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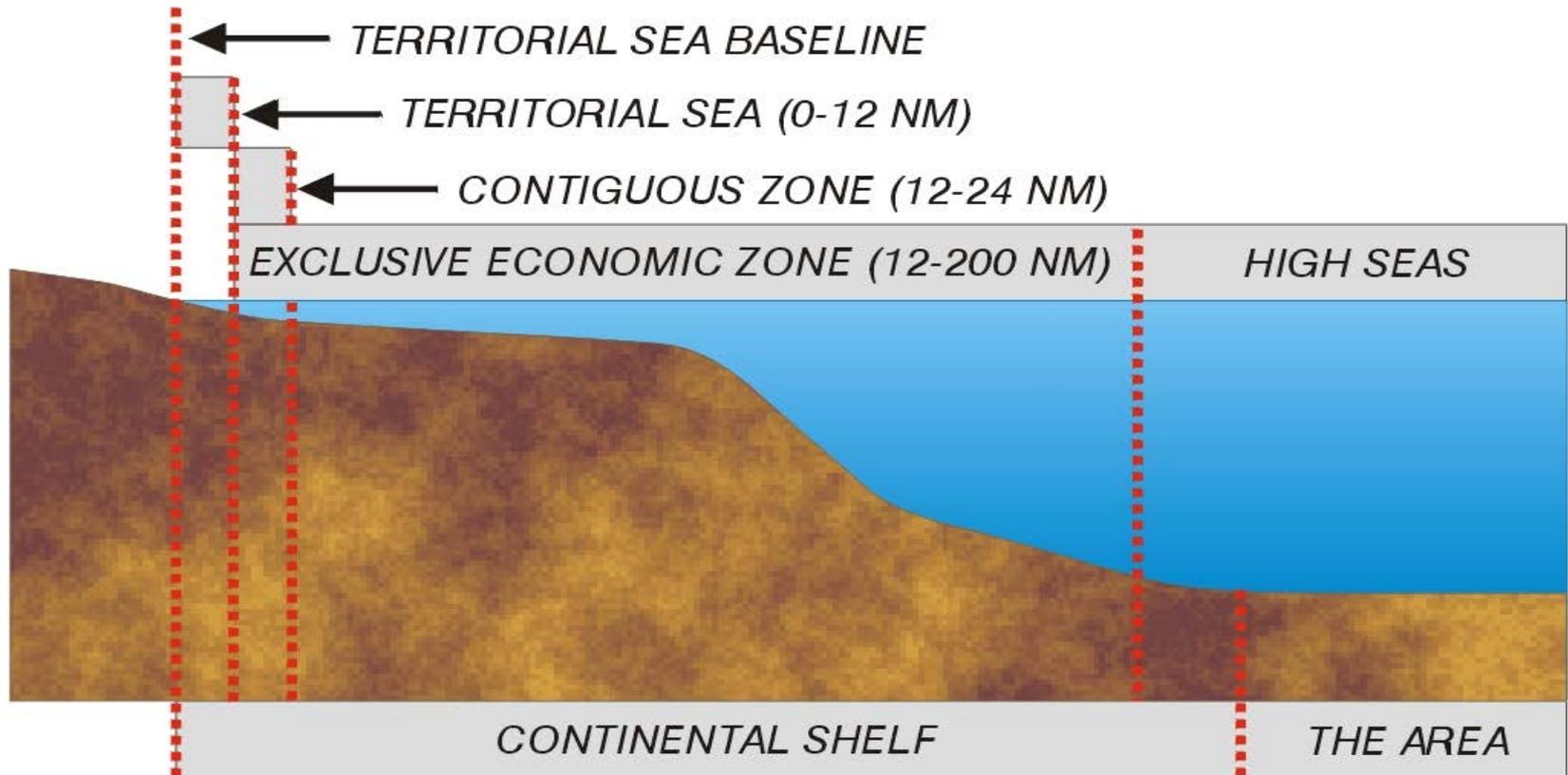
Who owns the North Pole? Understanding Denmark's submission to the CLCS

HIGH NORTH DIALOGUE 2015 – March 18, 2015

Christian Marcussen

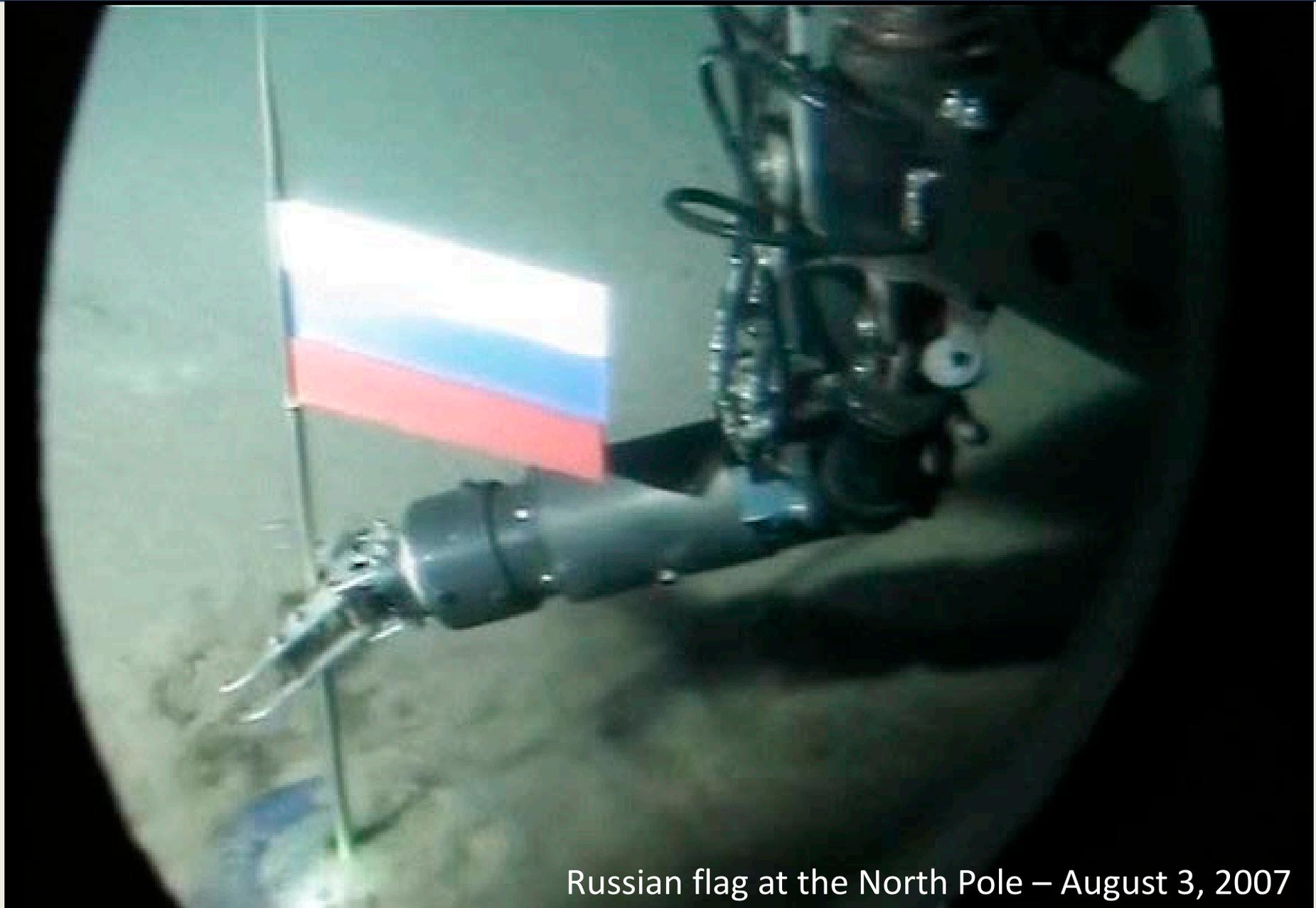
Geological Survey of Denmark and Greenland
Danish Ministry of Climate, Energy and Building

JURIDICAL COMPONENTS:



Issue: Maritime boundaries

Note: The juridical continental shelf is not the same as the physiographic continental shelf.



Russian flag at the North Pole – August 3, 2007

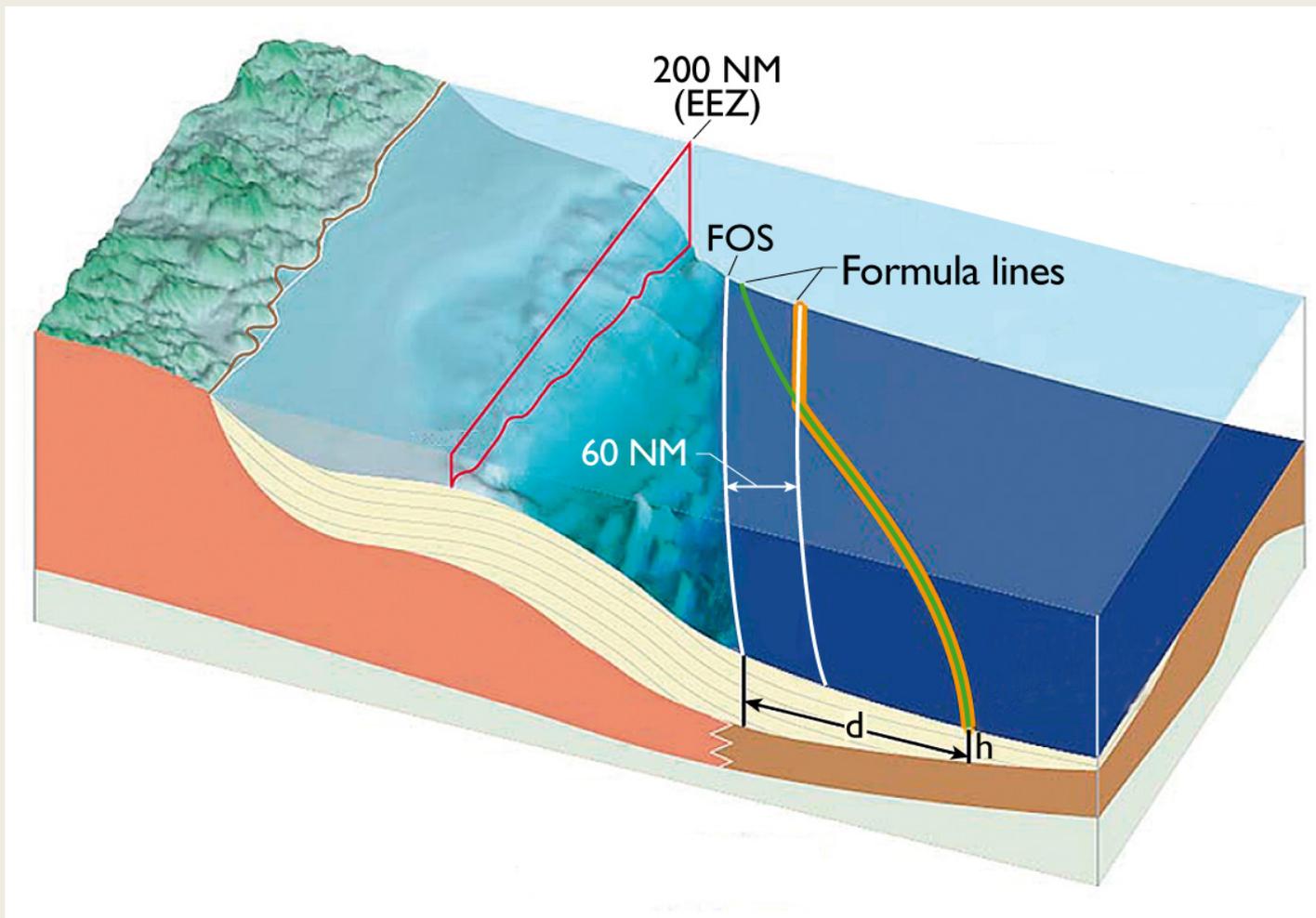
Extended Continental Shelf issues – 3 steps involved

1. Delineation of the outer limit of the continental shelf according to United Nations Convention on the Law of the Sea (UNCLOS), article 76
- a scientific/technical/legal process.
2. Deliberations of the Commission on the Limits of the Continental Shelf (CLCS) leading to Recommendations by the CLCS (on a case by case basis)
- a scientific/technical/legal process.
3. Delimitation of overlapping claims between involved coastal states - negotiations or arbitration
- a legal/diplomatic/political process.

Continental Shelf Project of the Kingdom of Denmark – Definitions:

1. The continental shelf of a coastal State comprises 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 (UNCLOS¹, Article 76 (1)) – **Jurisdiction**.
2. 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. It does not include the deep ocean floor with its oceanic ridges or the subsoil thereof (UNCLOS¹, Article 76 (3)) – **Physical extent**.
3. Fundamental issue: distinguish between the continental margin and the deep ocean floor.

¹ UNCLOS = United Nation Convention on the Law of the Sea



“The foot of the continental slope (FOS) shall be determined as the point of maximum change in the gradient at its base.”

1 nautical mile (NM) =
1.15075 mile =
1852 meters

Formula lines

Either FOS + 60 nautical miles (Hedberg) or 1% sediment formula (Gardiner)

Constraint lines

Either 350 nautical miles from the coastal states baselines or 100 nautical miles from the 2500 meter isobath.

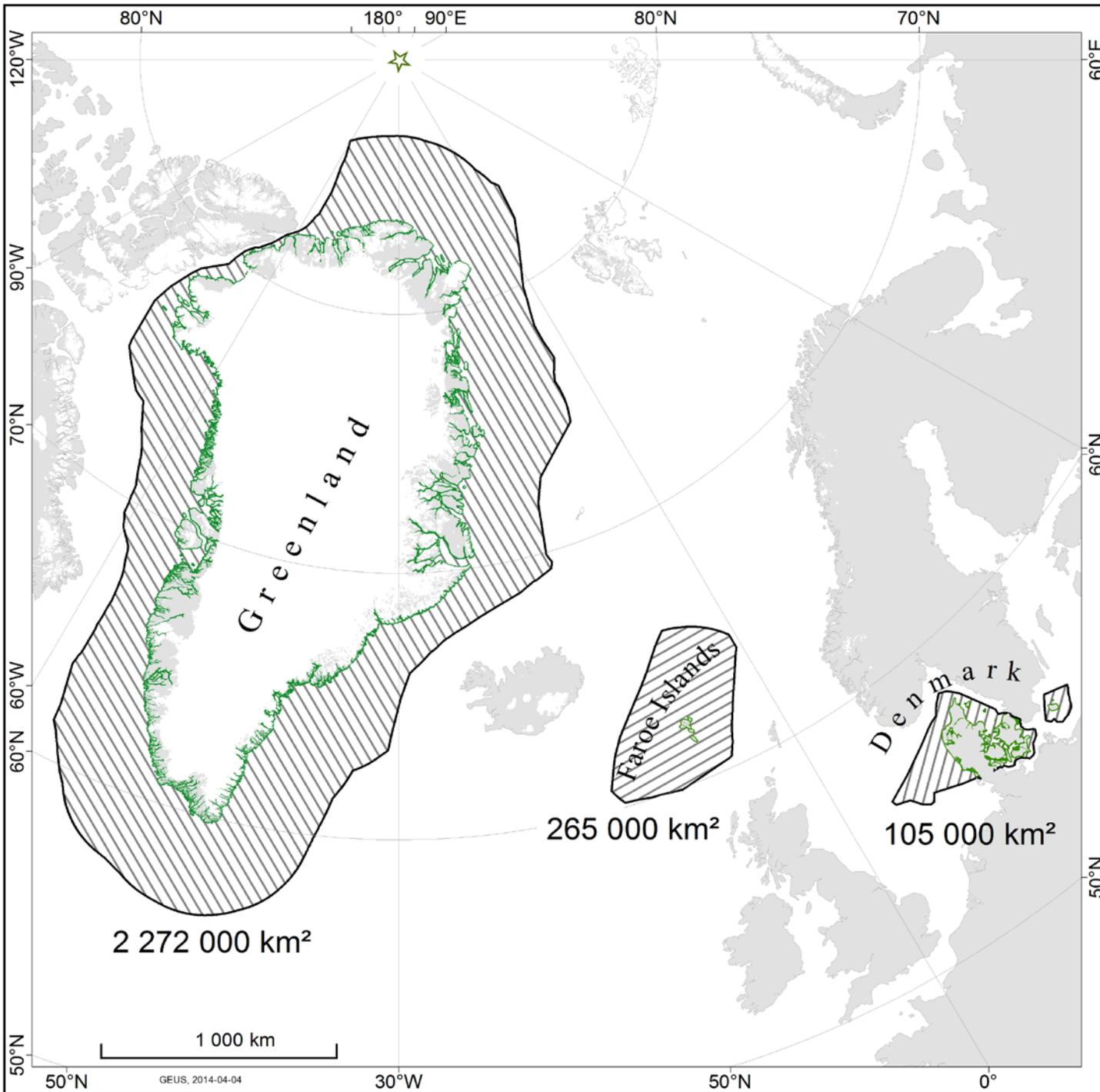
Continental Shelf Project of the Kingdom of Denmark – The concept:

1. (Geo)Morphology → definition of BOS¹ region → Natural prolongation.
2. Determination of FOS² points → Outer Edge (Hedberg arcs).
3. Determination of Gardiner Formula Points → Final Outer Edge.
4. Determination of Constraints: beyond 350 NM → classification of seafloor highs as submarine elevations - according to UNCLOS, CLCS Guidelines and recommendations.
5. Delineation of the outer limits of the Northern Continental Shelf of Greenland.

In general: The Kingdom of Denmark has tried to exploit the provisions of UNCLOS, Article 76 to their full extent (meaning maximizing the submission area).

¹ BOS = **Base of Slope, ² FOS = **Foot of Slope****

Kingdom of Denmark – Exclusive Economic Zone



Kingdom of Denmark – Submission Areas

2 areas around the Faroe Islands:

Submission for the area N of the Faroe Islands submitted in April 2009 (#28), recommendations adopted by CLCS, 12 March 2014.

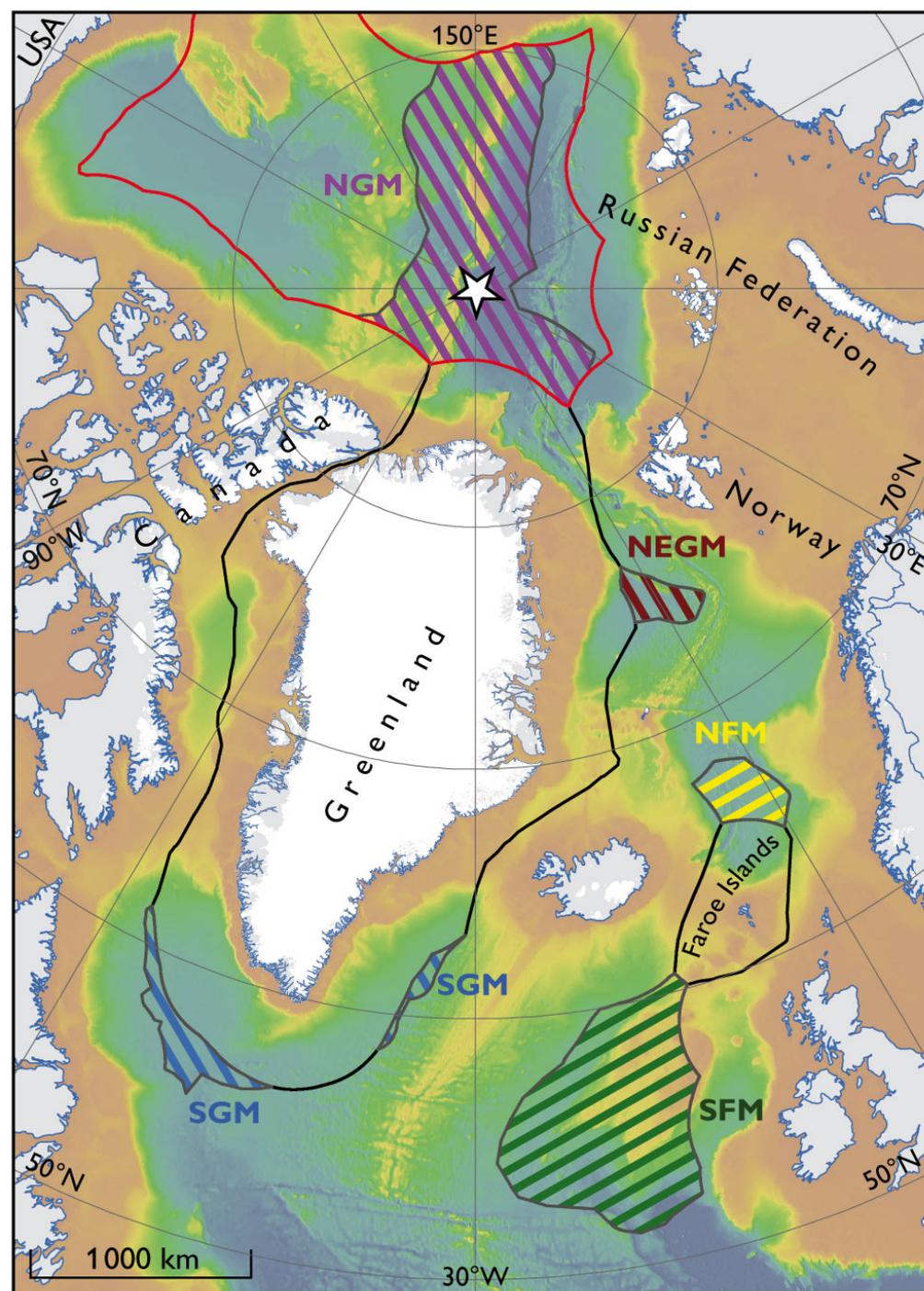
Submission for the area S of the Faroe Islands in December 2010 (#54).

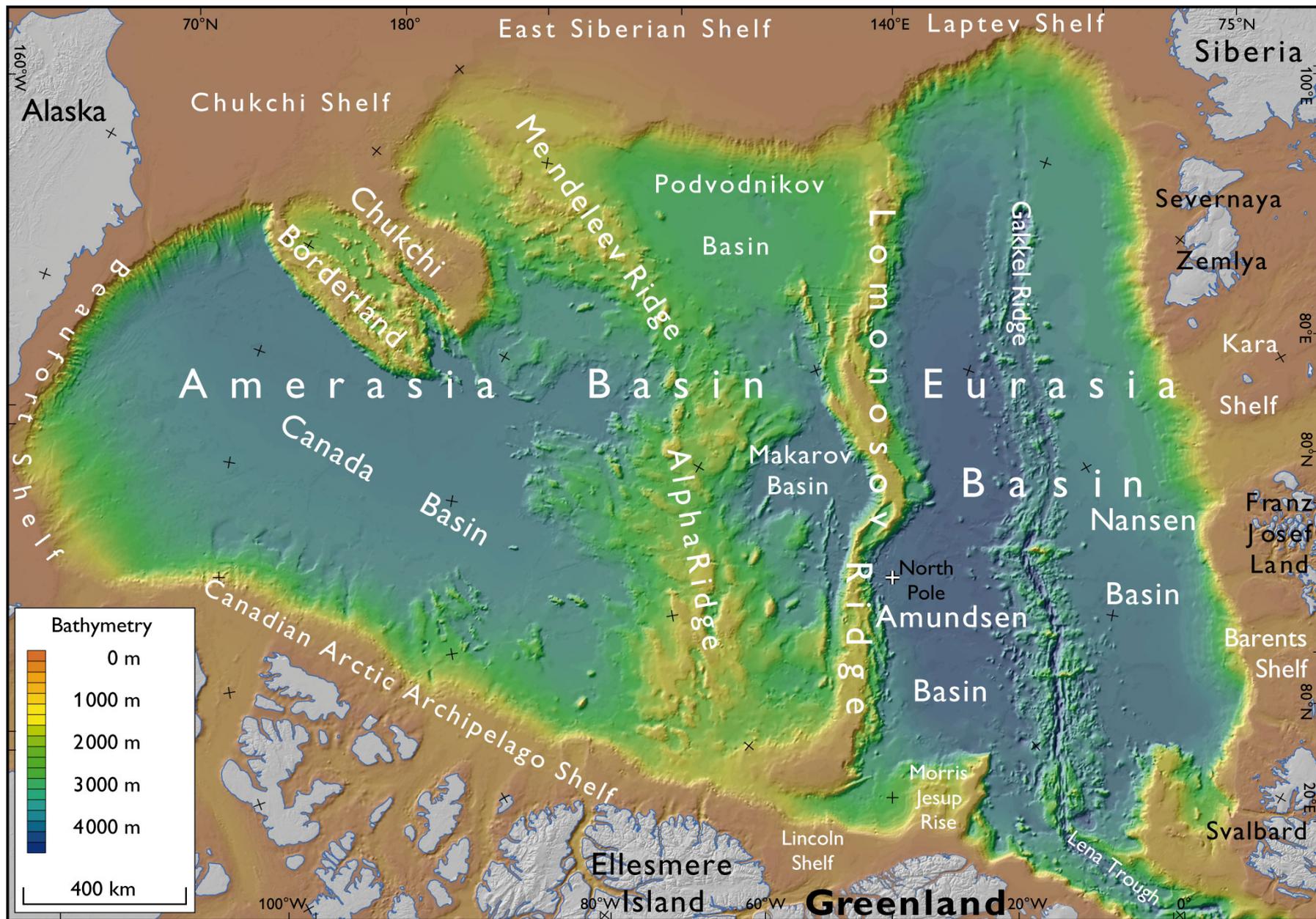
3 areas around Greenland:

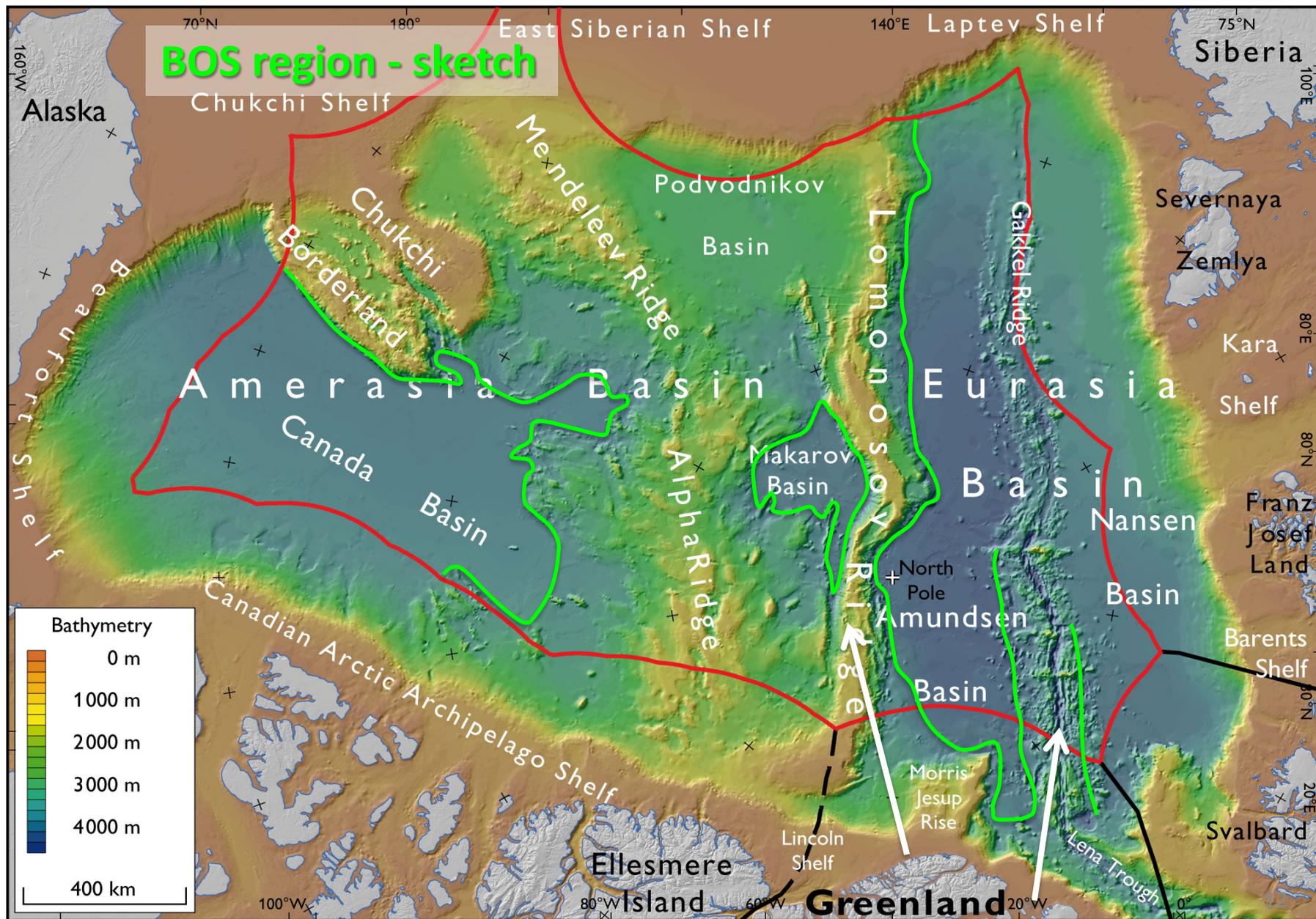
Submission for the area S of Greenland in June 2012 (#61).

Submission for the area NE of Greenland in November 2013 (#68).

Submission for the area N of Greenland in December 2014 (#76).







Classification of seafloor highs – general

- UNCLOS article 76 distinguishes between three different types of seafloor highs:
 - **Oceanic ridges** (not part of the continental margin)
 - **Submarine ridges**
 - **and submarine elevations**
- In order to extend the continental shelf beyond 350 NM requires the classification of seafloor highs as submarine elevations.
- A submarine elevation that is a natural component of the continental margin must, in addition to being morphologically continuous with the land mass of the coastal State, also **share geological characteristics** with the submerged prolongation of the land mass with which it is morphologically continuous (paragraph 6 of Article 76).

Classification of seafloor highs – specific (3)

- The Lomonosov Ridge and associated spurs is classified as a submarine elevation based on morphological, geological (continental) and geophysical evidence.
- *“The Alpha-Mendeleev ridge complex and Chukchi Borderland are morphologically continuous with the land mass of Greenland. However, the submitted data and other material in this Partial Submission do not provide for their classification as submarine elevations that are natural components of the Northern Continental Margin of Greenland.”*

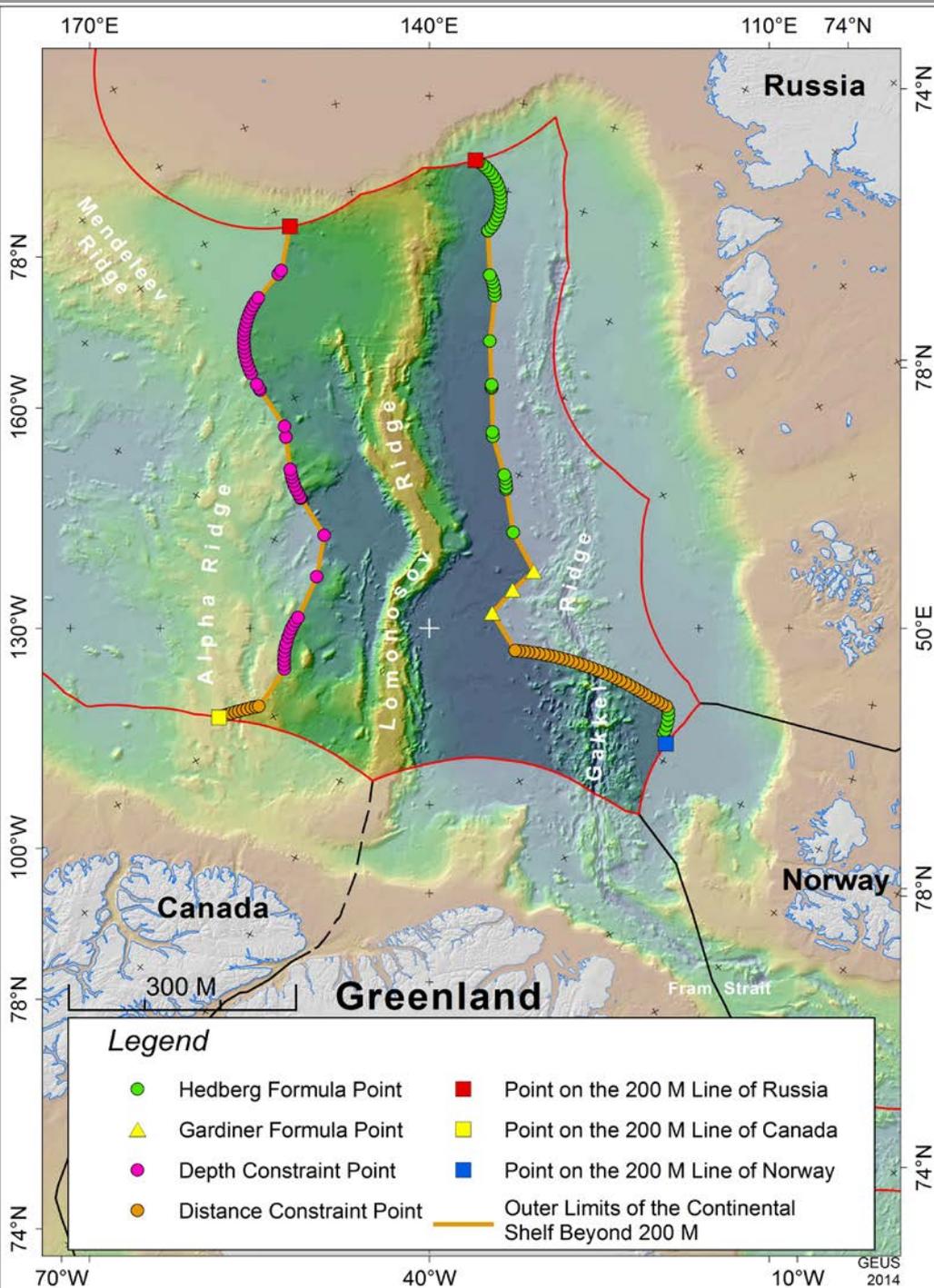
NGM Executive Summary: (http://www.un.org/depts/los/clcs_new/submissions_files/dnk76_14/dnk2014_es.pdf)

- Gakkel Ridge is classified as a submarine ridge and its assessment is based on the CLCS recommendations regarding the area north of the Faroe Islands: *“... **the Ægir Ridge is morphologically continuous with the continental margin north of the Faroe Islands and falls within a common envelope of the foot of the continental slope**, yet is an extinct seafloor spreading ridge that is **geologically different** from the landmass of the Faroe Islands, **it is a submarine ridge in the meaning of article 76, paragraph 6, of the Convention**. The Subcommittee agrees with this view.”*

CLCS Recommendations NFM, 12 March 2014 - paragraph 34:

http://www.un.org/depts/los/clcs_new/submissions_files/dnk28_09/2014_03_14_SCDNK_REC_COM_20140521.pdf

The outer limits of the Northern Continental Shelf of Greenland



Source:

http://www.un.org/depts/los/clcs_new/submissions_files/dnk76_14/dnk2014_es.pdf

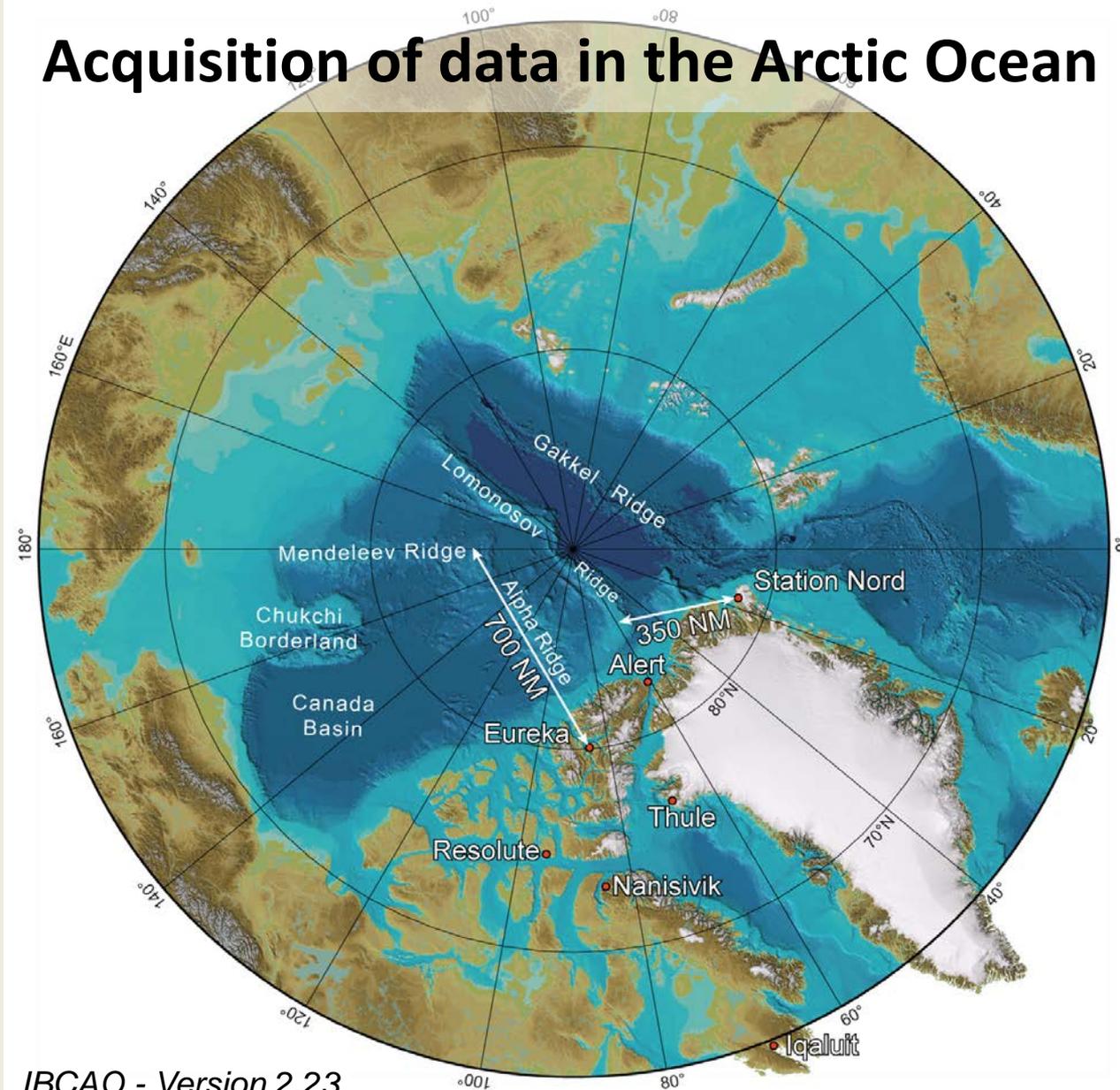
NGM Partial Submission – Database

Both data acquired by the Continental Shelf Project of the Kingdom of Denmark and publicly available data have been included and used:

1. International Chart of the Arctic Ocean (IBCAO 3.0 – www.ibcao.org), which is used as background for all maps included in the NGM partial submission.
2. Measured bathymetric data (multibeam and single beam data).
3. Seismic reflection and refraction data.
4. Subbottom profiler data.
5. ACEX boreholes and LOMROG dredge sample.
6. Aero-geophysical data (magnetic and gravimetric).
7. Scientific literature regarding geology and tectonic setting.

All points delineating the Final Outer Limit of the Northern Continental Shelf of Greenland are derived from measured data – either acquired by the Continental Shelf Project or publicly available.

Acquisition of data in the Arctic Ocean



Challenges:

Perennial sea ice cover

Remoteness

Very sparse infrastructure

Weather

Low temperatures

Fog conditions

Daylight hours

Survey seasons

Early spring and late summer - restricted

Costs

Fuel on the sea ice:

\$30 - \$35 / L by air

Concept: Cooperation



Photo: Ron Verrall

Lorita expedition 2006

Acquisition of seismic refraction data on the sea ice:

Study of the crustal structure from the shelf onto the Lomonosov Ridge.

Results published in Geophysical Journal International, 2010.

A



Photo: Uni Bull

Bathymetric measurements 2009

Joint Canadian- Danish fieldwork based on sea ice in the spring of 2009.

Temperatures ranged from -50°C in March to -20°C in the beginning of May.

B



Photo: Uni Bull

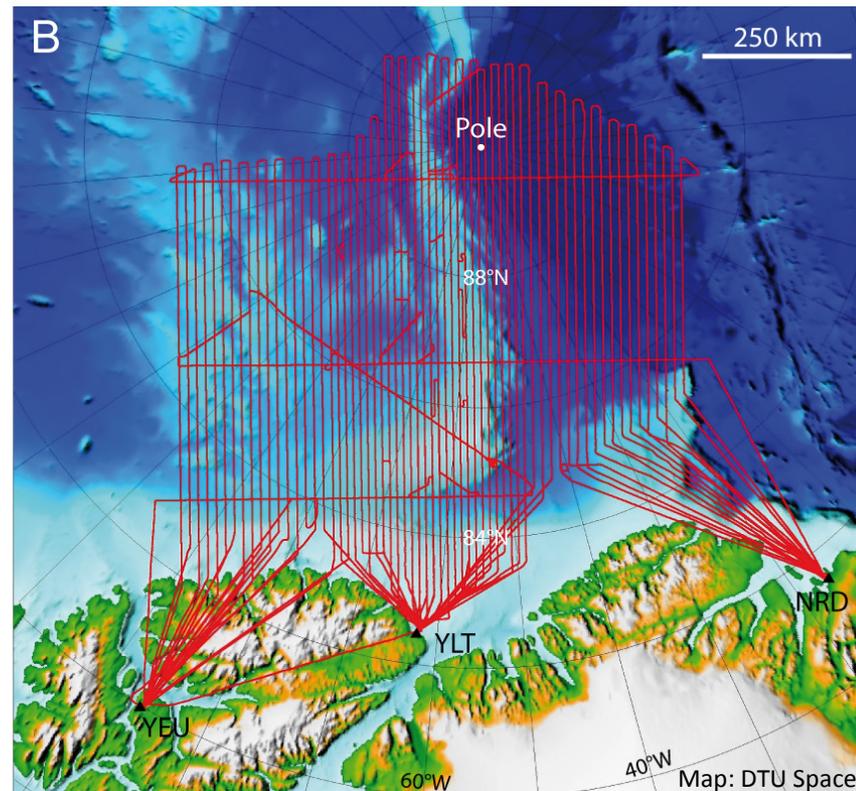
Data have been included in version 3.0 of the International Bathymetric Chart of the Arctic Ocean (IBCAO) www.ibcao.org.

A



Photo: Janice Lang, NRCan/DRDC

B



Acquisition of aero-geophysical data - Spring 2009

A joint Danish – Canadian project to acquire supporting data on both sides of the Lomonosov Ridge using a DC3T.

Magnetic data will be included in the World Digital Magnetic Anomaly Map (WDAM) and the gravity data in the Arctic Gravity Project (ArcGP) and results are published in *Earth Planets Space* **62**, 829–832, 2010.

Icebreaker operations in 2007, 2009 and 2012



Photo: Hans Ramløv



Photo: Bjørn Eriksson



Photo: Thomas Funck



Photo: Thomas Funck

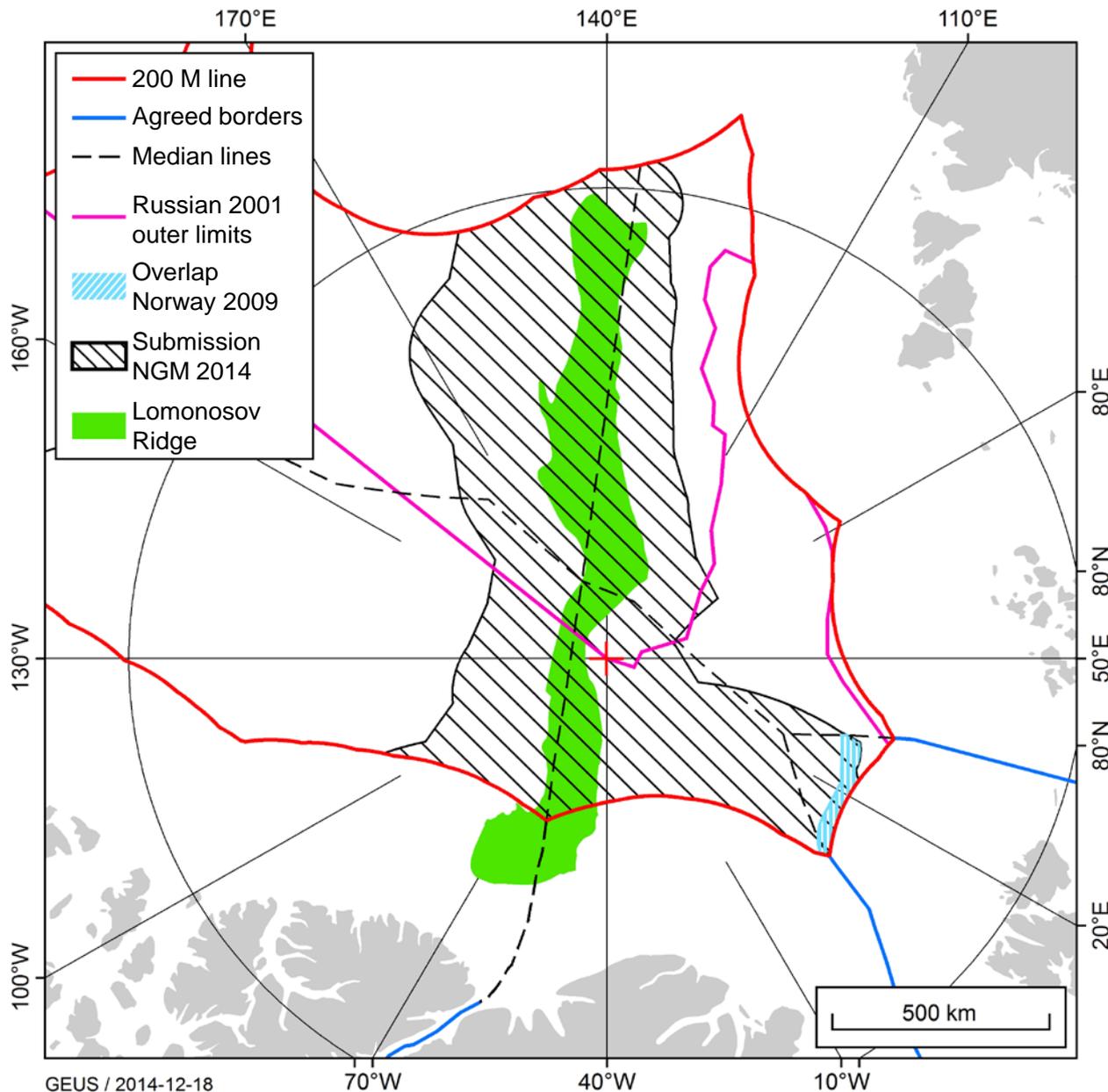
Operational conditions during acquisition of seismic data



Overlapping claims

“The Commission is a technical body responsible for making recommendations pertaining to the outer limits of the continental shelf. It has no mandate to resolve overlapping maritime boundaries, and submissions to it “are without prejudice to the question of delimitation of the continental shelf between States with opposite or adjacent coasts”. (Article 76.10) **Responsibility for resolving such disputes rests with the states involved.”**

From: Neither Conflict nor “Use It or Lose It” by Elizabeth Riddell-Dixon on opencanada.org



Overlapping claims

See: Chapter 7 of NGM Executive Summary

Non-objection notes filed by Norway and Canada and expected from Russia and USA.

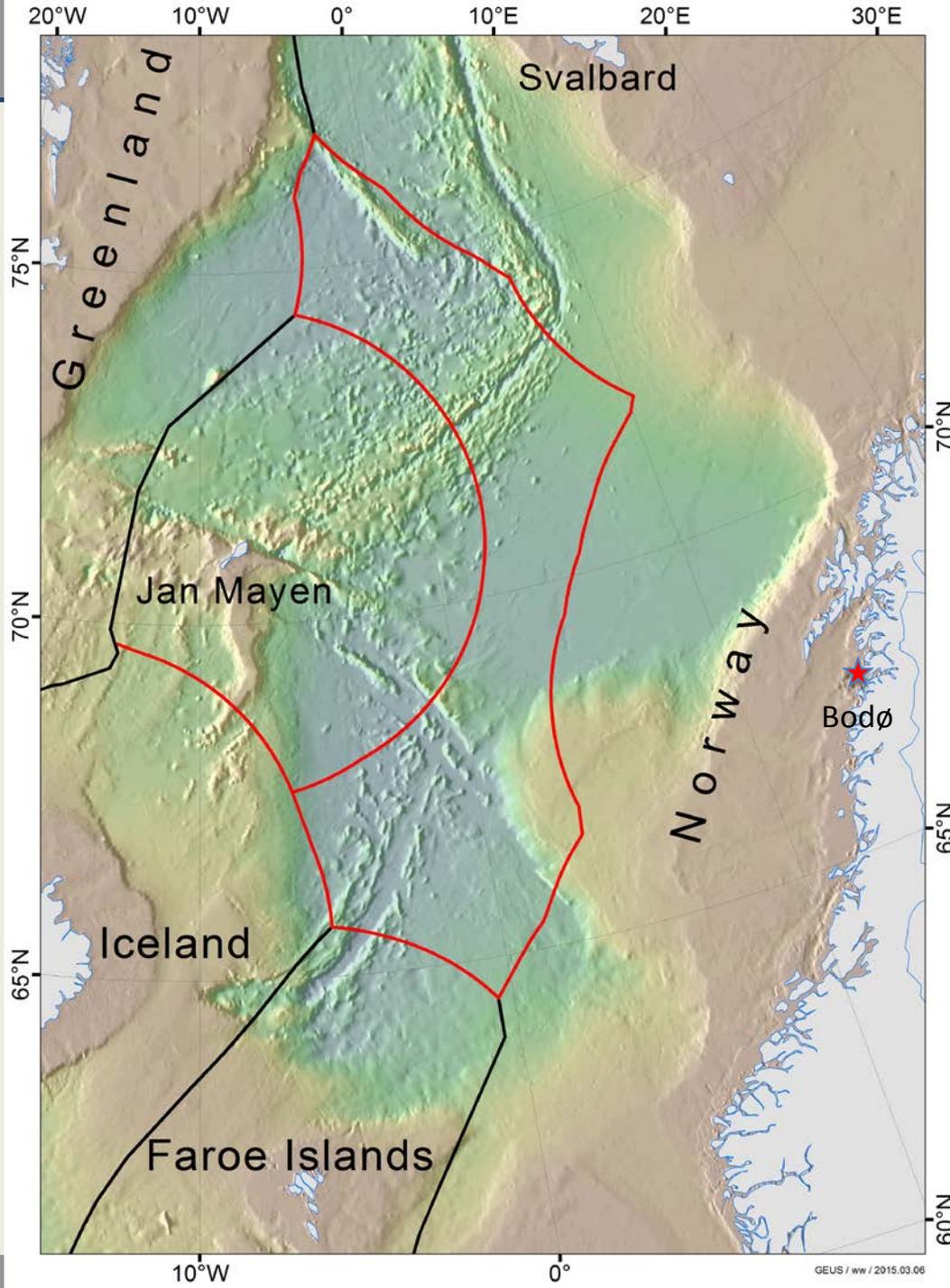
Submissions to come:

Russian Federation: resubmission in 2015?

Canada: expected 2013?

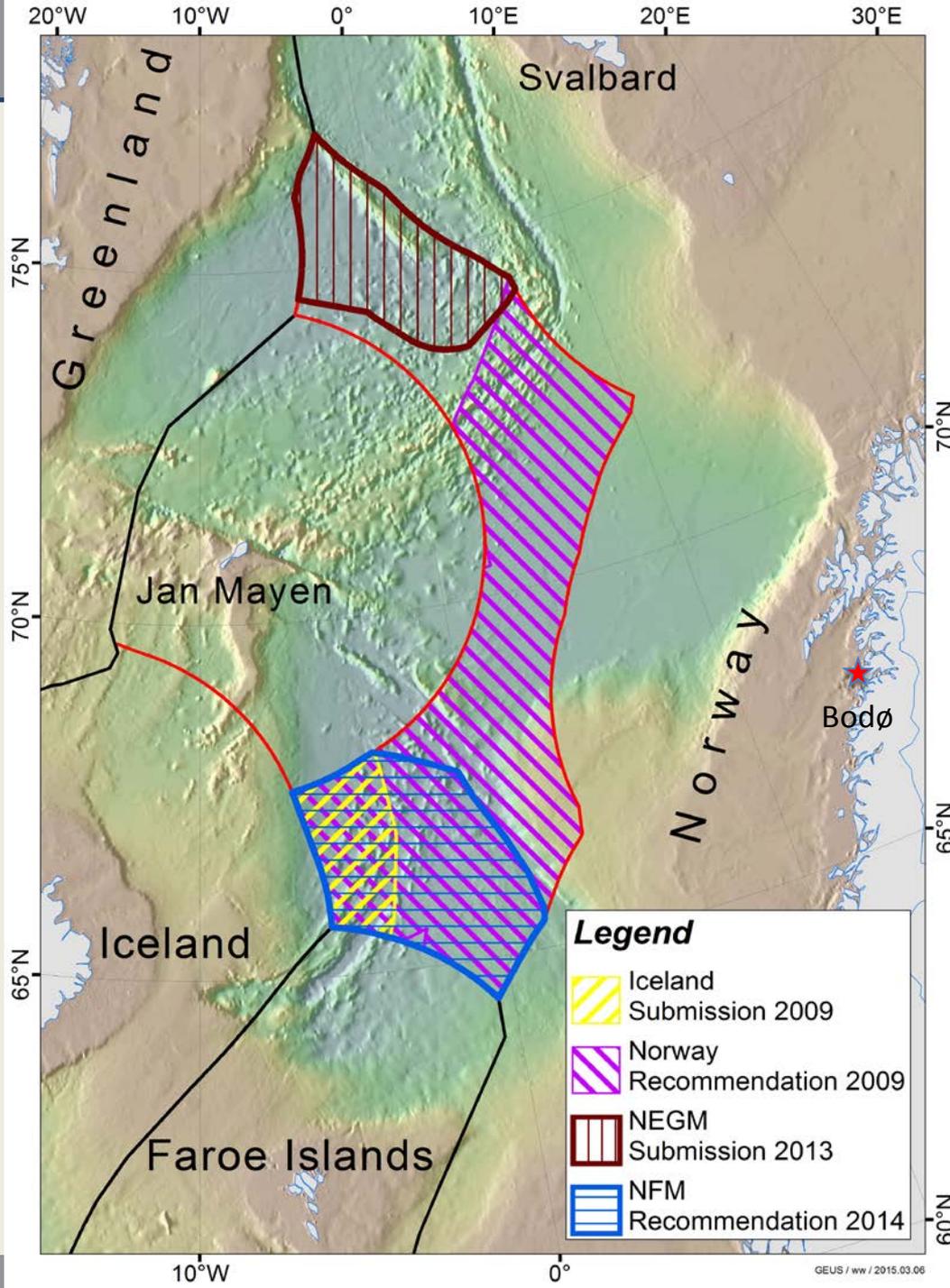
USA: ?

Long queue due to the modus operandi of the CLCS.



North Atlantic – overlapping claims Norway, Iceland and Faroe Islands

Agreed Minutes on the Delimitation of the Continental Shelf beyond 200 Nautical Miles between the Faroe Islands, Iceland and Norway in the Southern Part of the Banana Hole of the Northeast Atlantic of September 2006.



North Atlantic – overlapping claims Norway, Iceland and Faroe Islands

- 100% overlap between and Faroe Island ECS and Norway's ECS
- 100% overlap between Iceland's submission and Norway's ECS
- 100% overlap between Iceland's submission and Faroe Island ECS.

Arctic cooperation

- **Cooperation regarding data acquisition** with various countries.
- **“Ilulissat declaration”** of May 28, 2008:
 - Commitment to international law (UNCLOS) and orderly settlement of any possible overlapping claims.
 - Close cooperation i.e. collection of scientific data concerning the continental shelf.
- November 2007: first annual **workshop on scientific issues related to the continental shelf in the Arctic Ocean** – UNCLOS article 76 with participants from the Russian Federation, Canada and Denmark.
- Since 2009 the USA and since 2010 Norway also participated.
- Forum for open exchange of information on the status of the Arctic-5’s continental shelf projects regarding data acquisition and interpretation.
- Main focus on the tectonic development of the Arctic Ocean and the nature of its ridges.
- Forum for informal discussions and consultations between diplomats.

Thank you for your attention!



More information: www.a76.dk

North Pole Olympic Torch Relay, October 2013