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Law, Science, and the Continental Shelf: The Russian Federation and the Promise of Arctic Cooperation

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LAW, SCIENCE, AND THE CONTINENTAL SHELF: THE RUSSIAN FEDERATION AND THE PROMISE OF ARCTIC COOPERATION

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"Continental shelves make up half the Arctic ocean. Russia's Arctic shelf is the world's largest."**

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** *Arctic Ocean: The Unexpected Frontier*, NAT'L GEOGRAPHIC, May 2009 (Map Supplement).

INTRODUCTION

The Arctic Ocean is the smallest[1] and least understood[2] ocean in the world, yet it contains more than one-quarter of the earth's entire continental shelf.[3] In recent years, the United Nations Convention on the Law of the Sea ("UNCLOS" or "Convention")[4] has emerged as a powerful driver for acquiring scientific data about the Arctic continental shelf and seafloor and for encouraging new forms of scientific and diplomatic cooperation in the wild, pristine and diminishingly icy but still dangerous seascape of the Arctic Ocean.[5] This cooperation is in stark contrast to media assertions of the potential for conflict in the Arctic and to other speculation, often focusing unduly on the Russian Federation, that an unregulated race for the North Pole is underway.[6] In fact, Russia was the first State,

1. *See* Michael Pidwirny, FUNDAMENTALS OF PHYSICAL GEOGRAPHY (2006), http://www.physicalgeography.net/fundamentals/8o.html (last visited Nov. 27, 2009) (noting that the Arctic Ocean only covers about 3% of the Earth's surface area, whereas the Pacific Ocean, for example, covers about 31%); *see also* COMM. ON THE ARCTIC RESEARCH VESSEL ET AL., ARCTIC OCEAN RESEARCH AND SUPPORTING FACILITIES: NATIONAL NEEDS AND GOALS 7 (1995) (pointing out that, in spite of its small areal size, the Arctic Ocean has the world's widest continental shelves, which extend up to 1,210 km from certain points off the Siberian coastline).

2. *See* George B. Newton, *A Message From the Chair in* U.S. ARCTIC RESEARCH COMM., REPORT ON GOALS AND OBJECTIVES FOR ARCTIC RESEARCH (2005), *available at* http://www.arctic.gov/publications/usarc_2005_goals.pdf (remarking that there has been an increased research focus on the Arctic since the end of the Cold War).

3. George B. Newton, *Coming to the Arctic: Oil, Ships, and UNCLOS Plus Risk and Research in* INTERNATIONAL ENERGY POLICY, THE ARCTIC AND THE LAW OF THE SEA 321, 324 (Myron H. Nordquist et al. eds., 2005).

4. United Nations Convention on the Law of the Sea, Dec. 6, 1982, 1833 U.N.T.S. 3 [hereinafter UNCLOS].

5. *See generally* Nat'l Snow & Ice Data Ctr., http://nsidc.org/arcticseaice news/ (last visited Nov. 27, 2009) (charting the rapid and unexpected decline in the extent and thickness of Arctic Sea ice which, along with other natural drivers, has increased access to the seafloor and resulted in an increase in the amount of available data pertaining to the arctic region). On the challenges and dangers posed by an ice-diminished Arctic Ocean, see generally ARCTIC COUNCIL, ARCTIC MARINE SHIPPING ASSESSMENT 2009 REPORT (2009).

6. *See, e.g.*, Arctic Thaw Presents New Chance for Conflict, N.Y. TIMES, Jan. 29, 2009, *available at* http://www.nytimes.com/2009/01/29/world/europe/29iht-arctic.1.19773378.html (last visited Nov. 27, 2009) (describing a gathering of NATO commanders and lawmakers in Reykjavik, Iceland to discuss concerns over

Arctic or otherwise, to submit information under internationally agreed procedures to the Commission on the Limits of the Continental Shelf ("CLCS" or "Commission"), a review body of scientists created under the Convention.[7] This article demonstrates how UNCLOS has provided Russia and its Arctic neighbors with a legal framework for scientific and diplomatic cooperation that can extend beyond mapping the Arctic continental shelf. It also underlines the fundamental reliance of law on science in the continental shelf mapping process, showing how recent mapping efforts have contributed to the unprecedented availability of information about the nature and history of the Arctic Ocean.[8] In

new standoffs in the Arctic Circle); C.J. Chivers, *Eyeing Future Wealth, Russians Plant the Flag on the Arctic Seabed, Below the Polar Cap*, N.Y. TIMES, Aug. 3, 2007, at A8, *available at* http://query.nytimes.com/gst/fullpage.html?res=9C07E2DB1630F930A3575BC0A9619C8B63 (speculating that securing the rights to the resources of the Arctic seabed, around which Canada, Denmark, Norway, Russia, and the United States have territory, could be the key to future national wealth and power).

7. *See* UNCLOS, *supra* note 4, Annex II (stating that the States Parties elect experts from the fields of geology, geophysics, or hydrography to serve on the twenty-one-member Commission). *See generally* Ted L. McDorman, *The Role of the Commission on the Limits of the Continental Shelf: A Technical Body in a Political World*, 17 INT'L J. MARINE & COASTAL L. 301, 312 (2002) (noting that, unlike international courts, the Commission is not an arbitrator of inter-state "lines in the water" disputes, but rather serves an advisory function for States regarding the application of Article 76); Betsy Baker, *States Parties and the Commission on the Limits of the Continental Shelf*, *in* LAW OF THE SEA, PROTECTION OF THE MARINE ENVIRONMENT AND SETTLEMENT OF DISPUTES: LIBER AMICORUM JUDGE THOMAS A. MENSAH 669, 680-86 (Tafsir Malik Ndiaye & Rüdiger Wolfrum eds., 2007) (discussing the absence of legal expertise on the Commission as a potential source of questions as to the precise legal effect of its recommendations).

8. *See* LARRY A. MAYER & ANDREW A. ARMSTRONG, UNIV. OF N.H. CTR. FOR COASTAL AND OCEAN MAPPING, JOINT HYDROGRAPHIC CTR. CRUISE REPORT: USCGC ICEBREAKER *HEALY* (WAGB-20) U.S. LAW OF THE SEA CRUISE TO MAP THE FOOT OF THE SLOPE AND 2500-M ISOBATH OF THE U.S. ARCTIC OCEAN MARGIN 3 (2008) [hereinafter CCOM/JHC REPORT] (noting that the *HEALY* 08-05 voyage to map the seafloor on the Chukchi Cap not only helps identify where the United States may extend its continental shelf under UNCLOS, but also generates data for understanding processes, habitats, and climate models, which may, in turn, lead to a fuller understanding of how the Arctic is changing); *see also* Deborah R. Hutchinson et al., *Acquiring Marine Data in the Canada Basin, Arctic Ocean*, 90 EOS 197, 197-98 (2009) (stating that the UNCLOS gives coastal nations incentives to work together to address the difficulties associated with collecting geophysical data in the ice-covered Arctic); Larry Mayer et al., *Challenges of Collecting Law of the Sea Data in the Arctic in* INTERNATIONAL ENERGY POLICY, THE ARCTIC AND THE LAW OF THE SEA 125, 126 (Myron H. Nordquist et al. eds., 2005) (explaining

doing so, it examines how lawyers and scientists approach the same treaty provisions from their respective disciplinary perspectives. The article concludes by considering how recent U.S. and Russian statements of national policy regarding the Arctic, and how nurturing joint scientific projects there, can strengthen science and international cooperation in the region.

The five states with potential extended continental shelf above the Arctic Circle[9]—Canada, Denmark on behalf of Greenland, Norway, Russia, and the United States—are actively mapping the Arctic Ocean continental shelf as part of delimiting their respective shelves in accordance with Article 76 of the Convention.[10] The sheer breadth of the Arctic continental shelf is strikingly evident in the International Bathymetric Chart of the Arctic Ocean ("IBCAO").[11] Itself a product of international scientific cooperation in preparation for Article 76 mapping, the IBCAO renders with immediate clarity the most arresting features of Arctic Ocean bathymetry, such as the Lomonosov, Alpha-Mendeleev, and Gakkel Ridges.[12]

Under the Convention, a coastal State has exclusive sovereign rights to explore and exploit the natural resources of its continental shelf.[13] Within 200 nautical miles ("nm") from its territorial sea baseline, the State is automatically entitled to exercise these rights without taking further action even if the physiographic shelf does not

that the UNCLOS requires States seeking an extended continental shelf to measure "the absolute depth of the seafloor . . . the shape of the seafloor . . . the distance from the territorial baseline, and the thickness of the sediment column" in order to establish a claim).

9. *See* Arctic Monitoring and Assessment Programme, Geographical Coverage, http://www.amap.no (follow "Geographical Coverage" hyperlink) (last visited Nov. 29, 2009) (defining the Arctic Circle as roughly north of 66 degrees, 32 minutes latitude, but recognizing that different entities may differ about the exact demarcation of the region).

10. *See* UNCLOS, *supra* note 4, art. 76(1) (defining the continental shelf as "the seabed and subsoil of the submarine areas that extend beyond [a coastal State's] territorial sea throughout the natural prolongation of its land territory to the outer edge of the continental margin").

11. *See infra* Appendix, fig.1.

12. *See infra* Part VI, notes 121-131 (discussing IBCAO as a collaborative effort to exchange data in preparation for Article 76 mapping).

13. *See* UNCLOS, *supra* note 4, art. 77(1)-(2) (providing that no one may explore or exploit the natural resources of a coastal State's continental shelf without the express consent of that coastal State, even if that coastal State is not exercising its own right to do so).

extend that far.[14] Beyond 200 nm, a State may provide scientific evidence to establish the extent of the legally defined continental shelf in order to exercise the same rights.[15] That extent is determined in part by measuring the "natural prolongation" of a coastal State's land territory under water.[16] The shelf beyond 200 nm is sometimes referred to as the "extended continental shelf,"a term of convenience that does not appear in the treaty.

Each State has ten years from the date the Convention entered into force for that State to make a submission to the Commission.[17] Of the five Arctic coastal States, Russia[18] and Norway[19] have met their deadlines and also received recommendations[20] from the Commission, while Canada and Denmark on behalf of Greenland have until 2013 and 2014, respectively.[21] As a non-party, the United States will not face a deadline until it accedes to the Convention.[22]

14. *See id.* arts. 76(1), 76(4), 77.

15. *Id.* art. 76(4).

16. *Id.* art. 76(1).

17. UNCLOS, *supra* note 4, Annex II, art. 4.

18. Comm'n on the Limits of the Cont'l Shelf (CLCS), Outer Limits of the Continental Shelf Beyond 200 Nautical Miles from the Baselines: Submission by the Russian Federation, Ref. No. CLCS 01.2001.LOS (Dec. 20, 2001), *available at* http://www.un.org/Depts/los/clcs_new/submissions_files/submission_rus.htm [hereinafter Russ. CLCS Submission].

19. Comm'n on the Limits of the Cont'l Shelf (CLCS), Outer Limits of the Continental Shelf Beyond 200 Nautical Miles from the Baselines: Submission by the Kingdom of Norway, Ref. No. CLCS.07.2006.LOS (Nov. 26, 2006), *available at* http://www.un.org/Depts/los/clcs_new/submissions_files/submission_nor.htm [hereinafter Nor. CLCS Submission].

20. *See* The Secretary-General, *Report of the Secretary-General on the Oceans and the Law of the Sea*, ¶¶ 38-41, *delivered to the General Assembly*, U.N. Doc. A/57/57/Add.1 (Oct. 8, 2002) [hereinafter Sec'y Gen. Report]; Recommendations of the Commission on the Limits of the Continental Shelf in Regard to the Submission Made by Norway in Respect of Areas in the Arctic Ocean, the Barents Sea and the Norwegian Sea on 27 November 2009 (adopted Mar. 27, 2009), *available at* http://www.un.org/Depts/los/clcs_new/submissions_files/nor06/nor_rec_summ.pdf.

21. *See* Multilateral Treaties Deposited with the Secretary-General, Law of the Sea, United Nations Convention on the Law of the Sea, *available at* http://treaties.un.org/Pages/ViewDetailsIII.aspx?&src=TREATY&mtdsg_no=XXI~6&chapter=21&Temp=mtdsg3&lang=en [hereinafter UNCLOS Ratifications] (listing the dates on which the Convention entered into force as: June 24, 2006 for Norway; March 12, 1997 for Russia; November 7, 2003 for Canada; and November 16, 2004 for Denmark).

22. States not party to Convention may not make submissions to the CLCS. As

Nonetheless, the United States commissioned a 2002 study on the potential for extending its shelf, prepared by the Center for Coastal and Ocean Mapping/Joint Hydrographic Center at the University of New Hampshire ("CCOM/JHC"),[23] which has gathered over a million square kilometers of bathymetric data since 2003.[24]

One significant reason states are interested in mapping the continental shelf is that Article 77 of the Convention gives them exclusive sovereign rights "for the purpose of exploring it and exploiting" the living and non-living resources of their portion of the shelf's seabed and subsoil.[25] Non-living resources include gas and oil, gas hydrates and minerals, and living resources include bottom dwelling "sedentary" species such as clams and chemo-synthetic communities such as black smokers.[26] The sovereign rights articulated in Article 77 do not extend to resources in the water

of November 2009, the United States had not acceded to the treaty, which President Bill Clinton first transmitted to the Senate for advice and consent on October 7, 1994, together with the 1994 Agreement relating to the Implementation of Part XI of the U.N. Convention on the Law of the Sea (signed July 29, 1994). The U.S. Senate Committee on Foreign Relations has recommended accession to the treaty on three separate occasions. Despite widespread support by all branches of the U.S. armed services, environmental, and industry groups, all three times a vote of the full Senate has been blocked by a handful of Senators. *See, e.g.*, Michael J. Mattler, *The Law of the Sea Convention: A View from the U.S. Senate*, in INTERNATIONAL ENERGY POLICY, THE ARCTIC AND THE LAW OF THE SEA 33, 33 (Myron H. Nordquist et al. eds., 2005).

23. LARRY A. MAYER ET AL., UNIV. OF N.H. CTR. FOR COASTAL AND OCEAN MAPPING, JOINT HYDROGRAPHIC CTR., THE COMPILATION AND ANALYSIS OF DATA RELEVANT TO A U.S. CLAIM UNDER UNITED NATIONS LAW OF THE SEA ARTICLE 76: A PRELIMINARY REPORT (2002), *available at* http://ccom.unh.edu/publications /Mayer_02_Compilation_analysis_data_relevant_to_UNCLOS_76.pdf [hereinafter CCOM/JHC Article 76 Report].

24. U.S. Dep't. of State, U.S. Extended Continental Shelf Project, http://www.state.gov/g/oes/continentalshelf/index.htm (last visited Nov. 29, 2009) (noting that Congress and National Ocean and Atmospheric Administration ("NOAA") have funded twelve JHC Arctic Ocean research cruises between 2003 and 2009, most recently in August-September 2009). The inter-agency U.S. Extended Continental Shelf Task Force, chaired by the Department of State, oversees the mapping process for all U.S. coastal areas. *See* U.S. Dep't of State, Ocean and Polar Affairs, http://www.state.gov/g/oes/ocns/opa/ (last visited Nov. 29, 2009).

25. UNCLOS, *supra* note 4, art. 77(1) (emphasis added).

26. *Id.* art. 77(4) (defining "sedentary" organisms as those which are "immobile on or under the seabed or unable to move except in constant physical contact with the seabed or the subsoil" at the stage of harvest).

column such as fish stocks, which are covered under a separate regime for the Exclusive Economic Zone established under Part V of the Convention.[27] Nor do the continental shelf rights, which by the terms of Article 77 are for the specific purpose of exploring and exploiting resources, amount to full sovereignty or even to a greater jurisdiction over the area such as is enjoyed in territorial waters.[28] Under the maritime zones elaborated in UNCLOS, all States enjoy certain navigational, research (with coastal State permission) and other rights over and on the continental shelf of a coastal State, which may, in some instances, be overlain by High Seas.[29]

A 2008 survey conducted by the U.S. Geological Survey estimated that up to a third of the world's remaining and technically recoverable hydrocarbon reserves may be located north of the Arctic Circle.[30] A 2009 analysis of that survey concluded that the majority of such reserves are located offshore under less than 500 meters of water.[31] These observations suggest that many reserves likely occur well within areas already clearly subject to respective national jurisdictions, rendering the outcome of the extended continental shelf mapping relatively unimportant when it comes to any "new" hydrocarbon resources being allocated to any Arctic States as a result of the Article 76 process. They also render inapposite many of the arguments fueling misconceptions that a new "gold rush" or "cold war" is imminent between the five northern circumpolar states.

27. *Id.* arts. 55-75 (setting forth the legal regime governing the "exclusive economic zone," which is the area adjacent to, and not more than 200 nm beyond the baselines from which the breadth of the territorial sea is measured).

28. *Compare id.* art. 77(1)-(2) (giving coastal States exclusive rights over the continental shelf, but limiting these rights to exploration and exploitation of natural resources), *with id.* art. 2 (providing that the sovereignty of a coastal State over the territorial sea extends to air space over the territorial sea and the seabed and subsoil, limited only by the Convention and international law).

29. *See, e.g.*, *id.* art. 90 ("Every State, whether coastal or land-locked, has the right to sail ships flying its flag on the high seas.").

30. *See* Donald L. Gautier et al., *Assessment of the Undiscovered Oil and Gas in the Arctic*, 324 SCIENCE 1175, 1176 (2009) (specifying that U.S. Geological Survey estimated that the arctic region contains 13% of the world's undiscovered oil resources and 30% of the world's undiscovered natural gas resources). *See generally* U.S. Geological Survey Fact Sheet 2008-3049 (Peter H. Stauffer ed. 2008), *available at* http://pubs.usgs.gov/fs/2008/3049/fs2008-3049.pdf (providing the raw data of the study in graphical form divided into various types of natural resources).

31. Gautier et al., *supra* note 30, at 1175.

I. THE IRRELEVANCE OF FLAGS AND THE IMPORTANCE OF ACCESSION

In 2001, recognizing the legal certainty and legitimacy that the CLCS process would bring to its rights over the extended continental shelf, the Russian Federation became the first state[32] to file a submission with the Commission.[33] The submission covered areas of the continental shelf in the Central Arctic Ocean, as well as the Barents Sea, the Bering Sea, and the Sea of Okhotsk.[34] In 2002, Russia also became the first state to receive a recommendation—a formal evaluation of its submission—from the Commission.[35] The Commission requested "a number of points of clarification" as well as more data from the Russian Federation.[36] Since then, Russia has been gathering additional data, working with its Arctic neighbors on shelf issues[37] and abiding by the Rules of Procedure[38] and Scientific

32. U.N. Div. for Ocean Aff. and the Law of the Sea, *Submissions Through the Secretary-General of the United Nations, to the Commission on the Limits of the Continental Shelf, Pursuant to Article 76, Paragraph 8, of the United Nations Convention on the Law of the Sea of 10 December 1982*, http://www.un.org/Depts/los/clcs_new/commission_submissions.htm (last visited Nov. 29, 2009) [hereinafter CLCS Submissions]. Many States outside the Arctic are also mapping under Article 76, which applies to any coastal State that is party to the Convention. The Commission had received fifty-one submissions or preliminary information from over forty States as of December 2009. *Id.* At the Commission's current rate of issuing some two recommendations per year in a nine-week session, Macnab has estimated it would take until 2059 to process all Submissions. Ron Macnab, Complications in Delimiting the Outer Continental Shelf, Presentation at The 33rd Center for Oceans and Law Policy Conference: Changes in the Arctic Environment and the Law of the Sea (May 20-22, 2009), *available at* http://www.virginia.edu/colp/pdf/Macnab-outer-continental-shelf.pdf.

33. *See* Russ. CLCS Submission, *supra* note 18; *see also* Sec'y Gen. Report, *supra* note 20, ¶ 27 (acknowledging receipt of the Russian Federation's submission on December 20, 2001).

34. Sec'y Gen. Report, *supra* note 20, at ¶¶ 38-41.

35. CLCS Submissions, *supra* note 32.

36. Russ. CLCS Submission, *supra* note 18.

37. *See generally* Elizabeth Riddell-Dixon, *Canada and Arctic Politics: The Continental Shelf Extension*, 39 OCEAN DEV. & INT'L L. 343 (2008) [hereinafter Riddell-Dixon, *Canada and Arctic Politics*]; *see also infra* Part IV.

38. *See* U.N. Comm'n on the Limits of the Continental Shelf, Rules of Procedure of the Commission on the Limits of the Continental Shelf, Part VII, U.N. Doc. CLCS/40/Rev.1 (Apr. 17, 2008) [hereinafter CLCS Rules of Procedure] (illustrating procedure for Commission's consideration of a submission).

and Technical Guidelines[39] established by the CLCS and the States Parties to the Convention.

Despite persistent and often misleading media coverage to the contrary,[40] neither Russia nor any of the four other Arctic coastal states are engaged in a "land grab" or fomenting "conflict in the Arctic." There has been a significant effort on the part of the Arctic Ocean littoral states to follow the agreed rules of international law and each state is carrying out the costly scientific research necessary to provide legal certainty as to where it will delineate its respective extended continental shelf in the Arctic.[41] Gathering sufficient data for an Article 76 submission is typically a multi-year, multi-ministry, and multi-million dollar undertaking.[42] Given the difficulties, dangers

39. U.N. Comm'n on the Limits of the Continental Shelf, Scientific and Technical Guidelines of the Commission on the Limits of the Continental Shelf, U.N. Doc. CLCS/11 (May 13, 1999) [hereinafter CLCS Scientific and Technical Guidelines].

40. *See, e.g.*, MacKenzie Funk, *Healy Mapping Mission: Arctic Landgrab*, NAT'L GEOGRAPHIC, May 2009, at 104 (portraying the current exploration of the Arctic as a competition between Canada, Denmark, Norway, Russia, and the United States). Notwithstanding the misleading implications of the title of "Arctic Landgrab," this article does an excellent job of describing the Article 76 process and detailing the work of Larry Mayer and the 2007 HEALY ECS mapping cruise in the Arctic Ocean. The numerous maps accompanying the article give a visual summary of many of the issues involved in mapping the Arctic Ocean, the diminishing arctic sea ice, and the potential for hydrocarbon and other natural resource exploitation in the region. *Id.* at 110-117.

41. *See, e.g.*, Riddell-Dixon, *Canada and Arctic Politics*, *supra* note 37; Russian Submission to the Commission on the Limits of the Continental Shelf, Map Two Legend, http://www.un.org/Depts/los/clcs_new/submissions_files/rus01/RUS_page5_Legend.pdf (last visited Nov. 29, 2009) (referring to maps published as part of the original Russian Submission to the CLCS "provisional" and "subject to more precise determination through negotiations" with neighboring States); Nor. CLCS Submission, *supra* note 19 (providing the full Submission to the Commission of Norway).

42. A number of developing countries, including Somalia, faced a May 2009 deadline to submit a claim. Recognizing that many countries lack the financial and technical resources necessary to prepare the claim, in July 2008 the General Assembly approved a special process whereby States could file a statement of preliminary information to satisfy the ten year submission deadline. *See, e.g.*, *Somalia Submits Continental Shelf Information with Norwegian Assistance*, NORWAY POST, http://www.norwaypost.no/content/view/21910/26/ (last visited Dec. 1, 2009) (reporting that Somalia, with Norwegian aid, became the first African country and the first developing country to make a preliminary submission indicating the outer limits of its continental shelf and highlighting the challenges developing coastal States face in making these submissions).

and expense of collecting relevant data in the Arctic Ocean, many states are exchanging data and, in some cases, engaging in joint missions to gather information.[43]

In February 2007, the Russian polar explorer and member of the Duma, Artur Chilingarov carried off the technically stunning feat of using a two Mir manned mini-submersibles to plant a titanium Russian Federation flag at a depth of some 4200 meters at the geographic North Pole.[44] The scientific community acknowledged this logistical and technological accomplishment for advancing funding of polar science generally, though with mixed views as to its actual scientific import.[45] Political and media voices responded more hyperbolically, some asserting a new race for the Arctic,[46] while diplomatic and scholarly sources pointed out in more measured tones that, at best, the event possessed mere symbolic value.[47]

Article 77 of UNCLOS makes clear that any potential act of occupation such as flag planting has no legal significance with respect to coastal States' "sovereign rights" over their continental shelves, which are exercised and exist independently of any statement or physical gesture and as a matter of right. As stated in

43. *See infra* Part IV.

44. *See Russia Plants Flag Under N. Pole*, BBC NEWS, Aug. 2, 2007, http://news.bbc.co.uk/2/hi/europe/6927395.stm (noting that unless the explorers navigated back to the exact spot of their descent, they risked being trapped underneath the Arctic ice sheet); *Arthur Chilingarov: Russia's Arctic Explorer*, MOSCOW NEWS, July 17, 2008, http://www.mnweekly.ru/interview/20080717/55338262.html (interview) (comparing Russia's flag planting at the North Pole to the United States' placing its flag on the Moon after the 1969 landing).

45. *See, e.g.*, Tom Parfitt, *Profile: Artur Chilingarov, Russia's Polar Hero*, 324 SCIENCE 1382, 1384 (2009) (observing that one polar expert has said, "you can't determine anything with a single bucket of mud from the Pole").

46. *See* Chivers, *supra* note 6 (noting Russia's renewed energy to engage in the "international competition" for extraction rights in the polar region).

47. *See* Evan Bloom, U.S. Dep't of State, Remarks at the Third Symposium on the Impacts of an Ice-Diminishing Arctic on Naval and Maritime Operations at Annapolis, Maryland (June 11, 2009) (remarking that it is often overlooked that Chilingarov planted the flag during an expedition to gather bathymetric data for Submission to the CLCS); Richard A. Lovett, *Russia Plants Underwater Flag, Claims Arctic Seafloor*, NAT'L GEOGRAPHIC NEWS, Aug. 3, 2007, http://news.nationalgeographic.com/news/2007/08/07/070802-russia-pole.html (quoting Viktor Posyolov, deputy director of Russia's Institute of World Ocean Geology and Mineral Resources, saying that the planting of the Russian flag "means nothing" from a legal standpoint).

Article 77(3): "The rights of the coastal State over the continental shelf do not depend on occupation, effective or notional, or on any express proclamation."[48]

On what, then, do the rights of the coastal State over the continental shelf depend? Beyond 200 nm, under the Convention they depend in part on solid scientific data and "interpretation of the bathymetry, geology, and nature of the seafloor in a region."[49] States use such data to establish "the outer edge of the continental margin," the appurtenance of areas mapped to the State's land territory,[50] and the limits beyond which the continental shelf may not extend under Article 76.[51] A State Party to the Convention submits its data to the Commission, which comprises twenty-one experts in geology, geophysics, or hydrography.[52] Commissioners are elected by the States Parties with an eye to "equitable geographic representation," but the Commissioners must "serve in their personal capacities."[53] As of December 2009, two of the five Arctic coastal States, Russia and Norway, had members on the CLCS.[54] Article 76 provides that if a State uses the Commission recommendations as the basis of its published continental shelf limits, those limits are "final and binding."

A state that is not party to the Convention need not submit data to the Commission in order to establish the outer limits of its extended continental shelf. However, the absence of the Commission's imprimatur is one basis for other states to call into question any state's assertion of extended continental shelf rights. The fact that

48. UNCLOS, *supra* note 4, art. 77(3).

49. *See* CCOM/JHC REPORT, *supra* note 8, at 8.

50. *See* CLCS Scientific and Technical Guidelines, *supra* note 39, para. 2.1.2. (stating that the test of appurtenance consists in demonstrating that the natural prolongation of a coastal State's land territory to the outer edge of the continental margin extends beyond a line delineated 200 nm from the baselines used to measure the breadth of the territorial sea).

51. *See infra* Part II, notes 64-84 (discussing these technical concepts in relation to the Article 76 mapping basics).

52. UNCLOS, *supra* note 4, Annex II, art. 2.

53. *Id.* Annex II, art. 2(1).

54. *See* Commission on the Limits of the Continental Shelf, Members of the Commission, *available at* http://www.un.org/Depts/los/clcs_new/commission_members.htm#Members (last visited Dec. 1, 2009) (showing current membership, elected in June 2007 for a term of five years).

non-parties may not make a submission to the CLCS[55] is emphasized by proponents of U.S. accession to UNCLOS. Although the United States is actively mapping in anticipation of joining the Convention, it must also plan for the event of non-accession. Absent membership, the United States could proceed to publish what it considers to be the outer limits of its continental shelf beyond 200 nm and rely on the less secure foundation of customary international law to support those assertions.

II. HOW SCIENCE AND LAW APPROACH ARTICLE 76 MAPPING

The observation that scientists, policymakers, and lawyers—even while working together—take different approaches to understanding natural phenomena is not new, either generally[56] or in the Polar Regions.[57] In some respects, the history of modern multilateral environmental agreements[58]and certainly that of modern ocean management[59] could be written as the story of scientists, lawyers, and

55. ILA, *Legal Issues of the Outer Continental Shelf*, 72 INT'L L. ASS'N REP. CONF. 215 (2006) [hereinafter ILA Second Report] (Conclusion 16: "the right to make a submission to the CLCS, and the concomitant right to establish final and binding outer limits on the basis of the recommendations of the Commission, only exist for States Parties to the Convention"); *see also* ILA, *Legal Issues of the Outer Continental Shelf*, 71 INT'L L. ASS'N REP. CONF. 2773 (2006) [hereinafter ILA First Report] (same).

56. For example, the 1958 Geneva Convention on the Continental Shelf also gave rise to different physical and legal understandings of the continental shelf. *See* Convention on the Continental Shelf art. 1, Apr. 29, 1958, 15 U.S.T. 471, 499 U.N.T.S. 311; G. Etzel Pearcy, *The Continental Shelf: Physical vs. Legal Definition*, 3 CAN. GEOGRAPHER 26 (1961) (comments by the Office of the Geographer, U.S. Department of State).

57. Cf. NAT'L RES. COUNCIL, SCIENCE AND STEWARDSHIP IN THE ANTARCTIC 2 (1993) (recommending improvements in scientific monitoring programs to bring them more in line with the Antarctic Treaty's Protocol on Environmental Protection).

58. *See, e.g.*, KATE O'NEILL, INTERNATIONAL RELATIONS AND THE ENVIRONMENT 63-66, *passim* (2009) (providing an extensive bibliography of literature relevant to the interactions between law, science, and policy in shaping international approaches to addressing environmental concerns); Volker Röben, *Institutional Developments Under Modern International Environmental Agreements*, 4 MAX PLANCK Y.B. U.N. L. 363, 394 (2000) ("In order to assist States Parties to make complex trade-offs between scientific uncertainties and political judgments, many international environmental agreements have established a subsidiary body on scientific, technological and technical advice.").

59. YOSHIFUMI TANAKA, A DUAL APPROACH TO OCEAN GOVERNANCE: THE

policymakers attempting to describe and regulate an environmental concern, translating their disciplines for one another with varying degrees of success. Changes in technology and scientific understanding of the natural phenomena a treaty attempts to regulate will necessarily impact how effectively the Convention can be implemented. In the case of Article 76 mapping, much has been learned about the relationship between the ocean floor and the continental shelf since UNCLOS was opened for signature in 1982,[60] in part because of the advances in the technology used to map the world's oceans.[61] By necessity, lawyers, scientists, and policymakers involved in Article 76 mapping educate each other about how these changes affect implementation of the Convention,[62] and about how their respective disciplines approach the Convention and its requirements.[63]

CASES OF ZONAL AND INTEGRATED MANAGEMENT IN INTERNATIONAL LAW OF THE SEA 209 (2008) ("It is no exaggeration to say that marine scientific research is a foundation of ocean governance.").

60. *See, e.g.*, Bernard Coakley & Betsy Baker, *Mapping for Advocacy - Using Marine Geophysical Data to Establish the Limits of Extend Continent Shelves Under the Convention on the Law of the Sea*, 89 EOS TRANS. AGU Fall Meeting Supp., Abstract GC33B-0780 (2008) (stating that, since the signing of the Convention in 1982, the "distinction between continental and ocean crust has been blurred by a complex array of hybrids that complicate this determination (eg. [sic] oceanic plateaus, hyper-extended continental crust, etc.)" requiring the mapping process to "somehow reconcile the great diversity of seafloor structure and composition that has been recognized with the simplistic language of the treaty itself").

61. *See id.* ("Article 76 was written at a time when narrow-beam bottom sounder data was the primary bathymetric mapping tool. As a result it was built on a remarkably simplistic view of the seafloor that has been completely overturned by the swath bathymetric data collected over the last two decades.").

62. *See generally* McDorman, *supra* note 7 (discussing the role of the Commission as a scientific body in what is essentially a political process). There is a burgeoning number of fora in which lawyers and scientists come together to discuss Article 76. In 2009 alone, representative gatherings in the United States included: "Changes in the Arctic Environment and the Law of the Sea," the 33rd annual conference of The Center for Oceans Law and Policy ("COLP") of the University of Virginia School of Law, May 20-22, 2009, in Seward, Alaska; the Third Symposium on the Impacts of an Ice-Diminishing Arctic on Naval and Maritime Operations, June 9-11, 2009, at the U.S. Naval Academy, Annapolis, MD; and "Mounting Tensions and Melting Ice: Exploring the Legal and Political Future of the Arctic" hosted by the Vanderbilt Journal of Transnational Law, February 6, 2009, in Nashville, TN.

63. *See generally* Chris M. Carleton et al., *The Practical Realization of the Continental Shelf Limit*, *in* CONTINENTAL SHELF LIMITS 268 (Peter J. Cook & Chris M. Carleton eds., 2000) (detailing the scientific techniques available to delineate the outer limits of the continental shelf under Article 76).

At a very basic level, States mapping the continental shelf beyond 200 nm are attempting to show how far out their land mass extends underwater, by locating what the Convention calls "the outer edge of the continental margin."[64] To do so, a State must first demonstrate that the areas mapped are appurtenant to the State's continental land mass.[65] If it satisfies this test of appurtenance,[66] the State may then locate the edge of the continental margin.[67] It does this by finding the "foot of the continental slope," which involves drawing lines between fixed points that are located a certain distance beyond the slope under one of two formulae set out in Article 76.[68] Next, the State must apply constraint lines to the areas so mapped, so that its continental shelf beyond 200 nm does not extend indefinitely.[69] If the coastal State meets these three steps, it may then delimit its continental shelf beyond 200 nm.[70]

These Convention terms of art—"outer edge of the continental margin" and "foot of the continental slope," as well as "submarine ridges" and "submarine elevations"—are juridical constructs used by those who drafted the treaty to give legal designations to the natural features of the continental shelf and ocean floor.[71] These legal terms

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

65. U.N. DIV. FOR OCEAN AFF. AND THE LAW OF THE SEA, 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, at I-26, U.N. Sales No. E.06.v4 (2006) [hereinafter TRAINING MANUAL].

66. CLCS Scientific and Technical Guidelines, *supra* note 39, para. 2.2.2. (defining "test of appurtenance" as the process for examining how a coastal State establishes the outer edge of the continental margin to determine its legal entitlement to the extended continental shelf under art. 76(4)).

67. *Id.*

68. UNCLOS, *supra* note 4, art. 76(4)(i)-(ii). To create both formulae lines, the fixed points located in this manner are connected in 60 nm intervals. *Id.* The first prong of Article 76(4) describes the so-called Gardiner formula, which results in points being located where the sediment thickness is 1% of the distance back to the foot of the slope. *Id.* art. 76(4)(a)(i). The simpler Hedberg formula found in the second prong of Article 76 locates points 60 nm from the foot of the slope. States may combine the points resulting from these two lines to their advantage. *Id.* art. 76(4)(a)(ii).

69. TRAINING MANUAL, *supra* note 65, at I-26.

70. CLCS Scientific and Technical Guidelines, *supra* note 39, para. 2.2.3.

71. *See* TRAINING MANUAL, *supra* note 65, at I-13, I-14 (noting that UNCLOS's legal designations grew out of State practice and represent a balance between States' divergent interests in simultaneously affirming their rights to areas

do not always comport with how scientists understand those natural features.[72] For example, under Article 76, the continental margin "comprises the submerged prolongation of the land mass of the coastal State, and consists of the seabed and subsoil of the shelf, the slope and the rise."[73] The Convention subsumes those three elements—the shelf, slope, and rise—into one legally defined term: the continental shelf.[74] Scientists, on the other hand, have traditionally separated the three elements and considered the continental shelf to be just one component of the margin.[75] Figure 2 in the Appendix depicts these different physiographic and legal approaches to the continental shelf.[76]

Locating the "foot of the continental slope" helps to delineate the outer limits of a coastal State's extended continental shelf.[77] Geologists, geophysicists, and hydrographers who map the ocean and interpret data gathered on mapping expeditions work to provide the bright lines and individual points that the Convention encompasses with the legal term "foot of the continental slope."[78] To assist them,

beyond the territorial sea based on the adjacency of the continental shelf to their land territory and preventing interference with traditional governance of the high seas).

72. *See, e.g.*, *id.*, at I-10 (stating that although the legal regime draws on scientific concepts, it adopts more expansive definitions in order to accommodate the interests of States with continental shelves of varying sizes).

73. UNCLOS, *supra* note 4, art. 76(3).

74. *Id.*, art. 76(1) (identifying the continental shelf as a unified "natural prolongation" of land territory).

75. *See* TRAINING MANUAL, *supra* note 65, at I-11 (explaining that the scientific definition of "continental shelf" encompasses the "relatively flat and shallow . . . submerged part of the continent," which extends to the continental slope).

76. *See infra* Appendix, fig.2; *see also, e.g.*, SUZETTE V. SUAREZ, THE OUTER LIMITS OF THE CONTINENTAL SHELF: LEGAL ASPECTS OF THEIR ESTABLISHMENT 239-252 (2008) (discussing differences in the legal and scientific understandings of the continental shelf).

77. In paragraph 5.1.1., the CLCS Scientific and Technical Guidelines provide: "The Commission recognizes that the foot of the continental slope is an essential feature that serves as the basis for entitlement to the extended continental shelf and the delineation of its outer limits." CLCS Scientific and Technical Guidelines, *supra* note 39, para. 5.1.1.

78. *See* Carleton et al., *supra* note 63, at 271 ("Clearly, there is no 'exact' foot of the slope; there is, rather, a zone in which judgment must be applied to determine the most likely location of the feature which is taken to mark the edge of the continent.").

the CLCS Scientific and Technical Guidelines ("Guidelines") aim to clarify the Commission's interpretations of the Convention's "scientific, technical and legal terms."[79] For example, Article 76(4) of the Convention provides: "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."[80] The Guidelines elaborate, stating that the "identification of the region defined as the base of the continental slope" is one of "the fundamental requirements posed" by Article 76(4), locating the point of maximum change in gradient at the base is the other.[81]

"Natural prolongation" and the "test of appurtenance" are two more legal terms contained in or arising from the Convention that scientists had not typically applied to the shelves and seafloors of the world's oceans. Article 76(1) defines the continental shelf of a coastal State as comprising "the seabed and subsoil of the submarine areas that extend beyond its territorial sea throughout the natural prolongation of its land territory to the outer edge of the continental margin."[82] The Guidelines note that Article 76(4)(a)

> suggests the formulation of a test of appurtenance in order to entitle a coastal State to extend the outer limits of the continental shelf beyond the limit set by the 200-nautical-mile distance criterion. This test consists in the demonstration of the fact that the natural prolongation of its land territory to the outer edge of the continental margin extends beyond a line delineated at a distance of 200 nautical miles from the baselines from which the breadth of the territorial sea is measured.[83]

The relationship of the natural prolongation to the test of appurteancne to each other and to the Russian submission to the Commission is explored below.

79. CLCS Scientific and Technical Guidelines, *supra* note 39, para. 1.3.

80. UNCLOS, *supra* note 4, art. 76(4)(b).

81. CLCS Scientific and Technical Guidelines, *supra* note 39, at para. 5.1.3. (emphasis added).

82. UNCLOS, *supra* note 4, art.76(1) (emphasis added).

83. CLCS Scientific and Technical Guidelines, *supra* note 39, para. 2.1.2.

III. THE 2001 RUSSIAN FEDERATION SUBMISSION TO THE CLCS

When combined with data being gathered as part of the Article 76 process, the test of appurtenance is especially relevant in the Arctic Ocean, where the Russian Federation, Denmark, and Canada are each attempting to show that the Lomonosov Ridge is a natural prolongation of its respective land mass.[84] The Lomonosov Ridge effectively bisects the Arctic Ocean, separating the Amerasian Basin from the Eurasian Basin.[85] The Russian Federation, in its submission to the CLCS in 2001, asserted some degree of appurtenance of the Lomonosov Ridge to its continental land mass.[86] If the Lomonosov Ridge is deemed appurtenant, the question still remains as to whether it is a submarine ridge subject to the 350 nm cutoff discussed above in Part II or whether, as would favor Russia, it is a submarine elevation.[87]

As is the case with most submissions, at the time of Russia's 2001 submission relatively few details were known about it because the Article 76 process is largely confidential. All meetings are held in private unless the Commission decides otherwise.[88] As to the States' submissions, the Rules of Procedure require that the Commission make public only the Executive Summary that States are required to

84. *See, e.g.*, U.N. Comm'n on the Limits of the Continental Shelf , Statement Made by the Deputy Minister for Natural Resources of the Russian Federation During Presentation of the Submission Made by the Russian Federation to the Commission, Made on 28 March 2002, U.N. Doc. CLCS/31, at 4-6 (Apr. 5, 2002) (stressing that the categorization of the Lomonosov Ridge is "of fundamental importance" to Russia's submission to the CLCS); Nele Matz-Lück, *Planting the Flag in Arctic Waters: Russia's Claim to the North Pole*, 1 GÖTTINGEN J. INT'L L. 235, 250 (2009) (emphasizing correctly that there is "no broad consensus in the Arctic geoscientific community whether or not elevations such as the Lomonosov Ridge are natural prolongations").

85. *See infra* Appendix, fig.1.

86. *See* Russ. CLCS Submission, *supra* note 18, Map 2.

87. On the Russian submission generally, see Ron Macnab & Lindsay Parson, *Continental Shelf Submissions: The Record to Date*, 21 INT'L J. MARINE & COASTAL L. 309 (2006). *See also* Matz-Lück, *supra* note 84, at 250 ("Russia emphasizes the qualification of the Lomonosov and Alpha-Mendeleev Ridge as 'submarine elevations' and not as 'submarine ridges.'").

88. *See* CLCS Rules of Procedure, *supra* note 38, R. 23 (private meetings); *id.* Annex II, para. 4.2. (allowing a State to classify "any data and other material[] not otherwise publicly available that it submits in accordance with" the CLCS Rules of Procedure and Commission proceedings as private and confidential).

provide, including relevant charts and coordinates.[89] With respect to the Commission's own recommendations, it must make public a summary, which "shall not contain information which might be of a confidential nature and/or which might violate the proprietary rights of the coastal State" to data and information submitted; further the recommendation summary need contain only minimal references to those parts of the Commission recommendations "related to" the limits eventually deposited by the State under Article 76(9).[90] Critics have suggested that this lack of transparency diminishes the credibility of the Article 76 process.[91]

In its recommendation responding to Russia's 2001 submission, the Commission requested more data with respect to the Central Arctic Ocean, and recommended that Russia revise its submission accordingly for later consideration.[92] In addition, five states—Canada, Denmark, Japan, Norway, and the United States—filed responses to the Secretary General's published executive summary of the Russian submission.[93] The U.S. Notification rejected out of hand any possibility that the Lomonosov Ridge could be a natural prolongation, even though the ridge will not be of any direct significance to any possible U.S. submission. The U.S. Notification stated summarily that "[t]he ridge is a freestanding feature in the deep, oceanic part of the Arctic Ocean basin, and not a natural component of the continental margins of either Russia or any other

89. *Id.* R. 50.

90. CLCS Rules of Procedure, *supra* note 38, Annex III, Part V, para. 11(3); *id.* R. 54.

91. *See* Ron Macnab, *The Case for Transparency in the Delimitation of the Outer Continental Shelf in Accordance with UNCLOS Article 76*, 35 OCEAN DEV. & INT'L L. 1, 11, 14-16 (2004) (recommending the use of procedures that encourage States to make public even more information as part of their submissions to the CLCS in order to quell skepticism of the submission process).

92. *See* Sean D. Murphy, *Contemporary Practice of the United States Relating to International Law, U.S. Reaction to Russian Continental Shelf Claim*, 96 AM. J. INT'L L. 969, 970 (2002). As of November 2009, Russia had not yet filed the revised Submission.

93. *See* Russ. CLCS Submission, *supra* note 18; *see also* Matz-Lück, *supra* note 84, at 249 (detailing further other states' responses, none of which addressed the substance of Russia's submission to the extent the U.S. response did).

State."[94] It also questioned Russian assertions with respect to the nature of the Alpha-Mendeleev Ridge.[95]

Developments since publication of the Russian submission, the CLCS recommendation, and the U.S. response indicate how Article 76 mapping is making possible new understandings of the Arctic Ocean continental shelf, and how policymakers rely fundamentally on science in the Article 76 process, whether making submissions or responding to them. Notwithstanding the U.S. Notification in 2002, Russia has continued to gather data in the Central Arctic Ocean, presumably some of which it hopes will support its position that the Lomonosov Ridge is a natural prolongation of Russian land territory. Canada and Denmark have since carried out joint seismic surveys in the area to try to establish appurtenance between the Lomonosov Ridge and Canada and Greenland, respectively.[96] Russia and Canada are exchanging data on related issues.[97] In 2003, Russia organized an international conference on the question of ridges, again driving scientific exchange[98] and, at a 2007 meeting, shared charts, maps, and data from its 2001 submission with scientists from Canada and Denmark, thereby giving them access to information that was otherwise confidential under the processes outlined above.[99] While the United States has not offered any official comments amending its

94. *United States of America: Notification Regarding the Submission Made by the Russian Federation to the Commission on the Limits of the Continental Shelf*, U.N. Ref. CLCS.01.2001.LOS/USA, at 3 (Mar. 18, 2002) [hereinafter U.S. Notification]; *see also* U.S ARCTIC RES. COMM'N, ANNUAL REPORT FISCAL YEAR 2002, at 12 (2002), *available at* http://www.arctic.gov/publications/usarc_2002_annual.pdf ("Art Grantz and [Gary] Brass [then Executive Director, U.S. Arctic Research Commission] felt some of the Russian claim was not justified by the science and this was conveyed to the State Department.").

95. U.S. Notification, *supra* note 94, at 3.

96. Nat. Resources Can., *Using Science to Delineate the Limits of Canada's Continental Shelf*, at 2, *available at* http://cgc.rncan.gc.ca/org/atlantic/pdf/unclos_e.pdf.

97. *Russia, Canada Agree to Share Information on Continental Shelf Demarcation*, RUSSIA & CIS BUSINESS & FINANCIAL NEWSWIRE (Mar. 30, 2007).

98. Macnab & Parson, *supra* note 87, at 311-312.

99. Elizabeth Riddell-Dixon, *Canada's Arctic Continental Shelf Extention: Debunking Myths*, POLICY OPTIONS, Sept. 2008, at 39, 42 [hereinafter Riddell-Dixon, *Canada's Arctic Continental Shelf Extension*] ("This sharing gave Canadian and Danish officials access to the details and analysis that would not otherwise be available to them, as the specifics of submissions to the commission are confidential.").

stance in the 2002 Notification, State Department representatives have commented that the U.S. view of Arctic geology is evolving and that, in hindsight, the Notification reflected an inadequate appreciation of the scientific complexities involved.[100]

New information regarding the Alpha-Mendeleev Ridge that is emerging from Article 76 mapping work offers a window into how theories about the Arctic Ocean shelf are competing and developing, requiring policy makers to evaluate and translate these changes into decisions about national submissions to the Commission. For example, one observation in the 2002 U.S. Notification to the Russian submission regarding the Alpha-Mendeleev Ridge was to question the composition of informally reported Russian samples ("pebble and cobble suites") in the region. The U.S. concluded that the suites "can be shown to have originated in northwestern Canada, and to have been distributed widely in the Amerasian Basin . . . by glacial icebergs. They, therefore, cannot represent local bedrock on Mendeleev Ridge" and, by implication, could not be considered to be continental crust.[101] Since that time, initial results from dredges elsewhere on the Alpha-Mendeleev Ridge system, which must still undergo further analysis, suggest that current understanding of this feature may need re-evaluation and have called into question previous interpretations of the origins of that ridge system.

Considering the results of more detailed analyses of these and other samples with the outcomes of studies such as those cited in the 2002 U.S. Notification will make for the most scientifically sound U.S. delimitation of its continental shelf in the Arctic Ocean, regardless of whether it does so as a State Party to the Convention or independently thereof. Having the most complete picture of its own continental shelf will also allow the United States to better evaluate whatever information is eventually made public about Russia's subsequent submission to the Commission with respect to the Central Arctic Ocean. Additionally, the transparency with which

100. *See, e.g.*, Margaret Hayes, U.S. Dep't of State, Office of Ocean and Polar Affairs, Remarks at the American University International Law Review Symposium: Russia and the Rule of Law, Arctic Panel (Feb. 11, 2009), *video available at* http://media.wcl.american.edu/Mediasite/Viewer/?peid=70877630-e145-4946-bf19-04b88b69d010.

101. U.S. Notification, *supra* note 94, at 3.

CCOM/JHC is making its mapping data available[102] may serve as an impetus for other States to reconsider their more confidential policies with respect to their Article 76 data. Arguably, the more States know about each other's potential submissions, the more confidence they will place in the Article 76 mapping process.[103] This transparency with respect to scientific data could in turn bolster confidence in policy and other statements from the Russian Federation that its interests are best served by following the Convention's processes for delimiting the continental shelf, as explored in Part IV.

IV. UNITED STATES AND RUSSIAN ARCTIC POLICY

On September 17, 2008, the Russian Security Council issued a Maritime Strategy document that focused on the central importance of the Arctic to its national security.[104] On January 9, 2009, in the last days of his administration, then-U.S. President George W. Bush signed a dual Presidential Directive with the subtitle, "Arctic Region Policy" ("2009 U.S. Arctic Region Policy").[105] These Russian and U.S. documents, and other statements from Russian government sources have at least one message in common: that delimitation of the Arctic continental shelf under international law is desirable for legal certainty and strengthening national security.

102. *See* CCOM/JHC REPORT, *supra* note 8 (publishing extensive seafloor mapping data due to its usefulness for Convention purposes and to promote better understanding of conditions in the Arctic).

103. *See* Macnab, *supra* note 91, at 11, 14-16 (arguing that transparency breeds credibility, as well as allows States to learn from each other about the best ways to make submissions to the Commission).

104. *See* Statement of the Security Council of the Russian Federation (Sept. 18, 2008), *available at* http://www.scrf.gov.ru/documents/98.html (Russian-language source) (proclaiming Russia's national interests in the region as: a strategic resource to tackle socio-economic development, to preserve the region as a zone of peace and cooperation, to conserve the region's unique ecosystem, and for use as a northern sea route).

105. *See* National Security Presidential Directive 66/Homeland Security Presidential Directiive 25 on Arctic Region Policy, Office of the Press Sec'y (Jan. 12, 2009) [hereinafter NSPD 66/HSPD 25] (stating the United States' policy objectives in the arctic region as: meeting national security needs; protecting the Arctic environment; ensuring "natural resource management and economic development;" strengthening cooperation between the eight Arctic nations; involving the indigenous communities in decisions; and enhancing scientific monitoring and research).

The 2009 U.S. Arctic Region Policy supersedes an Arctic Policy that had been in place since 1994. The earlier Directive,[106] which otherwise remains in place with respect to Antarctic Policy, set forth U.S. policy with respect to both the Northern and Southern Polar Regions.[107] The 2009 Arctic Region Policy, under the paired rubrics of National Security and Homeland Security, refers generally in its second paragraph to the law of the sea[108] and directly to UNCLOS in three places: calling for U.S. accession,[109] acknowledging the fisheries regime established under the Convention and related agreements,[110] and recognizing the Convention as the "most effective way to achieve international recognition and legal certainty for our extended continental shelf."[111]

A closer reading of the 2009 U.S. Arctic Region Policy underlines the fact that science and law, working together, are essential foundations to effective, considered, and visible U.S. participation in the Arctic. The document opens by invoking the legal bases for its implementation[112] and contains references to UNCLOS and international obligations throughout.[113] Under "Extended Continental Shelf and Boundary Issues," Part III.D.3. refers to the existing maritime treaty between Russia and the United States,[114] as well as other legal bases for resolving such issues.

On the scientific side, Part III.E. dedicates five paragraphs to "Promoting International Scientific Cooperation," and contains

106. Presidential Decision Directive 26, Antarctic: Funding of the United States Antarctic Program, Including South Pole Station (Mar. 9, 1996).

107. NSPD 66/HSPD 25, *supra* note 105, pt. I.A.

108. *Id.* pt. I.B ("This directive shall be implemented in a manner consistent with the Constitution and laws of the United States, with the obligations of the United States under the treaties and other international agreements to which the United States is a party, and with customary international law as recognized by the United States, including with respect to the law of the sea.").

109. *Id.* pt. III.C.4, C.5.d.

110. *Id.* pt. III.H.4.

111. *Id.* pt. III.D.I.

112. *Id.* pt. I.B.

113. *Id.* pt. III.C.

114. *See id.* pt. III.D.3 ("The United States and Russia are abiding by the terms of a maritime boundary treaty concluded in 1990, pending its entry into force. The United States is prepared to enter the agreement into force once ratified by the Russian Federation.").

multiple references to international and multinational cooperation.[115] These five paragraphs elaborate on the basic premise that scientific research "is vital for the promotion of the United States interests in the Arctic region" and specifically names the Russian Federation in calling for greater access for researchers to all parts of the Arctic Ocean: "Better coordination with the Russian Federation, facilitating access to its domain, is particularly important."[116] 2009 U.S. Arctic Region Policy also promotes the "active involvement of all Arctic nations . . . in order to advance scientific understanding that could provide the basis for assessing future impacts and proposed response strategies" with respect to environmental and climate change.[117]

The Russian Federation's latest formal policy document with respect to the Arctic was made public after the 2009 U.S. policy but predated it by several months. In March 2009, the Russian Security Council released a document[118] entitled, "The Fundamentals of State Policy of the Russian Federation in the Arctic in the Period up to 2020 and Beyond" (*Osnovy gosudarstvennoi politiki Rossiiskoi Federatsii v Artike na period do 2020 goda i dalneishuiu perspektivu*), which president Dmitry Medvedev had signed on September 18, 2008.[119] That same month, the Russian Security Council had convened meetings relevant to the Arctic[120] and President Medvedev also visited the Chukotka Autonomous Area, calling it a "vital link of the Northern Sea Route."[121] In part as a

115. *Id.* pt. III.E.

116. *Id.* pt. III.E. ("Successful conduct of U.S. research in the Arctic region requires access throughout the Arctic Ocean and to terrestrial sites, as well as viable international mechanisms for sharing access to research platforms and timely exchange of samples, data, and analyses.").

117. *Id.* pt. III.E.3.

118. *See* Dmitry Solovyov, *Russia to Boost Arctic Troops to Defend Resources*, REUTERS, Mar. 27, 2009, *available at* http://www.reuters.com/article/environment News/idUSTRE52P5NS20090327 (reporting on the Russian Security Council's release of a paper outlining its Arctic policy until 2020, which includes the creation of new troop formation to secure Russia's Arctic borders).

119. *See* Katarzyna Zysk, *Comment, Russian: Arctic Strategy, September 2008*, Geopolitics in the North: Arctic Strategy Documents, http://www.geopoliticsnorth.org/index.php?option=com_content&iew=article&id=84:arctic-strategy-documents&catid=1:latest-news (last visited Jan. 12, 2010) (describing the strategy's emphasis on the importance of the Arctic to Russia's wealth and development).

120. Solovyov, *supra* note 119.

121. *Medvedev Calls for Developing Chukotka Infrastructure*, PRIME-TASS, Sep. 23, 2008, *available at* http://www.prime-tass.com/news/print.asp?id=444768&

response to concerns that these and other actions foretold increased Russian aggression in the Arctic, the Russian Foreign Ministry asserted with respect to the region, that "Russia strictly abides by the norms and principles of international law and is firmly determined to act within existing international agreements and mechanisms."[122] President Medvedev noted further that Russia should "wrap up all the formalities for drawing the external border in the continental shelf" in the Arctic.[123] These responses, and indeed the policies themselves, can be seen as an invocation of the rule of law, not an assertion of undue regional influence, to reach a state of legal certainty for both the Russian Federation and all others interested in establishing clear delimitations in the Arctic Ocean.[124]

CONCLUSION: SCIENTIFIC COOPERATION

The requirements in Article 76 of UNCLOS for delimiting the continental shelf have led the Russian Federation, the United States, and their Arctic neighbors to rely on common scientific processes and agreed rules of international law in preparing to establish the outer limits of their continental shelves. International teams of

topicid=0; *see also* Caitlyn Antrim, *Russia and the Changing Geopolitics of the Arctic*, WORLD POL. REV., May/June 2009, at 8, *available at* http://www.world politicsreview-digital.com/wpr/20090506/?pg=10 (describing the geopolitical aspects of the Northern Sea Route).

122. *Russia Denies Plans to Carry Out "Unilateral Partition" of Oil-Rich Arctic*, DOW JONES NEWSWIRES, Sept. 23, 2008, *available at* http://www.rigzone.com/news/article.asp?a_id=67031; *see also Russia Strictly Follows Regulatory Framework for Arctic Ocean*, ITAR-TASS, Sept. 23, 2008 (explaining that the President is preparing a federal law on the southern border of the Russian Arctic zone that includes determining which Russian Federation entities touch the border and how to plan for the socio-economic development expected in those entities).

123. *Russia Denies Plans to Carry Out "Unilateral Partition" of Oil-Rich Arctic*, *supra* note 123; *see also* Katarzyna Zysk, *Geopolitics in the Arctic: The Russian Security Perspective*, *in* CLIMATE OF OPINION: THE STOCKHOLM NETWORK'S ENERGY AND ENVIRONMENT UPDATE, ISSUE 12 - THE ARCTIC : MARCH 2009, Mar. 2009, at 7, 8 (stating that Russia "has acted in compliance with international law in pursuing its territorial claims").

124. Zysk, *supra* note 120 (remarking that Russia lists "[d]efining the limits of [its] continental shelf by 2015 . . . as a top priority"); *see also* Antrim, *supra* note 122 (pointing out that UNCLOS and its jurisdictional dispute rules have been around for over twenty-five years and that "the [C]onvention ensures that, despite alarmist forecasts, Arctic disputes, when they arise, are likely to be matters of law and diplomacy rather than conflict and stalemate").

scientists have worked together on gathering mapping data or exchanging information in the Arctic.[125] Arctic Ocean littoral states have used the peaceful processes of diplomatic notifications for questioning or responding to the first Russian Federation submission to the CLCS. Combined with the recently articulated Russian Federation and United States policies regarding the Arctic Region, these developments suggest that prospects for increased scientific collaboration between the two countries could be improving. Mutually beneficial joint research could overcome territorial, political, and security concerns that may be preventing Russian scientists from participating in a broader range of collaborative projects.[126]

The IBCAO map referenced at the outset of this article and reproduced in Figure 1 in the Appendix, is one example of successful circumpolar scientific cooperation driven by the Convention. In the early stages of preparing for Article 76 mapping, scientists collaborated to produce the IBCAO[127] by consolidating data from various national databases. IBCAO produced its first chart in just three years, from 1997 to 2000, and issued version 2.0 in 2008. Writing in 2001, IBCAO participants explained:

> [I]nvestigators from the five coastal States have met regularly since 1996 to discuss the coordination of scientific and technical procedures involved in the implementation of Article 76, and to develop a common understanding of the factors peculiar to the Arctic Ocean that impact upon those procedures, e.g. the identification and classification of natural prolongations, the criteria for locating the foot of the slope and the Gardiner line, etc. To the limit of practicability, the investigators have also agreed to construct common models of bathymetry and sediment

125. *See* Riddell-Dixon, *Canada's Arctic Continental Shelf Extension*, *supra* note 99, at 40-42.

126. That such concerns are preventing full Russian participation in circumpolar research efforts has been expressed in various fora, including "Changes in the Arctic Environment and the Law of the Sea," the 33rd annual conference of The Center for Oceans Law and Policy ("COLP"), May 20-22, 2009, in Seward, Alaska, and the Third Symposium on the Impacts of an Ice-Diminishing Arctic on Naval and Maritime Operations, June 9-11, 2009, at the Naval Academy in Annapolis, MD.

127. Ron Macnab et al., *Cooperative Preparations for Determining the Outer Limit of the Juridicial Continental Shelf in the Arctic Ocean: A Model for Regional Collaboration in Other Parts of the World?*, IBRU BOUNDARY & SEC. BULL., Spring 2001, at 86, 87; *infra* Appendix, fig.1.

> thickness, so that inconsistencies between their respective results are caused by varying methods of interpretation, and not by incompatibilities between data holdings.[128]

The International Arctic Science Committee, the Intergovernmental Oceanographic Commission, and the International Hydrographic Office all endorsed the IBCAO project.[129] The "limit of practicability" to the "common models" referenced above have not prevented further collaboration between scientists involved in mapping the Arctic Ocean, suggesting that similar approaches might be followed in other research areas.[130] As previously noted, Russian and Canadian scientists are exchanging information relevant to determining whether the Lomonosov Ridge is a natural prolongation of the continental landmass, and Canadian and Danish researchers are pursuing joint seismic operations to explore the same question.[131] The United States and Canada have carried out joint mapping cruises in the Arctic Ocean since 2008 and have plans to continue such collaboration.[132] Whether these activities will lead to joint submissions by one or more Arctic states remains to be seen.

Beyond continental shelf mapping and the requirements of Article 76 of UNCLOS, basic arctic geosciences could provide a useful realm of cooperative endeavor. One ongoing cooperative project between United States and Russian scientists involves geologic history and plate tectonic reconstruction research in the Russian Far East.[133] Workshops such as those held to identify common research interests in the region could serve as blueprints for collaborative work in other fields. Another simple model to improve international

128. *Id.* at 90.

129. *Id.*

130. *Id.* (commenting on upcoming projects involving aeromagnetic data).

131. Nat. Resources Can., *supra* note 96.

132. *See* U.S. Dep't. of State, *U.S.-Canada Joint Expedition to Survey the Extended Continental Shelf in the Arctic* (July 28, 2009), *available at* http://www.state.gov/r/pa/prs/ps/2009/july/126588.htm (observing that, in addition to advancing the mapping efforts of both countries, the joint expedition "saves millions of dollars").

133. *See* Joint U.S.-Russia Workshop on the Plate Tectonic Evolution of Northeast Russia (Dec. 9-12, 2004), http://pangea.stanford.edu/research/structure/nerussia/index.html (stating that the primary goal of the workshop, which brought together key Russian and American research scientists, was to "to frame a long-term scientific plan and to outline potential collaborative projects that utilize existing expertise, databases, laboratories and institutional capabilities").

scientific cooperation is to alternate the venues for important conferences so that each country can host such gatherings.[134]

Given the number of joint efforts by Arctic states to gather data relevant to mapping the continental shelf outlined above, it is important to recall that Article 76 itself contains no specific reference to scientific cooperation. UNCLOS as a whole, however, is replete with references to cooperation.[135] This is not the place to discuss at length the importance of cooperation to the Convention's regime for Marine Scientific Research (Part XIII),[136] but rather to point to Article 242's requirement that states and competent international organizations "shall . . . promote international cooperation in marine scientific research for peaceful purposes." This requirement is not only to enable such research but to "integrate the efforts of scientists in studying the essence of phenomena and processes occurring in the Marine environment and the interrelations between them."[137]

134. For example, the 2009-2010 Sixth International Conference on Arctic Margins ("ICAM") will be in Fairbanks, Alaska. Holding the 2013-1014 Seventh ICAM in St. Petersburg would allow Russian scientists to showcase their related work. Previous ICAMs have been held in Canada, Germany, Russia, and the United States. "The [ICAM] was founded by the U.S. Department of the Interior Minerals Management Service in 1991 with the underlying two-point theme of Arctic understanding and international cooperation in Arctic research. To these ends, ICAM has provided a forum for the exchange of information and presentation of research." International Conference on Arctic Margins, http://www.mms.gov/Alaska/icam/background.htm (last visited Dec. 2, 2009).

135. *See, e.g.*, UNCLOS, *supra* note 4, pmbl.; *id*. arts. 194, 197, 200, 204, 206 and 234 (mentioning joint measures or cooperation).

136. *See, e.g.*, FLORIAN H.TH. WEGELEIN, MARINE SCIENTIFIC RESEARCH: THE OPERATION AND STATUS OF RESEARCH VESSELS AND OTHER PLATFORMS IN INTERNATIONAL LAW (2005) (providing detailed studies of the Convention's Marine Scientific Research regime); MONTSERRAT GORINA-YSERN, AN INTERNATIONAL REGIME FOR MARINE SCIENTIFIC RESEARCH (2003) (same); *see also* J. Ashley Roach, *Marine Scientific Research and the New Law of the Sea*, 27 OCEAN DEV. & INT'L L. 59 (1996). For a more recent listing of resources on Marine Scientific Resarch, see TANAKA, *supra* note 59, at 209 n.1.

137. *See* TANAKA, *supra* note 59, at 213 ("Article 244 (2) also ensures that States, both individually and in co-operation with other States and with competent international organisations, shall actively promote the flow of scientific data and the transfer of knowledge resulting from marine scientific research, especially to developing States.").

As the Arctic Climate Impact Assessment 2004[138] and the Fourth International Polar Year ("IPY") 2007-2009[139] made abundantly clear, continuing and expanding scientific investigation of the unprecedented changes now occurring in the arctic environment is key to understanding the relationship of those changes - both in cause and effect - to global change. The Sustaining Arctic Observing Networks ("SAON"), endorsed by the Arctic Council, the International Arctic Science Committee, the World Meteorological Organisation and supported by a much larger initiating group, is just one project growing out of the Fourth IPY designed to help achieve this end.[140] Given that the Russian continental shelf is by far the largest in the Arctic Ocean, the absence of participation by Russian Federation scientists and limited or no access to that shelf would mean significant gaps in data and understanding, weakening the usefulness of SAON and, indeed, any scientific undertaking hoping to include truly circumpolar data.

Long before the start of the UNCLOS III negotiations that led to the 1982 Convention, the Union of Soviet Socialist Republics ("USSR") was a vocal member of the international scientific community as it expressed collective concern about growing restrictions worldwide on access to continental shelves for research purposes.[141] Indeed, as early as "January 1967 after earlier discussion in the [Intergovernmental Oceanographic Commission ("IOC")], the

138. ACIA SECRETARIAT, ARCTIC COUNCIL, ARCTIC CLIMATE IMPACTS ASSESSMENT (2005), *available at* http://www.acia.uaf.edu/pages/scientific.html. The ACIA was a project of the International Arctic Science Committee and the Arctic Council.

139. The Fourth International Polar Year ("IPY"), 2007–09 generated significant research into the causes and effects of global change in both polar regions, and into many other matters relevant to the poles. A history of the IPYs (First IPY 1882–83, Second IPY1932–33, and Third IPY, which was called the International Geophysical Year 1957–58), is available at http://www.ipy.org (last visited Jan. 12, 2010). A representative sampling of IPY projects can be found by searching the IPY Publications Database (IPYPD), available at http://www.nisc.com/ipy (last visited Jan. 12, 2010).

140. *See* Sustaining Arctic Observing Networks Homepage, http://www.arctic observing.org (last visited Jan. 12, 2010).

141. *See, e.g.*, WILLIAM T. BURKE, MARINE SCIENCE RESEARCH AND INTERNATIONAL LAW: OCCASIONAL PAPER NO. 8, at 9. Stated simplistically, the UNCLOS regime for marine scientific research requires a coastal State's permission for scientific activities in its territorial sea and, subject to fewer restrictions, in its EEZ and on its continental shelf.

USSR took the initiative and proposed that the IOC seek, *inter alia*, to elaborate a general convention embodying principles for safeguarding marine science research."[142] Such a convention never materialized but that initiative by the USSR represents well not only its leadership, but also the international scientific community's engagement in the process that eventually led to Part XIII on Marine Scientific Research being included in the 1982 Convention. Eighty years earlier, in 1902, Russia was a founding member of the International Council for the Exploration of the Sea, which in 1964 produced the first international agreement regarding marine scientific research.[143]

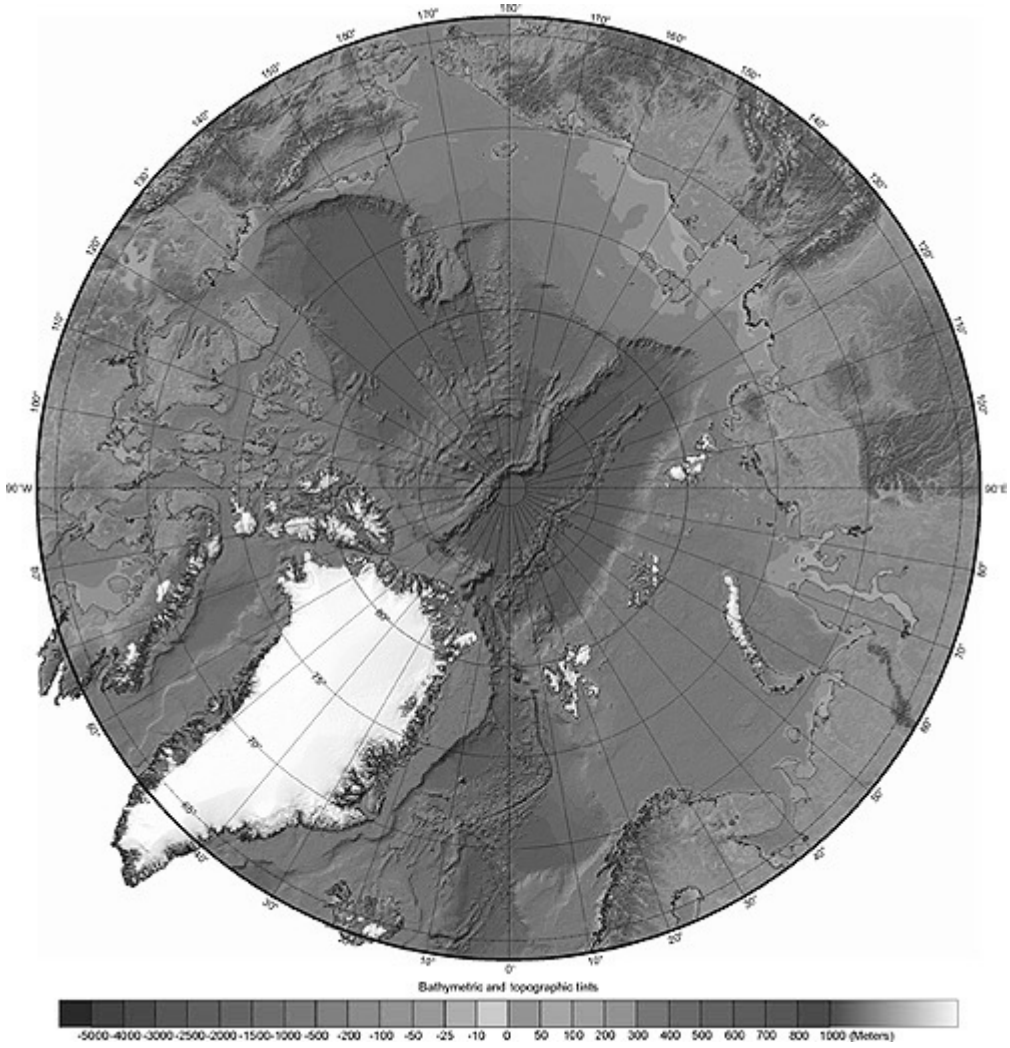
Recalling these actions by predecessor entities to the Russian Federation is a timely reminder of the potential it has today to take a leading role in promoting broad access for scientific research throughout the Arctic. The importance of the circumpolar North to all Arctic states provides incentives to enter into more collaborative scientific undertakings in the Arctic Ocean. As the Article 76 process is proving, developments in the world of science may well open doors for countries to work together on the political level as well.

142. *Id.* at 9.

143. *See* WEGELEIN, *supra* note 137, at 24 & nn. 54-55 (noting that Convention for the International Council for the Exploration of the Sea, Sept. 12, 1964, 652 U.N.T.S. 237, established the International Council for the Exploration of the Sea ("ICES") in 1902). ICES was originally founded by Russia, Great Britain, the Netherlands and the Scandinavian countries. *Id.*

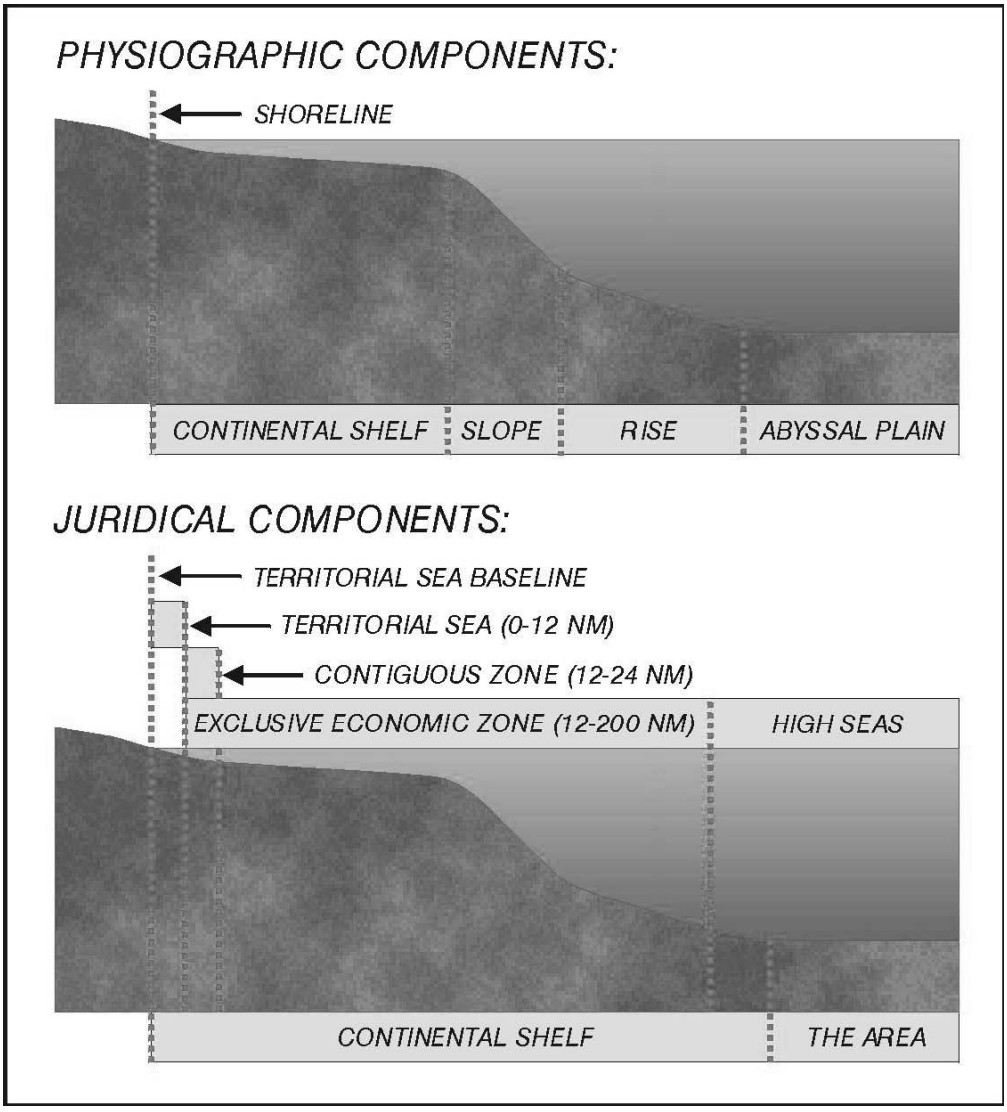
APPENDIX

FIGURE ONE[144]



144. Martin Jakobsson, et al., *An improved bathymetric portrayal of the Arctic Ocean: Implications for ocean modeling and geological, geophysical and oceanographic analyses*, 35 GEOPHYSICAL RESEARCH LETTERS, L07602, 2008.

FIGURE TWO[145]



145. Ron Macnab & Richard Haworth, *Earth Science and the Law of the Sea:Keys to Canada's Offshore Energy and Mineral Resources Beyond 200 Nautical Miles*, 28 GEOSCIENCE CAN. 79, 80 fig.1 (2001).