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 made to the Commission on the Limits of the Continental Shelf (CLCS) under Article 76 of the United Nations Convention on the Law of the Sea (UNCLOS) must be submitted to the CLCS by 25 March 2023. The continentally 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 1/3 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 seaward end of the points in the two sets described above. Each coastal state’s outer limit is constrained by one of two ‘cut-off’ criteria that apply regardless of the location of the foot of the continental slope and the thickness of sediment seaward of that point. The ‘cut-off’ 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.

Note 2. The Canadian deposit of its partial submission regarding its economic zone in the Arctic Ocean continental shelf with the CLCS on 23 May 2019 (see https://www.un.org/Depts/los/clcs_new/submissions_files/cns13_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 submersed 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 area, 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-object 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 “Babao” Hole in the Northeast Atlantic in September 2006 (see https://www.regeringen.no/en/dokumenter/Agreed-Minutes/id468393). 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 continental shelf covered by their 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_SCDKN_REC_COM_20140521.pdf and www.un.org/Depts/los/clcs_new/submissions_files/nor06/nor_rec_summ1.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/idf27_09/2016_10_30_idf_web.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 Northern Continental Shelf of Greenland on 26 November 2013 (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). 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 limit defined by the Kingdom of Denmark overlaps beyond the continental shelf area between 200 nautical miles seaward 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 of Canada, the Kingdom of Denmark, and Russia all overlap. The submission notes that the Greenland shelf limit 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-object 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.

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 and 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 https://www.durham.ac.uk/research/institutes-and-centres/ibru-borders-research/maps-and-publications/maps/arctic-maps-series/. The 2015 submission indicates that geologic and geophysical research undertaken from 2005 to 2014 confirmed the Russian view that “the Lomonosov Ridge, the Mendelieve Rise, the Chukchi Rise and separating them the Podvodnykov 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 Russia, 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-object agreements with its neighbours which allow for consideration of the Russian submission without prejudice to future delimitation negotiations. Since then, the 2015 CLCS (as modified by the 2021 addenda), is a revision of the earliest submission made to the CLCS (made in 2001) and is currently 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 Varangerfjorden 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 Varangerfjorden 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 where the boundary lies more than 200 M from Russia’s coast, 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 ‘Green 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 2002 agreement between the United States and Russia (see Note 9).
Agreed maritime boundaries

- 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 agreement 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).

Arctic seabed relief map generated in CARIS LOTS using ETOPO2 data (www.gfdl.noaa.gov/products/vis/data/datasets/ETOPO2_topography.html)

Notes updated April 2021