

## Briefing notes for IBRU Arctic map series

**Note 1.** This map illustrates Arctic Ocean continental shelf areas, as well as exclusive economic zones (EEZs) and miscellaneous special management areas and unresolved and agreed boundary lines and limits in the Arctic Ocean. Continental shelf submissions are made to the Commission on the Limits of the Continental Shelf (CLCS) using criteria established in Article 76 of the United Nations Convention on the Law of the Sea (UNCLOS) (see [https://www.un.org/Depts/los/convention\\_agreements/texts/unclos/unclos\\_e.pdf](https://www.un.org/Depts/los/convention_agreements/texts/unclos/unclos_e.pdf)). Where the continental margin of a coastal state extends beyond 200 nautical miles (M) from the state's territorial sea baseline, the outer limit of the continental shelf is defined with reference to two sets of points: (i) points 60 M from the foot of the continental slope; (ii) points at which the thickness of sediment is at least 1% of the shortest distance from the points in question to the foot of the continental slope. The outer limit of the continental shelf is defined by a series of straight lines (not exceeding 60 M in length) connecting the seawardmost of the points in the two sets described above. Each coastal state's outer limit is constrained by one of two 'cutoff' criteria that apply regardless of the location of the foot of the continental slope and the thickness of sediment seaward of that point. The 'cutoff' limit is the seawardmost combination of two lines: (i) a line 350 M from the state's territorial sea baseline; (ii) a line 100 M seaward of the 2,500 metre isobath.

Because the Central Arctic Ocean contains a number of shallow ridges where ocean depth falls short of 2,500 metres, there are significant areas of continental shelf overlap, including a 103,300 square nautical mile area around the North Pole that is included in the Canadian, Danish, and Russian submissions. UNCLOS envisions that there will be many areas in the world where states' continental shelves legitimately overlap. It therefore calls for one state's submission to be assessed without prejudice to the submission of another state, and for the peaceful and lawful settlement of overlaps in order to achieve an equitable solution. Because arbitration panels, courts, and tribunals have often turned to median lines as the foundation for achieving equitable maritime delimitations, they are depicted on this map as a reference point for potential continental shelf delimitation.

**Note 2.** Canada deposited its partial submission regarding its Arctic Ocean continental shelf with the CLCS on 23 May 2019 (see [https://www.un.org/Depts/los/clcs\\_new/submissions\\_files/can1\\_84\\_2019/CDA\\_ARC\\_ES\\_EN\\_secured.pdf](https://www.un.org/Depts/los/clcs_new/submissions_files/can1_84_2019/CDA_ARC_ES_EN_secured.pdf)). Noting that "*the continental margin of Canada in the Arctic Ocean is part of a morphologically continuous continental margin that includes a number of extensive seafloor highs*" and that "*these seafloor highs include the Central Arctic Plateau (Lomonosov Ridge, Alpha Ridge, and Mendeleev Rise) that forms the submerged prolongation of the landmass of Canada,*" Canada's submission included c. 352,000 square nautical miles of seabed beyond 200 M from its baselines. In addition to overlaps with a potential USA submission, the Canadian submission includes c. 108,900 square nautical miles of overlap with the Kingdom of Denmark's submission and c. 222,000 square nautical miles of overlap with Russia's submission. These figures include a 54,850 square nautical mile area that includes the North Pole that falls within the continental shelf areas of Canada, the Kingdom of Denmark, and Russia. Additionally, the straight line joining the two main Canadian continental shelf areas (the Canada Basin and the Amundsen Basin) is accompanied by a notation that this line is understood as lying entirely within Canada's continental margin and that "*Canada does not delineate the outer limits of its continental shelf in the Arctic Ocean beyond this line.*" This implies that Canada could revisit its outer limits at a later date. The submission refers to non-objection agreements with all three neighbours that allow for consideration of the Canadian submission without prejudice to future delimitation negotiations.

**Note 3.** The Kingdom of Denmark, Iceland and Norway concluded a delimitation of the continental shelf beyond 200 nautical miles in the southern part of the "Banana Hole" in the Northeast Atlantic in September 2006 (see <https://www.regjeringen.no/en/dokumenter/Agreed-Minutes/id446839/>). As the delimitation agreement preceded submissions to the CLCS, the agreement made provision for adjustments to the delimitation if any of the three states was unable to demonstrate entitlement over the full area of continental shelf allocated to it under the agreement. Both Denmark and Norway confirmed entitlement to the whole of the area allocated in the 2006 agreement through submissions to the CLCS (see the summaries of the CLCS recommendations at [www.un.org/depts/los/clcs\\_new/submissions\\_files/dnk28\\_09/2014\\_03\\_14\\_SCDNK\\_REC\\_COM\\_20140521.pdf](http://www.un.org/depts/los/clcs_new/submissions_files/dnk28_09/2014_03_14_SCDNK_REC_COM_20140521.pdf) and [www.un.org/depts/los/clcs\\_new/submissions\\_files/nor06/nor\\_rec\\_summ.pdf](http://www.un.org/depts/los/clcs_new/submissions_files/nor06/nor_rec_summ.pdf)). However, the continental shelf limit submitted by Iceland for the Ægir Basin fell short of the boundary with Norway established in 2006 (see [https://www.un.org/depts/los/clcs\\_new/submissions\\_files/isl27\\_09/2016\\_03\\_10\\_sc\\_isl.pdf](https://www.un.org/depts/los/clcs_new/submissions_files/isl27_09/2016_03_10_sc_isl.pdf) for the summary of the CLCS recommendations concerning the outer limits of Iceland's continental shelf in the Ægir Basin). Under the terms of the 2006 agreement, the area beyond Iceland's continental shelf limit - which lies entirely within the continental shelf limits of both Denmark and Norway - will be shared between Denmark (40 per cent) and Norway (60 per cent).

The Kingdom of Denmark made a partial submission to the CLCS concerning the outer limit of the North-Eastern Continental Shelf of Greenland on 26 November 2013 ([www.un.org/depts/los/clcs\\_new/submissions\\_files/dnk68\\_13/DNK2013\\_ES.pdf](http://www.un.org/depts/los/clcs_new/submissions_files/dnk68_13/DNK2013_ES.pdf)). The proposed limit creates an overlap with the continental shelf of Norway as recommended by the CLCS (see note 4) of approximately 140 square nautical miles. It also means that 2,450 square nautical miles of seabed between Jan Mayen and Svalbard will form part of The Area (the deep seabed on which no state can claim sovereign rights).

The Kingdom of Denmark made a second partial submission to the CLCS concerning the outer limit of the Northern Continental Shelf of Greenland on 15 December 2014 ([www.un.org/depts/los/clcs\\_new/submissions\\_files/dnk76\\_14/dnk2014\\_es.pdf](http://www.un.org/depts/los/clcs_new/submissions_files/dnk76_14/dnk2014_es.pdf)). The submission argues that the Lomonosov Ridge, which runs across the central Arctic Ocean, is "both morphologically and geologically an integral part of the Northern Continental Margin of Greenland". On this basis, the Kingdom of Denmark has defined a continental shelf limit straddling the ridge which extends up to the outer limit of the Russian exclusive economic zone, more than a thousand nautical miles from the nearest point on the coastline of Greenland. The area of continental shelf beyond 200 nautical miles from Greenland's baselines defined in the submission is around 261,000 square nautical miles. The continental shelf defined by the Kingdom of Denmark overlaps with the continental shelf areas beyond 200 nautical miles submitted to the CLCS by Norway (overlap = c.3,000 square nautical miles), Russia (overlap = c.234,000 square nautical miles), and Canada (overlap = c. 108,900 square nautical miles). These figures include a 103,300 square nautical mile area around the North Pole where submissions by Canada, the Kingdom of Denmark, and Russia all overlap. The submission notes that the Greenland shelf is also likely to overlap with a future continental shelf submission by the USA. The executive summary notes that the Kingdom of Denmark has consulted with all of its neighbours regarding its submission, and refers to non-objection agreements with Norway and Russia that allow the CLCS to consider the Danish submission without prejudice to the future delimitation of the areas submitted by the respective parties.

**Note 4.** A summary of the 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 can be found at [www.un.org/depts/los/clcs\\_new/submissions\\_files/nor06/nor\\_rec\\_summ.pdf](http://www.un.org/depts/los/clcs_new/submissions_files/nor06/nor_rec_summ.pdf).

**Note 5.** Summaries of Russia's Arctic Ocean submissions to the CLCS are available at [www.un.org/Depts/los/clcs\\_new/submissions\\_files/submission\\_rus.htm](http://www.un.org/Depts/los/clcs_new/submissions_files/submission_rus.htm) and [www.un.org/depts/los/clcs\\_new/submissions\\_files/submission\\_rus\\_rev1.htm](http://www.un.org/depts/los/clcs_new/submissions_files/submission_rus_rev1.htm). After reviewing the first submission made in 2001, the CLCS asked Russia to revise its submission relating to its continental shelf in the Central Arctic Ocean; a partial revised submission was made on 3 August 2015. The area covered by the original submission was more than 386,000 square nautical miles, and the 2015 submission added a further 30,000 square nautical miles. On 31 March 2021 Russia filed two addenda to the 2015 submission, which added a further c. 205,000 square nautical miles. A cartographic comparison of the two submissions and the addenda can be found on the IBRU website at <http://www.dur.ac.uk/ibru/resources/arctic>. The 2015 submission indicates that geological and geophysical research undertaken from 2005 to 2014 confirmed the Russian view that "the Lomonosov Ridge, the Mendeleev Rise, the Chukchi Rise and separating them the Podvodnikov Basin and the Chukchi Basin form a single consolidated block of continental crust [which] is a component of the continental margin of the Arctic Ocean and constitutes a natural prolongation of the continental margin of Eurasia". The 2021 addenda further recognised the Gakkel Ridge as a submarine feature extending Russia's continental extent, and it extended Russia's 2015 submission out to the limits of the Canadian and Danish Exclusive Economic Zones. The Russian submission, as revised in 2015 and 2021, overlaps with the submission previously made by the Kingdom of Denmark (overlap = c. 234,000 square nautical miles), and the one subsequently made by Canada (overlap = c. 222,000 square nautical miles). These figures include a c. 103,300 square nautical mile area around the North Pole where the submissions of Canada, the Kingdom of Denmark, and Russia all overlap. Noting the overlap between the Russian and Danish submissions to the CLCS, and what was then understood as a likely overlap between the Russian submission and a future Canadian submission, the 2015 submission refers to non-objection agreements with its neighbours which allow for consideration of the Russian submission without prejudice to future delimitation negotiations. Since the 2015 submission, as modified by the 2021 addenda, is a revision of the earliest submission made to the CLCS (made in 2001), it is presently under review. It is assumed that the CLCS will offer a recommendation on the Russian submission before it offers recommendations on the Danish submission of December 2014 (see Note 3) or the Canadian submission of May 2019 (see Note 2).

**Note 6.** Norway and the Soviet Union agreed to a partial maritime boundary in Varangerfjord in 1957 but for many years were unable to agree on the alignment of their maritime boundary in the Barents Sea: Norway claimed the boundary should follow the median line, while Russia sought a 'sector' boundary extending due north (but deviating around the 1920 Svalbard Treaty area). In July 2007 the Varangerfjord boundary was extended through the innermost 73 km of the disputed area, and in September 2010 an agreement was finally signed extending the boundary northwards through the Barents Sea to the outer limit of the two countries' overlapping continental shelf entitlements in the Arctic Ocean. In the area to the east of the boundary which lies within 200 M of the Norwegian mainland but more than 200 M from Russian territory, the agreement grants Russia the EEZ rights that would otherwise fall to Norway (this "Special Area" is similar to those established in the vicinity of the Russia-USA maritime boundary in 1990 – see Note 9). The 2010 agreement renewed fisheries cooperation agreements originally signed in 1975 and 1976 for at least a further fifteen years, but the 'Grey Zone' fishing regime established in 1978 has been terminated. The agreement also includes provisions for cooperative exploitation and management of transboundary hydrocarbon deposits.

**Note 7.** The USA has yet to make a submission to the CLCS or otherwise publicly assert continental shelf limits beyond 200 M in the Arctic. Only hypothetical areas of U.S. continental shelf can therefore be presented. The continental shelf area depicted here for the USA is based on an assumption that the Article 76 ‘cutoff limits’ described above in Note 1 apply, namely the seawardmost combination of two lines: (i) a line 350 M from the state’s territorial sea baseline; (ii) a line 100 M seaward of the 2,500 metre isobath. These cutoffs can be estimated from publicly available data. Additionally, the western limit of the hypothetical U.S. continental shelf is defined by the 1990 boundary delimitation agreement with Russia (see Note 9).

**Note 8.** Canada argues that the maritime boundary in the Beaufort Sea was delimited in the 1825 treaty between Great Britain and Russia defining the boundary between Alaska and the Yukon as following the 141° W meridian “as far as the frozen ocean”. The USA argues that no maritime boundary has yet been defined and that the boundary, out to the 200M limit of the EEZ, should follow the median line between the two coastlines. The area of overlap between the two claims is more than 7,000 M<sup>2</sup>. Resolution of this boundary could potentially affect the delimitation of continental shelves beyond 200M as well as the delimitation of territorial seas and exclusive economic zones.

**Note 9.** The Eastern Special Area lies more than 200 M from the baseline of the USA but less than 200 M from the baseline of Russia. Under the June 1990 boundary agreement between the two states, the Soviet Union agreed that the USA should exercise EEZ jurisdiction within this area. A second Eastern Special Area and a Western Special Area (in which the opposite arrangement applies) were established adjacent to the boundary south of 60° north. The agreement has yet to be ratified by the Russian parliament but its provisions have been applied since 1990 through an exchange of diplomatic notes.

**Note 10.** Under a treaty signed in February 1920, Norway has sovereignty over the Svalbard archipelago and all islands between latitudes 74° and 81° north and longitudes 10° and 35° east. However, citizens and companies from all treaty nations enjoy the same right of access to and residence in Svalbard. Right to fish, hunt or undertake any kind of maritime, industrial, mining or trade activity are granted to them all on equal terms. All activity is subject to legislation adopted by Norwegian authorities, but there may be no preferential treatment on the basis of nationality. Norway is required to protect Svalbard’s natural environment and to ensure that no fortresses or naval bases are established. 39 countries are currently registered as parties to the Svalbard treaty.

**Note 11.** Under the 1981 continental shelf boundary agreement between Iceland and Norway, each country is entitled to a 25% share in petroleum activities on the other’s continental shelf within a 45,470 km<sup>2</sup> area between latitudes 68° N and 70° 35’ N and longitudes 6° 30’ W and 10° 30’ W. The idea of a joint development zone straddling the boundary was proposed by a conciliation commission set up by the two governments when they were unable to reach a negotiated boundary settlement. The continental shelf boundary itself is located 200 M from the coast of Iceland but less than 100 M from Jan Mayen, reflecting the significant disparity in the lengths of the relevant coastal fronts (more than 18:1 in Iceland’s favour).

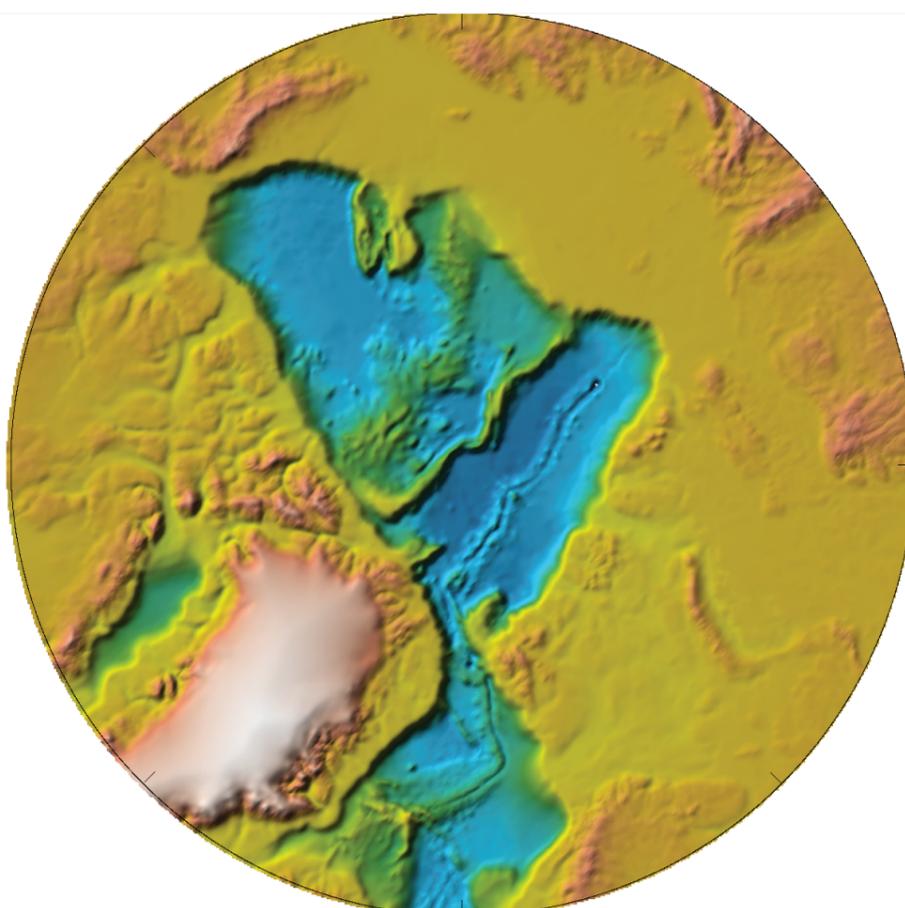
**Note 12.** Canada claims that the waters of its Arctic archipelago are historic internal waters, and has enclosed them within a system of straight baselines. Accordingly, Canada holds that there is no right of innocent passage through these waters. However, other states (particularly the USA) do not accept Canada’s baselines and also argue that the channels in the archipelago which form part of the ‘Northwest Passage’ through the Arctic qualify as straits used for international navigation under Part III of UNCLOS, and that there is therefore a right of transit passage through the straits for foreign ships and aircraft. Similar issues affect the straits of the ‘Northeast Passage’ (or ‘Northern Sea Route’) around Russia’s Arctic coastline.

#### Agreed maritime boundaries

- Canada-Denmark (Greenland): continental shelf boundary agreed 17 December 1973.
- Denmark (Greenland)-Iceland: continental shelf and fisheries boundary agreed 11 November 1997.
- Denmark (Greenland)-Norway (Jan Mayen): continental shelf and fisheries boundary agreed 18 December 1995 following adjudication by the International Court of Justice.
- Denmark (Greenland)-Iceland-Norway (Jan Mayen) tripoint agreed 11 November 1997.
- Denmark (Greenland)-Norway (Svalbard): continental shelf and fisheries boundary agreed 20 February 2006.
- Iceland-Norway (Jan Mayen): fisheries boundary following the 200 nm limit of Iceland’s EEZ agreed 28 May 1980; continental shelf boundary and joint zone agreed 22 October 1981 (see note 11).
- Norway-Russia: maritime boundary in Varangerfjord partially delimited 15 February 1957 and extended 11 July 2007. Agreement on the maritime boundary in the Barents Sea and Arctic Ocean signed on 15 September 2010 and entered into force on 7 July 2011 (see note 6).
- Russia-USA: single maritime boundary agreed 1 June 1990 (see note 9).

#### Seabed topography

As discussed in note 1, the outer limit of the continental shelf is defined in relation to the geology and geomorphology of the continental margin. The Arctic Ocean seabed is currently rather poorly surveyed, but existing public domain datasets such as US National Geophysical Data Center’s ETOPO2 bathymetry dataset, from which the seabed relief map below was generated, suggest that in many areas of the Arctic the outer limit of the continental shelf may fall well short of the theoretical maximum limits shown on the main map. The Arctic coastal states are currently conducting hydrographic and geophysical surveys of the Arctic Ocean in order to identify the outer limits of the continental shelf with precision. Some data being acquired through collaborative ventures are being made available to the public, notably the International Bathymetric Chart of the Arctic Ocean ([www.ngdc.noaa.gov/mgg/bathymetry/arctic](http://www.ngdc.noaa.gov/mgg/bathymetry/arctic)).



Arctic seabed relief map generated in CARIS LOTS using ETOPO2 data ([www.gfdl.noaa.gov/products/vis/data/datasets/etopo2\\_topography.html](http://www.gfdl.noaa.gov/products/vis/data/datasets/etopo2_topography.html))