms, as it is the fact that such terms were ‘imported’ into a legal instrument which, in many cases, conferred upon them a meaning and a context distinct from that which exists in geo-sciences.

#### *5.4. Practical Considerations in the Implementation of Paragraph 6*

The title ‘practical considerations in the implementation of paragraph 6’ requires a word of caution. There is no question of describing (as to characteristics, origin, composition, etc.) the different types of ridges around the world, or of applying the interpretation proposed to any specific geographical setting. The goal of this section is rather modest. We simply seek to offer very brief, broad pointers and guidelines on how the interpretation proposed above may be put into practice. The parameters that in our view are decisive in the implementation of paragraph 6 will also be outlined. No attempt is made to interpret actual scientific-technical data in light of Article 76(6). The systematisation of practical criteria to be utilised in the implementation of paragraph 6 is here the ultimate objective.

From the outset, it should be remembered that the difficulties in this respect stem from the fact that the three types of features in hand – oceanic ridges, submarine ridges and submarine elevations – have a common denominator: they are all elevations of the seafloor. To differentiate between these concepts, it is necessary to resort to paragraphs 1, 3 and 6 of Article 76. Taking this provision into account, the following definitions can be put forward:

- A ‘submarine elevation’ is a natural component of a continental margin, being thus necessarily a part of the submerged natural prolongation of the land territory.
- A ‘submarine ridge’ is not a natural component of a continental margin, but it is a part of the submerged natural prolongation of a land territory.
- An ‘oceanic ridge’ is neither a natural component of a continental margin, nor a part of the submerged natural prolongation of a land territory.

This distinction resorts to a language that is typically legal, i.e. it reflects the contents of the relevant legal provisions. Bearing in mind that the implementation of Article 76 entails the recourse to scientific-technical data, an attempt can be made to translate such definitions into a more scientific language. The above three-fold categorisation could then be rephrased along the following lines:

- ‘Submarine elevations’ are features typically composed of continental crust, and they are part of the geomorphic continental margin. Intrinsic to this definition is, therefore,

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(106) *Eritrea/Yemen* Arbitration, Second Stage: Maritime Delimitation, Award of the Arbitral Tribunal of 17 December 1999, para.116.



a two-fold requirement: geological continuity with (or linkage to) the geological continental margin; and geomorphic continuity<sup>107</sup>.

- ‘Submarine ridges’ may be distinguished from ‘submarine elevations’ in that they are in principle composed of oceanic crust (although they may also be partly formed by an amalgam of materials, which reflects their complex origin). In this category, there is only one relevant requirement: geomorphic continuity<sup>108</sup>.
- ‘Oceanic ridges’ are elevations of the seafloor that can in no way be considered as the submerged natural prolongation of a territory. They are, both in geomorphic and in geological terms, completely detached from any landmasses.

With these definitions in mind, an important clarification concerning oceanic islands must be made. Under this categorisation, the natural prolongation of oceanic islands can never encompass submarine elevations. At first glance, this view may appear to discriminate against islands. This is not the case, however. As mentioned before, the term ‘natural component of the continental margin’, utilised in the second sentence of paragraph 6, evinces a geological link between certain features and the geological *continental* margin. And, strictly speaking, as far as geology is concerned, the margin of islands is not continental. For the sake of argument, let it nevertheless be assumed that it would be possible to conceive the existence of submarine elevations off an insular margin. If this were possible, the first sentence of paragraph 6 would have no application in the case of oceanic islands. Since the requirement of a geological link between the feature and the insular margin would always be verified, all features would fall under the category of submarine elevations. To the extent that one of the reasons behind the first sentence of paragraph 6 was exactly the situation of certain oceanic islands<sup>109</sup>, this interpretation would be somewhat absurd. Hence, as far as oceanic islands are concerned, it may be argued that the definitions above reflect correctly what seems to have been a compromise reconciling the non-existence of a ‘continental prolongation’, with the existence of a ‘submerged prolongation’; a compromise, we may add, to which all states involved appear to have adhered.

Cases involving oceanic islands should, as any other, be assessed on their own merits. No doubt, the setting within which oceanic islands are to be considered is peculiar, indeed distinct from those involving continental territories. Typically, these islands have a small shelf (depths of 100 to 500 m) with sediments from wave erosion and rain or small rivers runoff, and a wider plateau (depths of 2000 to 3000 m) possibly with sediments due to downslope fallen materials. The deep ocean bottom around them lies at depths of 4000 to 5000 m. The slopes between the shelf and the plateau, and between the plateau and the deep ocean bottom, are usually very steep, and most of the times, it is not possible to identify a rise.

Another point relevant for this debate concerns ‘mid-ocean ridges’. The term is utilised in literature to refer to very large features, usually associated with global plate tectonics. It is important to note that mid-ocean ridges are not continuous features. They are complex geologic entities, which show strong discontinuities and include differentiated spreading ridges and other ridge-like features, such as plateaus, seamounts, micro-plates, islands and even micro-continents. The term mid-ocean ridge is sometimes equated to the term oceanic ridge. This, however, should not be done in the context of Article 76. The former belongs to the geo-scientific realm, whereas

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(107) The question of ‘morphological continuity’, which is relevant for both submarine elevations and submarine ridges, is inextricably related to the definition of the FOS. The crux of the matter is the continuity of a ‘seabed shape’, which is linked with no ‘breaks’ to the landmass of a territory, forming thus its morphological submerged prolongation. It should be noted that, despite the central role of morphological data, geological and geophysical data might be relevant to demonstrate that the ridge is indeed the ‘natural prolongation’ of the land territory.

(108) No doubt, there will be cases in which geological continuity will exist (e.g. oceanic islands); but this continuity will not be relevant for purposes of classifying an underwater relief feature as submarine ridge.

(109) It is noteworthy that Pulvenis refers to the case of Iceland as the typical example of the type of situations to which this provision was meant to apply; cf. Pulvenis, supra n.30, at p.354. Besides the case of Iceland, Verlaan mentions also that of the Chilean islands of Easter and Sala y Gomes; cf. Verlaan, supra n.96, at p.427. Referring also to Iceland, cf. Saura Estapà, supra n.94, at p.53.

the latter belongs to the legal realm. Whether part of a mid-ocean ridge can be incorporated in the legal continental shelf of a state is a matter to be decided by reference to the legal-scientific parameters set down in Article 76, and not on the basis of strict scientific reasoning.

The nature of islands located in mid-ocean areas is of course oceanic. Nevertheless, as a result of the formation processes, they often have a distinct geo-chemical signature. Oceanic crust is generally formed by tholeiitic basalts (“mid-ocean ridges basalts”, or MORB), which are originated in spreading ridges and then ‘transported’ by plate tectonic motions. Many oceanic islands (and their plateaus), on the other hand, are formed by alkaline basalts (“oceanic islands basalts”, or OIB). This type of basalts has a well-defined, distinct composition. The difference is explicable by the fact that these islands are formed by specific local or regional phenomena, involving lower mantle materials (e.g. plumes and hot spots). It may be said, therefore, that the geological composition or signature of many oceanic islands differs from that of oceanic crust. This distinction may become relevant in terms of the ‘identification’ of the natural prolongation of such islands.

In terms of ridge-like features located off continental landmasses, the crucial distinction to be made is between submarine elevations and submarine ridges. Only ridge-like features that are continental in origin can qualify as submarine elevations. All other ridge-like features have to be dealt with under the category submarine ridges. A requirement to be verified in both cases is that of geomorphic continuity between the margin and the feature in question. Features that are not part of the geomorphic margin cannot be part of the natural prolongation of a territory.

One should not forget that some continental margins include geological materials whose geo-chemical composition is similar to that of oceanic crust. Rifted volcanic margins are a clear example of such cases (in which ancient lava flows, pillows or dikes are mixed with continental materials). In these cases it may become necessary to define a considerably wide zone to make the transition from the continental crust to oceanic crust. Even in rifted non-volcanic margins, the initial rifting may be followed by up-lift of the mantle (e.g. gabbros and peridotites), creating a rather wide transition zone between pure continental crust and pure oceanic crust. Similarly, in some convergent margins, terranes with oceanic origin may be accreted to the continental margin and may become a part thereof. In short, although it is possible to identify some pointers, there is no doubt that the implementation of the legal provisions will always have to rely upon a detailed analysis of the relevant scientific-technical data. The problem is far from subsumable to a simple delimitation of ‘continental crust’ *versus* ‘oceanic crust’.

A final word concerns plate tectonics. In themselves, assessments concerning tectonics are not absolute for purposes of the legal categorisations in question. The tectonic discontinuity in active trenches, for example, corresponds not only to a morphological discontinuity, but also to a geological discontinuity. It marks a boundary between two different geologic plates. In contradistinction, a fault may separate two tectonic plates with the same geological composition, and be morphologically imperceptible. Further, it should be remembered that the same tectonic plate might contain simultaneously areas of continental crust and areas of oceanic crust. In conclusion, tectonic analysis may be relevant; but it should be resorted to in conjunction with geological and morphological analyses. One aspect in which tectonic theory may offer help concerns the interpretation of features whose origin is related to stress and compression effects at plate boundaries. For instance, certain transform faults may create an undersea relief, which may project out to the continental margin and even inland, following the path of the fault. Sometimes, this relief may be the trailing edge of the land plate motion, showing a linkage between undersea and inland relief.

The few stylised drawings that follow seek to illustrate in practice the implementation of the provisions on ridges and ridge-like features. Consider the example of Figure 9, in which the feature identified as “plateau” (which could be equally a cap, bank, rise or spur) is continental in origin. As shown in the profile, this feature is somewhat detached from the margin. However, there is no break in the geomorphic continuity of the margin. The significant change in gradient

landwards of the plateau occurs at a depth that is far from being at the base of the slope. The FOS appears seawards of the plateau (where it is also possible to identify a rise). This example could be seen as a typical case of a submarine elevation. Let it be assumed instead that the plateau was located further seawards, and that the geomorphic FOS lay landwards thereof. This would be evidence of a break in the geomorphic continuity of the margin. In this situation, the location of the COT could become a relevant aspect of the problem. If it were demonstrated, for instance, that the COT were located seawards of the plateau, this could be taken as evidence to suggest that the plateau was part of the natural prolongation of the state.

The example in Figure 10 is very similar to the previous case, the difference being that the feature in question is a ridge of oceanic origin. This ridge is encroached into the margin, and has accreted to it in a way that makes it a morphological part of the margin. Again, the change in gradient that can be observed in the profile landwards of the ridge is far from occurring at the depth of the base of the slope. This signifies that the FOS is not located landwards of the ridge, which is clear evidence that there is no break in the geomorphic continuity of the margin. As the feature in question is oceanic in origin, it should be classified as a submarine ridge. *A fortiori*, a ridge encroaching further into the margin will also have to be considered as part of the natural prolongation. The question may arise then as to what happens if the feature in question is neither strictly continental nor strictly oceanic in origin, being instead originated by a complex process. The answer would have to be given *in casu*, by reference to the evidence presented. Particular attention would probably have to be devoted to the tectonic, geological and geophysical context.

Figure 11 is also an example involving a ridge of oceanic origin. In contradistinction with Figure 10, the ridge is located further offshore, and the continental slope reaches its base before the ridge comes into play. Practically speaking, this means that the FOS is situated landwards of the ridge, evidencing a break in the geomorphic continuity of the margin. Hence, in principle, the ridge could not be viewed as part of the natural prolongation of the state. No doubt, the state in question could still attempt to rebut what would be a very strong presumption against the ridge being assumed as part of the natural prolongation.

All in all, as far as ridges and ridge-like features are concerned, the fundamental aspects appear to be two-fold: geomorphic continuity, and geological continuity. For any ridge or ridge-like feature to be taken as part of the natural prolongation of a territory, a negative requirement has in principle to be verified: *there can be no break in the geomorphic continuity of the margin*. How to assess the geomorphic continuity is thus a key point. In our view, this question should perhaps be delved into primarily by reference to the location of the FOS. A feature will be part of the natural prolongation of a territory if it is possible to determine a FOS line that encompasses the feature in question within its perimeter. The point just made is illustrated in Figure 12, in which the cases of Figures 10 and 11 are compared. Whereas in the case of a submarine ridge it is possible to delineate a continuous FOS line around the feature in hand, that is not possible in the case of an oceanic ridge<sup>110</sup>. In the latter case, the FOS points that could possibly be defined at the base of the slope of the ridge are detached from those at the base of the continental slope. A different situation could be that of a state seeking to determine the FOS by recourse to evidence to the contrary. Here, the continuity of the FOS would not be related to geomorphic continuity. The requirement would still be that the FOS line be continuous around the feature in hand. Once the feature is known to be part of the natural prolongation of a state, it must then be established whether it is a submarine elevation or a submarine ridge. Geological continuity becomes again relevant. For a feature to be classified as submarine elevation, it must be continental in origin. Oceanic islands are object of differentiated treatment, which appears to have resulted from a compromise. Geological continuity is used only for the purposes of demonstrating the existence

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(110) The FOS points indicated in Figure 12 are merely exemplificative. There is no suggestion that, in the case illustrated, those should be the FOS points chosen for the purpose of applying the combined 'Gardiner-Hedberg rule'. The objective of the chosen points was to illustrate the question of 'continuity-discontinuity' of the FOS line.

of natural prolongation. It cannot be utilised as argument to suggest that a feature off an oceanic island is a submarine elevation.

## 6. Concluding Remarks

The ideas put forward in this article are no more than a contribution, however modest it may be, for the debate surrounding the implementation of one of the most difficult provisions of the LOSC: Article 76. With it, we have sought to tie together some of the two types of strands on which its implementation depends: legal aspects and scientific-technical aspects. It is important to note that, throughout this exercise, we were never under the impression that we would arrive at definitive answers. With the ‘product’ finalised, this impression remains. The problem is that there seems to be no real alternative to debate, if we are ever to reach a wide consensus on the application of Article 76.

An outline of the key points advanced here is perhaps better undertaken if the issues are grouped under two headings. On the one hand, we have issues concerning the nature of Article 76, its context in the legal realm and the impact of these issues upon its practical implementation. On the other hand, we have more substantive matters, which regard the practical implementation of Article 76, i.e. the issues that directly involve the interpretation and utilisation of scientific and technical data.

With respect to the first of these two groups of questions, the following thoughts may be offered for consideration. First, we take the view that Article 76 is above all a legal provision, the interpretation of which must be made in light of the relevant legal tenets. *Inter alia*, we argue that Article 76 must be delved into through the rules of interpretation laid down in international law. This entails a holistic interpretation of Article 76; i.e. an interpretation that weighs the text, the object and purpose of the LOSC, the preparatory work, the interrelationships between the different paragraphs, the methodological rules of treaty interpretation, logics and hermeneutics. In keeping with this approach, we have concluded that there is no relationship of prevalence between the different paragraphs of Article 76, which should in effect be interpreted as a whole, in light of the legal context provided to it by the LOSC and by the international *corpus juris*. Secondly, we have suggested that a crucial point concerns terminology and the recourse had in Article 76 to some scientific-technical concepts. Just as the term ‘continental shelf’ has acquired an autonomous juridical meaning, distinct from that given to it in geo-sciences, the same appears to have occurred with other terms imported into the LOSC: e.g. continental margin, deep ocean floor, foot of the continental slope, oceanic ridge. As a result, it became necessary to distinguish between the legal meaning and the scientific-technical meaning of these terms, which are not exactly correspondent. Further, we have contended that any scientific-technical interpretation of the data utilised may not overrun the bounds that are derived from the legal interpretation of Article 76. A final point relates to the CLCS and its powers of interpretation and implementation of Article 76. The competence of the CLCS under the LOSC seems to be that of technical homologation of the work carried out by states with a view to delineating their continental shelf limits beyond 200 M. Implied here are indubitably all discretionary powers that correspond to the scientific-technical assessments necessary to evaluate the data provided. To the extent that an implementation of the Article 76 requires that some interpretation of this provision be used as reference, the CLCS is also empowered to interpret this provision. In effect, besides referring to the scientific-technical parameters by reference to which the submissions will be considered, the Guidelines incorporate also an interpretation of Article 76. As this interpretation is not authoritative, the question arises then as to what happens if the submitting state holds a different interpretation of Article 76. We would argue that, unless the interpretation adopted by the state in its submission is unreasonable, the CLCS should assess the data provided in light of that

interpretation<sup>111</sup>. Disputes over whether the interpretation adopted is legally acceptable should be resolved through the dispute settlement mechanisms set down in the LOSC, and in international law in general<sup>112</sup>.

Turning now to the second group of issues, we would start by emphasising that in some part they intertwine with the perspective endorsed here as to the legal nature of Article 76. First, the way in which we interpret Article 76 has led us to conclude that it embodies a principle of ‘crustal neutrality’, which is particularly relevant for the case of oceanic islands. It means in practice that the implementation of Article 76 is subject to Article 121, as regards the entitlement of islands, in the sense that the application of the relevant formulae should not make any strict distinction on the basis of the nature of the crust. Secondly, in contrast to the Guidelines, we would suggest that the FOS problem should not be examined by reference to a ‘rule-exception’ approach. Our interpretation of paragraph 4.(b) is that there is only one rule, under which the different type of data (geomorphological, geological, and geophysical) is to be assessed. Thirdly, we have the issue of ridges and ridge-like features. There appears to be good reason to argue that, legally speaking, Article 76 makes reference to three types of categories, and that the legal regime applicable to each of these categories is not contested. The difficulties seem essentially practical, as they refer to the classification of a specific feature under any of these categories. The pointers advanced above in this respect are a contribution to a debate that is far from over, and rely undoubtedly heavily on what is our interpretation of Article 76. In short, for a feature to be considered as part of the natural prolongation (either a submarine elevation or a submarine ridge) of a state, it is necessary to demonstrate that it is part of the geomorphic margin. The distinction between the two types of features that may be part of the natural prolongation of a state relies on the nature and origin of the crust. Submarine elevations must be entities that are part of the geological continental margin.

Finally, a more general point should be emphasised. The principle of good faith, which is explicitly mentioned in Article 300, is paramount to the implementation of the LOSC. States are under the express obligation of not abusing their rights. As far as the implementation of Article 76 is concerned, this has a two-fold impact. On the one hand, states are under the obligation not to interpret Article 76 in any artificial way that unduly exploits the lacunae and/or vagueness of its terms<sup>113</sup>. On the other hand, the CLCS should, as a matter of principle, assume that the interpretation of a state is made in good faith. Reasonableness may become then a fundamental legal point of reference for the implementation of Article 76. This, however, is hardly surprising. As the ICJ affirmed, in the *Barcelona Traction* case, “in all fields of international law, it is necessary that *the law be applied reasonably*”<sup>114</sup>. Thus, just as the state has to take account of this principle when making its submission, so must the CLCS retain it when assessing the scientific-technical data provided in light of the interpretation adopted by the submitting state. By analogy to Article 59, which refers to conflicts involving rights or jurisdiction not attributed to states, we would argue that outstanding divergences should be resolved on the basis of equity and in the light of all relevant circumstances; in other words, on the basis of reasonableness.

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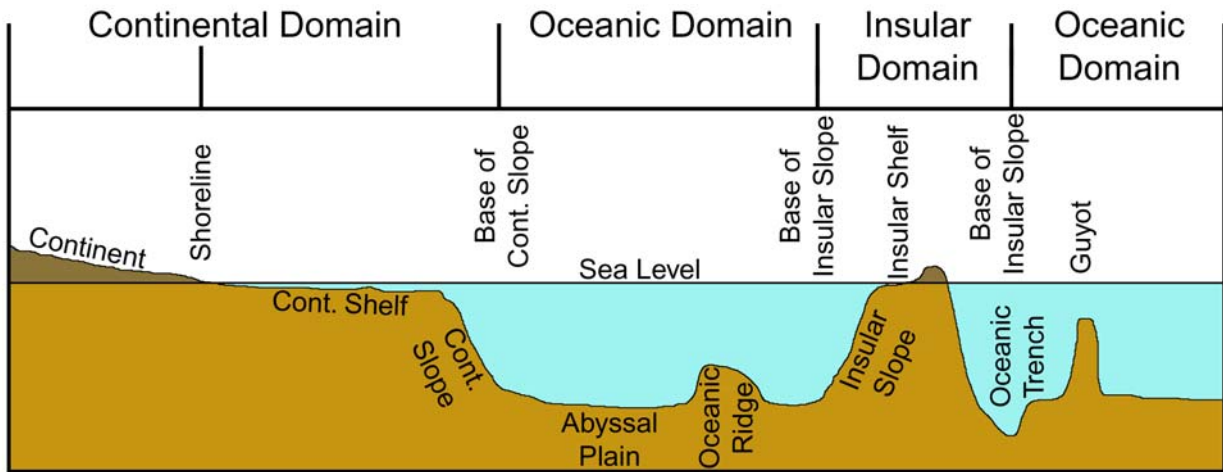
(111) We recognise that this may be a very contentious point, and it is not without trepidation that we reach this conclusion. However, taking into account what are the rules of international law in this matter, and the powers that are attributed to the CLCS under the LOSC, there appears to be no other logical conclusion.

(112) No evidence was found to suggest that Article 76 is excluded from the dispute settlement mechanisms of the LOSC.

(113) If at all possible, i.e. if it does not conflict with other obligations (e.g. the need to resolve ambiguities by examination of text, context and object and purpose of the treaty, and the need to comply with treaty provisions in good faith), the principle *in dubio mitius* may also have to be considered. In broad general terms, this principle establishes that, given multiple possible interpretations, the meaning that is less onerous to the party assuming an obligation is to be preferred. This principle may thus have an impact upon the amount of data that is required from a state in order to make its case.

(114) ICJ, *Case Concerning the Barcelona Traction, Light and Power Company – Limited* (Belgium v Spain), judgment of 5 February 1970, ICJ Rep. (1970) 4, at p.49, para.93, emphasis added.

FIGURE 1



(after Hedberg, 1972, Fig. 1a)

FIGURE 2

**Traditional Continental Margin Profile**

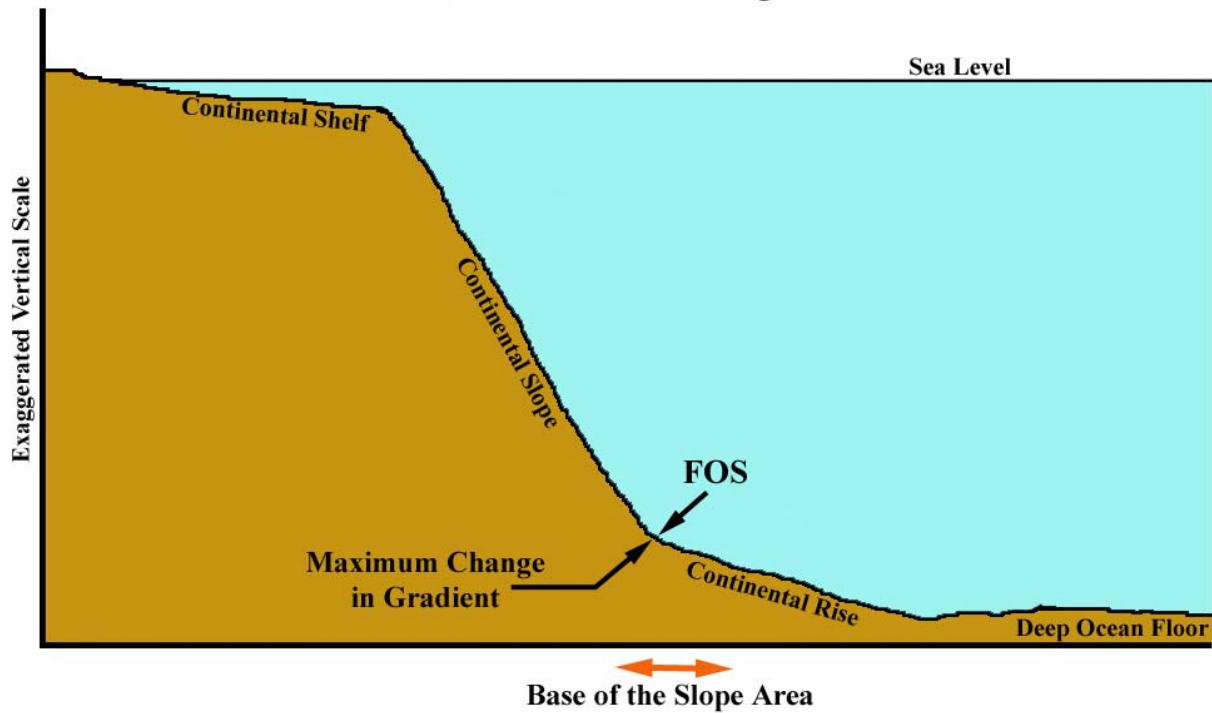


FIGURE 3

Hypothetical Profile A

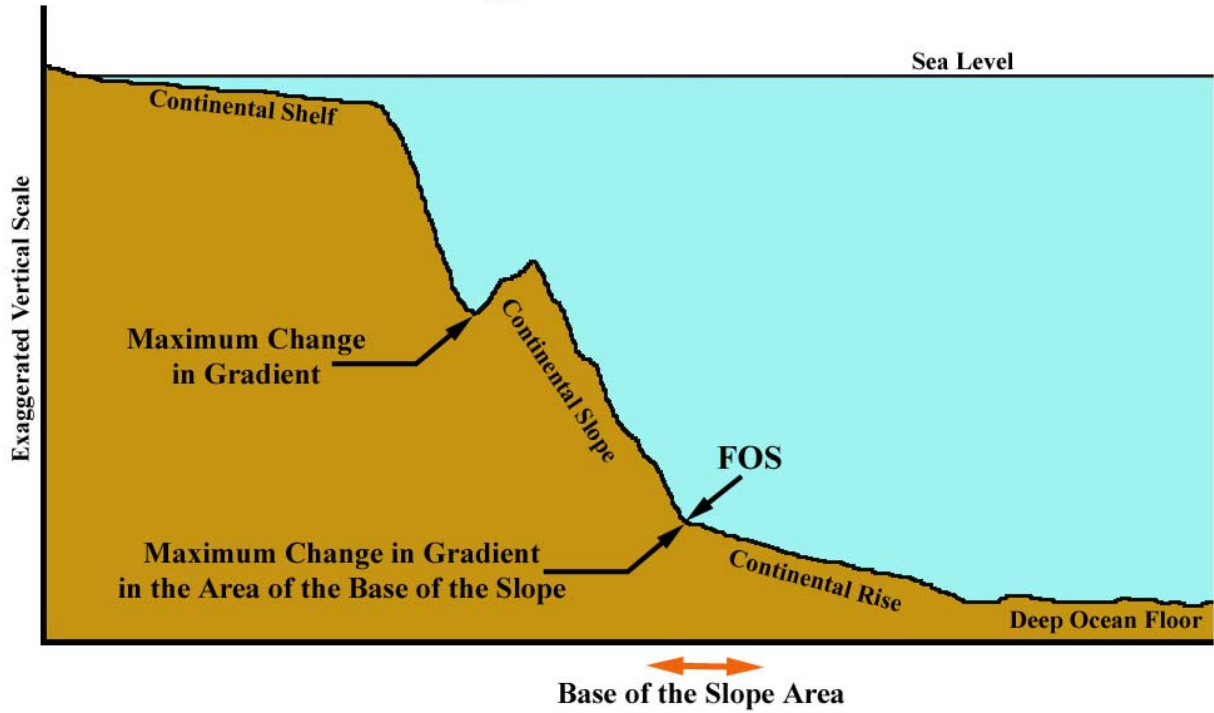


FIGURE 4

Hypothetical Profile B

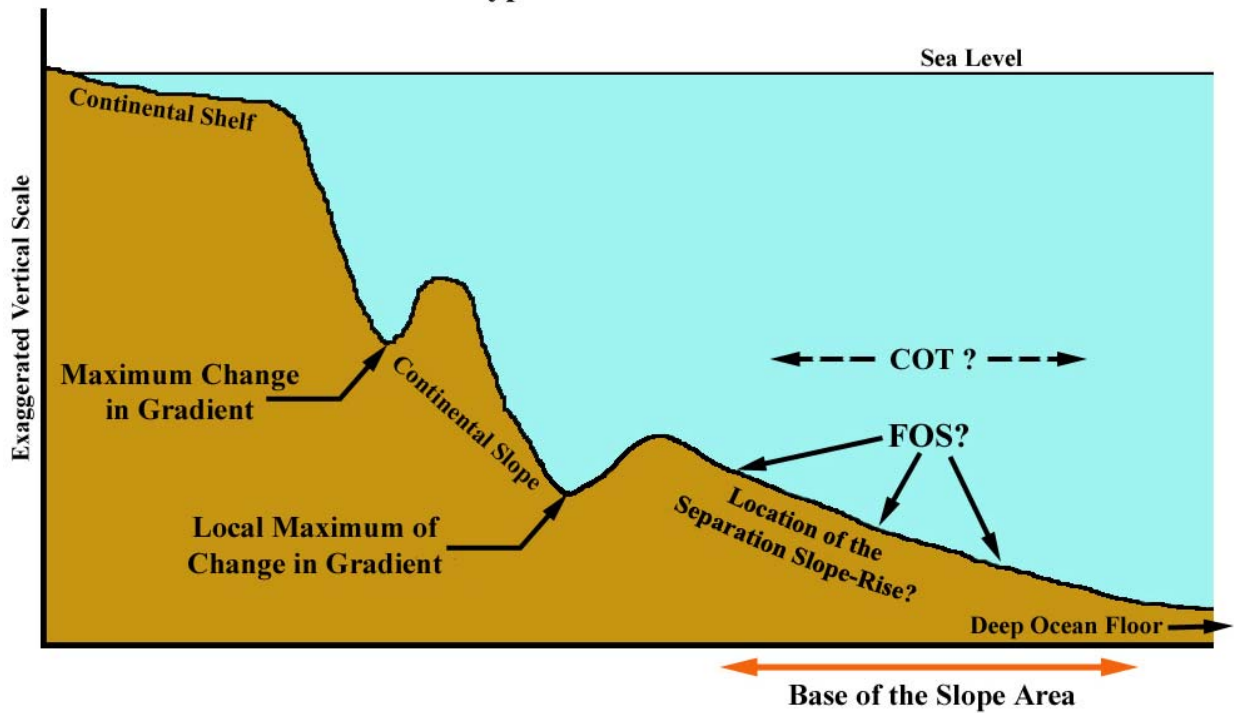


FIGURE 5

Hypothetical Profile C

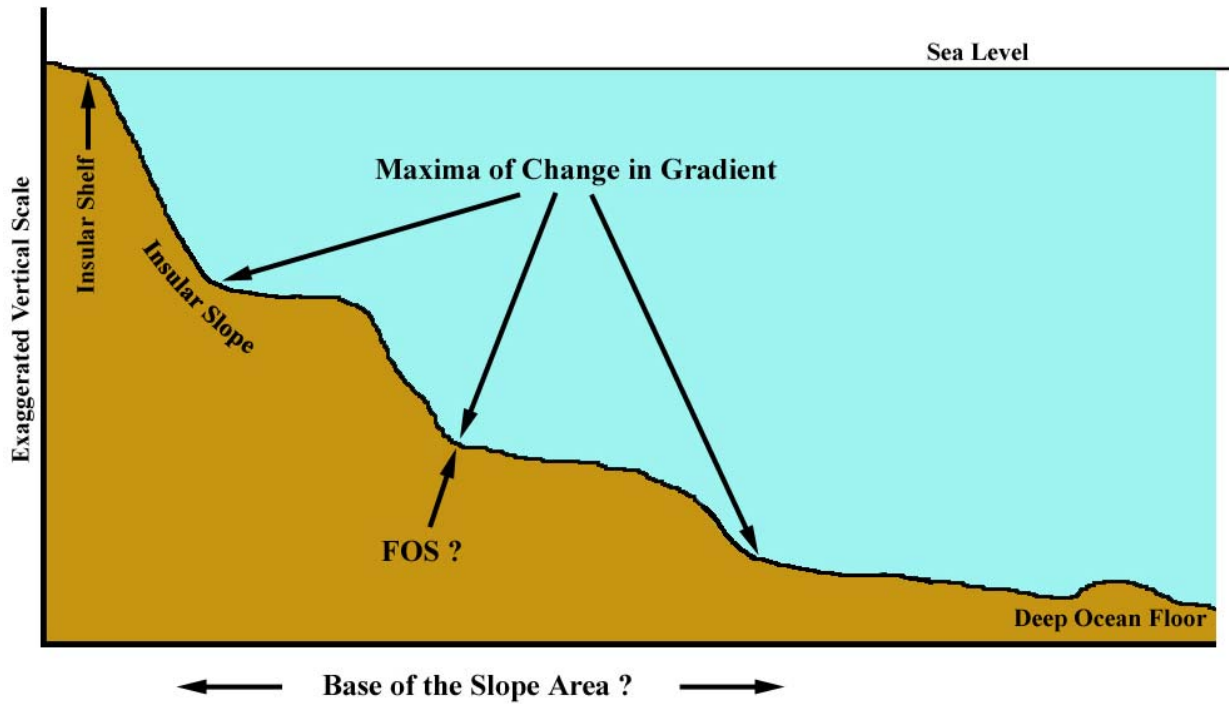


FIGURE 6

Hypothetical Profile D

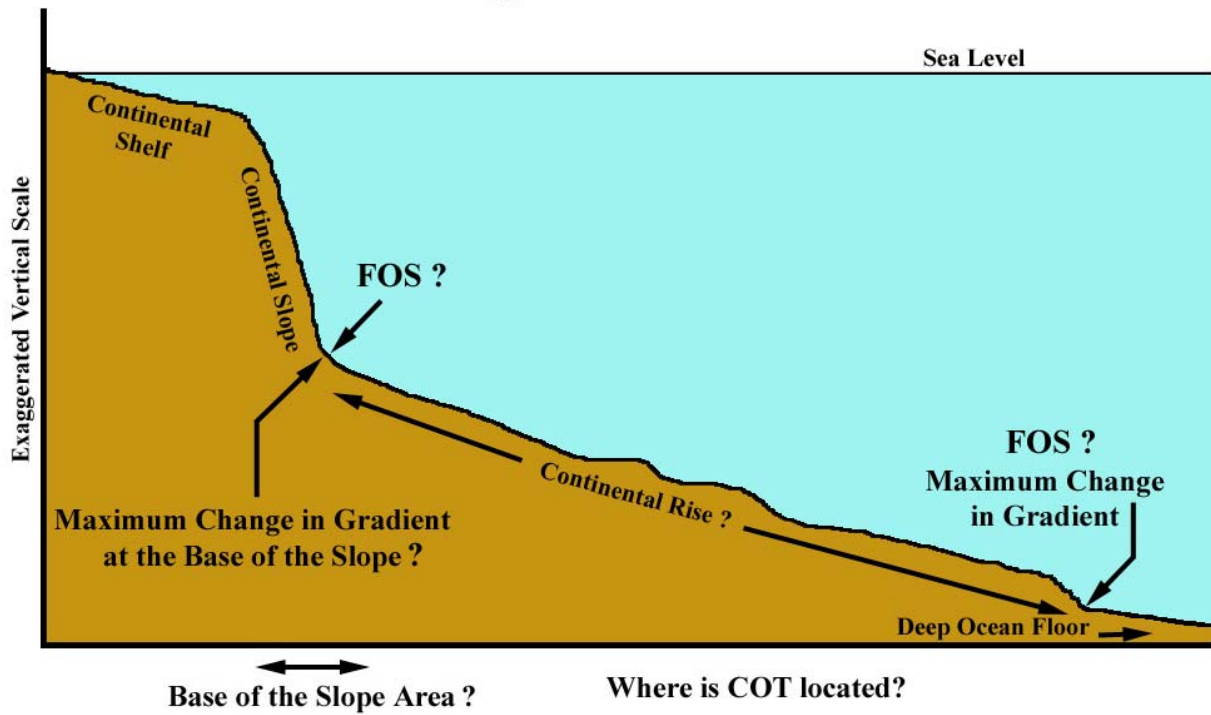




FIGURE 7

Hypothetical Profile E

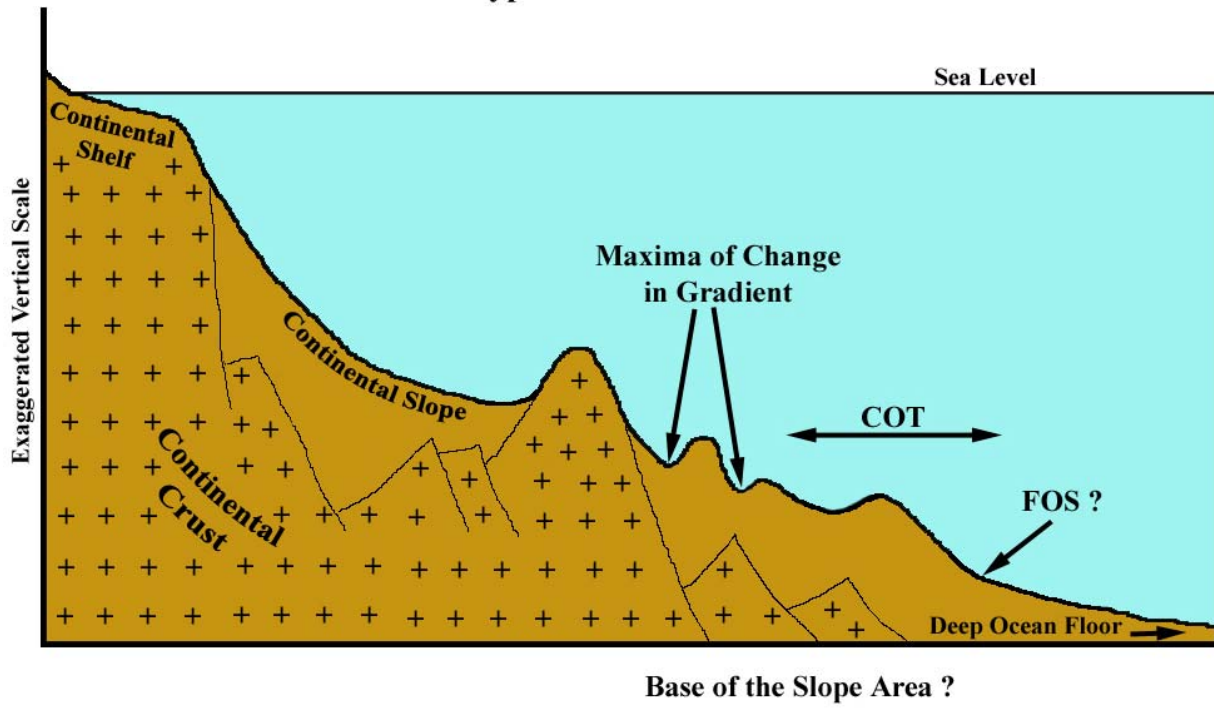


FIGURE 8

Hypothetical Profile F

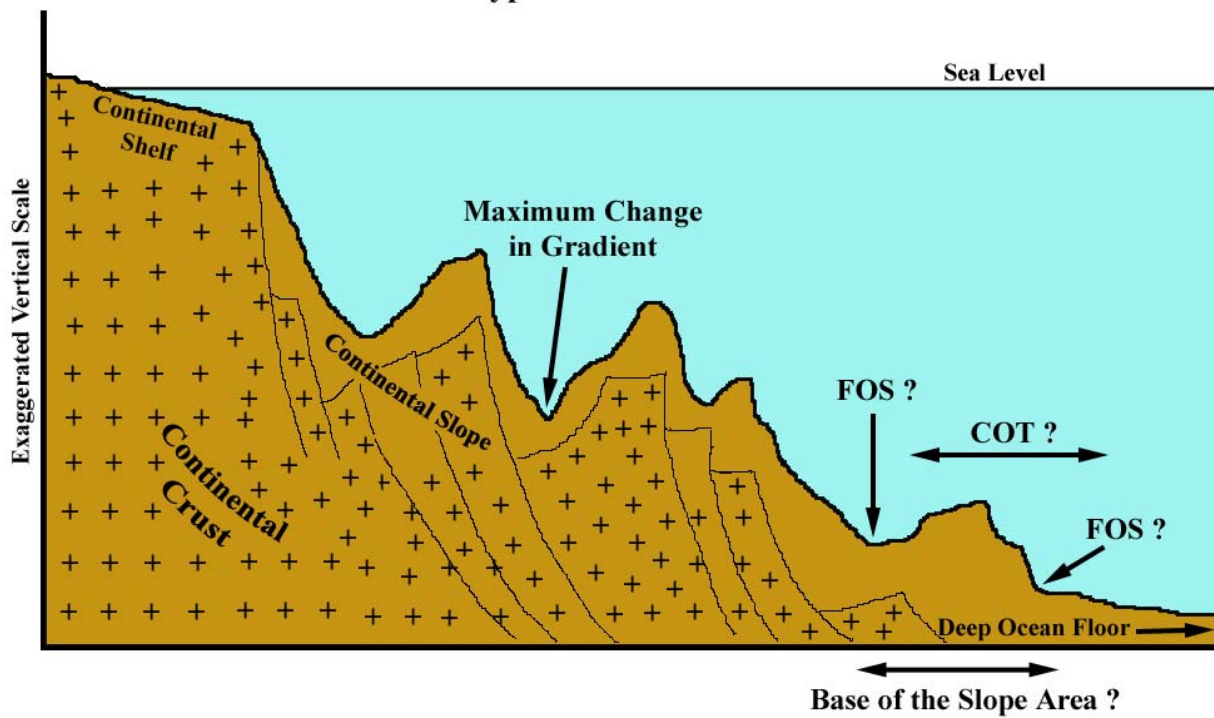


FIGURE 9

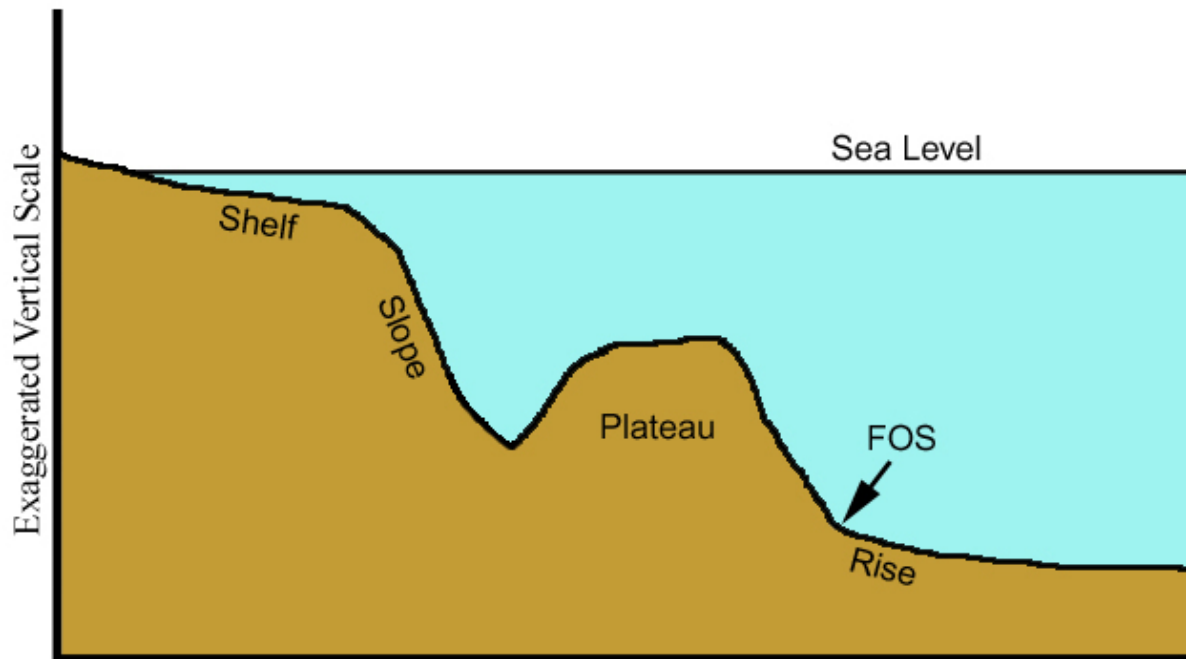
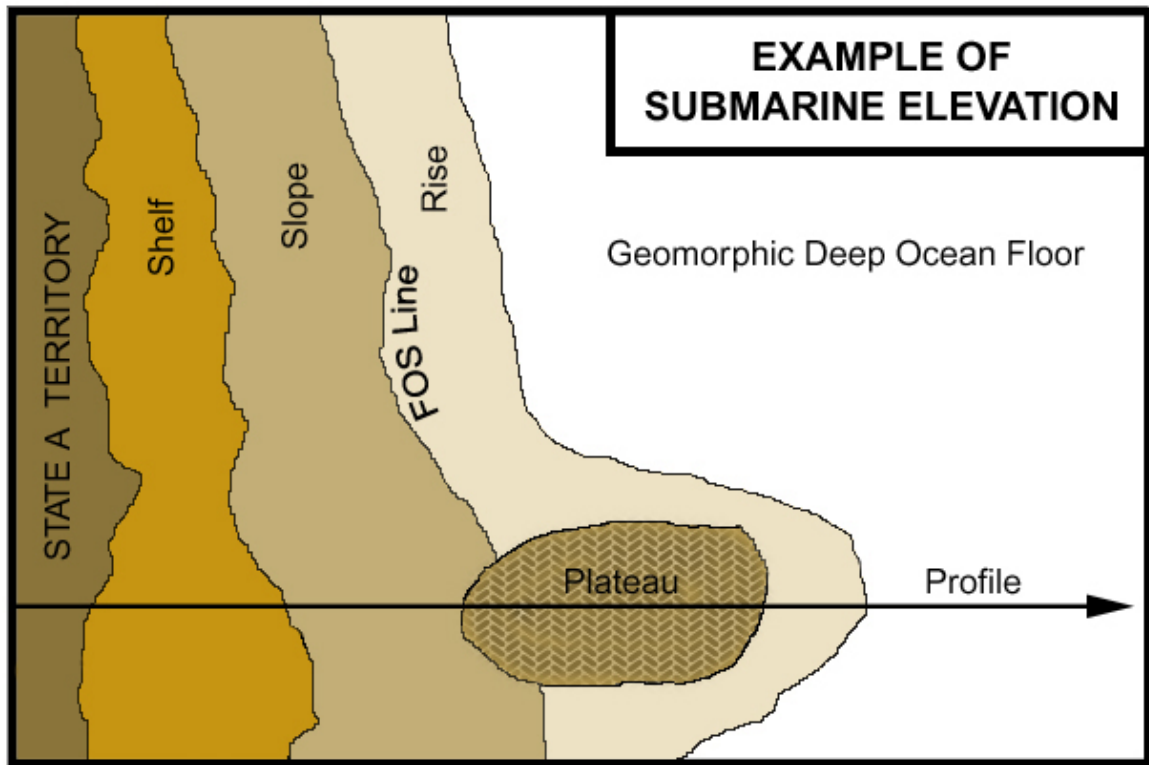


FIGURE 10

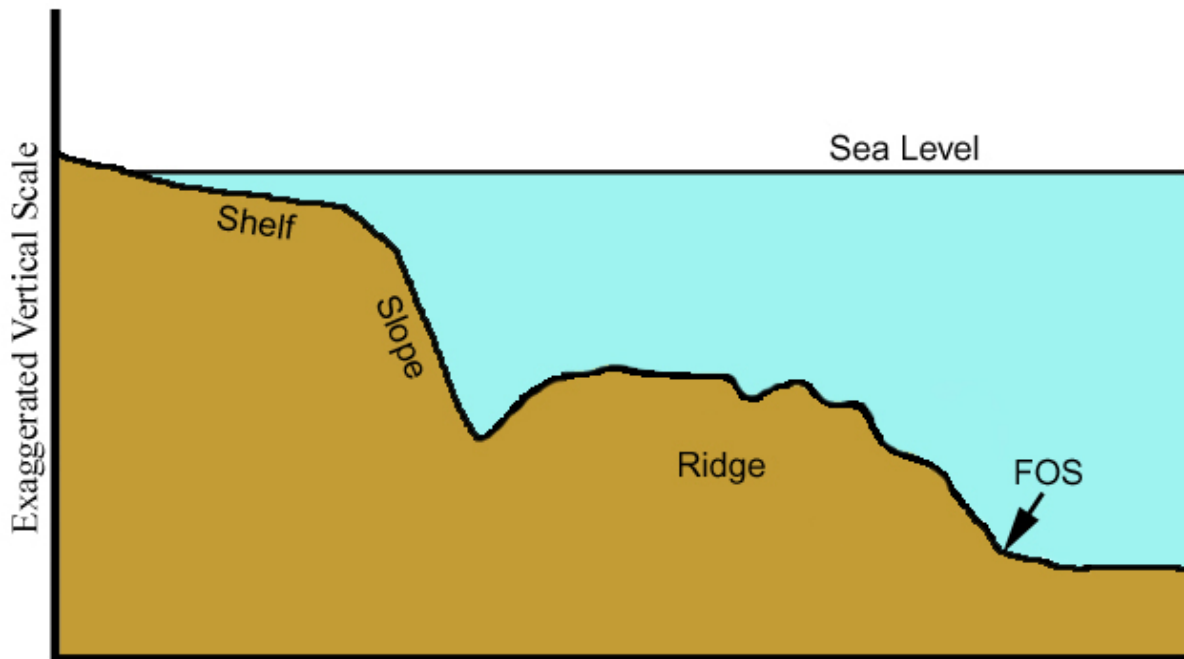
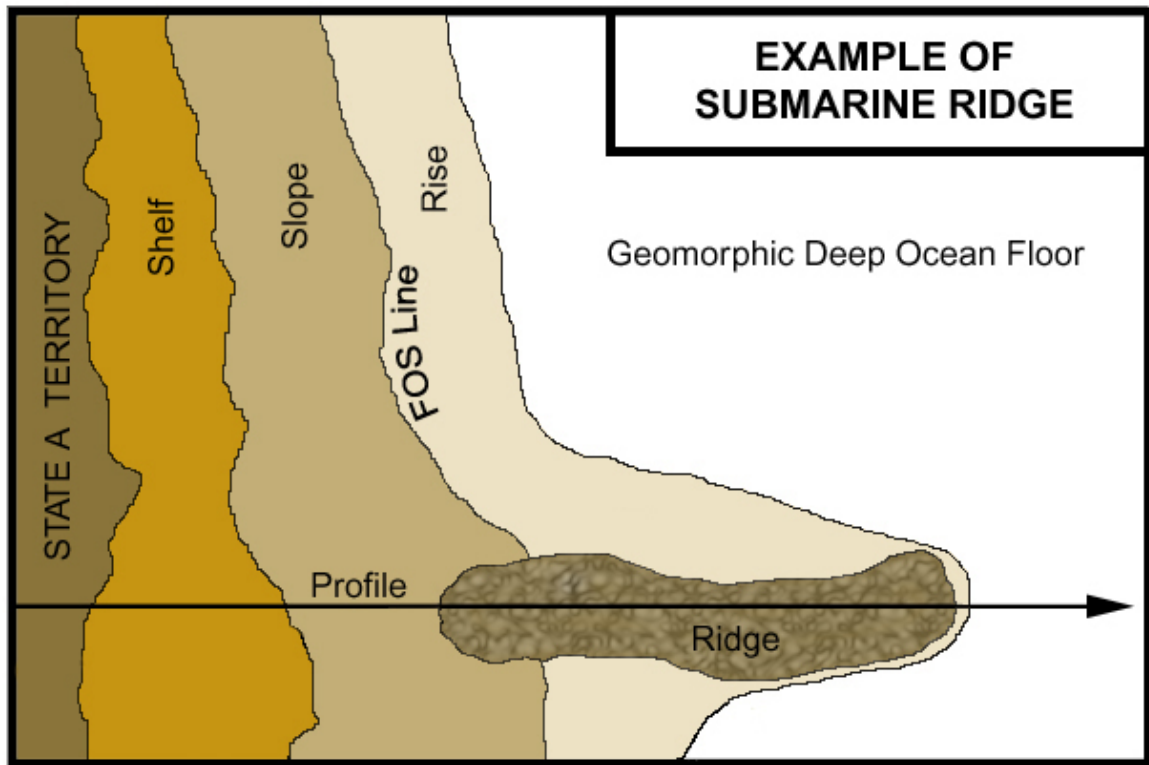


FIGURE 11

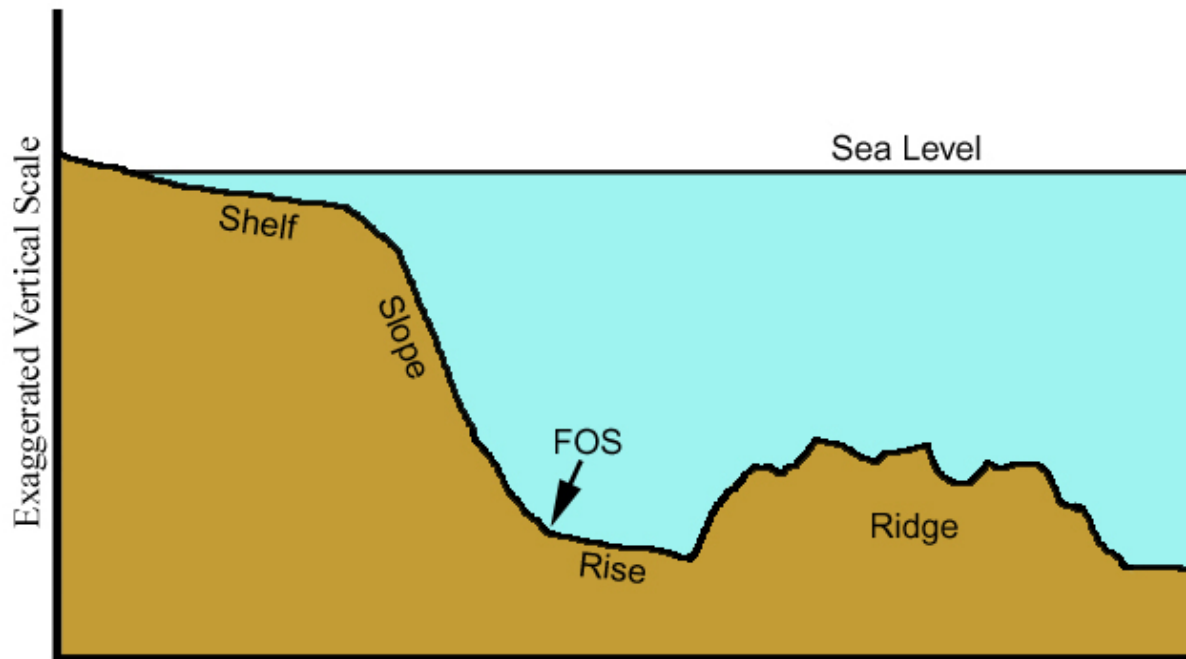
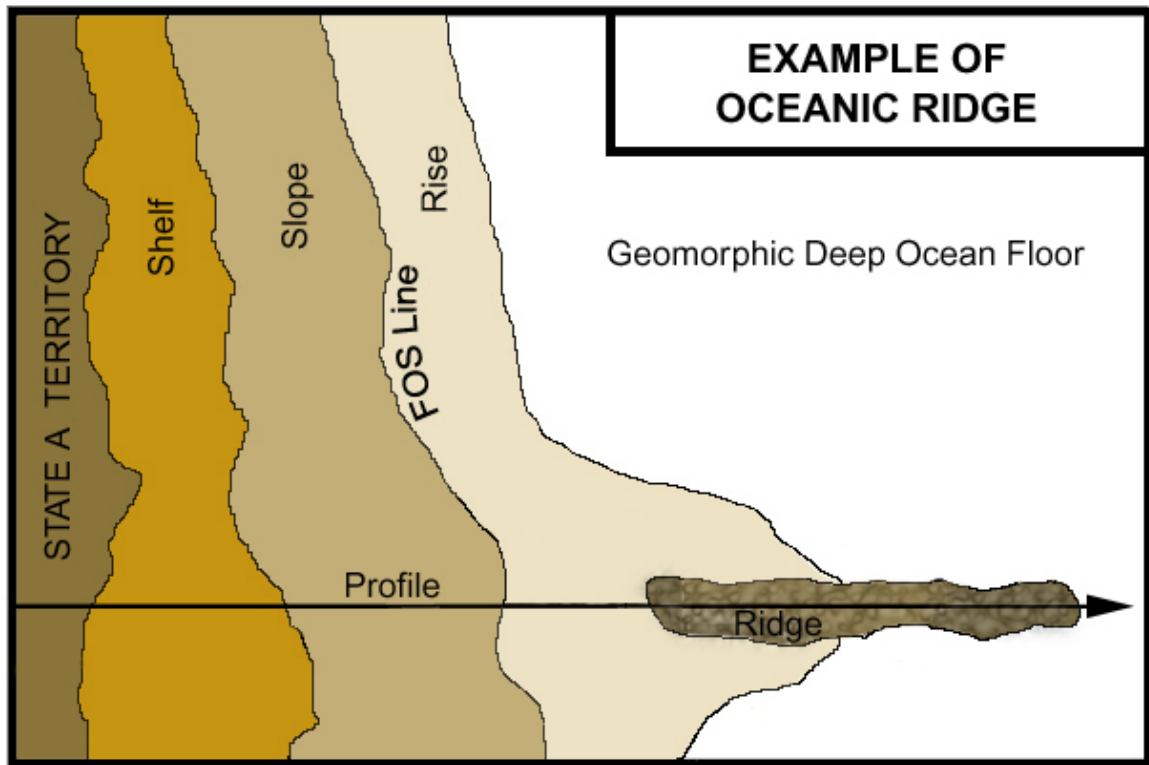


FIGURE 12

