

Economic Political Drivers: The potential for AUVs in UNCLOS

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Masterclass in AUV Technology, NOC

Structure

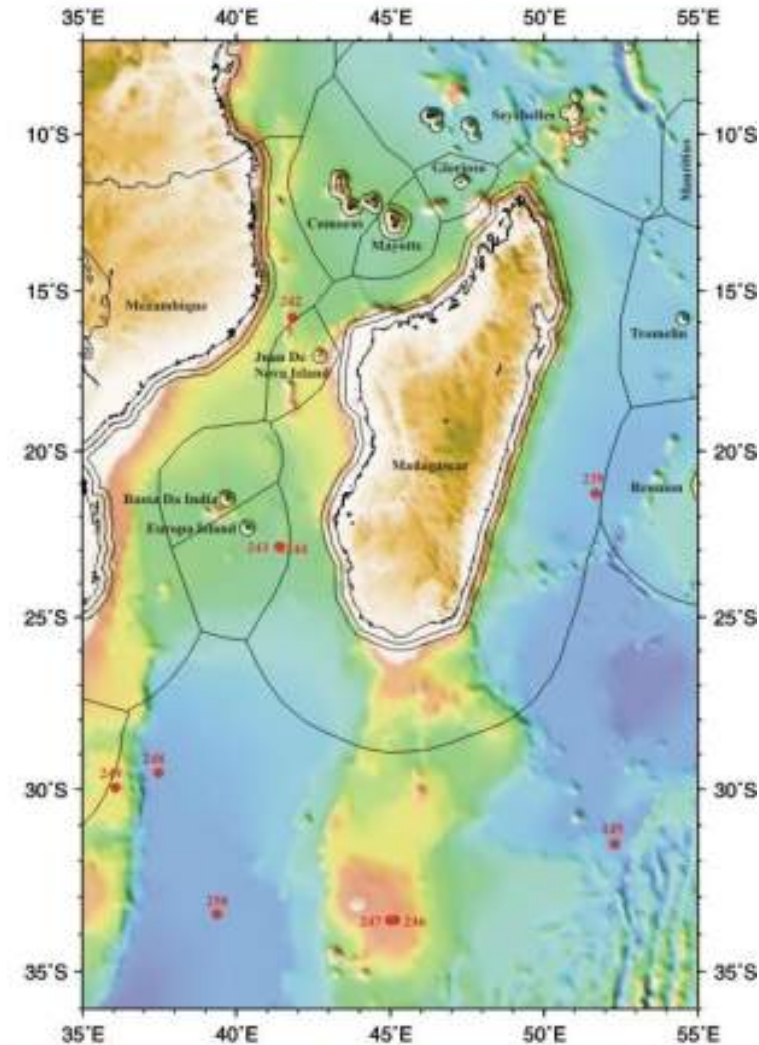
- Article 76 of the UNCLOS
- Current status of eCS submissions
- Potential for AUV technologies in CS work
- Summary

Article 76 of the United Nations Convention on the Law of the Sea

Paragraph 4(a)

- for the purposes of this Convention, the coastal State shall establish the outer edge of the continental margin wherever the margin extends beyond 200 nautical miles from the baselines from which the breadth of the territorial sea is measured, by either:

Madagascar - Maritime Boundary Issues



• DSDP drill sites
— Provisional maritime boundaries and/or EEZ limits

Paragraph 4(a)(i) of Article 76 of UNCLOS: Outer Limit - Formula 1

- a line delineated by reference to the outermost fixed points at each of which the thickness of sedimentary rocks is at least 1 per cent of the shortest distance from such point to the foot of the continental slope;

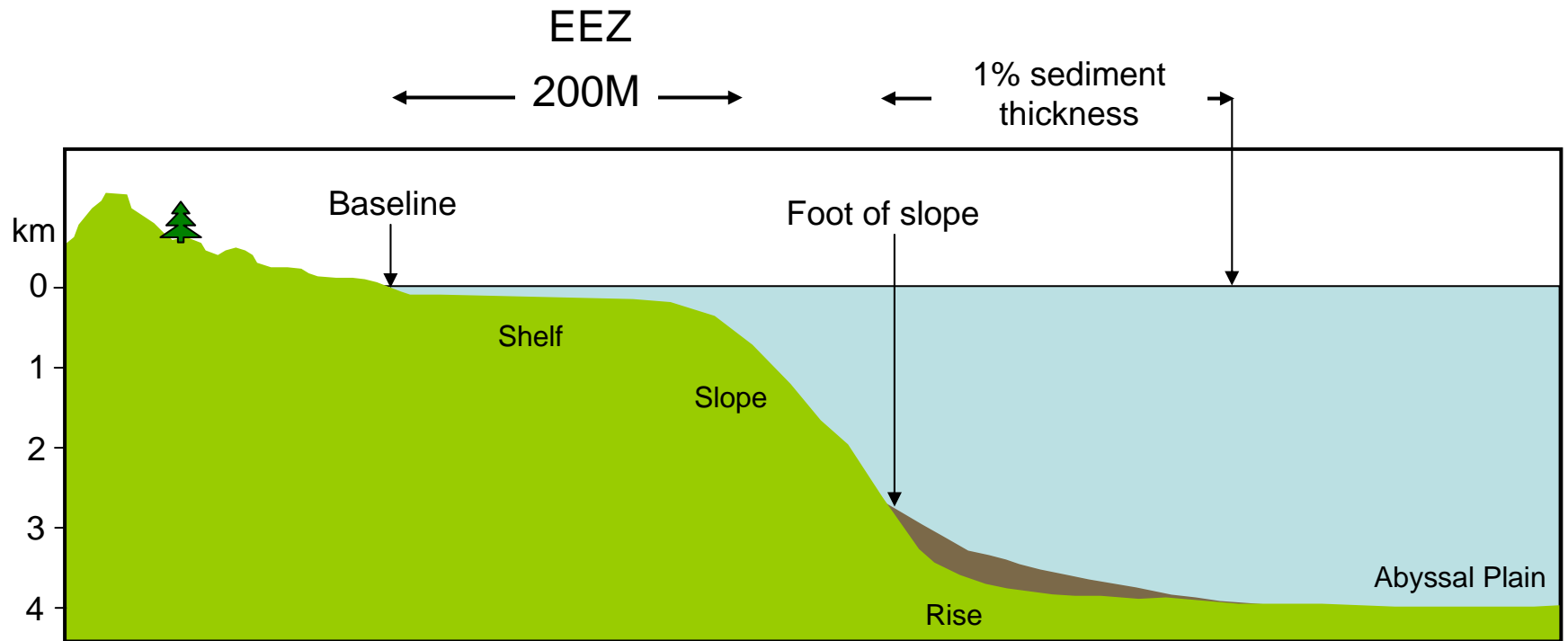
Paragraph 4(a)(ii) of Article 76 of UNCLOS: Outer Limit - Formula 2

- a line delineatedby reference to fixed points not more than 60 nautical miles from the foot of the continental slope

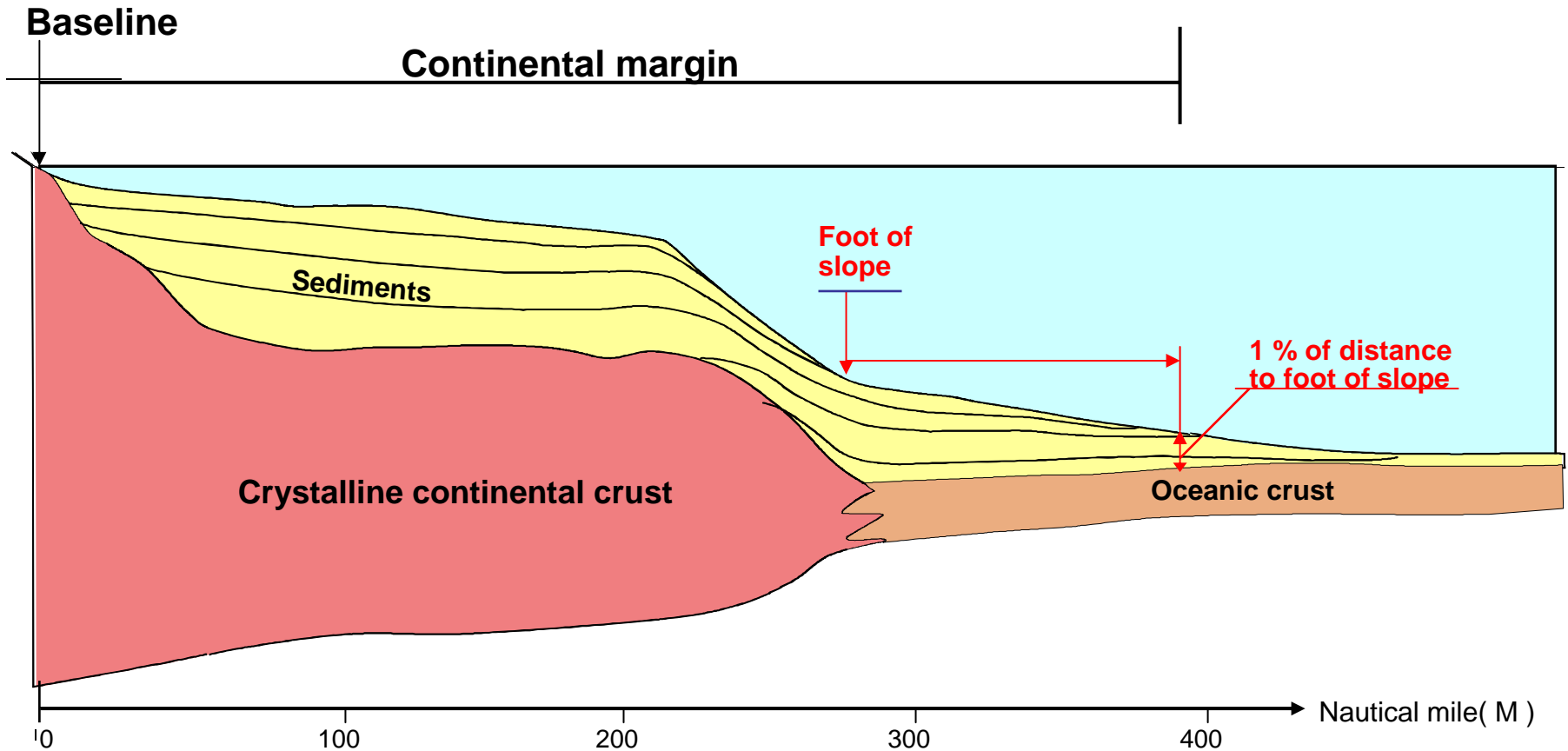
The 1% Line (Gardner Line)

- Identify the FOS
- Identify section of sedimentary rocks at the FOS
- Monitor/measure thickness until it is 1% of the distance from the FOS
- Identify the FOS by **bathymetric surveying**, then sediment thickness by **seismic reflection measurements**

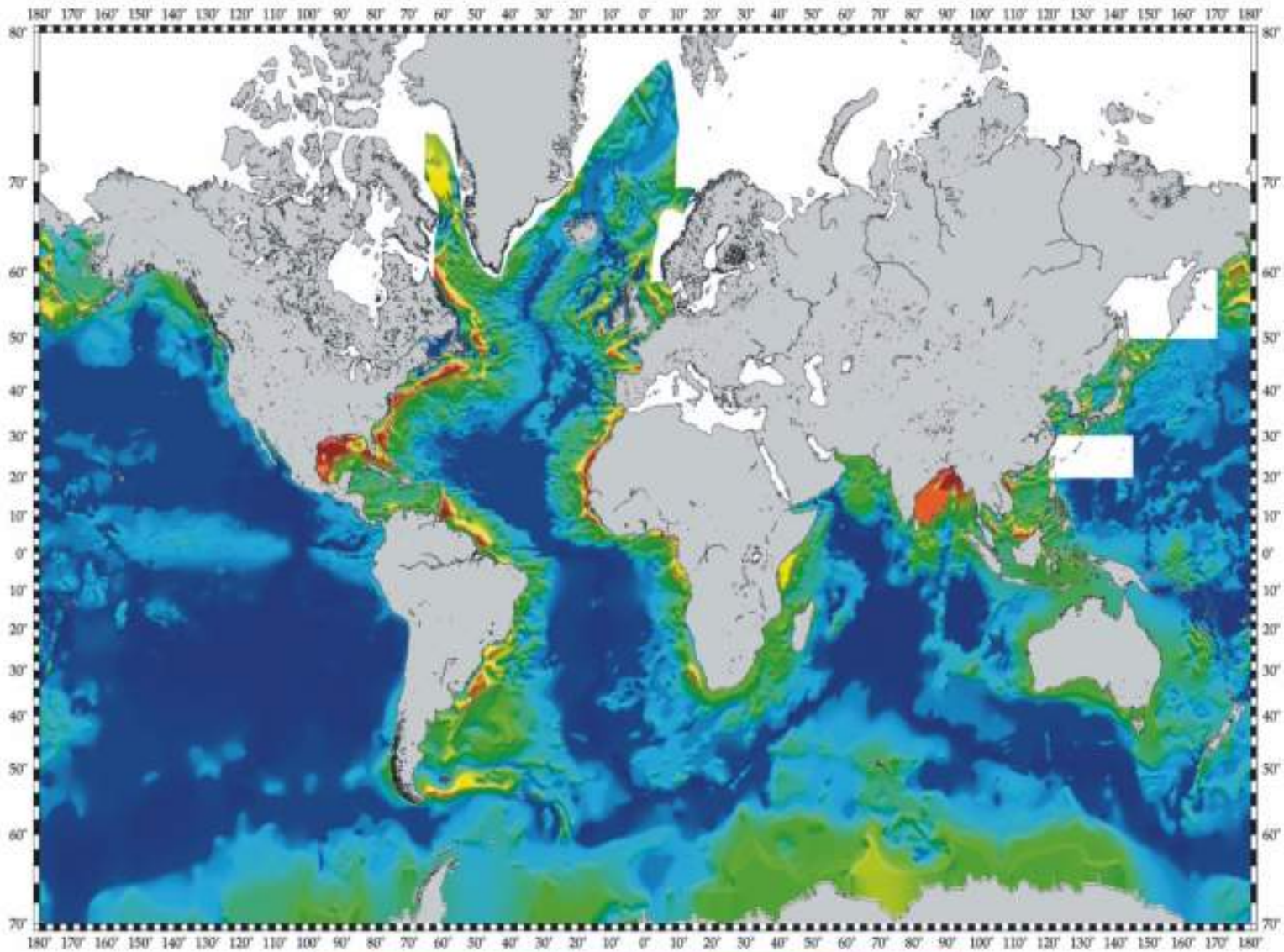
eCS - Foot of slope and 1% Outer Limit Position



Determination of the outer edge of the continental margin by sediment thickness



Global Sediment Thickness Distribution



Sediment thickness [m]

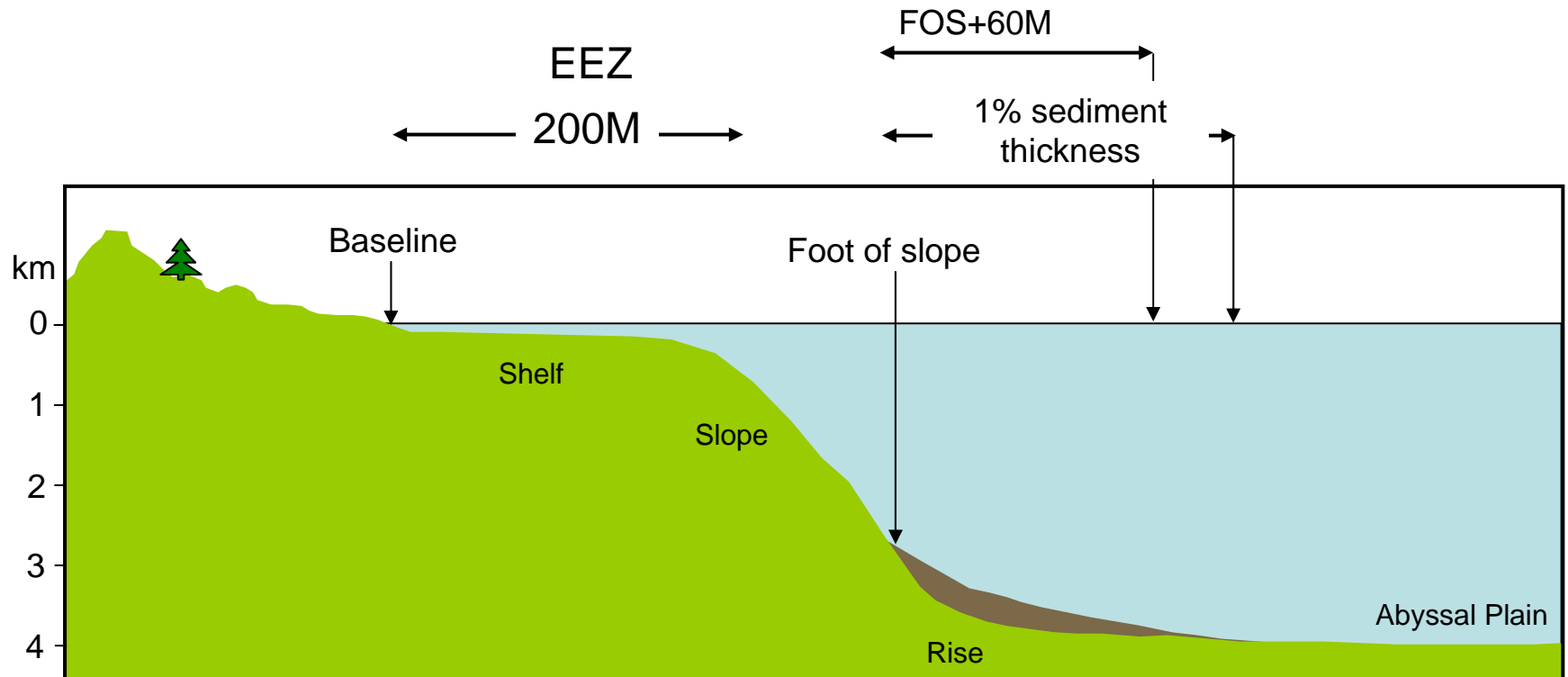


NOAA National Data Centers, NGDC

FOS + 60 M Line (Hedberg Line)

- Delineate the Foot of the Slope
- Determine position that is 60 nautical miles from the FOS
- Effectively a series of 'rolling arcs' 60 M from a defined FOS
- Once FOS has been identified **using bathymetric data**, straightforward geodetic measurement is required

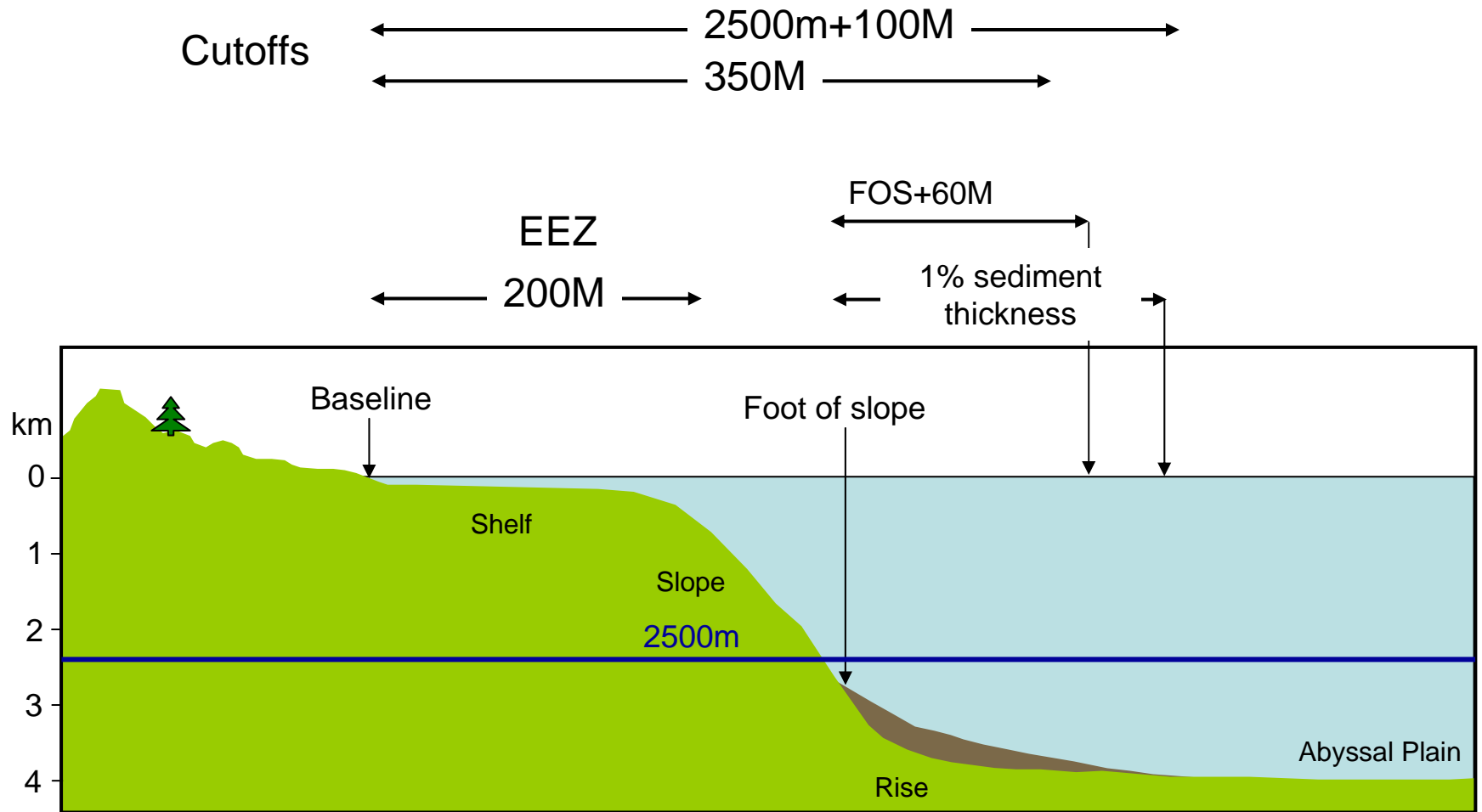
eCS - Foot of slope and 60M Outer Limit Position







Article 76 constraints - Paragraph 5

- The Constraint Lines determine that the outer limit cannot exceed:
 - 350 Nautical Miles from the Territorial Sea Baseline, or
 - 2,500 metre isobath + 100 nautical miles
- Whichever is the most advantageous to the coastal state
- The second constraint needs **accurate, precisely navigated bathymetric data**

eCS - Foot of slope and Constraint Lines



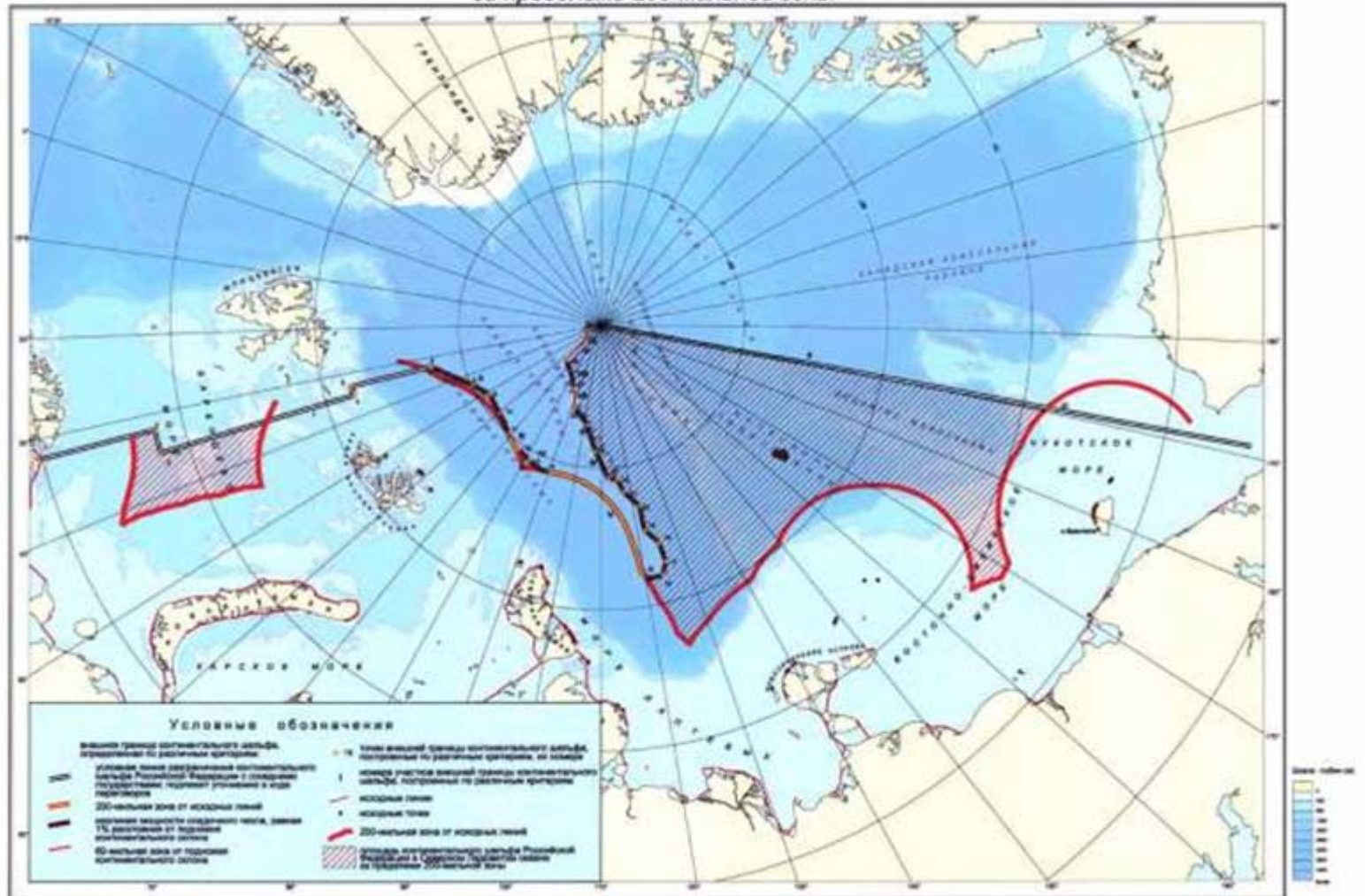
Coastal States and dates of their submissions

<i>STATE</i>	<i>YEAR</i>
	2001
	2004
	2004
	2005

Most states have a 2009 deadline

Russia's Submission: Barents Sea and Central Arctic

Площадь континентального шельфа Российской Федерации в Северном Ледовитом океане за пределами 200-мильной зоны



Australia's Continental Shelf Submission

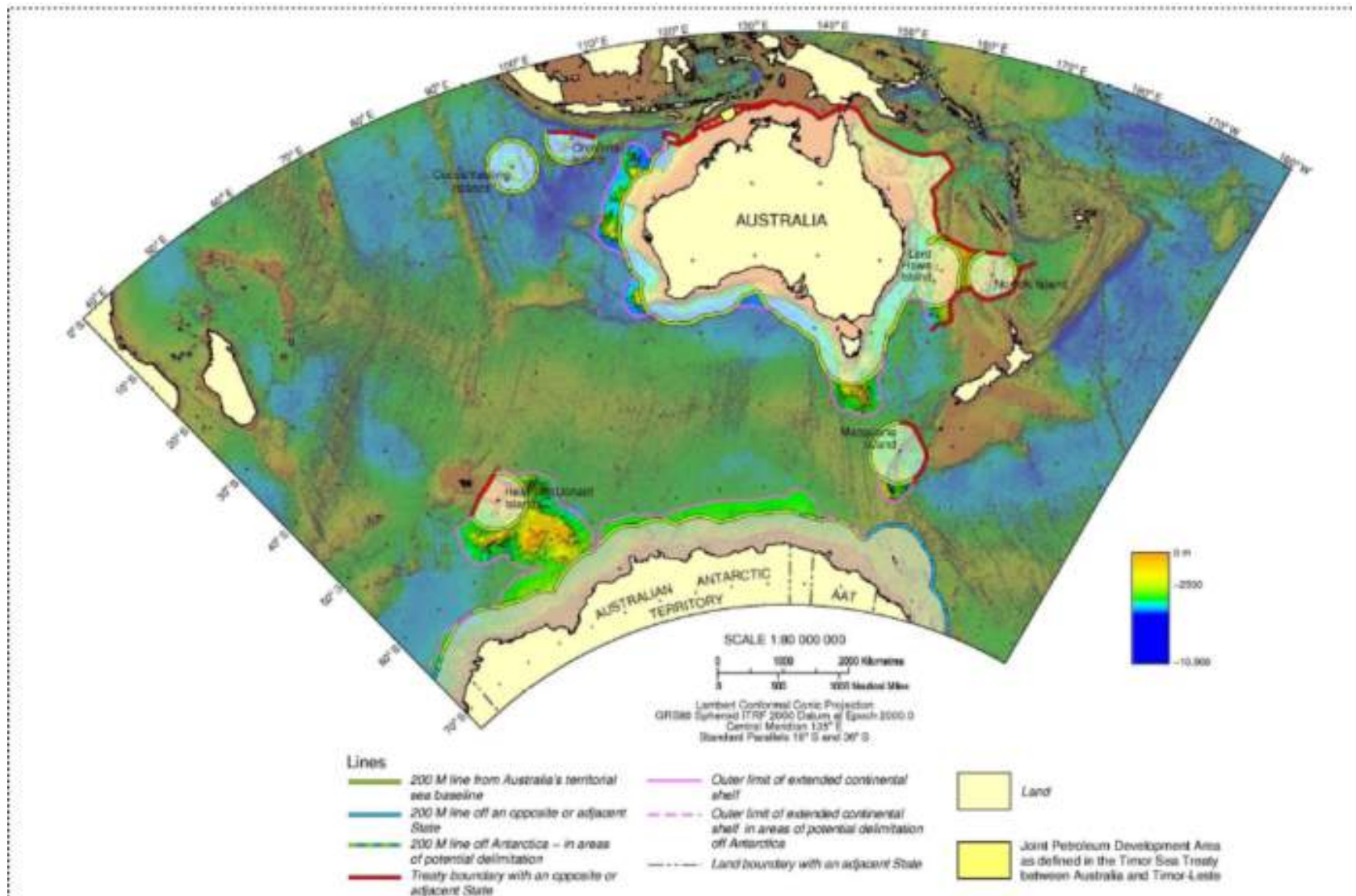
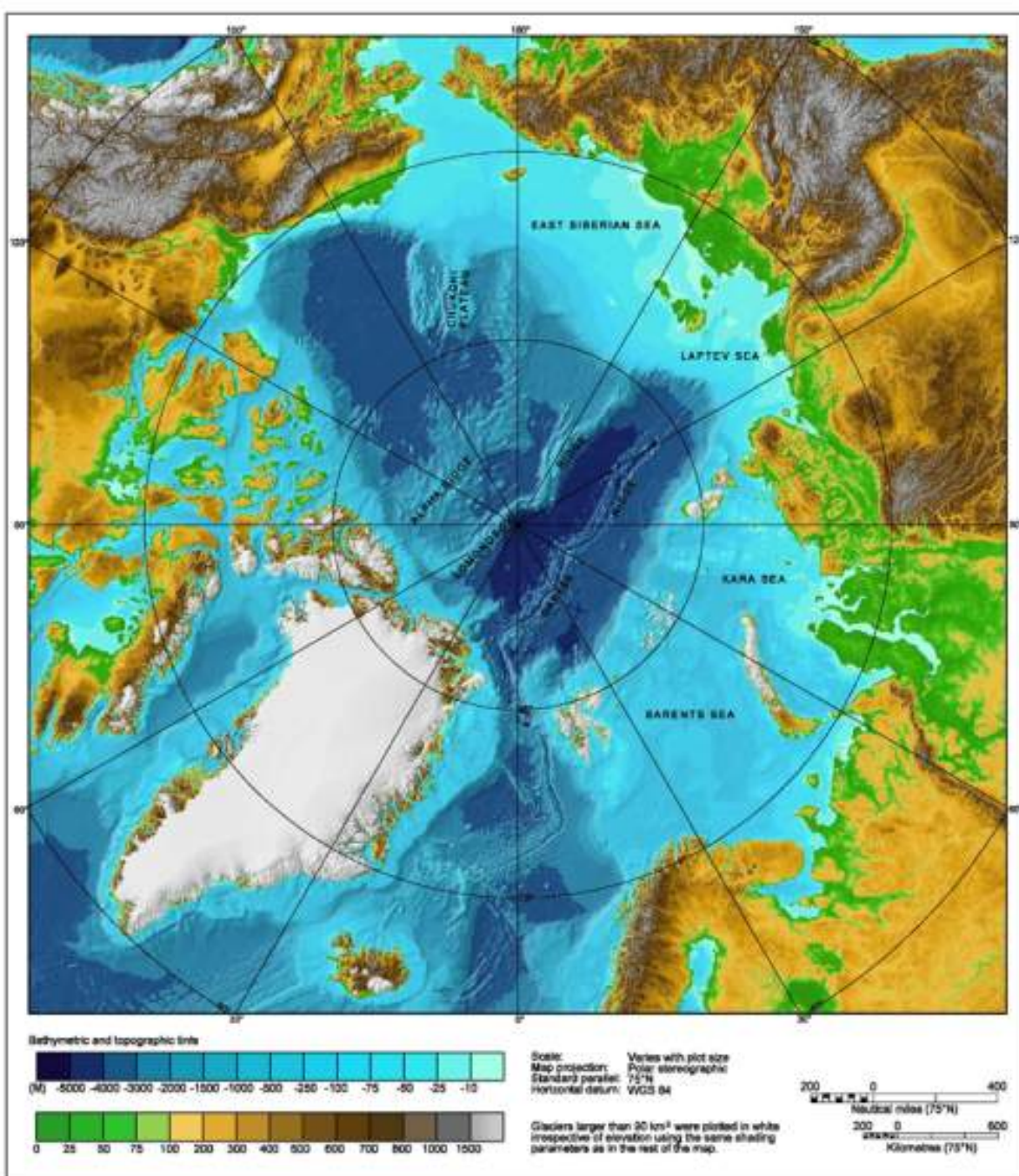
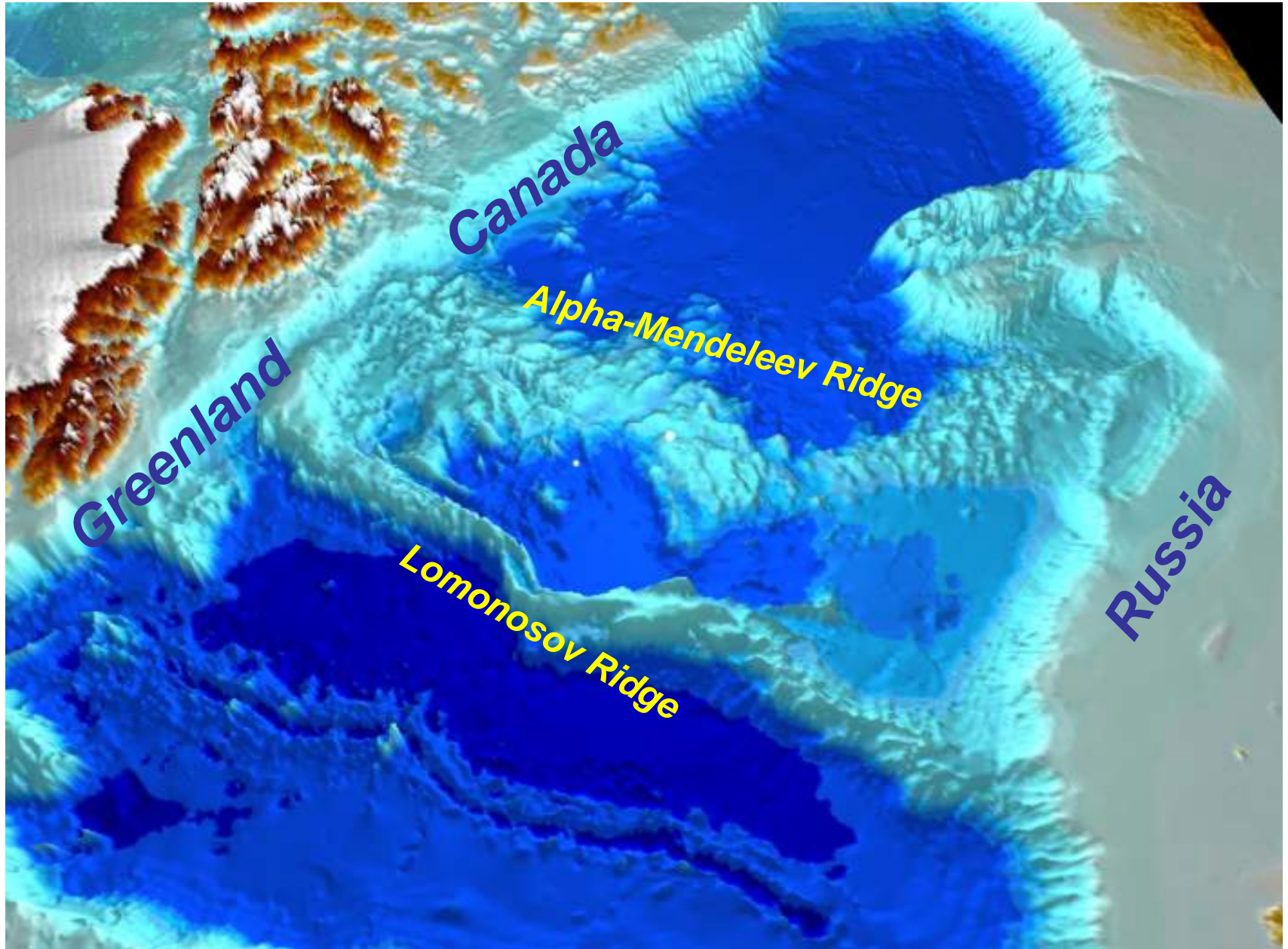


Figure 1. The outer limit of the continental shelf of Australia showing the outer limit line and the area of extended continental shelf.

- Ice-covered areas
- Arctic has 5 coastal states with eCS
- Key features may provide prolongation of CS
- Data required is bathymetry, seismic reflection and refraction

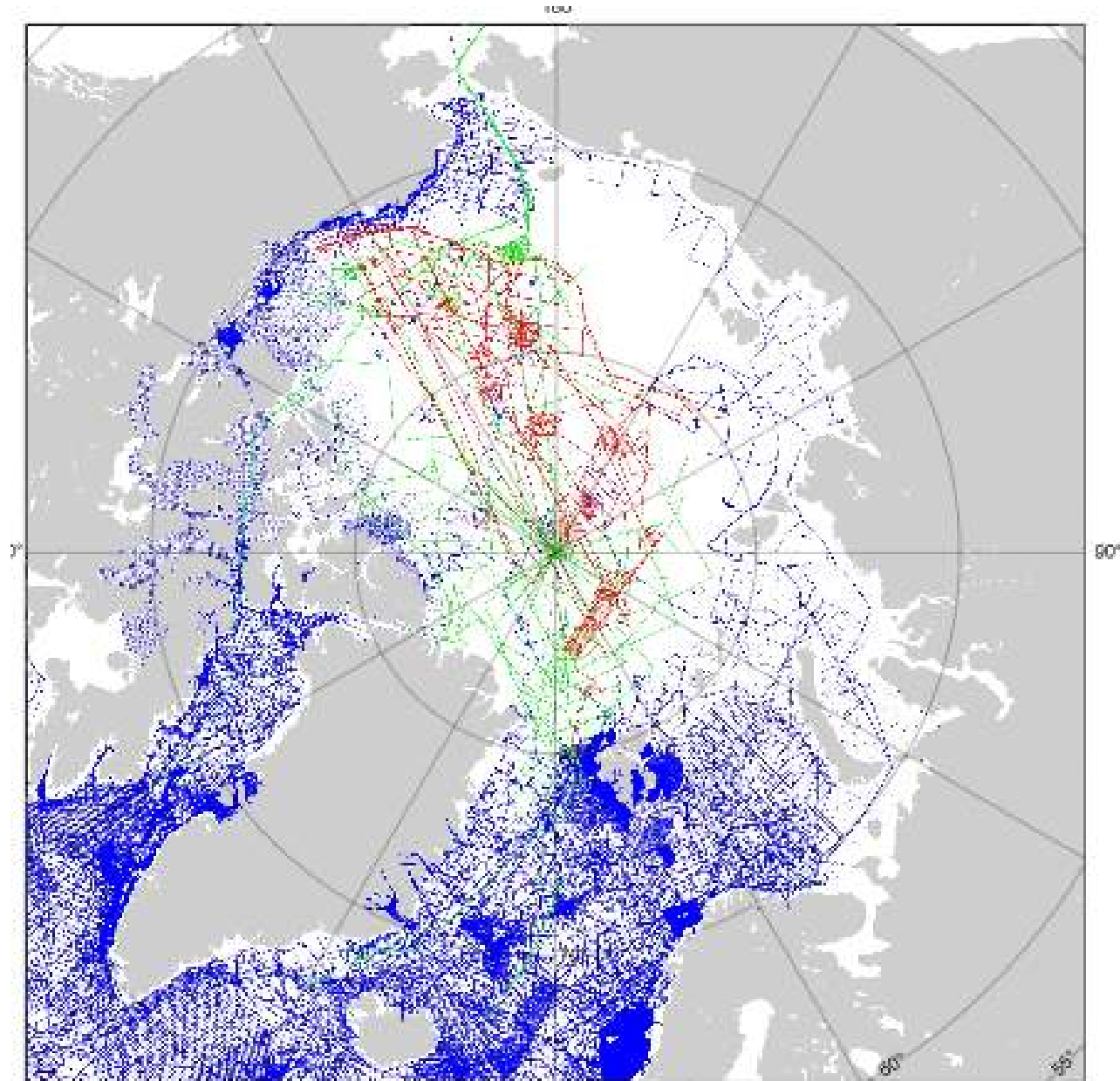


The Arctic Ocean - Morphology

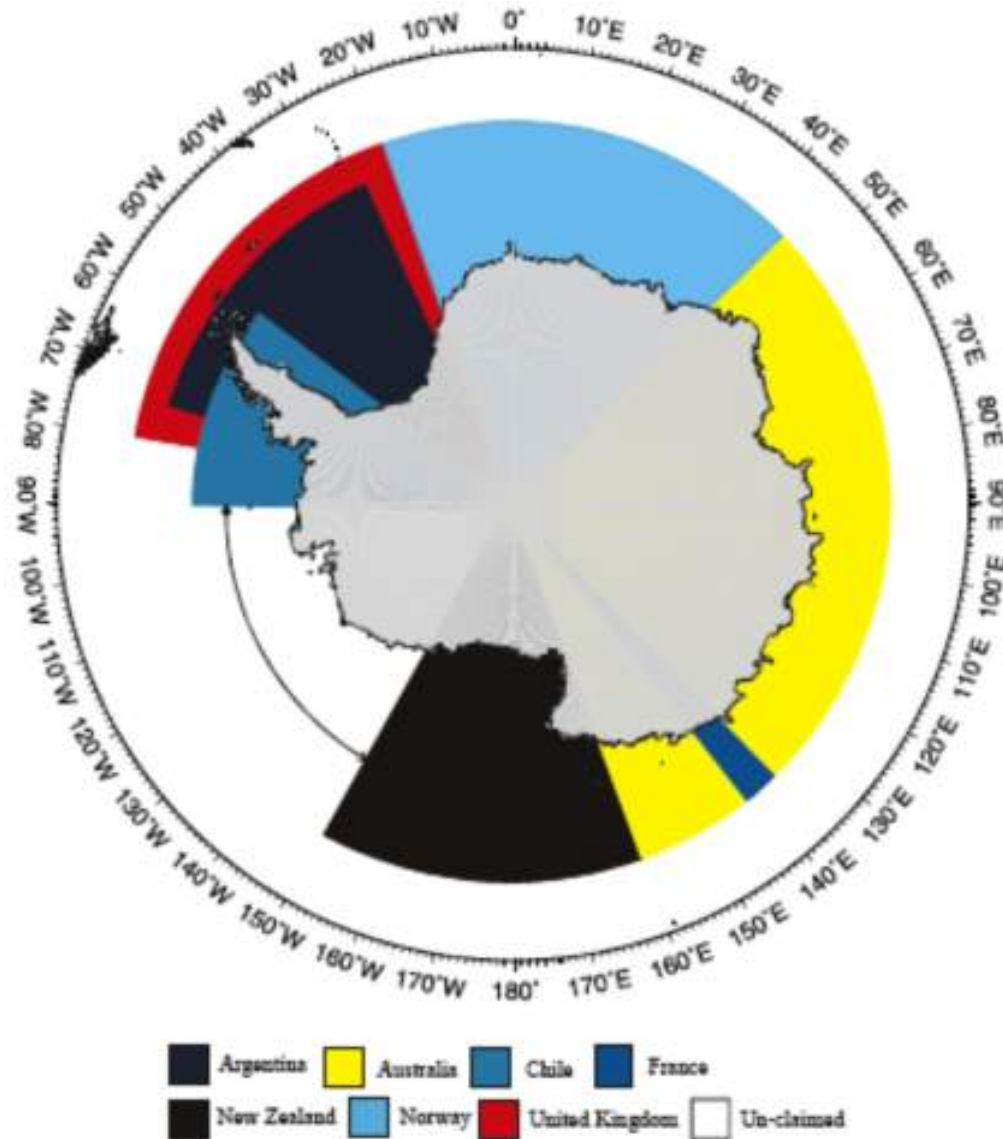


The Arctic Ocean

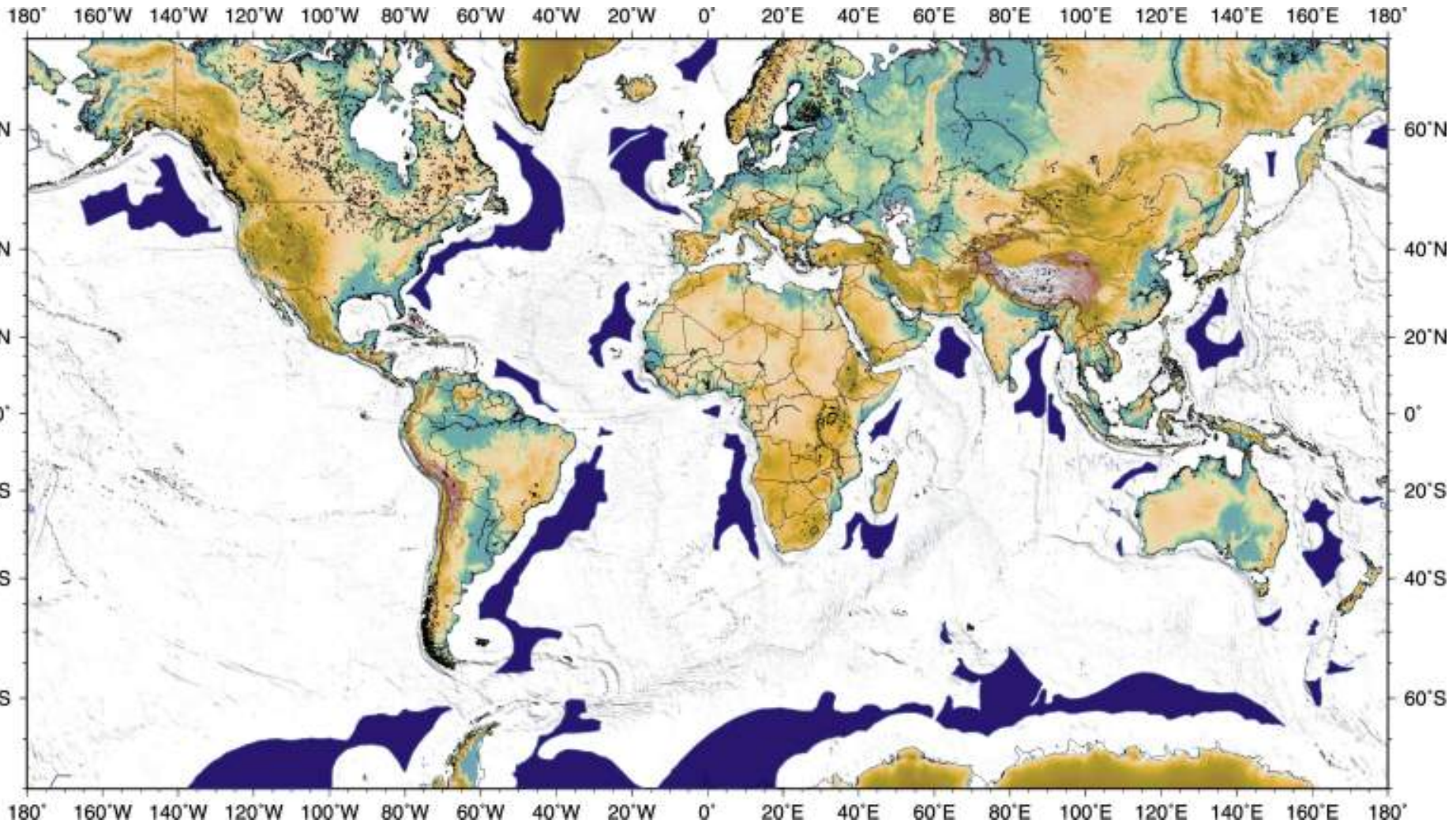
- Data available at present
- Insufficient - e.g. Russian Submission



Antarctica - The Treaty and UNCLOS



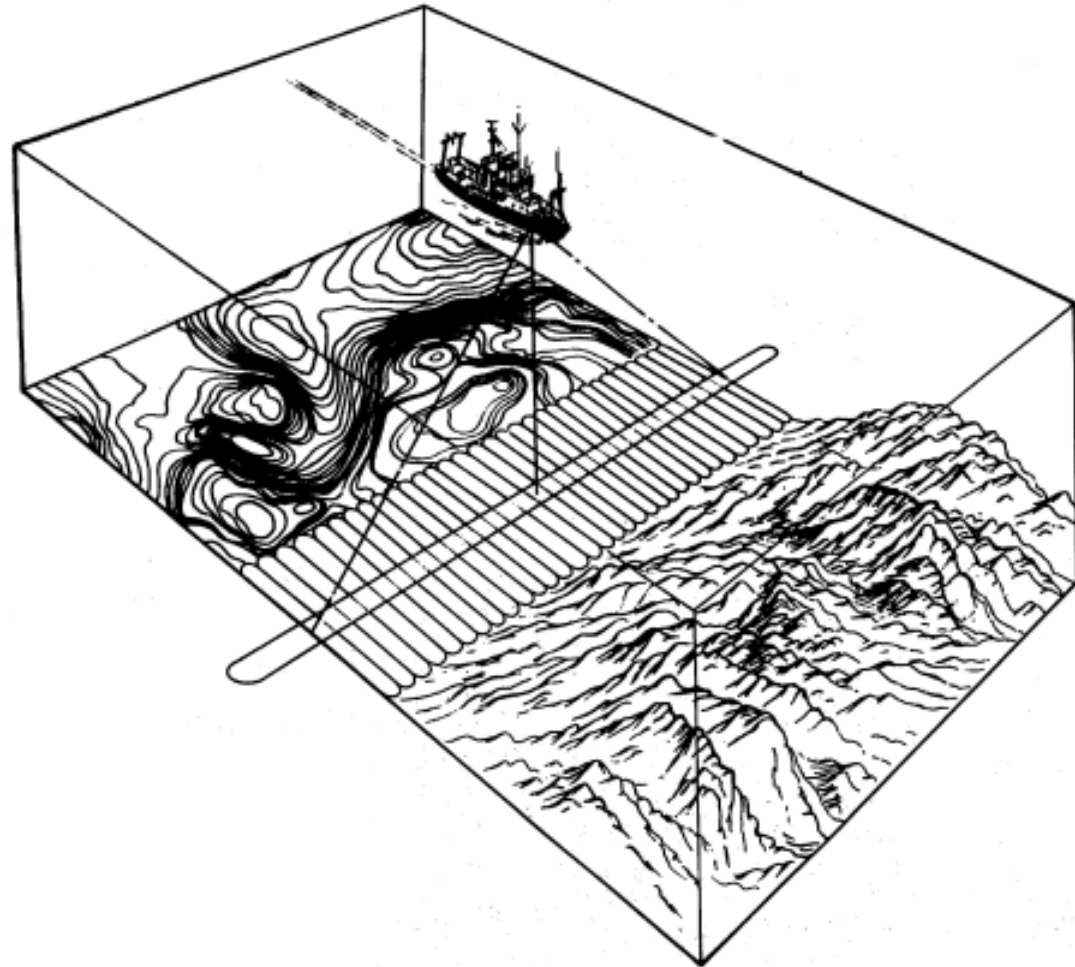
Global potential for eCS submissions



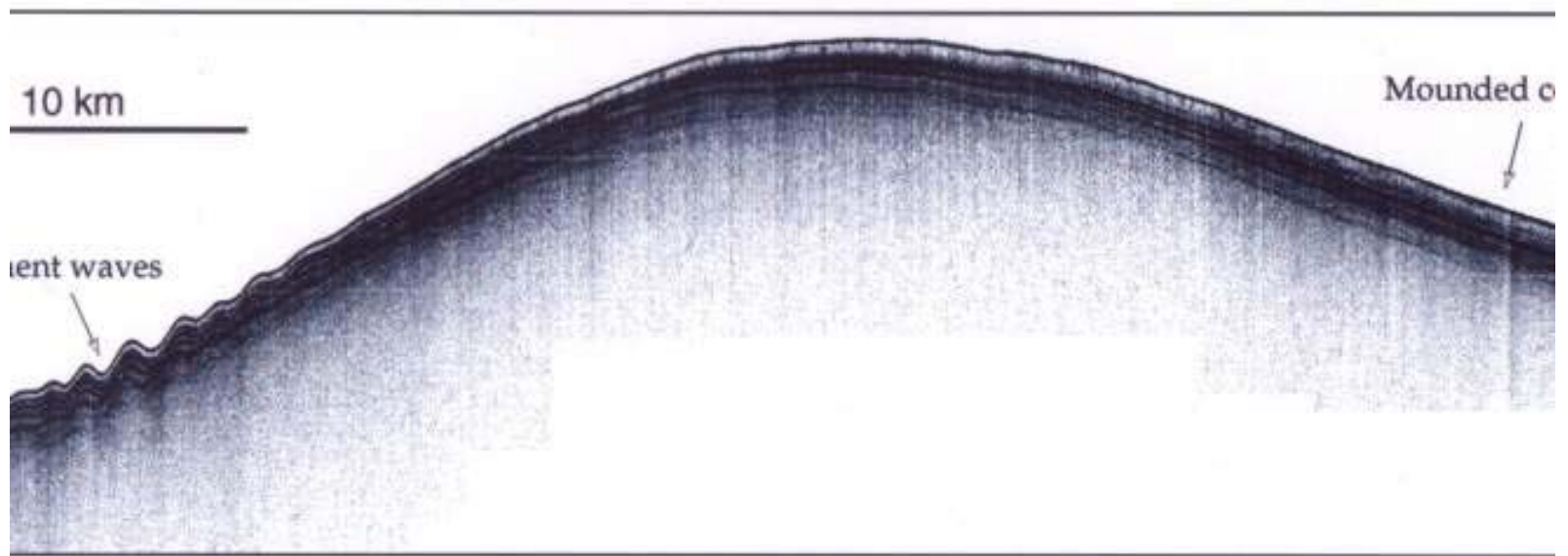
AUV Technologies

- Bathymetry - single and multibeam
- Seismic reflection profiling - but high resolution only? - for continuity
- Hybrid land-based and marine (AUV)?
- Magnetics and gravity - of supplementary use
- Endurance

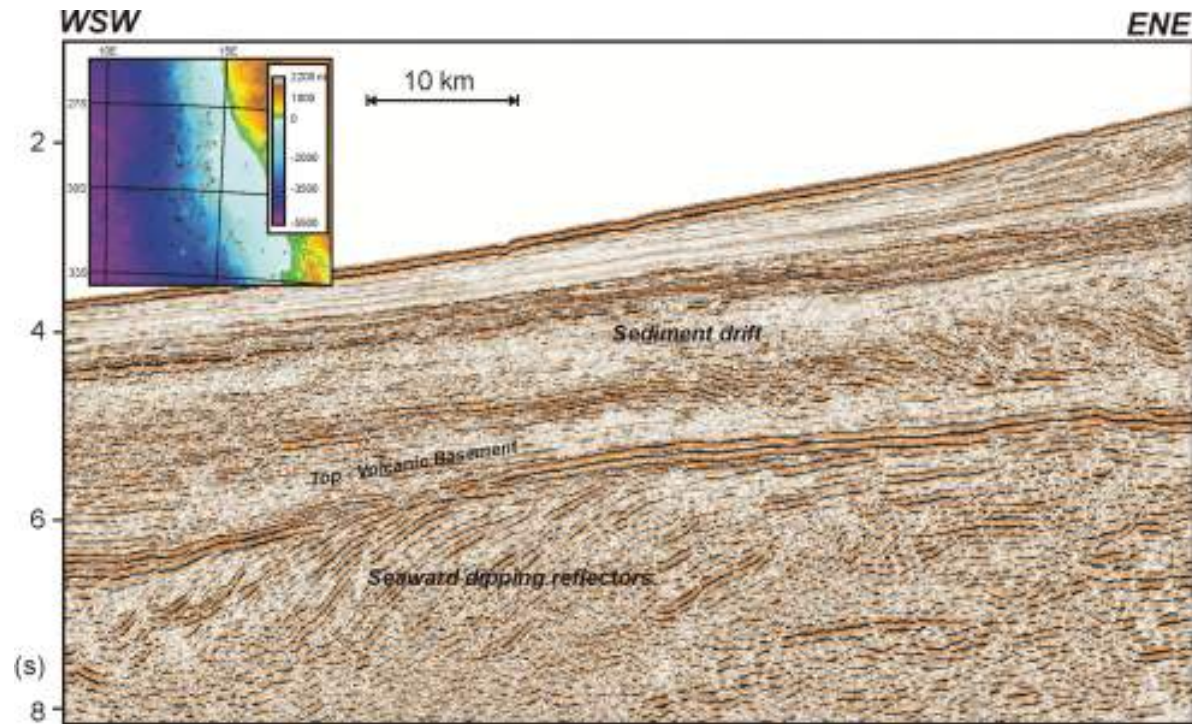
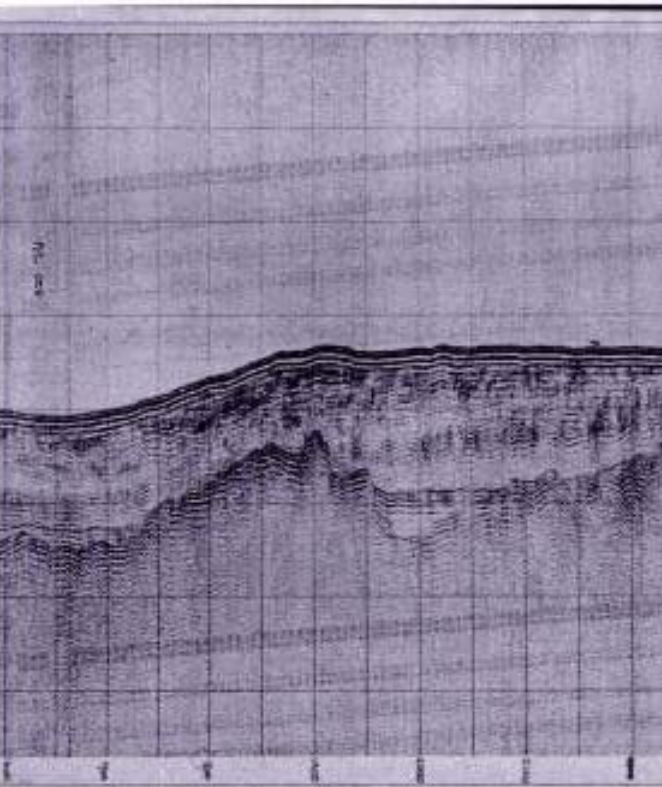
Bathymetry - multibeam desirable, but not essential



3.5 kHz profile - can provide sediment continuity



Multichannel seismics - in some form, needed at the 1% sediment thickness point



Summary

- As potential for eCS claims is recognised, frontier areas need data acquisition
- The deadline for submission of most coastal states is May 2009
- Can AUV development deliver?