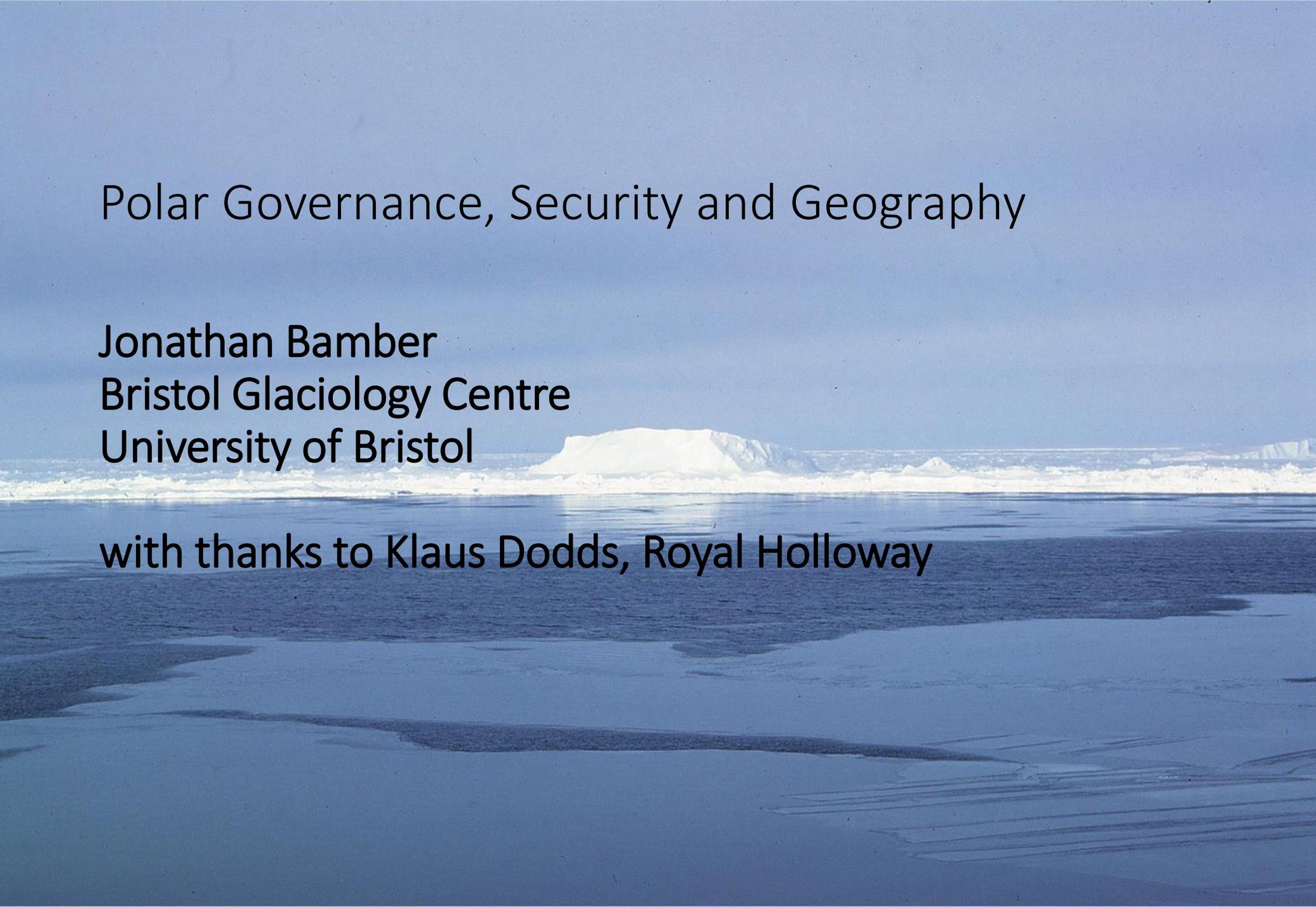


# Polar Governance, Security and Geography

Jonathan Bamber  
Bristol Glaciology Centre  
University of Bristol

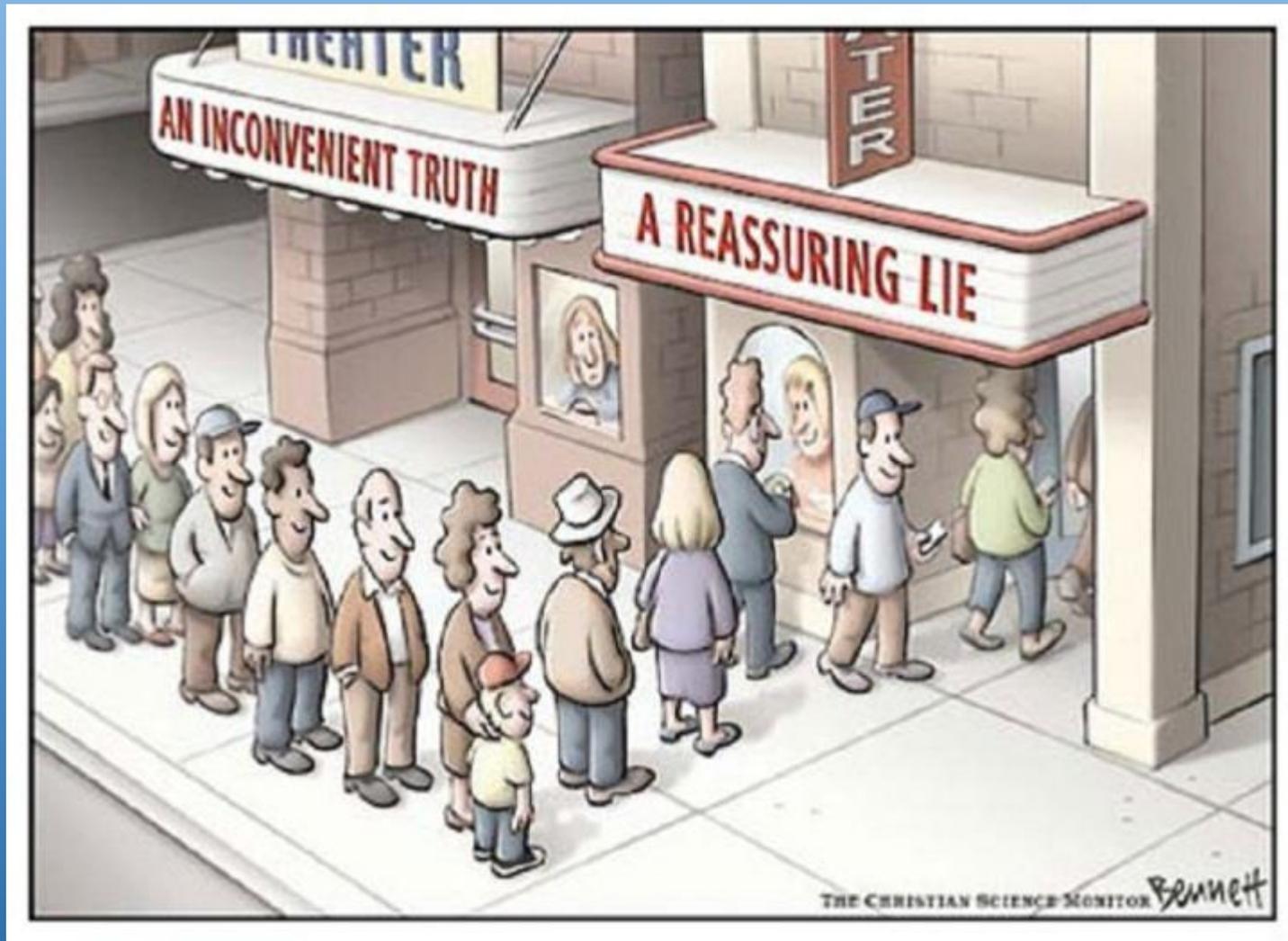
with thanks to Klaus Dodds, Royal Holloway



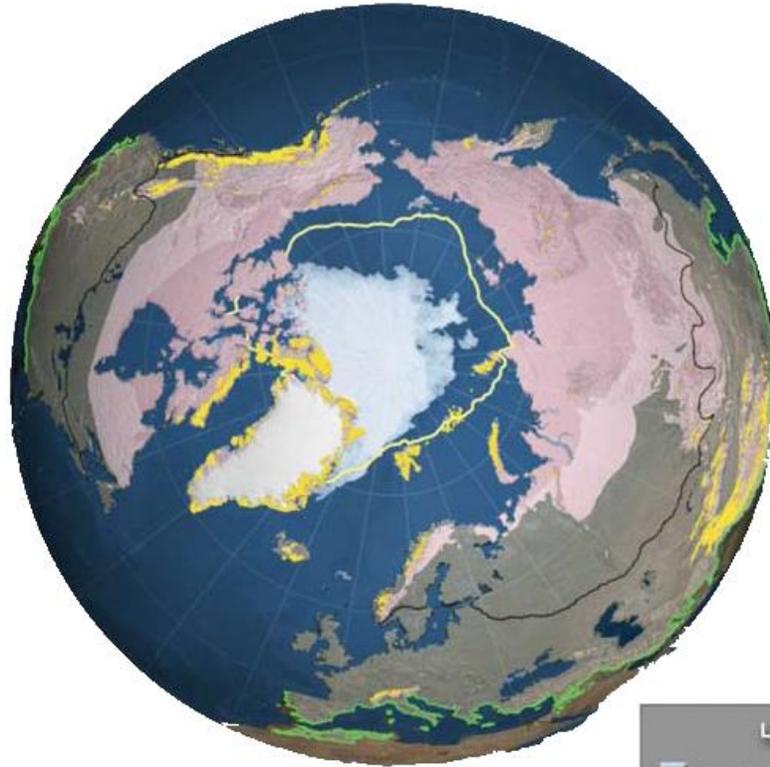
# Demanding Polar Geopolitics

- Demanding and receiving attention from 'outsiders'
- Climate change: global security
- Resource exploitation
- Governance
- Access and rights
- Visitation/settlement
- Polar Regions making demands of their own
- Indigenous rights and activism
- Community resilience
- Ecosystem and geo-physical change
- Knowledge collection and usage

My favourite climate change cartoon:



# A bit of geography...

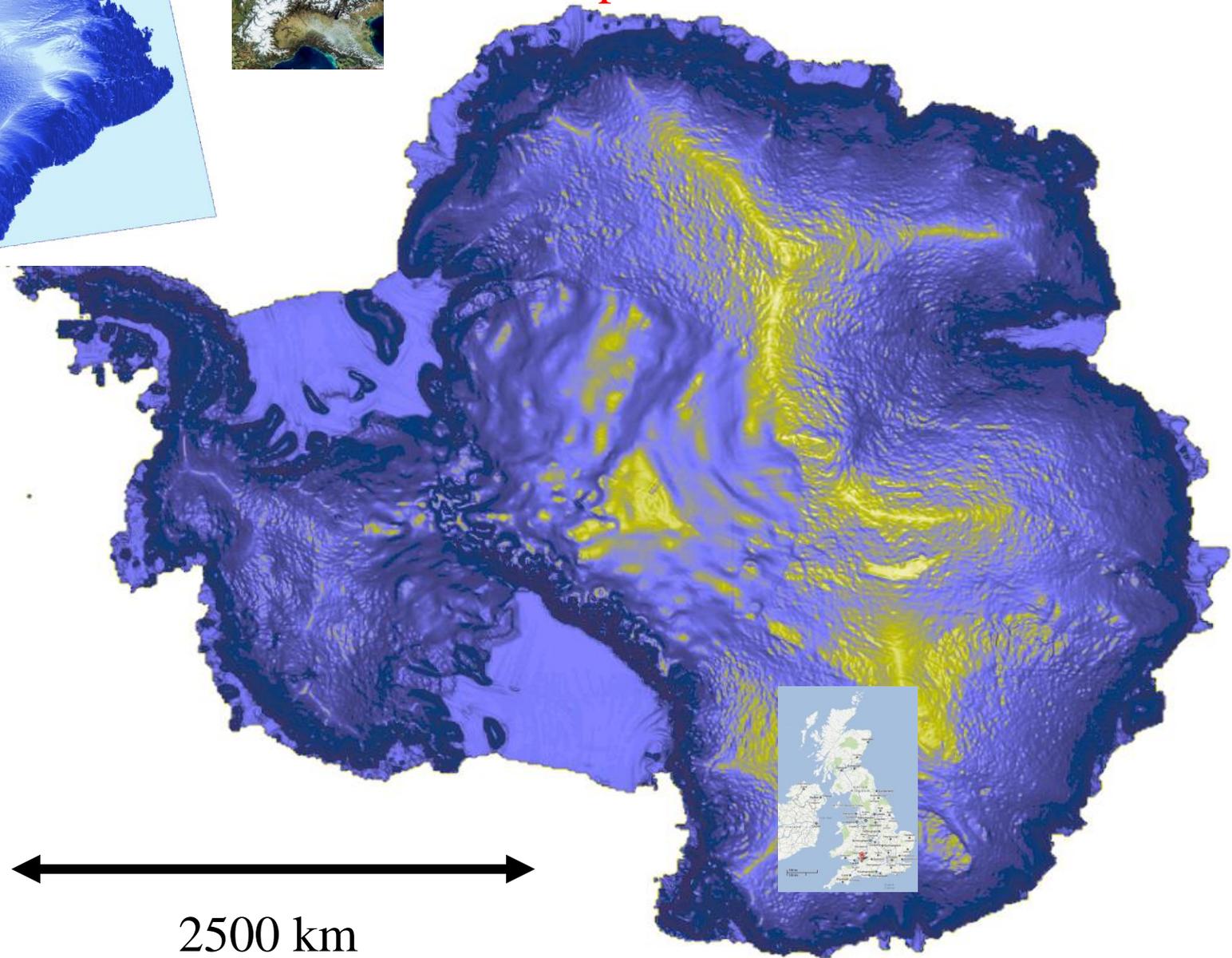
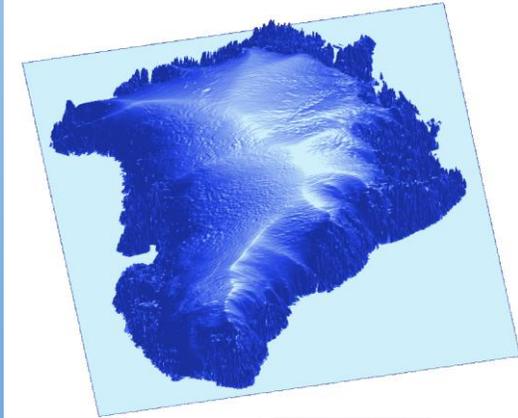


## Legend

- Sea Ice
- Glaciers
- Ice Sheet
- Ice Shelves
- Continuous Permafrost
- Discontinuous Permafrost
- Sea Ice 30 Yr Ave Extent
- 50% Snow Extent Line
- Max Snow Extent Line

5 Arctic Ocean  
Coastal States (A5):  
Denmark, Russia, Canada,  
USA, Norway

# Antarctica, Greenland & the Alps to scale



2500 km



# Permafrost change:



## IMPACTS OF A WARMING ARCTIC



**Melting of Permafrost is having a marked Impact on Buildings and Ice Roads**

National news

# Thaw in Greenland threatens new ice age

This week's big chill could prove a taster of winters to come

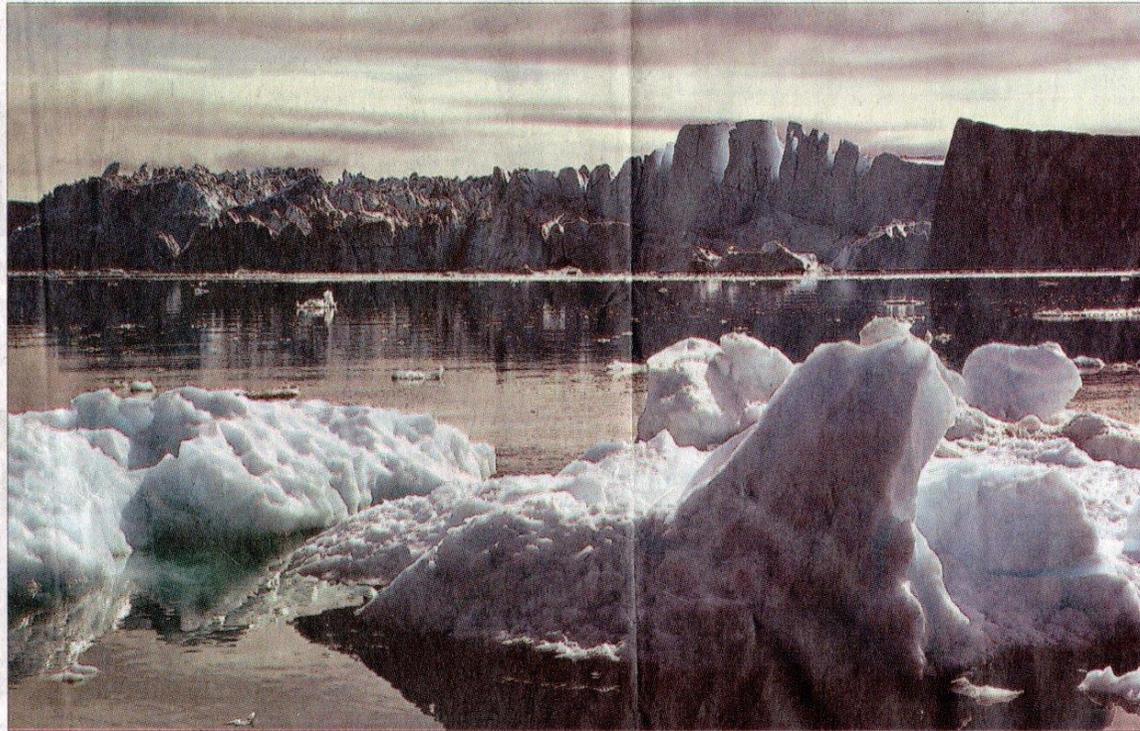
**Paul Brown**  
Environment correspondent

The snowfalls of the past week may be just a taster of what is to come, if the latest predictions from scientists are correct. The amount of ice melting from the surface of the Greenland ice sheet broke all known records last year, threatening a rapid rise in sea levels and a return of very cold winters to Britain because of a slowing down in the Gulf Stream.

Already the Gulf Stream, which bathes the west coast of Britain in warm water from the Gulf of Mexico and keeps the country much milder than normal for such northern latitudes, is slowing down. Even greater melting of the Greenland ice could shut off the currents altogether, allowing depressions to dump snow rather than instead of rain in Britain and leading to a much colder continental climate, as has been experienced in the past week.

As happens on the eastern seaboard of Canada, which on the same latitude, the sea could freeze and snow lie for weeks or months instead of a day or two.

Last year large areas of the Greenland ice shelf, previously too high and too cold to melt, began pouring billions of gallons of fresh water into the



As record amounts of Greenland's ice sheet break off, scientists warn that the cold Britain has endured this week, right, will worsen

"Since the season also was characterised by very stormy conditions, we believe these two factors contributed to extensive melt and break-up of the icepack," said research associate Mark Serreze, the lead author of the study, which was

to an increase in the rate of sea level rise, mainly due to the dynamic response of the large ice sheet rather than just the surface melting.

"For every degree increase in the mean annual temperature

near Greenland, the rate of sea level rise increases by about 10%," Professor Steffen said. Oceans are now rising by a little more than half an inch every 10 years.

Both sea ice and glacier ice

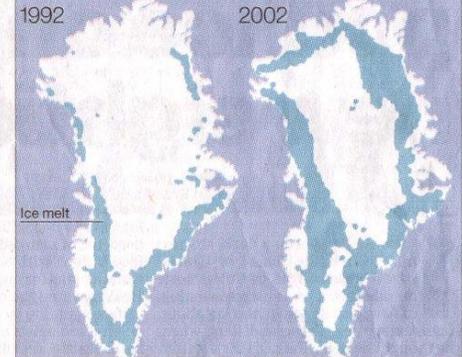
cool the earth, reflecting back into space about 80% of springtime sunshine and 40% -50% during the summer melt. But winter sea ice cover slows heat loss from the relatively warm ocean to the cold atmo-

sphere. Without large sea ice masses at the poles to moderate the energy balance, warming escalates.

More at [guardian.co.uk/climatechange](http://guardian.co.uk/climatechange)

### The melt

The ice melt in Greenland has increased every year since 1992 reaching record levels in 2002 when previously unaffected areas of the ice-cap melted



# Why some scientists are worried about a surprisingly cold 'blob' in the North Atlantic Ocean

From the Washington Post 24 Sept 2015!

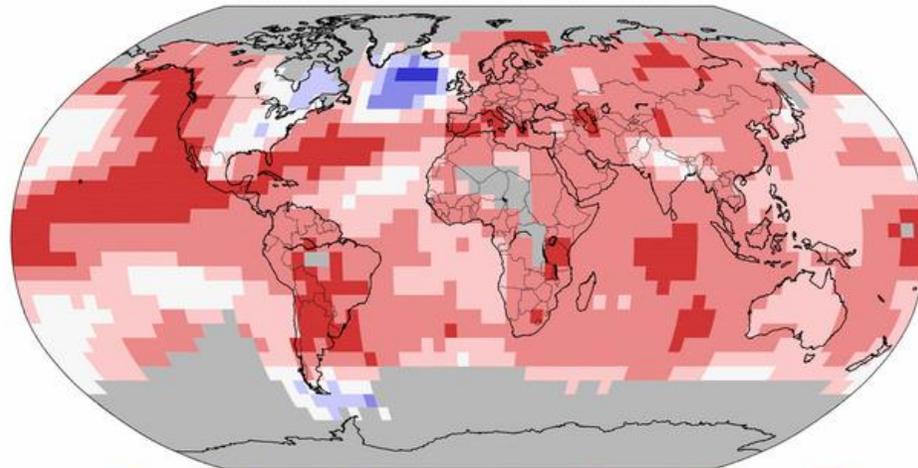
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By **Chris Mooney** September 24  Follow [chrismooney](#)

## Land & Ocean Temperature Percentiles Jan–Aug 2015

NOAA's National Centers for Environmental Information

Data Source: GHCN–M version 3.3.0 & ERSST version 4.0.0



Mon Sep 14 06:43:31 EDT 2015

January–August 2015 Blended Land and Sea Surface Temperature Percentiles. (NOAA)

### Most Read

**1** It's sleazy, it's totally illegal, and yet it could become the future of retirement



**2** Why some scientists are worried about a surprisingly cold 'blob' in the North Atlantic Ocean



**3** Next up from climate change: Shell-crushing crabs invading Antarctica



**4** The drug industry wants us to think Martin Shkreli is a rogue CEO. He isn't.

**5** Why one of the world's worst human rights offenders is leading a U.N. human rights panel



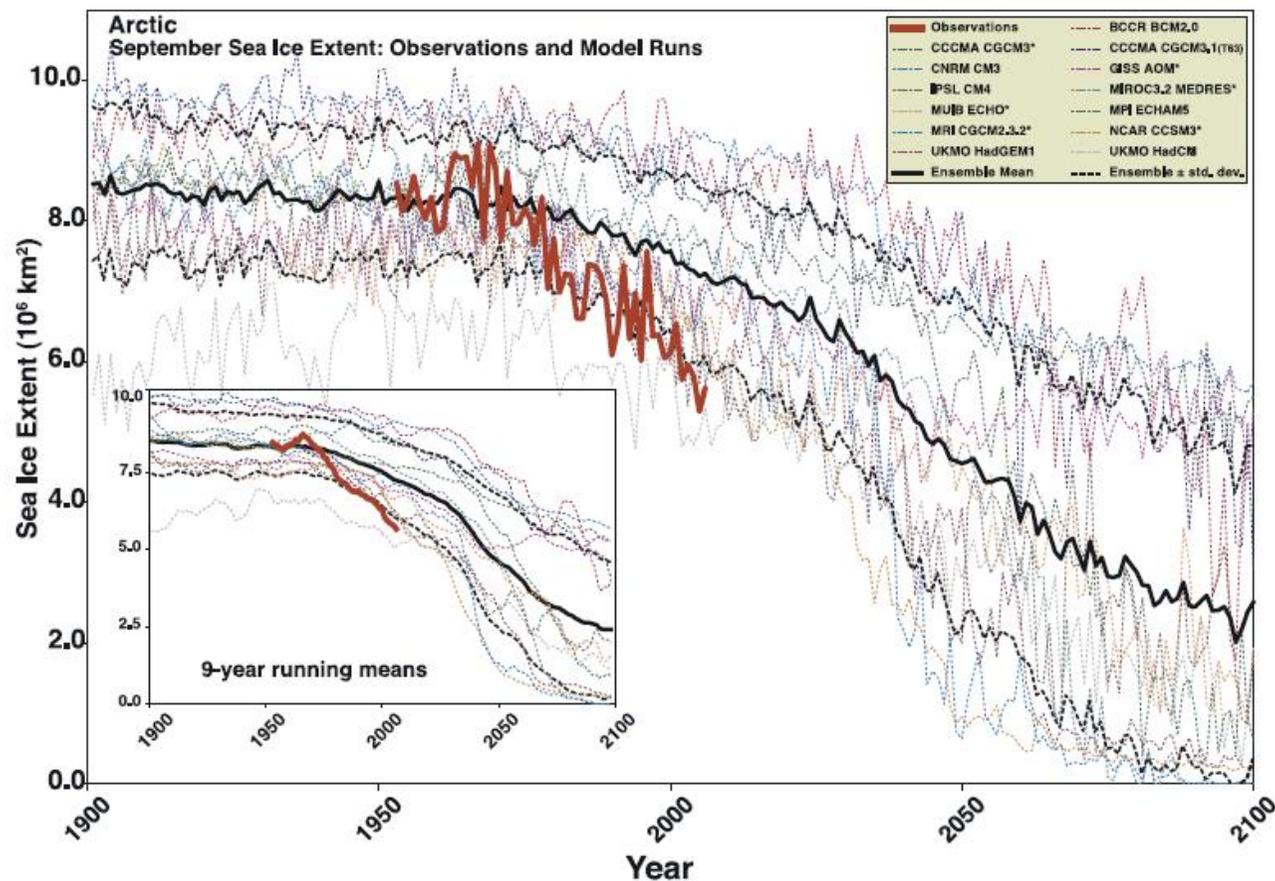
The Most Popular All Over

# Arctic sea ice:

L09501

STROEVE ET AL.: ARCTIC ICE LOSS—FASTER THAN FORECAST

L09501

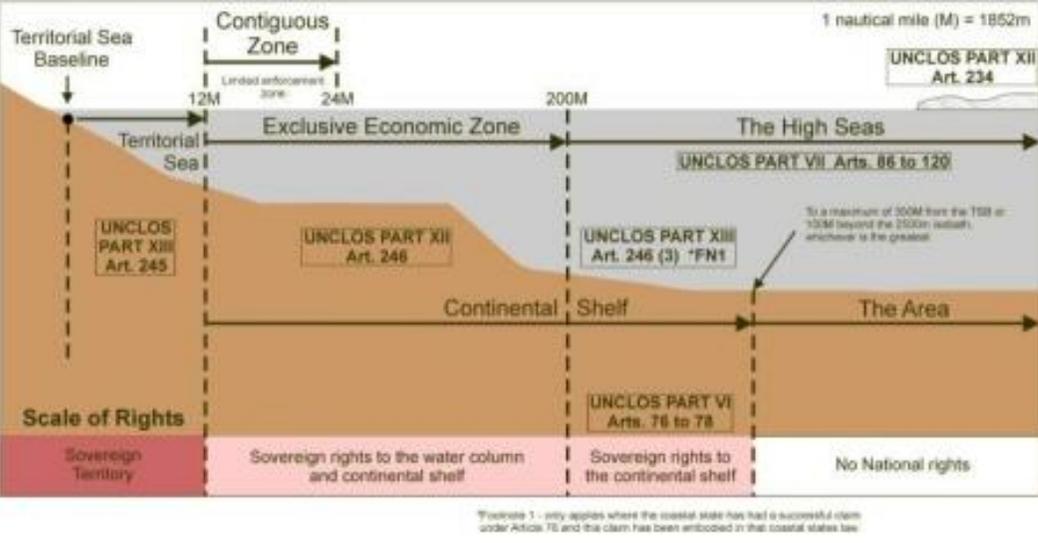


**Figure 1.** Arctic September sea ice extent ( $\times 10^6$  km<sup>2</sup>) from observations (thick red line) and 13 IPCC AR4 climate models, together with the multi-model ensemble mean (solid black line) and standard deviation (dotted black line). Models with more than one ensemble member are indicated with an asterisk. Inset shows 9-year running means.

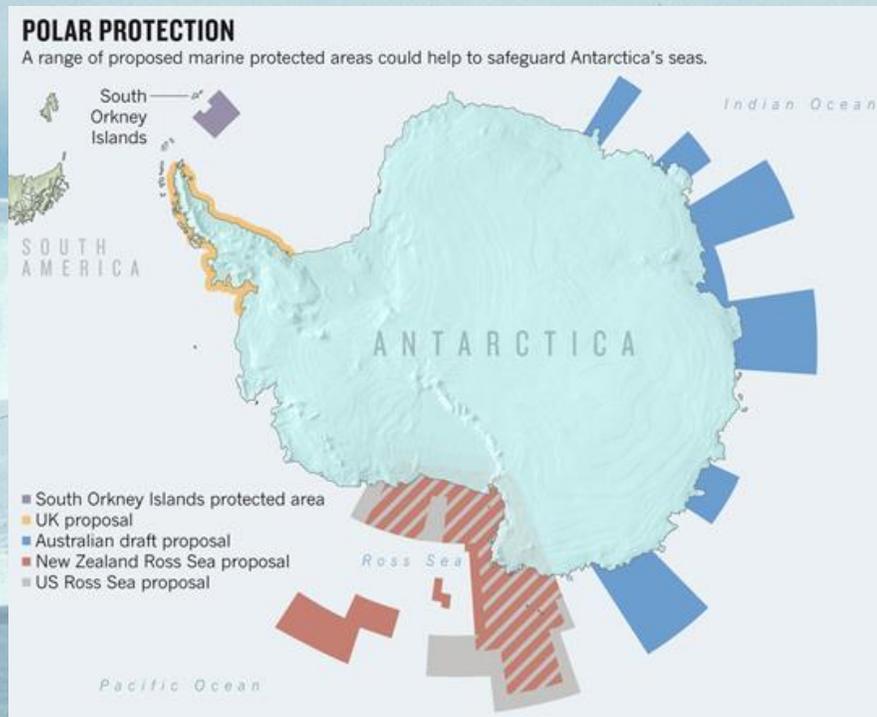
# From Bridget Bardot to Emma Thompson



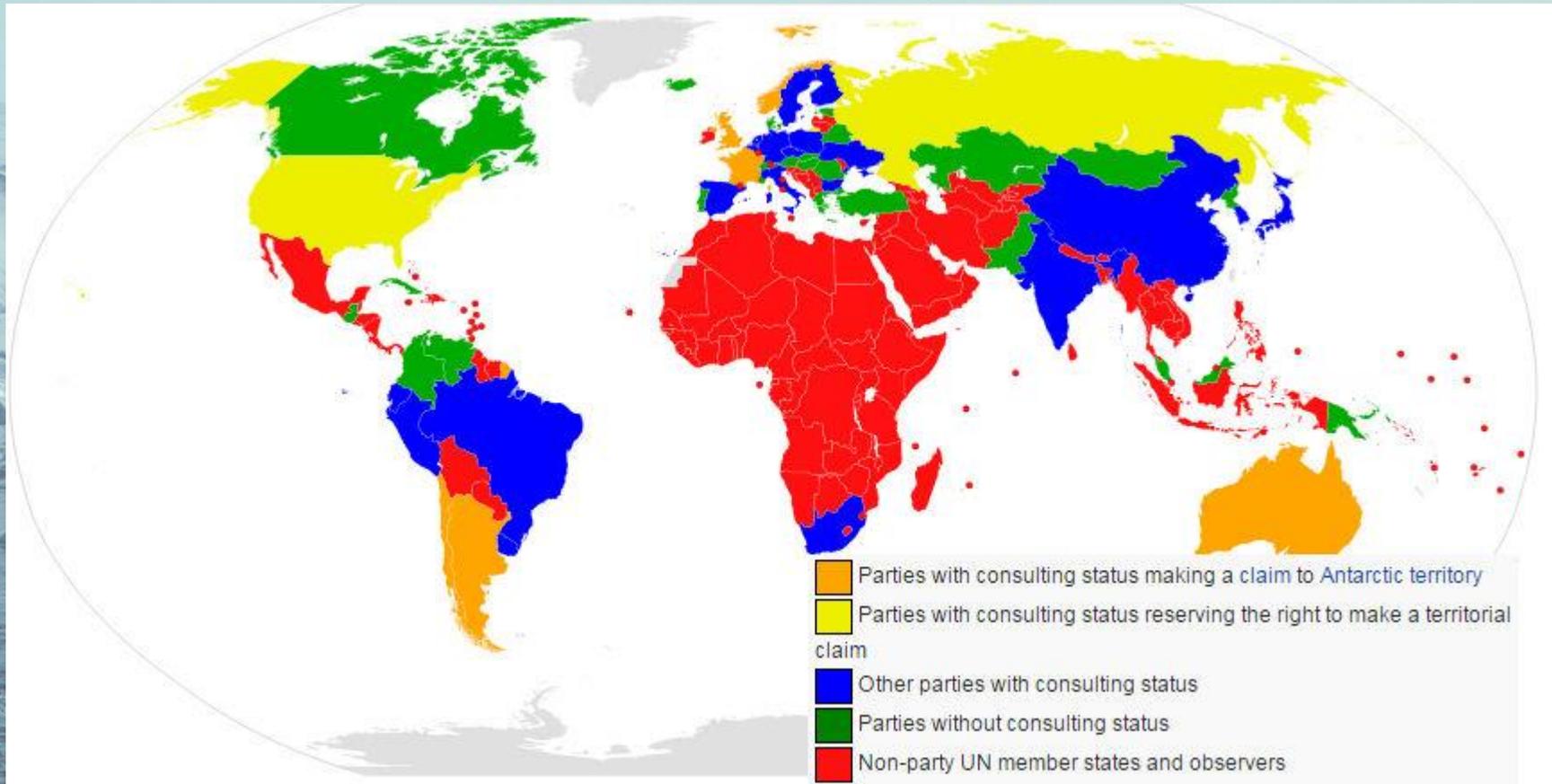
# Coastal state rights to exploit (and preserve): UNCLOS (UN convention on Law of the Sea)



# Clashing demands – preserve or exploit in the Southern Ocean?



# Who owns Antarctica?



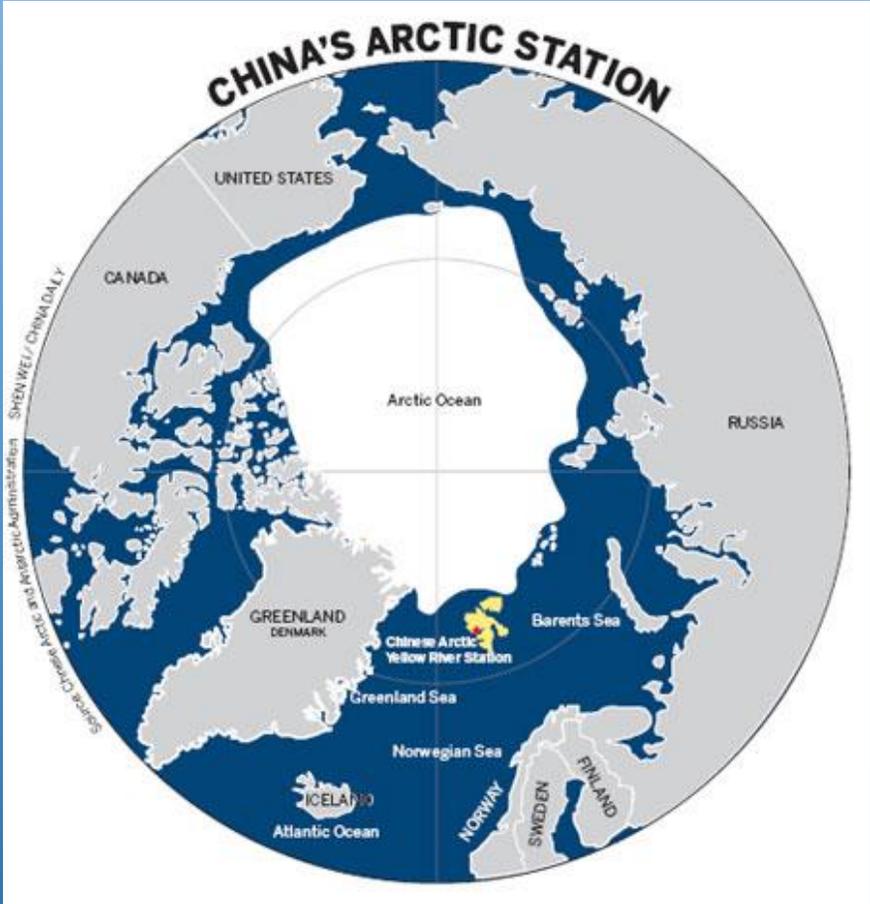
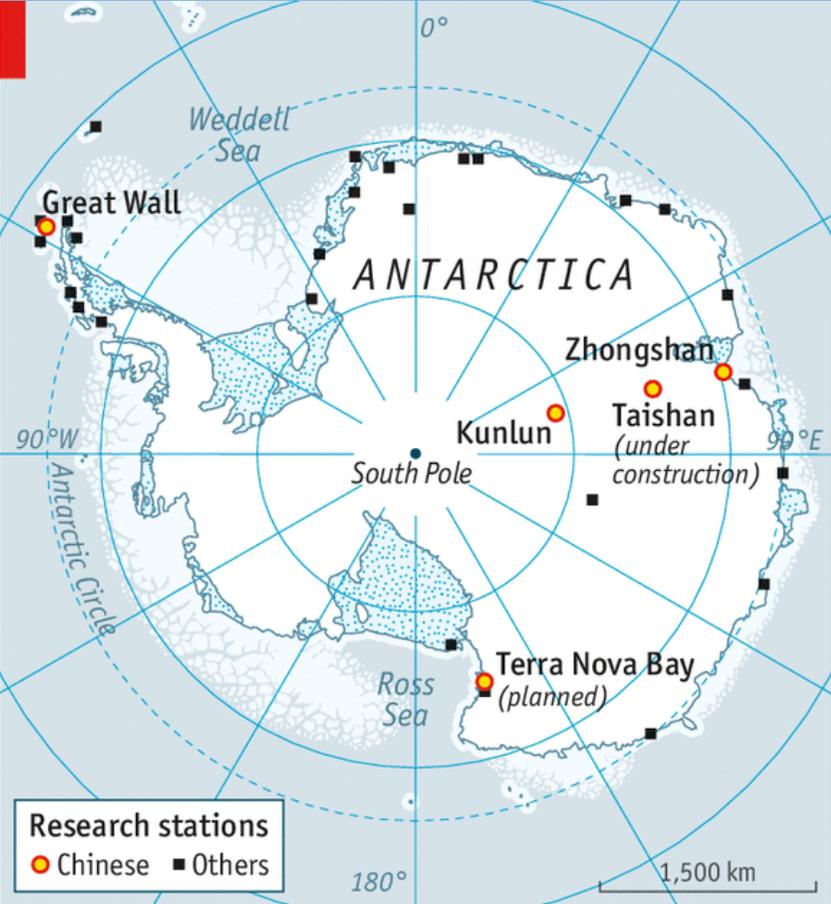
150°W

180°

ZEALAND

AUSTRALIA

# New actors and new demands – China as example

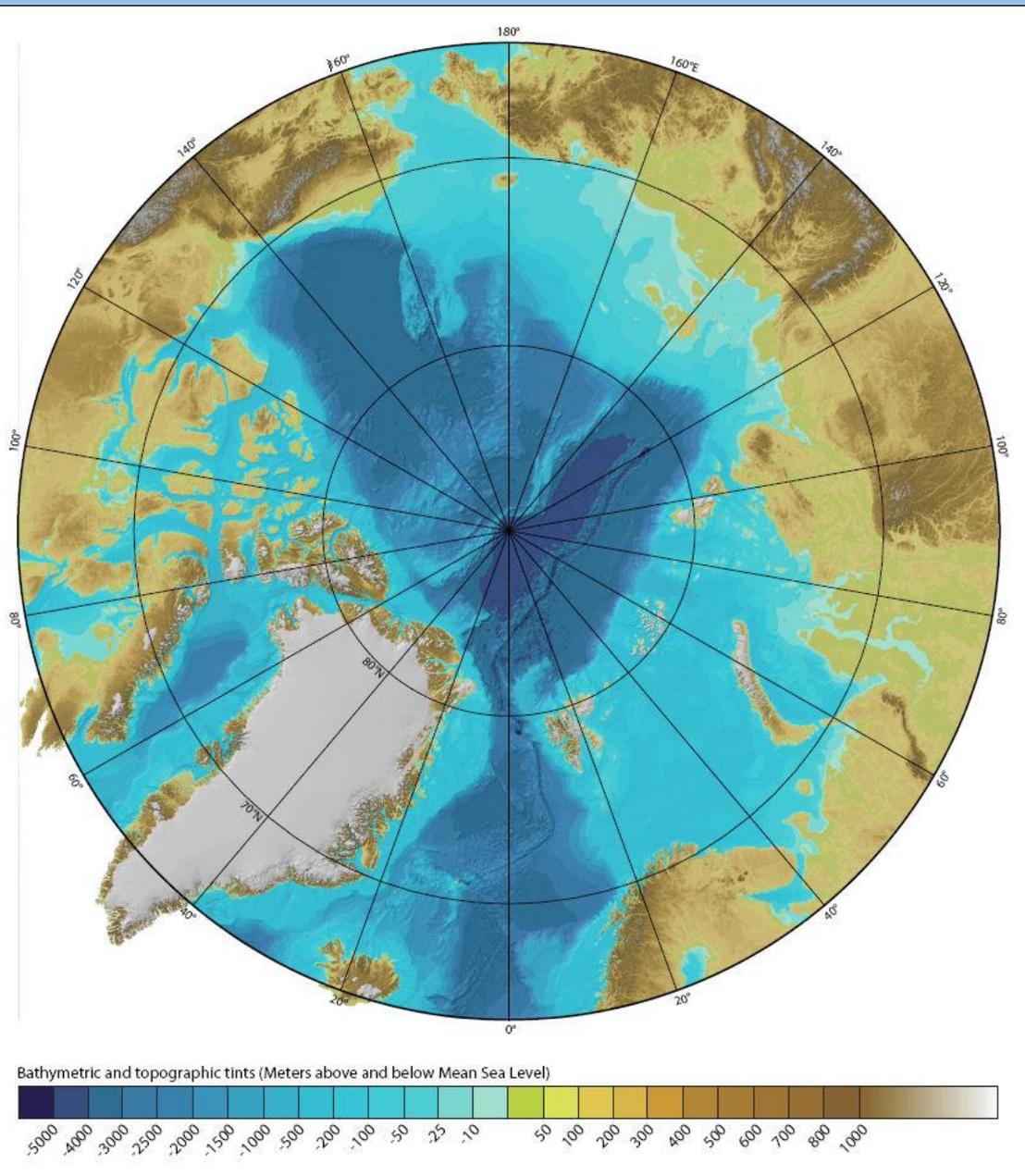


# Future demands on polar oceans



## Central Arctic Ocean: Resource or Reserve?

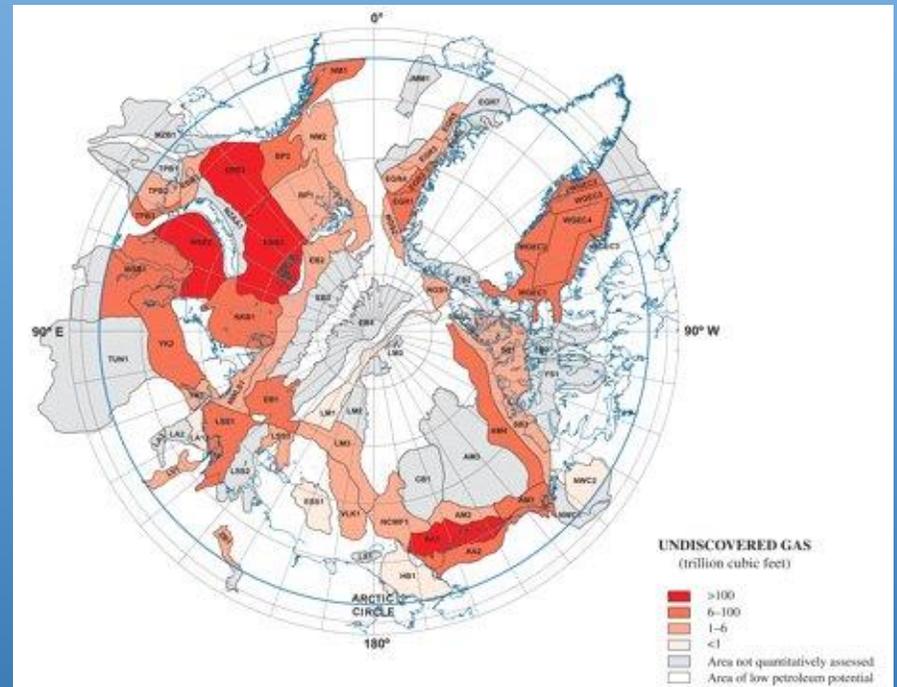
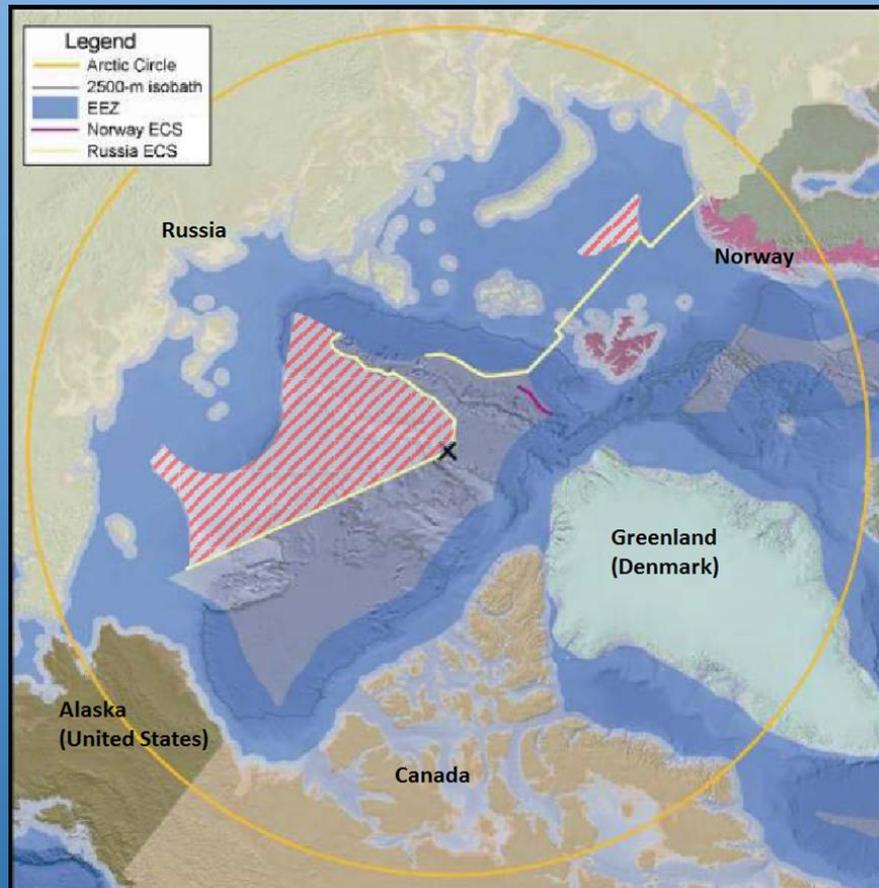
# IBCAO: bathymetric chart of the Arctic Ocean



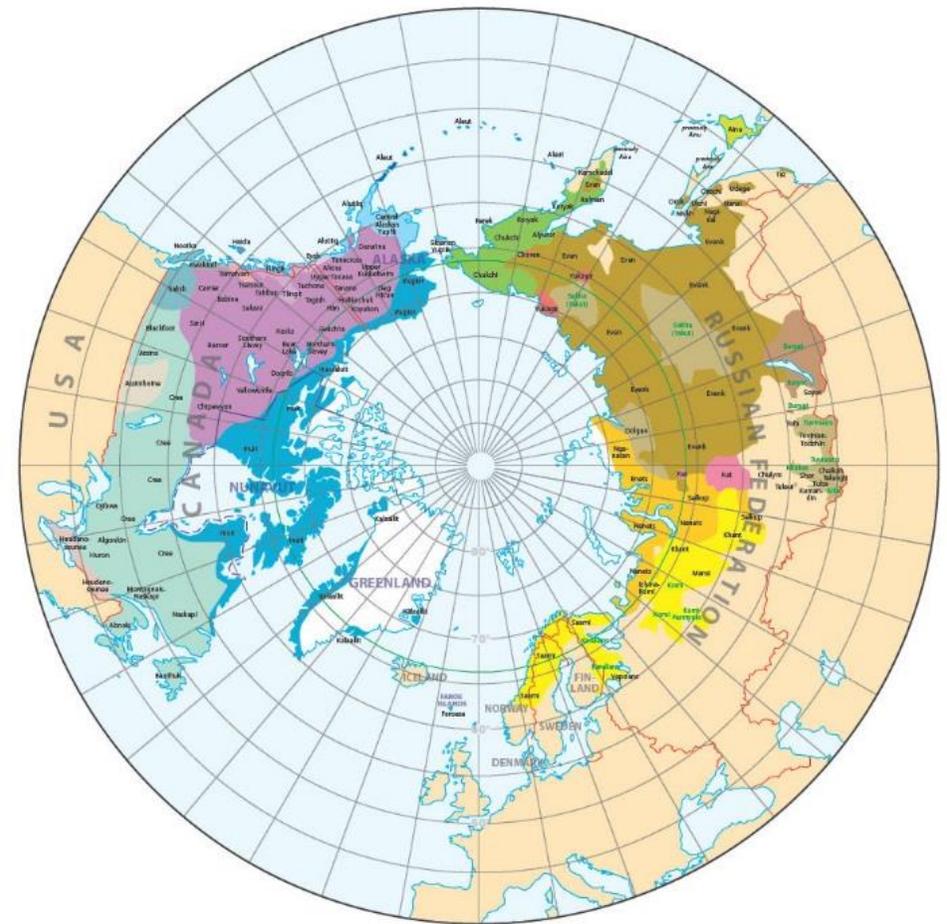
Another way of demanding our attention?



# The polar seabed and undiscovered resource potential



# Indigenous people:



## Indigenous peoples of the Arctic countries

Subdivision according to language families

<b>Na-Dene family</b>	<b>Eskimo-Aleut family</b>
Atthabaskan branch	Inuit group of Eskimo branch
Eyak branch	Yupik group of Eskimo branch
Tlingit branch	Aleut group
Haida branch	<b>Uralic-Yukagrian family</b>
<b>Penatan family</b>	Finnic-Ugric branch
<b>Macro-Algonkian family</b>	Samodic branch
Algonkian branch	Yukagrian branch
Wakasha branch	<b>Altai family</b>
Salish branch	Turkic branch
<b>Macro-Sioux family</b>	Mongolic branch
Sioux branch	Tunguso-Manchurian branch
Iroquois branch	<b>Chukotko-Kamchatkan family</b>
<b>Indo-European family</b>	Ket (isolated language)
Germanic branch	Nivkh (isolated language)
	Ainu (isolated language)

Notes:

For the USA, only peoples in the State of Alaska are shown. For the Russian Federation, only peoples of the North, Siberia and Far East are shown.

Majority populations of independent states are not shown, not even when they form minorities in adjacent countries (e.g. Finns in Norway).

Areas show colours according to the original languages of the respective indigenous peoples, even if they do not speak these languages today.

Overlapping populations are not shown. The map does not claim to show exact boundaries between the individual groups.

In the Russian Federation, indigenous peoples have a special status only when numbering less than 50,000. Names of larger indigenous peoples are written in green.



# Further reading/info

- Papers by Klaus Dodds (Royal Holloway)
- British Antarctic Website (for lay info on Treaty: <https://www.bas.ac.uk/about/antarctica/the-antarctic-treaty/>)
- Arctic Council and AMAP (Arctic monitoring and assessment programme: <http://www.amap.no/>)