

The Canadian Submission to the United Nations Commission on the Limits of the Continental Shelf

Andrew Higdon*

In anticipation of Canada's submission to the United Nations Commission on the Limits of the Continental Shelf, this article provides an overview of the international legal regime that governs the allocation of resource rights at sea beyond 200 nautical miles and the process of delineating this area from a Canadian perspec-

tive. The author concludes that, though the economic rewards from the Canadian continental shelf may ultimately be modest in the short term, the process of delineation has been orderly and has been characterized by cooperation between states and an adherence to international law.

En prévision de la soumission du rapport du Canada à la Commission des Nations Unies sur les limites du plateau continental, cet article fournit une vue d'ensemble du régime juridique international régissant l'attribution des droits sur les ressources maritimes au-delà des 200 miles marins et du processus de délimitation de cette zone à partir d'une perspective canadienne.

L'auteur conclut que, bien que les retombées économiques du plateau continental canadien pourraient ultimement être minces à court terme, le processus de délimitation s'est articulé dans le respect de l'ordre établi et s'est caractérisé par la coopération entre les États et le respect du droit international.

* Andrew Higdon is a third year law student at McGill University. He developed an interest in maritime law and Canada's continental shelf while serving as a reserve naval officer in the Royal Canadian Navy. He would like to thank Jon Bellish of the One Earth Future Foundation and Marianne Rutherford of the Canadian Department of Foreign Affairs, Trade and Development for their support. The views expressed in this article are those of the author alone.

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When the *United Nations Convention on the Law of the Sea* (“UNCLOS”) came into effect in 1994, the international community gained a new, more clearly defined regime for supporting coastal state jurisdiction.¹ One way this was accomplished was by clearly recognizing the ability of a state to establish sovereignty over an undersea geological formation known as a continental shelf. A continental shelf is a common feature of ocean floor topography. Often, the ocean remains shallow for some distance from the shore, and then falls steeply away; the shallow area is known as the continental shelf. While the state practice of claiming ownership over resources located on or within a continental shelf outside of territorial waters is longstanding, precisely what could be claimed and how such claims could be asserted against other states had not been defined with any certainty.² UNCLOS has reduced much of this ambiguity by establishing a broadly accepted regime to govern claims over this area of the seafloor.

Canada in particular has obtained considerable resource rights by virtue of the outer continental shelf regime in UNCLOS. Under this regime, Canada has asserted rights over approxi-

¹ *United Nations Convention on the Law of the Sea*, 10 December 1982, 1833 UNTS 397 (entered into force 16 November 1994, ratification by Canada 7 December 2003) [UNCLOS].

² Arguably the first application of the continental shelf regime to support a resource claim occurred with the 1945 *Truman Proclamation*. The proclamation went on to say that “the United States regards the natural resources of the subsoil and sea bed of the continental shelf beneath the high seas but contiguous to the coasts of the United States, subject to its jurisdiction and control” (*Proclamation 2667 of September 28, 1945: Policy of the United States with Respect to the Natural Resources of the Subsoil and Sea Bed of the Continental Shelf*, 10 Fed Reg 12305 (1945) (codified as *Executive Order 9633* at 3 CFR), online: National Oceanic and Atmospheric Administration <http://www.gc.noaa.gov/documents/gcil_proc_2667.pdf>).

mately 1.75 million square kilometers under the Atlantic and Arctic Oceans.³ Although the size of the expanse is staggering, some commentators have argued that the benefits from this expansion may not prove to be an unmitigated windfall.⁴ While this area is known to contain frozen methane gas deposits, the technology to develop them does not yet exist.⁵ Further, other resources could be difficult and expensive to recover due to their vast distance from shore and extreme depths.⁶ Despite the possibility that, at least in the short term, the rewards may be modest, the Canadian government has clearly stated its intention to assert its rights in the Arctic to the fullest extent possible.⁷ Scientists are predicting an ice-free Arctic within a few decades; consequently, Arctic states are being forced to prepare for the new reality of more accessible Arctic territory.⁸ The Canadian government has responded by pledging to develop civilian and military capabilities in the Arctic, and by seeking to generate certainty about the nature and extent of its northern rights.⁹ The pursuit of international recognition of a Canadian northern continental shelf should therefore be understood in the context of this strategy.

While the existence of Canada's resource rights over its continental shelf is unquestioned, the exact boundaries of the area over which these rights exist has not yet been determined. In order to make this delineation, states are required under *UNCLOS* to make a submission to the Commission on the Limits of the Outer Continental Shelf (the "CLCS").¹⁰ When discussing the role of the CLCS in Canada's outer continental shelf claim, it is important to make clear what is at stake, and what is not. Canada does not need to make a submission to obtain resource rights over its outer continental shelf; it has those rights by virtue of *UNCLOS* alone.¹¹ Rather, the CLCS process will allow Canada to delineate clearly the outer extent of its legal continental shelf. To this end, Canada will provide the CLCS with a document outlining its position on the location of the limit of its extended continental shelf and special evidence supporting it. The CLCS will then review Canada's submission and issue a recommendation to Canada based on its findings. If Canada accepts the recommendation, Canada may use it as the basis for a binding delineation of its extended continental shelf. The CLCS does not itself create the delineation; rather, it provides informed technical advice and recommendations to states that are pursuing such rights. *UNCLOS* ordinarily requires states that have ratified the convention after 1999 to submit their documentation within ten years of ratifying the conven-

³ Elizabeth Riddell-Dixon, "Canada and Arctic Politics: the Continental Shelf Extension" (2008) 39:4 *Ocean Devel & Int'l L* 343 [Riddell-Dixon, "Canada and Arctic Politics"] at 347.

⁴ *Ibid* at 344.

⁵ *Ibid*.

⁶ *Ibid*.

⁷ Klaus Dodds, "Flag planting and finger pointing: The Law of the Sea, the Arctic and the political geographies of the outer continental shelf" (2010) 29 *Political Geography* 63 at 66.

⁸ *Ibid* at 64, 66.

⁹ *Ibid* at 65.

¹⁰ *UNCLOS*, *supra* note 1, art 76(8). Recognition of Canada's Arctic claims is strong. Though the characterization of the Northwest Passage and Hans Island, as well as the maritime delineation in the Beaufort Sea are still debated, there is no serious questioning of Canada's sovereignty over the Arctic Archipelago, and, consequently, the maritime rights extending from this territory (Robert Dufresne, *Controversial Canadian Claims over Arctic Waters and Maritime Zones* (Ottawa: Parliamentary Information and Research Service, Library of Parliament, 2008) at 16; François Côté & Robert Dufresne, *The Arctic: Canada's Legal Claims* (Ottawa: Parliamentary Information and Research Service, Library of Parliament, 2008) at 1, 3–4, 6).

¹¹ Ted L McDorman, "The Role of the Commission on the Limits of the Continental Shelf: A Technical Body in a Political World" (2002) 17:3 *Int'l J Mar & Coast L* 301 at 305.

tion.¹² Since Canada ratified the convention in 2003, it must submit all of its documentation by December 2013.¹³

Given the importance of this submission to Canada’s national interest, it is worth understanding the CLCS process from a Canadian perspective. The Canadian experience has been largely positive and has been characterized by intergovernmental and international cooperation.¹⁴ However, the Canadian experience has not been without challenges. Among other considerations, Arctic geography in the form of submarine mountain ranges has tested the technical ability of *UNCLOS* and the CLCS to delineate clearly a shelf, and the CLCS process itself may not yield a result for decades. The experience of the Canadian drafters sheds light on the *UNCLOS* outer continental shelf regime and provides a case study for the regime in action. This article addresses the process in five parts. Following this introduction, Part 2 introduces the international legal regime under which claims are being made, and Part 3 describes the course of the Canadian project and investigates challenges, successes, and likely outcomes of the Canadian submission. Part 4 explores the delimitation of claims between states, and the final part draws conclusions from the information presented throughout.

2. THE INTERNATIONAL LEGAL REGIME GOVERNING THE OUTER CONTINENTAL SHELF

The reigning framework for maritime law is contained in *UNCLOS*. *UNCLOS* sets out the structure of maritime jurisdiction, defines the rights and responsibilities of nation states, and creates authorities for adjudicating some types of disputes. It also addresses resource exploitation and environmental concerns.

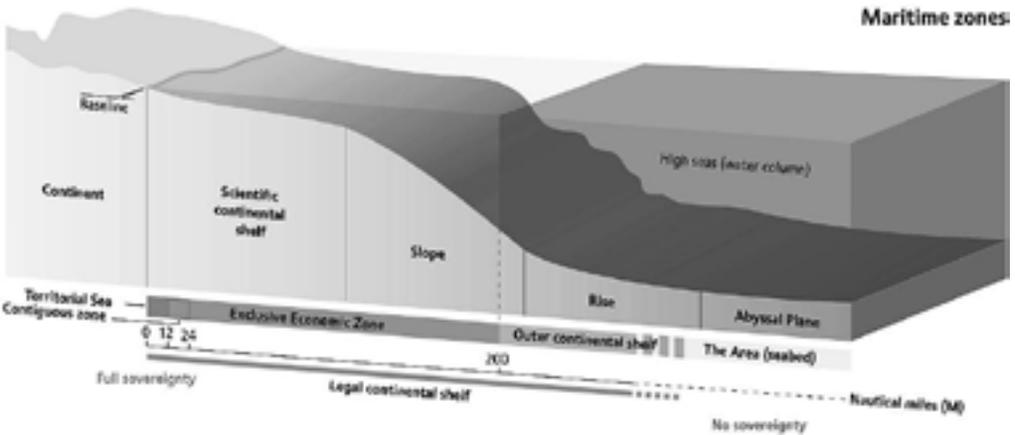


Figure 1 Maritime Zones and the Continental Shelf

Courtesy of Riccardo Pravettoni, UNEP/GRID-Arendal¹⁵

¹² *UNCLOS*, *supra* note 1, Annex II, art 4. The process that Canada will follow is outlined in article 76 (*ibid*), and in the *CLCS Technical Guidelines*, *infra* note 47. The role of the CLCS as a legitimating body that does not itself make delineations is well articulated by McDorman (*supra* note 11 at 305–306, 311–315).

¹³ Jacob Verhoef & Julian Goodyear, “Defining Canada’s Extended Continental Shelf in the Arctic” (Spring/Summer 2011) *Meridian* 1 at 2.

¹⁴ Riddell-Dixon, “Canada and Arctic Politics”, *supra* note 3 at 349–350.

¹⁵ Tina Schoolmeester & Elaine Baker, eds, *Continental Shelf: The Last Maritime Zone* (Norway: UNEP/GRID-Arendal, 2011) at 9.

UNCLOS defines a succession of maritime zones progressively further from a state's coast, as pictured in Figure 1, above. The extent of sovereign rights with regard to the continental shelf varies depending on the maritime zone, and functions generally in negative correlation to the distance from the coast. The convention distinguishes between internal waters, territorial waters, the contiguous zone, the exclusive economic zone, and the high seas.¹⁶ With the exception of internal waters and the high seas, the dimensions of these areas are determined by their distance from shore.¹⁷ This distance-based determination contrasts with the *UNCLOS* provisions concerning the extended continental shelf, which rely largely on the nature of the seafloor to determine the extent of its area. While the distance of the continental shelf from shore varies, it becomes a practically significant feature if it extends further than the exclusive economic zone.¹⁸

The exclusive economic zone extends 200 nautical miles ("nm") from the shore and gives the state sole rights over the resources contained in the water column and the seabed. However, while the state has authority over resources and resource management, its powers do not extend to ships operating in the zone.¹⁹ Article 58(2) provides that "freedom of the seas" provisions associated with the high seas apply to the exclusive economic zone where they do not conflict with the exclusive resource rights granted by the exclusive economic zone regime. This means that other states enjoy the right of freedom of navigation, freedom of over-flight, and the right to place submarine cables as they would on the high seas, beyond state jurisdiction.

All states also have possession over their continental shelves up to a distance of 200 nm from shore. The shelf is only considered to be an extended or outer continental shelf if it extends beyond 200 nm.²⁰ Article 76 of *UNCLOS* creates the regime permitting states to claim an extended continental shelf.²¹ States with extended continental shelves may claim exclusive rights over resources in the shelf seabed and subsoil, as well as over living resources that are immobile or can only move through constant contact with the seafloor.²² Canada has continental shelves that extend beyond 200 nm under two oceans, the Atlantic and the Arctic.²³

¹⁶ *UNCLOS*, *supra* note 1, arts 2 (Territorial Sea), 8 (Internal Waters), 33 (Contiguous Zone), 55 (Exclusive Economic Zone), 87 (High Seas).

¹⁷ Article 3 limits the territorial sea to 12 nm, Article 33(2) limits the contiguous zone to 24 nm, and Article 57 limits the exclusive economic zone to 200 nm (*ibid*).

¹⁸ *UNCLOS* grants the coastal state "sovereign rights for the purpose of exploring and exploiting, conserving and managing the natural resources, whether living or non-living, of the waters superjacent to the sea-bed and of the sea-bed and subsoil" (*ibid*, art 56(1)). These are broader rights that exhaustively include those granted under the extended continental shelf regime. Consequently, there could be no advantage to employing the outer continental shelf regime for areas already within an exclusive economic zone.

¹⁹ *Ibid*, arts 57, 58 (article 58(2) imports freedom of the seas provisions from the high seas regime into the exclusive economic zone, ensuring that ships generally pass through the zone as though upon the high seas).

²⁰ *Ibid*, art 56 (the exclusive economic zone regime gives states sovereignty over the seabed and subsoil, as well as living resources in the water column).

²¹ *Ibid*, art 76.

²² *Ibid*, art 77(4).

²³ Jacob Verhoef, David Mosher & Steve Forbes, "Defining Canada's Extended Continental Shelves" (2011) 38:2 *Geosci Can* 85 at 88.

2.1 THE EXTENDED CONTINENTAL SHELF

The extended continental shelf rules outlined in Article 76 of *UNCLOS* can create confusion, as some of the terms it employs to frame legal concepts have a different scientific meaning. In the interest of clarity it is necessary to address these distinctions.

Scientists describe the ocean floor as being composed of continental and oceanic crust. The continental crust is thick and light, while the oceanic crust is thin and heavy.²⁴ Because of their different densities, continental crusts float above oceanic crusts.²⁵ The boundary between the continental crust and the oceanic crust forms the basis for delineation of the continental shelf in the scientific sense.

From the shoreline proceeding seaward, scientists have classified the seafloor into three major segments: the continental shelf, the slope, and the rise.²⁶ The continental shelf is relatively flat and is submerged beneath a shallow column of water (usually between 1.2 km and 2.5 km deep) and may contain hydrocarbon resources in its sediments.²⁷ It extends from the shoreline to the continental slope. The continental slope is the area of seabed where the gradient changes, as the continental crust thins and the oceanic crust begins. This is also the segment where the “foot” of the continental shelf is found, a concept that is important for legal demarcation. The foot of a continental shelf is analogous to a foot of a hill, and is usually the point at the bottom of the slope where the change in gradient is highest. The slope separates the plateau of the continental shelf from the deeper oceanic crust. Across its length, the slope descends from the height of the shelf down to between 3.5 km and 5.5 km deep.²⁸ The last segment is the continental rise. The continental rise is the segment immediately following the slope, and is characterized as being a gentle rise up from the deep sea floor to the foot of the slope.²⁹ It is made from a wedge-shaped layer of sediment that has accumulated at the base of the slope, and often sits over part of the oceanic crust.³⁰ All three of these segments, taken together, are known to scientists as the continental margin.³¹ Seaward from the continental margin is the deep ocean floor.³²

The *UNCLOS* legal definition of a continental shelf is dependent on the scientific one, but is not identical to it. Under *UNCLOS*, the extended continental shelf describes the area over

²⁴ UN Division for Ocean Affairs and the Law of the Sea, Office of Legal Affairs, *Training Manual for Delineation of the Outer Limits of the Continental Shelf Beyond 200 Nautical Miles and for Preparation of Submissions to the Commission on the Limits of the Continental Shelf* (New York: UN, 2006) [DOALOS, *Training Manual*] at I-11.

²⁵ *Ibid.*

²⁶ *Ibid.*

²⁷ *Ibid.*

²⁸ *Ibid.*

²⁹ *Ibid.*

³⁰ *Ibid.* at I-11, I-12.

³¹ *Ibid.* at I-12.

³² *Ibid.*

which a state may exercise rights pursuant to the convention.³³ The legal continental shelf may extend beyond the scientific one.³⁴

2.2 THE TEST OF APPURTENANCE

In order for a state to request a recommendation from the CLCS, it must first show that it is eligible to make a claim. States do this by showing that there is an area over which the extended continental regime could apply. This process is known as the test of appurtenance, which demonstrates a state's entitlement to delineation.³⁵ The process of submission can therefore be understood as having two distinct steps. First, states demonstrate that there is at least some area to which they are entitled. Next, they delineate this area.

2.3 DELINEATING THE OUTER CONTINENTAL SHELF

Once a state has passed the test of appurtenance, it can begin to produce evidence delineating its outer continental shelf. This is done through the application of formula lines, of which there are two types: positive and constraint. Positive formula lines serve to extend the area of the extended shelf, while constraint lines form a cut-off beyond which rights claims cannot be extended—even if a positive formula line lies further seaward.³⁶ A line formed by the innermost positive and constraint lines describes the area of seafloor that can be claimed.³⁷

2.4 POSITIVE FORMULA LINES

UNCLOS provides for two types of positive formula lines, both of which rely on the concept of the continental foot envelope. Determining the location of the foot envelope will be discussed in greater detail below; however, it is necessary at this stage to explain that the foot of the continental slope is ordinarily the point at which the change in gradient is greatest at the base of the slope.³⁸ This is near the point where the continental slope levels off as it approaches the continental rise or the deep ocean floor.

³³ *UNCLOS*, *supra* note 1, art 76.

³⁴ Verhoef, Mosher & Forbes, *supra* note 23 at 87.

³⁵ Suzette V Suarez, *The Outer Limits of the Continental Shelf: Legal Aspects of their Establishment*, Beiträge zum ausländischen öffentlichen Recht und Völkerrecht vol 199 (Berlin: Springer, 2008) at 148 (SpringerLink).

³⁶ *UNCLOS*, *supra* note 1, arts 76(4)–(5).

³⁷ *Ibid*, arts 76(4) (positive lines), 76(5)–(6) (constraint lines).

³⁸ DOALOS, *Training Manual*, *supra* note 24 at V-14.

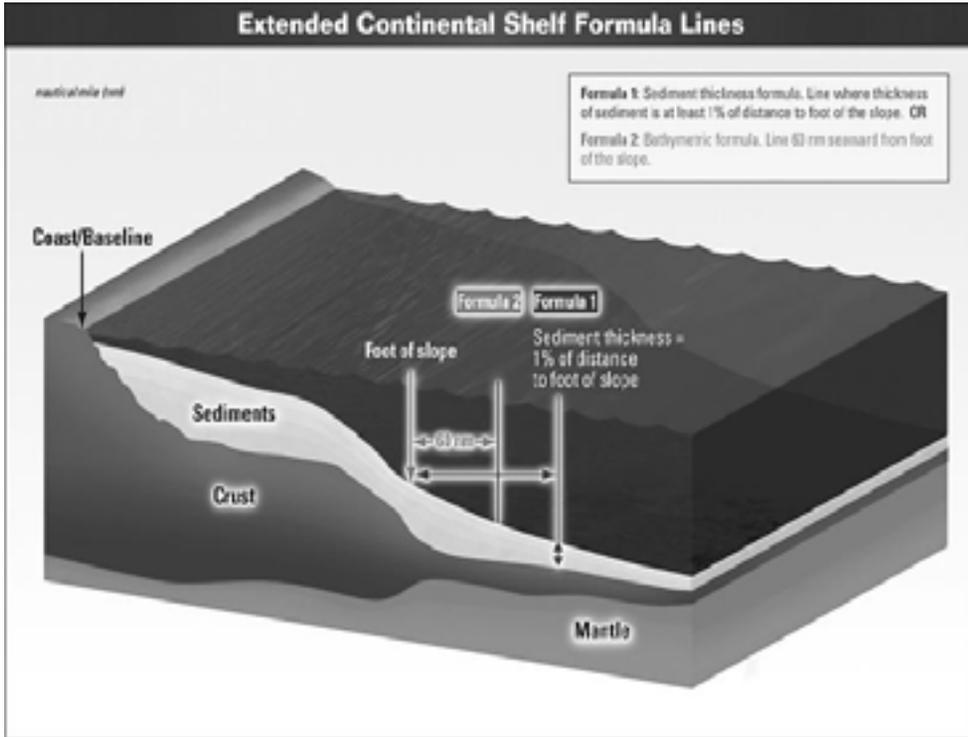


Figure 2 Positive Formula Lines

Courtesy of United States Extended Continental Shelf Project³⁹

The two types of positive formula lines are the Gardiner and Distance lines. The Gardiner line is also known as the “Irish formula” or the “sedimentary thickness line.”⁴⁰ The Gardiner line is “[a] line delineated in accordance with paragraph 7 by reference to the outermost fixed points at each of which the thickness of sedimentary rocks is at least 1 per cent of the shortest distance from such point to the foot of the continental slope.”⁴¹

Initially, the inclusion of this formula was controversial. Some delegates to the convention worried that the Gardiner line would be too difficult to implement, as it requires states to acquire knowledge of the composition of the seafloor, and not merely its relief and depth.⁴² However, the Irish delegation argued that with modern seismic equipment, this would be a viable method of demarcation.⁴³

The Distance line is more straightforward.⁴⁴ Also known as the “Heberg formula” or “Bathymetric formula,” the Distance line is “delineated in accordance with paragraph 7 by ref-

³⁹ “Formula Lines”, online: Extended Continental Shelf Project <<http://continentalshelf.gov>>.

⁴⁰ See *ibid*, Figure 2, Formula 1.

⁴¹ *UNCLOS*, *supra* note 1, art 76(4)(a)(i).

⁴² Suarez, *supra* note 35 at 160.

⁴³ *Ibid*.

⁴⁴ See “Formula Lines”, *supra* note 39, Figure 2, Formula 2.

erence to fixed points not more than 60 nautical miles from the foot of the continental slope.”⁴⁵ Relative to the Gardiner line, this method is easier to apply. States need only identify the foot of the continental slope, and then draw a line that is 60 nm away from the foot at every point.

2.5 ESTABLISHING THE FOOT OF THE CONTINENTAL SLOPE

Both types of positive formula lines rely on the foot of the continental slope. Consequently, both the charted contour of the foot and the data and methodology employed by a state to determine the foot’s location are critical elements of its submission to the CLCS.

UNCLOS states that the foot of the continental slope is established either at the point of maximum change in gradient at the base of the slope or, if there is “evidence to the contrary,” by other means.⁴⁶ In its *Technical Guidelines*, the CLCS clarifies that this alternative method of establishing the foot is meant to be interpreted as an exceptional method, and is considered complementary to the maximum change provision.⁴⁷ Since this method is complementary, states must continue to include technical data regarding the point of maximum change.⁴⁸ What may constitute evidence to the contrary is not clearly defined. The CLCS interprets this provision as a means of giving states the option of generating geological or geophysical arguments to justify the placement of the foot where there is difficulty ascertaining its location using the maximum change in gradient formula.⁴⁹

2.6 CONSTRAINT LINES

The constraint lines, when taken together, describe the outermost limit that the positive formula lines may encompass. The legal extended continental shelf can extend no further than the constraint lines.⁵⁰

⁴⁵ *UNCLOS*, *supra* note 1, art 76(4)(a)(ii).

⁴⁶ *Ibid*, art 76(4)(b).

⁴⁷ Commission on the Limits of the Continental Shelf, *Scientific and Technical Guidelines of the Commission on the Limits of the Continental Shelf*, *UNCLOS*, 5th Sess, CLCS/11, (1999), s 6.1.2 [*CLCS Technical Guidelines*].

⁴⁸ *Ibid*.

⁴⁹ *Ibid*, s 6.2.4.

⁵⁰ *UNCLOS*, *supra* note 1, art 76(5).

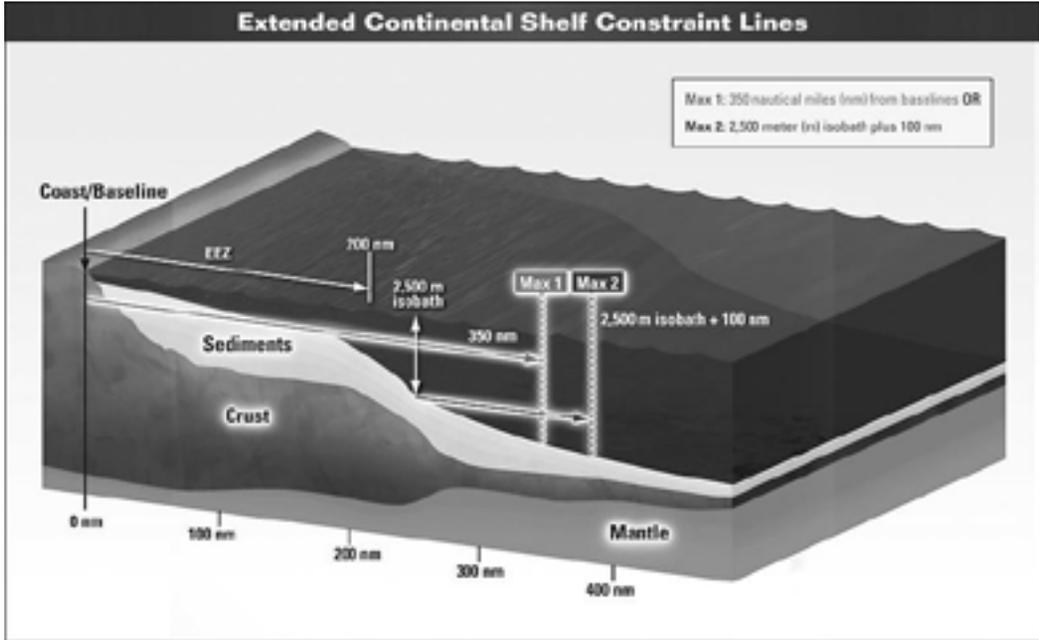


Figure 3 Constraint Lines

Courtesy of United States Extended Continental Shelf Project⁵¹

There are two types of constraint lines: the 350 nm constraint line, and the 100 nm from 2500 m isobaths line. The provision for both constraint lines is found at Article 76(5):

The fixed points comprising the line of the outer limits of the continental shelf on the sea-bed...either shall not exceed 350 nautical miles from the baselines from which the breadth of the territorial sea is measured or shall not exceed 100 nautical miles from the 2,500 metre isobaths, which is a line connecting the depth of 2,500 metres.⁵²

The 350 nm constraint line is found simply by measuring the distance to the baseline (geodesy).⁵³ However the establishment of the 100 nm from the 2500 m depth constraint line requires states to combine the distance to the baseline with a determination of depth (bathymetry).⁵⁴ As we shall see, this constraint line cannot be applied to submarine ridges, which has significant ramifications.

⁵¹ "Constraint Lines", online: Extended Continental Shelf Project <<http://continentalshelf.gov>>.

⁵² UNCLOS, *supra* note 1, art 76(5).

⁵³ The US National Oceanic and Atmospheric Administration defines geodesy as "the science of measuring and monitoring the size and shape of the Earth including its gravity field and determining the location of points on the Earth's surface" ("Geodesy", online: US NOAA <<http://oceanservice.noaa.gov/facts/geodesy.html>>).

⁵⁴ The US National Oceanic and Atmospheric Administration defines bathymetry as "the study of the "beds" or "floors" of water bodies, including the ocean, rivers, streams, and lakes. The term "bathymetry" originally referred to the ocean's depth relative to sea level, although it has come to mean "submarine topography," or the depths and shapes of underwater terrain" ("Bathymetry", online: US NOAA <<http://oceanservice.noaa.gov/facts/bathymetry.html>>).

2.7 COMBINING POSITIVE FORMULA LINES AND CONSTRAINT LINES

In its *Technical Guidelines*, the CLCS affirms that these provisions are meant to be interpreted as being subject to an inclusive disjunction.⁵⁵ This means that when states are compiling their submissions, they may use either the Gardiner or the Distance formulas, and either of the constraint lines.⁵⁶ Additionally, states do not need to rely exclusively on one type of line to delineate their entire continental shelf. They are free to use whichever line grants them sovereignty over the greatest area at any given point.⁵⁷

Naturally, states examine the seafloor to determine which combination of positive formula lines will delineate the area most suited to their interest. In seabed areas beyond the foot where sedimentary rocks form a thick layer and extend a great distance, the Gardiner line delimits a larger area. Where there is only a thin layer of sedimentary rocks, the Distance formula supports a larger claim. As one would expect, the Canadian surveys were conducted with this knowledge in mind.⁵⁸

Combining the constraint lines is more challenging. The constraint line drawn at 350 nm from the baselines is fairly straightforward. It only poses a question of geodesy and provides a clear articulation of a limit that restricts states from claiming unfair amounts of seabed. However, when the constraint line is combined with the 100 nm from 2500 m isobaths line, states, Arctic states in particular, must contend with the question of seafloor highs. As this constraint line is based on depth, seafloor highs that rise above that depth, and are part of a continental shelf or are sufficiently related to one, may give rise to exceptionally large claims, as discussed below.

2.8 SEAFLOOR HIGHS AND DELIMITATION

UNCLOS describes three types of seafloor highs: oceanic ridges of the deep ocean floor, submarine ridges, and submarine elevations.⁵⁹ Each responds differently to the provisions in the convention.

UNCLOS considers oceanic ridges of the deep ocean floor to be beyond the continental shelf. Classifying a seafloor high as an oceanic ridge has the legal effect of excluding it from the outer continental shelf regime by relegating it to the class of features that occur on the deep ocean floor.⁶⁰ Oceanic ridges are explicitly mentioned in Article 76(3) as being unsusceptible to resource claims under the extended continental shelf regime. *UNCLOS* does not provide a definition of oceanic ridges. However, doctrine and other materials provided by the UN shed light on their characteristics.⁶¹ Oceanic ridges are classified as such either because they rise entirely from the deep ocean floor, or because their geology, geomorphology, and tectonic

⁵⁵ *CLCS Technical Guidelines*, *supra* note 47, s 2.3.2.

⁵⁶ *Ibid*, ss 2.1.5, 2.1.8.

⁵⁷ *Ibid*, ss 2.1.6, 2.1.9.

⁵⁸ See Verhoef & Goodyear, *supra* note 13, for additional descriptions of the Canadian methodology.

⁵⁹ *UNCLOS*, *supra* note 1, art 76.

⁶⁰ DOALOS, *Training Manual*, *supra* note 24 at I-41.

⁶¹ Marc Benitah, "Russia's Claim in the Arctic and the Vexing Issue of Ridges in UNCLOS", online: (2007) 11:27 ASIL Insights <<http://www.asil.org>>; Suarez, *supra* note 35 at 163.

setting provide convincing evidence that they should properly be understood as being of the ocean floor and not of the natural prolongation of the submerged territory.⁶²

Submarine ridges, like oceanic ridges, are not defined in *UNCLOS*. It is not clear how they differ from oceanic ridges, except in that they cannot occur on the deep ocean floor and they have a closer relation to the continental margin.⁶³ The wording in Article 76(3) leaves open the possibility that oceanic ridges that do not occur on the deep ocean floor could be included in the continental margin as submarine ridges.⁶⁴ This suggests that they are not categorically different structures. Ron Macnab submits that submarine ridges are distinct from oceanic ones because they are “integral components of continental margins.”⁶⁵ Integral, in this sense, should not be taken to mean that they are geologically similar to the continental shelf. In fact, submarine ridges are not natural components of the continental margin. Rather, they are distinct types of elevation that happen to extend outward from within the foot envelope of the continental slope.⁶⁶ In other words, submarine ridges must be morphologically linked to the continental margin, but may nonetheless be similar geologically to oceanic ridges.⁶⁷ However difficult this distinction is to determine, *UNCLOS* unequivocally states that submarine ridges create legal effects distinct from those created by oceanic ridges.⁶⁸

In contrast to oceanic ridges, there is a possibility that submarine ridges may be used to extend sovereignty by extending the foot of the slope envelope.⁶⁹ However, they cannot be used to justify an outer continental shelf that extends more than 350 nm from the baselines. *UNCLOS* prohibits this by denying states the use of the 100 nm from 2500 m isobaths constraint line for these features.⁷⁰ This prohibition limits the distance states can use a ridge that may be morphologically connected to the continental shelf, but that cannot truly be considered part of the natural prolongation.

Submarine elevations are the third type of seafloor high. They are distinct from oceanic and submarine ridges in that they are characterized as natural components of the continental margin.⁷¹ A submarine elevation is also the only type of seafloor high that has specific types of formations explicitly linked to it, being the continental margin’s plateaux, rises, caps, banks,

⁶² Suarez, *ibid.*

⁶³ Article 76(6) distinguishes between submarine ridges and submarine elevations. It also clarifies that submarine ridges are capable of extending the delineation. As oceanic ridges cannot extend the delineation, it must be the case that the two types of ridges are distinct features, from a legal perspective (*UNCLOS*, *supra* note 1).

⁶⁴ *Ibid.*, art 76(3).

⁶⁵ Ron Macnab, “Submarine Elevations and Ridges: Wild Cards in the Poker Game of *UNCLOS* Article 76” (2008) 39:2 *Ocean Devel & Int’l L* 223 at 233.

⁶⁶ Harald Brekke & Philip Symonds, “Submarine Ridges and Elevations of Article 76 in Light of Published Summaries of Recommendations of the Commission on the Limits of the Continental Shelf” (2011) 42:4 *Ocean Devel & Int’l L* 289 at 299.

⁶⁷ DOALOS, *Training Manual*, *supra* note 24 at VII-27, VII-28.

⁶⁸ *UNCLOS*, *supra* note 1, art 76(6).

⁶⁹ Macnab, *supra* note 65 at 224.

⁷⁰ *UNCLOS*, *supra* note 1, art 76(6).

⁷¹ *Ibid.* (the 350 nm constraint line on submarine ridges “does not apply to submarine elevations that are natural components of the continental margin, such as its plateaux, rises, caps, banks and spurs”).

and spurs.⁷² Submarine elevations are the seafloor highs connected most closely with the continental shelf, and are interpreted as constituting true extensions of the shelf.⁷³ Like submarine ridges, submarine elevations extend a state's sovereignty by extending its foot of slope envelope.⁷⁴ However, in light of this feature's strong relation to the continental shelf, states that successfully demonstrate that a seafloor high is a submarine elevation may then apply either constraint rule to the seafloor high. Consequently, a submarine elevation that crests above 2500 m isobaths could, theoretically, extend a state's sovereignty indefinitely.⁷⁵

2.9 PREPARING A SUBMISSION

States that have ratified *UNCLOS* since 1999 that wish to take advantage of the outer continental regime under Article 76 should, ordinarily, submit a claim to the CLCS within ten years of ratifying *UNCLOS*.⁷⁶ The CLCS is a body created by Article 76 and Annex II of *UNCLOS*. However, these provisions only provide general information about the role of the CLCS and its process for receiving submissions. More detailed information about the day-to-day functioning of the body can be found in the *CLCS Rules of Procedure*.⁷⁷

2.10 THE COMMISSION ON THE LIMITS OF THE CONTINENTAL SHELF

The CLCS is perhaps best understood as a legitimizing institution that boosts international confidence over the quality of delineation claims.⁷⁸ Unlike international courts or tribunals, the CLCS is not a body that renders binding decisions or judgments.⁷⁹ However, nor is it a body without effective power. Article 76(8) of *UNCLOS* requires states seeking to delineate an outer continental shelf to make a submission to the CLCS, and holds that delineations made "on the basis" of the CLCS recommendations are authoritative:

Information on the limits of the continental shelf beyond 200 nautical miles from the baselines from which the breadth of the territorial sea is measured shall be submitted by the coastal State to the Commission on the Limits of the Continental

⁷² *Ibid.*

⁷³ According to Brekke & Symonds, "[i]n general, the CLCS regarded all these features to be natural components of the continental margin on the basis of their geological characteristics, in addition to their already proven morphological continuity with the landmass of the coastal state. It seems that for this purpose the CLCS makes an assessment as to what extent such an elevation is geologically associated or continuous with the landmass of the coastal state, and to what extent it is geologically different to the surrounding deep ocean floor" (*supra* note 66 at 299–300).

⁷⁴ *Ibid.*

⁷⁵ *Ibid* at 299.

⁷⁶ Suarez, *supra* note 35 at 182; *UNCLOS*, *supra* note 1, Annex II, art 4. States that ratified *UNCLOS* prior to 1999 were given until 2009 to make their submission. The commission now allows states to make a submission outside of the ten-year limit if they signal their intention to do so within the ten-year limit.

⁷⁷ *CLCS Rules of Procedure*, *infra* note 97.

⁷⁸ See McDorman, *supra* note 11 at 319 ("[w]hat the political context of ocean boundary-making, the real achievement of Article 76, the constitutive structure of the Commission, an understanding of the wording of the LOS Convention and the intention of the negotiators all lead to is the conclusion that the role served by the Commission in outer continental margin delineation is that of *legitimator*" [emphasis in original]).

⁷⁹ *Ibid* at 315.

Shelf set up under Annex II on the basis of equitable geographical representation. The Commission shall make recommendations to coastal States on matters related to the establishment of the outer limits of their continental shelf. The limits of the shelf established by a coastal State on the basis of these recommendations shall be final and binding.⁸⁰

While the role played by the CLCS recommendations in the delineation process is not necessarily definitive, the CLCS recommendations nonetheless constitute a required aspect of the claim process under *UNCLOS*.⁸¹ This has led some commentators to describe the procedure as a quasi-legal process.⁸²

While the CLCS does not have the power to issue binding decisions, it does have the ability to demonstrate, through its reviewing process, that a state submission is convincing to a group of international experts who are well-versed in the technical and scientific aspects of the regime.⁸³ This could be understood as a means of ensuring that state submissions are perceived by other international actors as being credible and reasonable, and as a means of preventing exaggerated claims.⁸⁴

The CLCS is composed of twenty-one experts in geology, geophysics, and hydrography, elected by the states party to *UNCLOS*. The elections seek to ensure that the experts reflect an equitable distribution of states across the globe.⁸⁵ The current chairman is Lawrence Folajimi Awosika, from Nigeria, and the current composition of the CLCS, elected in 2012, will last until the next elections in 2017.⁸⁶

Annex II of *UNCLOS* empowers the CLCS with two functions. The first is to consider the submissions of coastal states and to make recommendations regarding their demarcations.⁸⁷ The second is to provide technical guidance to states that are preparing submissions.⁸⁸ When the state receives the CLCS' recommendations, it may use them to create a binding delineation. The opposability of these binding delineations is still a controversial matter. The United States and UN Office of Legal Affairs have issued statements suggesting that they interpret these delineations as binding on the asserting state as well as on all other states.⁸⁹ However,

⁸⁰ *UNCLOS*, *supra* note 1, art 76(8).

⁸¹ *Ibid.*

⁸² Donald R Rothwell, "Issues and Strategies for Outer Continental Shelf Claims" (2008) 23 *Int'l J Mar & Coast L* 185 at 188.

⁸³ McDorman, *supra* note 11 at 306–08, 311. "One certainty is that it is the coastal state, not the Commission, which has the legal capacity to set the state's outer limit of the continental margin" (*ibid* at 306 [emphasis in original]).

⁸⁴ *Ibid* at 308 ("[the Commission] has a safeguard or watchdog role respecting exaggerated continental margin claims").

⁸⁵ *UNCLOS*, *supra* note 1, Annex II, art 2.

⁸⁶ The only Canadian nomination is Richard Haworth, a geologist and British national who has worked extensively with the Canadian government and served as the Canadian representative at the DOALOS expert panels in 1993 and 1995 (CLCS, *Richard Thomas Haworth (Canada and United Kingdom of Great Britain and Northern Ireland)*, UN Doc SPLOS/240 (December 2012)).

⁸⁷ *UNCLOS*, *supra* note 1, Annex II, art 3.

⁸⁸ *Ibid.*

⁸⁹ McDorman, *supra* note 11 at 314.

Ted McDorman has raised the point that, since the CLCS is not capable of making binding decisions and is not representative of all sovereign states, it is unclear how these decisions could be made effectively binding on other states.⁹⁰ In light of this, another possible interpretation is that the submitting state binds only itself, after delineating the continental shelf on the basis of a CLCS recommendation.⁹¹ Under this interpretation, the delineation would become binding on other states upon the passing of a reasonable amount of time without protest from states following the publication of this claim by the UN Secretary-General. This is in keeping with traditional boundary practice.⁹²

In order to review submissions, the CLCS may, at its discretion, employ a sub-commission composed of seven CLCS members.⁹³ Submissions to the CLCS are confidential, a practice enforced by two levels of secrecy. First, CLCS members undertake obligations of confidentiality.⁹⁴ They may only deliberate submissions in private, and once they cease to be CLCS members, they cannot disclose any confidential information they have learned by virtue of their office.⁹⁵ Second, the *CLCS Rules of Procedure* protect the confidentiality of the submissions themselves, distinct from the members who interact with them. States may classify any non-public material they submit.⁹⁶ This material is treated separately, cannot be reproduced, and must be returned to the state at any time upon its request.⁹⁷

The recommendations made by the CLCS are without prejudice to disputes between states concerning rights over opposing or adjacent extended continental shelves.⁹⁸ Article 76(8) renders the *UNCLOS* continental shelf regime incapable of affecting these disputes,⁹⁹ and the *CLCS Rules of Procedure* further emphasizes the Commission's inability to influence inter-state disputes. Annex I of these rules provide that states may make joint submissions.¹⁰⁰ In these cases, the CLCS will only concern itself with the determination of the limit of the extended continental shelf, leaving to the state parties the question of the demarcation between them.

While the CLCS has been criticized for its lack of transparency, the greatest problem affecting the organization is its inability to process submissions within a reasonable time limit.¹⁰¹ The small size of the CLCS, combined with the number and complexity of the submissions it reviews, results in long waiting times for state submissions. As of November 2013, the CLCS

⁹⁰ *Ibid* at 315.

⁹¹ *Ibid.*

⁹² *Ibid* at 316–17.

⁹³ *UNCLOS*, *supra* note 1, Annex II, art 5.

⁹⁴ *DOALOS, Training Manual*, *supra* note 24 at I-49.

⁹⁵ *Ibid.*

⁹⁶ *Ibid.*

⁹⁷ Commission on the Limits of the Continental Shelf, *Rules of Procedure of the Commission on the Limits of the Continental Shelf*, *UNCLOS*, 21st Sess, CLCS/40/Rev.1, (2008), 2.1, 3.6, 7 [*CLCS Rules of Procedure*].

⁹⁸ *UNCLOS*, *supra* note 1, art 76(10).

⁹⁹ *Ibid*, art 76(8).

¹⁰⁰ *CLCS Rules of Procedure*, *supra* note 97, Annex I, para 4.

¹⁰¹ Riddell-Dixon, "Canada and Arctic Politics", *supra* note 3 at 351; Macnab, *supra* note 65 at 224.

had received sixty-seven submissions and only seventeen had been processed.¹⁰² At this rate, Canada's submission will not be processed for several decades, and this prognosis is unlikely to change without serious reform within the CLCS.¹⁰³ There is reason to be sceptical that such reform is coming. Developed countries already fund more than half of the UN budget and do not want to spend more.¹⁰⁴ Landlocked states and states whose continental shelves do not extend beyond 200 nm, cannot be expected to be overly generous either, as they derive no direct benefit from the application of the regime.¹⁰⁵ It is an unfortunate consequence of the system in place that states under pressure from the ten-year time constraint imposed by *UNCLOS* may find themselves scrambling to complete a submission, and then be forced to wait decades for a recommendation.

3. THE CANADIAN SUBMISSION

The Canadian experience of the outer continental shelf regime has been largely positive. Far from a tense international confrontation in the North, the submission process has been marked by international cooperation between Arctic states. Canada has worked especially closely with the United States and Denmark.¹⁰⁶ Additionally, Canada's submission was the product of diverse governmental organizations working well together and learning quickly from one another.¹⁰⁷ The project was well orchestrated and has followed a coherent schedule since its inception.¹⁰⁸

Despite the difficult conditions in the Arctic, Canadian survey teams have demonstrated persistence and ingenuity in obtaining data. Canada is also on the leading edge of robotic surveying, having employed autonomous drone submersibles successfully to conduct metric surveys.¹⁰⁹ The strength of the program and the confidence of its participants in its technical completeness suggest that the delineations proposed by Canada will be well received by the CLCS. Moreover, cooperation between Arctic states is cause for optimism that the submission will be considered to be well supported, because states working together corroborate each other's data. That Canada's submission may not even be examined for decades is especially frustrating for Canadians who had to work quickly to meet the ten-year deadline but will now have to wait for an indeterminate period of time to learn the result of their efforts. However, the secrecy provisions that bind the CLCS make it difficult to learn from other submissions what type of evidence is likely to convince the CLCS with regard to the character of the Alpha-Mendelev and Lomonsov Ridges.¹¹⁰

¹⁰² "Submissions to the CLCS", (updated 4 September 2013) online: CLCS <http://www.un.org/depts/los/clcs_new/commission_submissions.htm>.

¹⁰³ Elizabeth Riddell-Dixon, "Meeting the Deadline: Canada's Arctic Submission to the Commission on the Limits of the Continental Shelf" (2011) 42:4 *Ocean Devel & Int'l L* 368 at 376 [Riddell-Dixon, "Meeting the Deadline"].

¹⁰⁴ *Ibid* (this reluctance is due to serious domestic budgetary constraints).

¹⁰⁵ *Ibid* at 376, 378.

¹⁰⁶ *Ibid* at 374.

¹⁰⁷ *Ibid* at 371.

¹⁰⁸ *Ibid* at 371–75.

¹⁰⁹ *Ibid* at 372.

¹¹⁰ See Figure 5, below.

As Canada ratified *UNCLOS* in late 2003,¹¹¹ the Canadian submission must be delivered to the CLCS no later than December 2013 in order to respect the ten-year time limit.¹¹² The Canadian submission is a joint effort between the Department of Foreign Affairs, Trade and Development (“DFATD”), Natural Resources Canada (“NRCan”) and the Department of Fisheries and Oceans (“DFO”).¹¹³ NRCan is engaging in the project through its Geological Survey of Canada (the “GSC”). Among other things, the GSC is responsible for conducting seismic surveys, which help determine the structure and composition of the seabed and seafloor.¹¹⁴ The DFO is supporting the project through the Canadian Hydrographic Service (the “CHS”). In order to map the topography of the seafloor, the CHS is responsible for conducting bathymetric surveys.¹¹⁵ DFATD is providing overall legal support, and is responsible for the final preparation and submission of the documents to the CLCS.¹¹⁶

Canada began preparing its submission in the mid-1990s, well before ratifying *UNCLOS*. The GSC and the CHS conducted a desktop study to determine where Canada would likely be able to claim an extended continental shelf.¹¹⁷ They concluded that Canada could make claims in the Atlantic and Arctic oceans, and that no claim was possible in the Pacific.¹¹⁸

It is important to qualify some of the expectations Canadians may have about the benefits to Canada of delineating a large outer continental shelf in the Arctic. The exact type and quantity of resources to be obtained on the outer continental shelf are unknown, and due to the depth at which the extended shelf lies, what may be found will be exceptionally difficult to recover from the ocean floor.¹¹⁹ Moreover, the Arctic poses logistical and environmental challenges to resource exploitation.¹²⁰ There are almost certainly more resources within Canada’s 200 nm exclusive economic zone and on the Canadian mainland than on the outer continental shelf, and these resources will be much more easily obtained than those found on the outer continental shelf.¹²¹ Despite these qualifications, Canada surely believes that it is in its interest to clearly establish clearly the extent of its claim over the territory.

3.1 THE ATLANTIC CONTINENTAL MARGINS

Canada’s extended continental shelf claim in the Atlantic Ocean spans the Scotian, Grand Bank and Labrador margins. The Canadian government has been acquiring survey data on the Atlantic seafloor since the 1960s, and the private-sector has conducted surveys in this area for exploration purposes.¹²² Unfortunately, most of this surveying was conducted over the

¹¹¹ Riddell-Dixon, “Meeting the Deadline”, *supra* note 103 at 370.

¹¹² Verhoef & Goodyear, *supra* note 13 at 4.

¹¹³ Formerly the Department of Foreign Affairs and International Trade.

¹¹⁴ Riddell-Dixon, “Meeting the Deadline”, *supra* note 103 at 371.

¹¹⁵ *Ibid.*

¹¹⁶ *Ibid* at 371, 375

¹¹⁷ Verhoef, Mosher & Forbes, *supra* note 23 at 88.

¹¹⁸ Verhoef & Goodyear, *supra* note 13 at 2.

¹¹⁹ Riddell-Dixon, “Canada and Arctic Politics”, *supra* note 3 at 344.

¹²⁰ *Ibid.*

¹²¹ *Ibid* at 344–45.

¹²² *Ibid* at 4.

continental shelf itself and not over the slope, foot, and rise—the most useful areas for the CLCS submission.¹²³ As a result, more surveys were required over the pertinent areas in order to establish the data required for the submission.

The Scotian margin is characterized by thick sedimentary deposits, often as deep as two km.¹²⁴ Consequently, the Canadian surveys performed there attempted to delineate the continental shelf by using the Gardiner formula.¹²⁵ Additionally, since there are no seafloor highs that stand higher than 2500 m isobaths outside of 350 nm, the distance constraint line enclosed the greatest area.¹²⁶ As the dominant type of data required to make a Gardiner formula claim is sedimentary thickness, seismic surveys were required to uncover the geology of the seafloor. In 2007, Canada performed these seismic surveys between 200 nm and 350 nm from the baselines to obtain the data necessary to generate a submission.¹²⁷ In the same year, Canadian hydrographers completed the required bathymetric surveys.¹²⁸

In many places, the Grand Bank margin has a type of slope that is similar to the Scotian margin. The Grand Banks are characterized by a large shallow plateau that extends a considerable way out to sea. Because of the shallowness and extension of the Grand Banks plateau, the 100 nm from the 2500 m isobaths constraint line often encircles the greatest area.¹²⁹ Along this margin, the distance positive formula line often lies near or beyond this constraint line.¹³⁰ Consequently, there was no need to employ seismic surveying in the area, as all the necessary information could be obtained by determining ocean depths through bathymetry. This work was completed in 2006 using multi-beam echo-sounding surveys.¹³¹

Along the Labrador margin, the distance positive formula line described an area that lay inside 200 nm from the baseline.¹³² This meant that in order to claim continental shelf beyond the default limit, Canada needed to apply the sedimentary thickness positive formula. Canada completed the required seismic surveys in 2009.¹³³ Data was acquired and analyzed jointly with Denmark, who was operating on behalf of Greenland's claim.¹³⁴ By jointly developing submissions, Canada and Denmark strengthened their claims by verifying each other's proposals. Bathymetric surveys were completed in the same year.¹³⁵

¹²³ *Ibid.*

¹²⁴ *Ibid* at 5.

¹²⁵ *Ibid.*

¹²⁶ *Ibid.*

¹²⁷ “Defining Canada’s Continental Shelf”, online: Fisheries and Oceans Canada <<http://www.dfo-mpo.gc.ca/science/hydrography-hydrographie/unclos-eng.html>> [DFO, “Defining Canada’s Continental Shelf”].

¹²⁸ *Ibid.*

¹²⁹ Verhoef, Mosher & Forbes, *supra* note 23 at 90.

¹³⁰ *Ibid.*

¹³¹ DFO, “Defining Canada’s Continental Shelf”, *supra* note 127.

¹³² Verhoef, Mosher & Forbes, *supra* note 23 at 91; DFO, “Defining Canada’s Continental Shelf”, *supra* note 127.

¹³³ DFO, “Defining Canada’s Continental Shelf”, *ibid.*

¹³⁴ *Ibid.*

¹³⁵ Verhoef, Mosher & Forbes, *supra* note 23 at 91.

3.2 THE ARCTIC CONTINENTAL MARGINS

The Arctic environment posed a significant challenge to researchers preparing Canada's submission. Because of the harsh weather conditions, operations in the North were concentrated in two six-to-eight week periods each year. Eastern Arctic research was conducted in the spring (March and April) and western Arctic research was conducted in the fall (August and September).¹³⁶ While the operations conducted in the western Arctic were performed from ice-breaking ships provided by the Canadian and US coast guards, the ice in the eastern Arctic is simply too thick to conduct surveys from ships reliably. As a result, the work in the eastern Arctic was performed from ice camps or from shore bases.¹³⁷

3.3 THE WESTERN ARCTIC

The dominant feature in the western Arctic is the Canada Basin. This basin is separated from the Eurasian basin by the Alpha/Mendelev and Lomonosov Ridge features.¹³⁸ Along the Canada Basin, Canada's claim is greatest when the Gardiner formula is applied. As a result, in the western Arctic, Canada conducted seismic surveying operations in addition to bathymetric surveys.¹³⁹ Canada began surveying operations unilaterally in the western Arctic in 2007, and quickly coordinated a joint survey program with the United States in 2008.¹⁴⁰ From 2008 to 2011, the Canadian Coast Guard Ship Louis S. St. Laurent ("CCGS LSSL") and the United States Coast Guard Cutter Healy ("USCGC Healy") worked together to survey the ocean floor in the interest of both states.¹⁴¹

In the same way that international collaboration strengthened Canada's submission along the Labrador margin, joint operations with the United States had a similar effect in the western Arctic.

3.4 THE EASTERN ARCTIC

The conditions in the eastern Arctic make it impossible or impractical to conduct surveying operations by ship. As a result, the Canadian surveys were conducted by teams on the ice, by air, or by the Autonomous Underwater Vehicle ("AUV").¹⁴² The main features of the eastern Arctic from a Canadian perspective are the Alpha-Mendelev and Lomonosov Ridges. While the characterization of the Alpha-Mendelev Ridge is a primarily Canadian concern, Denmark and the Russian Federation ("Russia") share an interest with Canada in the Lomonosov Ridge. Once again, Canada and Denmark cooperated on their surveys of the ridge.¹⁴³

¹³⁶ Riddell-Dixon, "Meeting the Deadline", *supra* note 103 at 371.

¹³⁷ Verhoef & Goodyear, *supra* note 13 at 5.

¹³⁸ *Ibid* at 3.

¹³⁹ Verhoef, Mosher & Forbes, *supra* note 23 at 92.

¹⁴⁰ Verhoef & Goodyear, *supra* note 13 at 6; Riddell-Dixon, "Meeting the Deadline", *supra* note 103 at 373; DC Mosher, ed, *2011 Canadian High Arctic Seismic Expedition: CCGS Louis S St-Laurent expedition report*, Geological Survey of Canada, Open File 7053 (Ottawa: Natural Resources Canada, 2012) at 1.

¹⁴¹ Mosher, ed, *ibid*.

¹⁴² Verhoef & Goodyear, *supra* note 13 at 5.

¹⁴³ *Ibid* at 4.

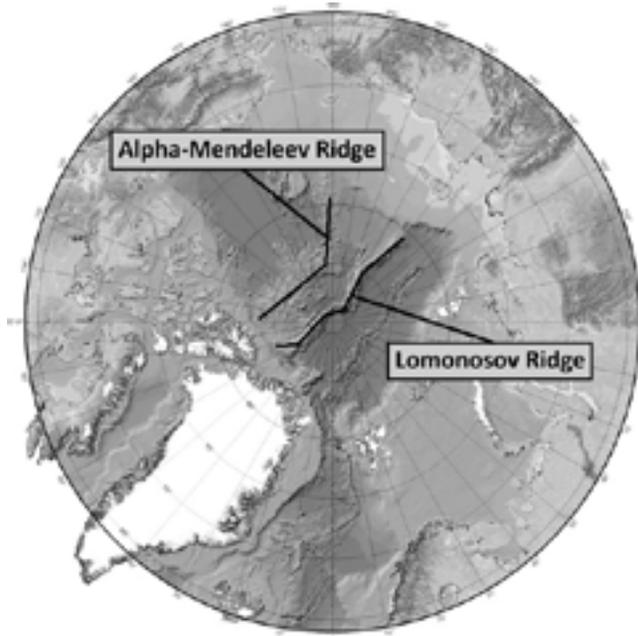


Figure 5 The approximate locations of the Alpha-Mendelev and Lomonosov Ridge features.
Original chart courtesy of the United States Extended Continental Shelf Project.¹⁴⁴

The Alpha-Mendelev and Lomonosov Ridges have attracted the interest of Arctic states due to their potential to greatly increase state claims over continental shelves. However, both ridges have depressions where they meet the continental shelves on either side of the Arctic Ocean that could potentially limit their capacities to support these claims.¹⁴⁵ The shallow portions of the continental shelf are separated from the shallow heights of the ridge by deep saddle areas. The CLCS will need to determine whether the saddle area that lies between the ridge and the rest of the continental shelves of Canada, Denmark, and Russia is sufficient to characterize the feature as an oceanic ridge in the sense of Article 76(3) of *UNCLOS*.¹⁴⁶ If the saddle area does form a morphological breach, the claimant states will have to demonstrate that the saddle area should be characterized as part of the continental margin by other means. This type of argument will require resorting to geological and geo-morphological evidence. Should this evidence fail to convince the CLCS, its recommendation will not extend delineation over these features. Only if the saddle areas are found to be submarine ridges or submarine elevations, will they have the capacity to support claims.

¹⁴⁴ “International Bathymetric Chart of the Arctic Ocean (composite based on sparse data)”, online: Extended Continental Shelf Project <<http://continentalshelf.gov>>.

¹⁴⁵ Nele Matz-Lück, “Planting a Flag in Arctic Waters: Russia’s Claim to the North Pole” (2009) 1:2 *Göttingen Journal of International Law* 235 at 249; Thomas Funck, H Ruth Jackson & John Shimeld, “The crustal structure of the Alpha Ridge at the transition to the Canadian Polar Margin: Results from a seismic refraction experiment”, (2011) 116:B12 *Journal of Geophysical Research* at 2, Figure 1.

¹⁴⁶ Brekke & Symonds, *supra* note 66 at 292. See also *UNCLOS*, *supra* note 1, art 76(3).

The need for confidentiality in submissions, discussed above, is understandable. Nonetheless, this confidentiality has the unfortunate consequence of making it more difficult for states to know precisely what type of arguments are most likely to convince the CLCS of a seafloor high characterization. Other domains of international law benefit from court judgments or the publication of documentation concerning disputes. This easily accessible information diminishes ambiguities in the law, thus allowing all states concerned to structure their actions and legal claims accordingly. The confidentiality rules associated with the CLCS effectively prohibit other states from learning about the deliberations relating to ridges and elevations resulting from other submissions.¹⁴⁷ As a result, Canada can neither learn from the mistakes of others nor draw on their successful techniques.

In 2001, Russia submitted a proposed delineation based on its own technical data.¹⁴⁸ Due to the confidentiality surrounding submissions, it is impossible to know exactly how Russia characterized the Mendeleev and Lomonosov features. However, the public portion of its submission indicates a desire to demonstrate that these features are submarine elevations that form part of the natural prolongation of the Russian land territory. As submarine ridges can only support sovereignty within 350 nm, geodesic maps would have been a necessary inclusion for a state making such an argument. The absence of these maps from the public portion of the Russian submission suggests that Russia could not have been attempting to argue that the features were submarine ridges.¹⁴⁹ Additionally, it is clear from the public portion of the submission that Russia intended to make a claim over an area greater than a characterization of these features as oceanic ridges would allow.¹⁵⁰ It must therefore be the case that Russia argued that the two ridges are submarine elevations.¹⁵¹ Russia's probable claim that these ridges constitute submarine elevations is contentious among the international community. The United States responded to the 2001 Russian submission by stating that it considers both the Alpha-Mendeleev and Lomonosov Ridges to be oceanic in character, and that neither ridge can ground the sovereignty of any nation.¹⁵² In any event, the CLCS requested that Russia produce more data to substantiate its claim.¹⁵³

Cognisant of the treatment of the Russian submission by the CLCS, Canada has made extensive efforts to build a compelling argument concerning the characterization of the Alpha-Mendeleev and Lomonosov Ridges. The LORITA project (Lomonosov Ridge Test of Appurtenance project) was a joint effort in 2006 by Denmark and Canada to assess the structure of the Lomonosov ridge, and to determine whether it could properly be considered part of the natural prolongation of the continental shelf.¹⁵⁴ The project was based out of both the

¹⁴⁷ Macnab, *supra* note 65 at 224.

¹⁴⁸ Commission on the Limits of the Continental Shelf, *Outer limits of the continental shelf beyond 200 nautical miles from the baselines: Submissions to the Commission: Submission by the Russian Federation*, (Russian Federation, 2001) online: CLCS <http://www.un.org/depts/los/clcs_new/submissions_files/submission_rus.htm>.

¹⁴⁹ *Ibid.*

¹⁵⁰ Benitah, *supra* note 61.

¹⁵¹ *Ibid.*

¹⁵² *Ibid.*

¹⁵³ Matz-Lück, *supra* note 145 at 249.

¹⁵⁴ Verhoef & Goodyear, *supra* note 13 at 4.

Canadian Forces Station Alert and an ice camp 100 km offshore. To strengthen the argument for natural prolongation of the feature, Canada and Denmark conducted high-quality seismic surveys of the ridge.¹⁵⁵ The data was hard-won. Between 65 percent and 70 percent of the available project days were lost to bad weather.¹⁵⁶ In the end, the surveys concluded that the ridge is a continuation of the continental crust extending north from Ellesmere Island, and that there is no intervening oceanic crust that could upset its characterization as a natural prolongation of the continental shelf and, ultimately, of the land territory of both Canada and Greenland.¹⁵⁷ The inclusion of this geological evidence will supplement the existing hydrographical evidence and could support Canada's claim in spite of the depressions that separate the ridge from the shelf.

The same method was applied to the Alpha-Mendeleev Ridge in spring 2008 as part of the ARTA project (Alpha Ridge Test of Appurtenance project). This was a unilateral project undertaken by Canada, but it bore resemblance to the LORITA effort.¹⁵⁸ Scientists conducted seismic surveying perpendicular to the margin from the continental shelf to the heights of the ridge. Next, they performed a cross-section survey over the saddle parallel to the margin.¹⁵⁹ Though the results are still being examined, the initial findings indicate that the crustal composition of the Alpha-Mendeleev Ridge is distinct from the crustal composition of the continental shelf.¹⁶⁰ However, the *CLCS Technical Guidelines* are clear that crustal composition alone is insufficient to relegate a feature to the class of structures characterized as oceanic ridges.¹⁶¹ The origin of a feature can serve as an additional means of determining its legal status. According to the geophysicists interpreting the data, "the results from the ARTA experiment are "overall most compatible with a tectonic model in which the [Alpha-Mendeleev Ridge] was formed by interaction of a plume with seafloor-spreading along a spreading center parallel to the Canadian Polar Margin."¹⁶² Seafloor-spreading is explicitly characterized in the *CLCS Technical Guidelines* as a process that may be associated with the creation of oceanic ridges.¹⁶³ While the CLCS states that the complexity associated with these types of characterizations means that ridges must be examined on a case-by-case basis,¹⁶⁴ the crustal composition and

¹⁵⁵ *Ibid.*

¹⁵⁶ *Ibid.*

¹⁵⁷ *Ibid.*

¹⁵⁸ Verhoef, Mosher & Forbes, *supra* note 23 at 92.

¹⁵⁹ Funck, Jackson & Shimeld, *supra* note 145 at para 1.

¹⁶⁰ Verhoef, Mosher & Forbes, *supra* note 23 at 92.

¹⁶¹ *CLCS Technical Guidelines*, *supra* note 47, s 7.2.9.

¹⁶² Funck, Jackson & Shimeld, *supra* note 145 at para 66.

¹⁶³ *CLCS Technical Guidelines*, *supra* note 47, s 7.2.1.

¹⁶⁴ *Ibid.*, ss 7.2.9-7.2.10.

probable origin of the Alpha-Mendeleev Ridge suggest that it is extremely unlikely that it will be characterized as a submarine elevation.¹⁶⁵

4. DELIMITATION BETWEEN STATES

Despite the CLCS's ability to provide recommendations on the delineation of the outer continental shelf from a technical and scientific standpoint, it cannot resolve boundary disputes between states. Canada shares adjacent continental shelf borders with both the United States and Denmark. However, if the Lomonosov Ridge is found to be capable of supporting an outer continental shelf claim for both Canada and Russia across its length, Canada may find itself negotiating a three-way delimitation of the ridge with Russia and Denmark.

Russia's first submission to the CLCS indicated that Russia might have been limiting the extent of its claim by employing a type of Arctic delimitation known as sector theory.¹⁶⁶ Sector theory is a strategy of delimitation based on meridians of longitude. Explained simply, states select the meridians at the east and west extremes of their Arctic territory, extend them northward to the pole, and claim some type of right over the "pie-shaped" area enveloped.¹⁶⁷ When applied to the delimitation of the outer continental shelf, sector theory would grant resource rights over areas capable of supporting outer continental shelf claims to the state whose sector the areas fell within.¹⁶⁸ While a similar approach has been used successfully to divide rights in the Antarctic, it is not a traditional means of resolving borders under customary international law and has not been endorsed by other states.¹⁶⁹ The more prevalent practice under international law is to apply the concept of equitable principles to resolve disputes concerning delimitations of continental shelves. In *Case Concerning the Continental Shelf (Libyan Arab Jamahiriya/Malta) (Merits)*, the International Court of Justice (the "ICJ") employed this concept to draw a border based in part on a line that was at every point equidistant from the low water marks of each state's shores.¹⁷⁰ However, the court also made clear that it stood by the principle that "equity does not necessarily imply equality," and considered a broad variety

¹⁶⁵ According to Funck, Jackson & Shimeld, "[t]he ARTA seismic refraction experiment provides the first detailed crustal image of the transition from the continent to the AMR. The results indicate a clear difference between the continental crust beneath the Sverdrup Basin in northern Canada and the crust encountered on the Alpha Ridge. Increasing evidence of magmatic activity can be observed from the onshore portion of the line to its offshore termination on the Alpha Ridge. What is even more important, the transition zone with thinned continental crust is heavily modified by magmatic activity and is distinctively different from the crust on the ridge. Lower crustal velocities in the transition zone are intermediate to those on the continent and on the ridge. In addition, a high-velocity lower crustal body interpreted as underplating is observed. This argues against interpretations that the AMR is composed of continental crust that was altered by magmatism as suggested for the Mendeleev Ridge" (*supra* note 145 at para 64).

¹⁶⁶ In its simplest expression, the sector theory divides a region into "pie slice" sectors formed by the drawing of straight lines starting from a common point, the North Pole, and attributes each to a neighbouring state. See e.g. Senate, *Standing Committee on Fisheries and Oceans*, 39th Parl, 2d Sess, No 2 (13 March 2008) (Dr Ron Huebert).

¹⁶⁷ Côté & Dufresne, *supra* note 10 at 5, 7.

¹⁶⁸ Ivan L Head, "Canadian Claims to Territorial Sovereignty in the Arctic Regions" (1963) 9:3 McGill LJ 200 at 202.

¹⁶⁹ Donat Pharand, *Canada's Arctic waters in international law* (Cambridge: Cambridge University Press, 1988) at 1-79.

¹⁷⁰ [1985] ICJ Rep 13 [*Malta*].

of equitable factors in its decision.¹⁷¹ *UNCLOS*, although not yet operative at the time, was considered by the court,¹⁷² as Article 83 of *UNCLOS* provides that delimitations of continental shelves should be made with an equitable solution in mind.¹⁷³ It remains to be seen whether sector theory will be accepted as consistent with the equitable principles grounding delimitation under *UNCLOS*, although its simplicity seems at odds with the complexity of the ICJ's interpretation of the concept in *Malta*.

The possibility of overlapping claims does create a risk of international disputes. However, in light of current levels of cooperation between states, as well as the explicit commitment Arctic states have made to the peaceful delimitation of their claims under international law, it seems likely that if disputes occur, they will be resolved through negotiations or under international law.¹⁷⁴

5. CONCLUSION

The Canadian submission to the CLCS includes claims over two oceans and across many continental margins. It is the culmination of a decade's worth of surveying and analysis both unilaterally and in collaboration with other Arctic states. Canada seems likely to delineate successfully a large area in both oceans. The area claimed in the Atlantic Ocean has been well surveyed and the information obtained should prove to be compelling evidence before the CLCS. Canada's claim in the western Arctic has been enriched by cooperation with the United States. In the eastern Arctic, there is reason to be optimistic about the claim over the Lomonosov Ridge, a claim which has been strengthened by scientific collaboration and agreement with Denmark. The same cannot be said for the Alpha-Mendeleev Ridge system, which is likely to be interpreted as a feature that is less receptive to grounding claims under the *UNCLOS* regime. On the whole, the submission project has been characterized by strong interdepartmental and international cooperation. Canadian scientists have worked well with each other and with other nations in order to obtain the necessary information, and have strengthened the Canadian claims in the process. It is heartening to see that a project with the potential for

¹⁷¹ *Ibid* at para 46, citing *North Sea Continental Shelf*, [1969] ICJ Rep 3 at para 91.

¹⁷² *Ibid* at paras 26-27, 29, 31-33, 65.

¹⁷³ *UNCLOS*, *supra* note 1, art 83.

¹⁷⁴ States have openly expressed their intention to resolve disputes peaceably and within legal frameworks. The best evidence of this desire to cooperate is found in the organizations that have been expressly created for this purpose. The Arctic Council (membership: Canada, Finland, Denmark, Iceland, Norway, Sweden, Russia and the United States, as well as non-state actors such as indigenous groups) is committed to cooperation between states on Arctic issues, especially environmental concerns. The Arctic Ocean Conference is another example. In May 2008, the conference produced the *Ilulissat Declaration*, according to which, "[n]otably, the law of the sea provides for important rights and obligations concerning the delineation of the outer limits of the continental shelf, the protection of the marine environment, including ice-covered areas, freedom of navigation, marine scientific research, and other uses of the sea. We remain committed to this legal framework and to the orderly settlement of any possible overlapping claims" (Arctic Ocean Conference, *The Ilulissat Declaration* (27-29 May 2008) 48 ILM 362, online: Oceanlaw.org <www.oceanlaw.org/downloads/arctic/Ilulissat_Declaration.pdf>). In addition to these multilateral organizations, bilateral groups such as the Arctic and North Working Group of the Intergovernmental Economic Commission (Russia & Canada) seek to promote trade integration and resolve disputes (Foreign Affairs, Trade and Development Canada, International Arctic Partners, online: <<http://www.international.gc.ca/arctic-arctique/partners-international-partenaires.aspx?lang=eng>>).

overlapping claims over resources and territory has been met with such a cooperative spirit by the Arctic and international communities.