"Work in a cold climate"

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British Antarctic Survey

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British Antarctic Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

POLAR SCIENCE FOR PLANET EARTH

Antarctica is extreme!

- *stormiest*
- *coldest*
- *driest*
- *windiest*
- *highest*

- *remote*
- *hazardous*
- *challenging*


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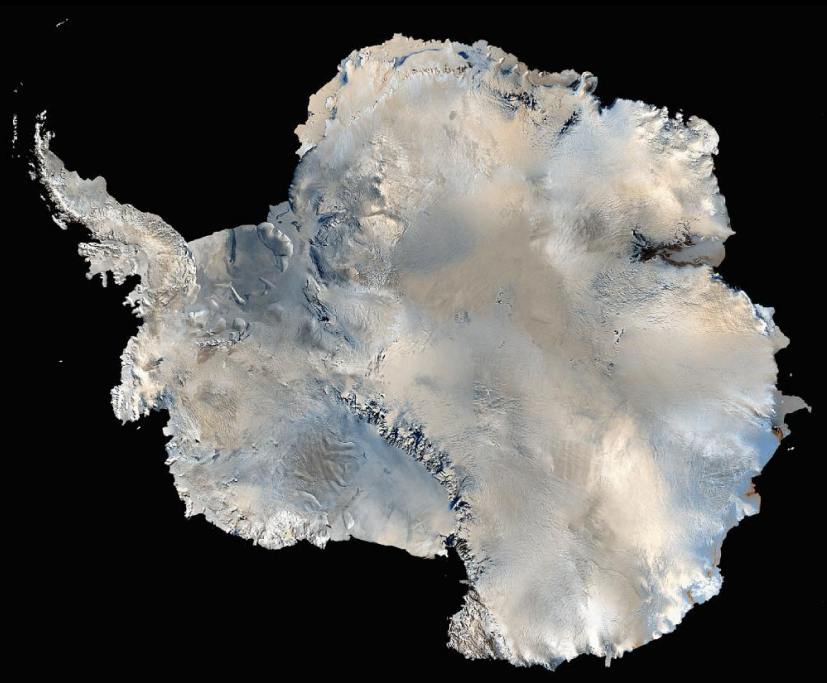
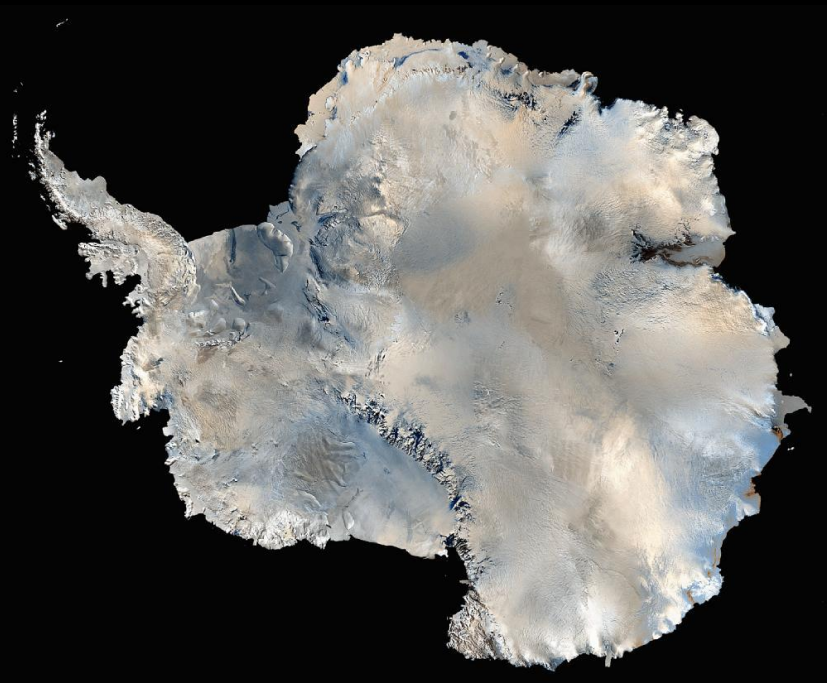
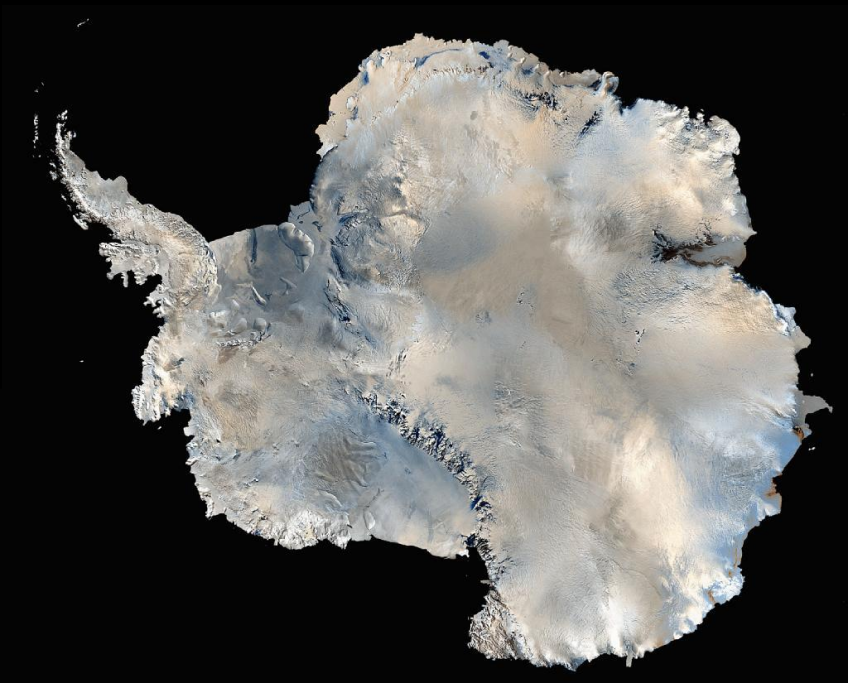






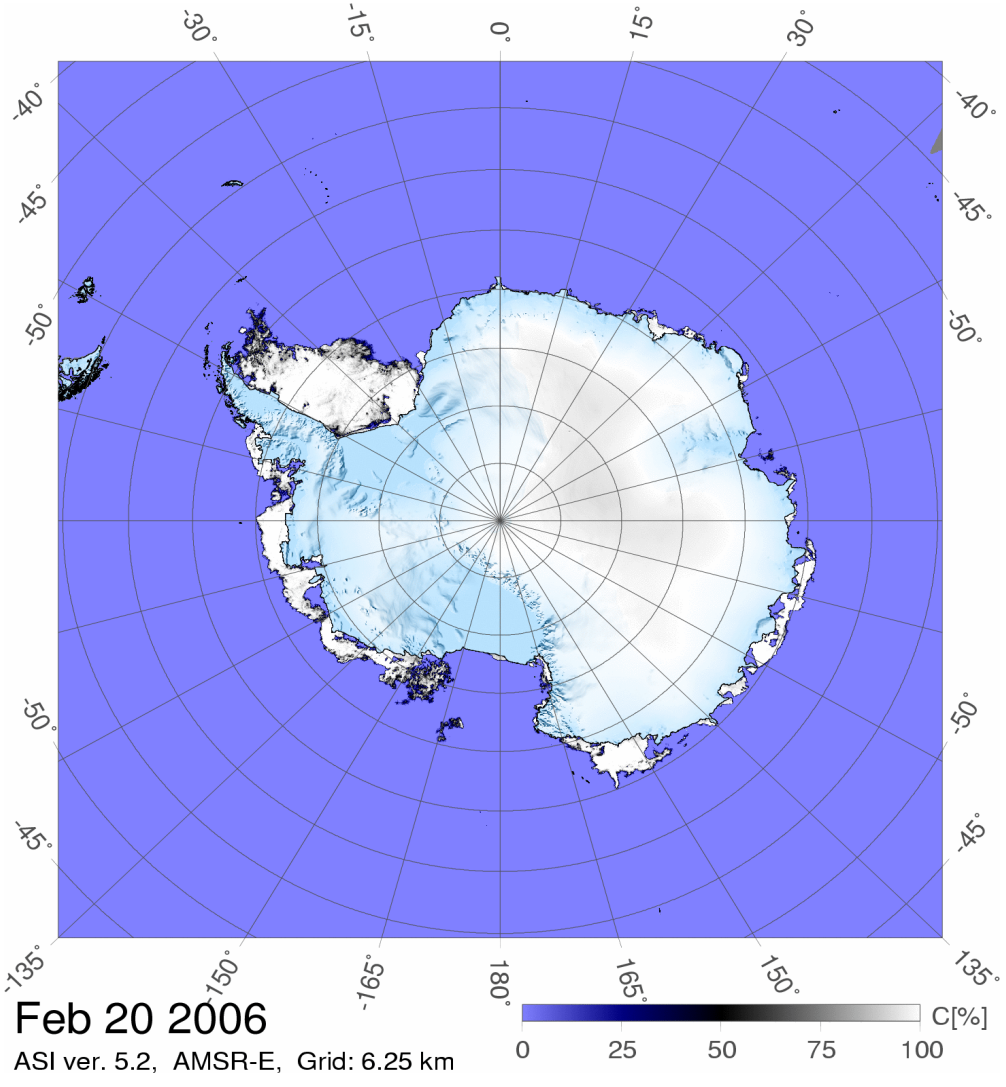
Contrasting light environment

Midnight in midsummer
(24 hours per day light)

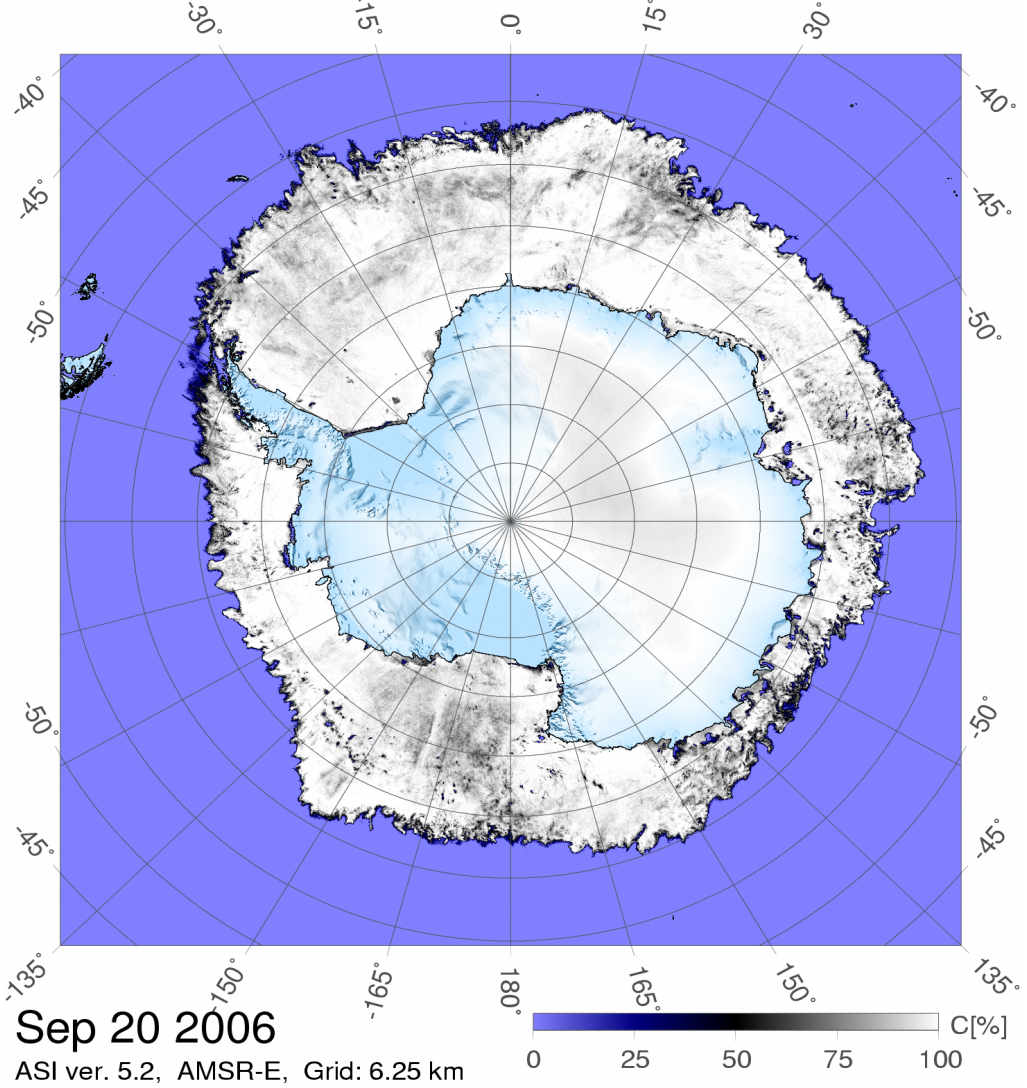
Midday in midwinter
(24 hours per day dark)

Sea ice: annual minimum and maximum

~2.5 million square kilometers



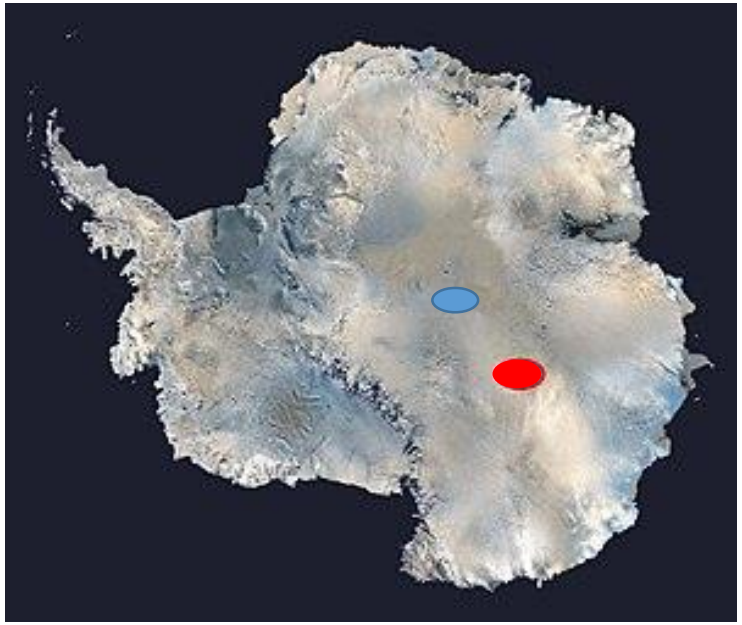
~18 million square kilometers



growth/loss of thousands of square kms of sea ice each year

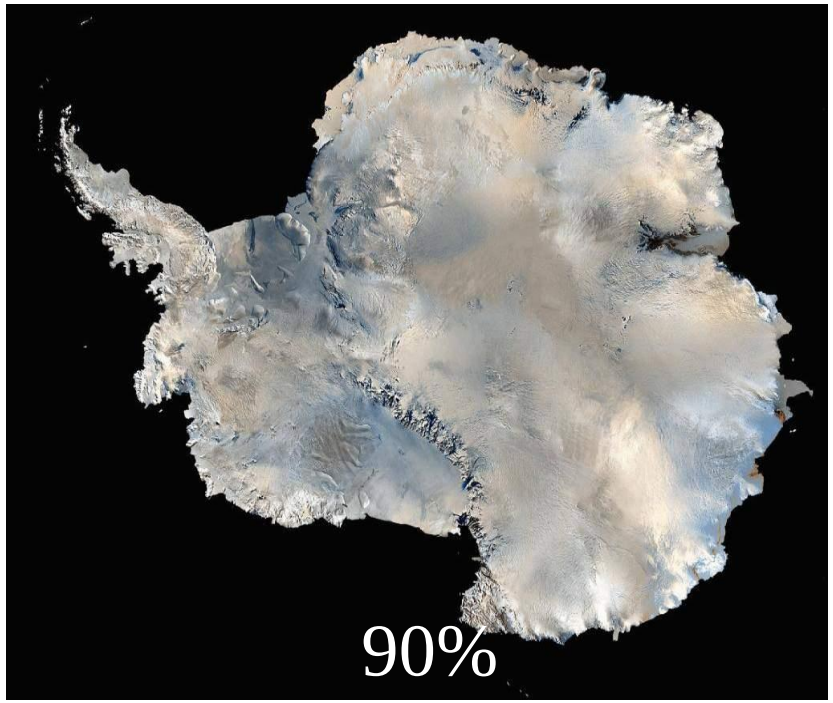
Coldest place on Earth:

- Ground-based record: −89.2 °C (Vostok station)
  21 July 1983
- Satellite measurement: −93.2 °C (81.8°S 59.3°E)
  10 August 2010



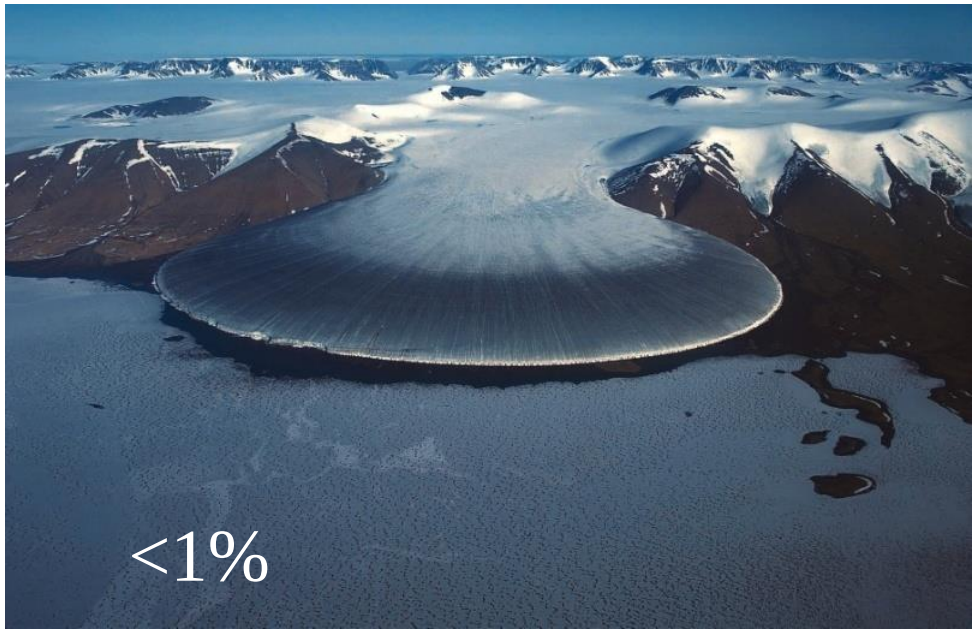
Only 0.6% of Antarctica is free of ice

90% of the world's ice is located in the Antarctic



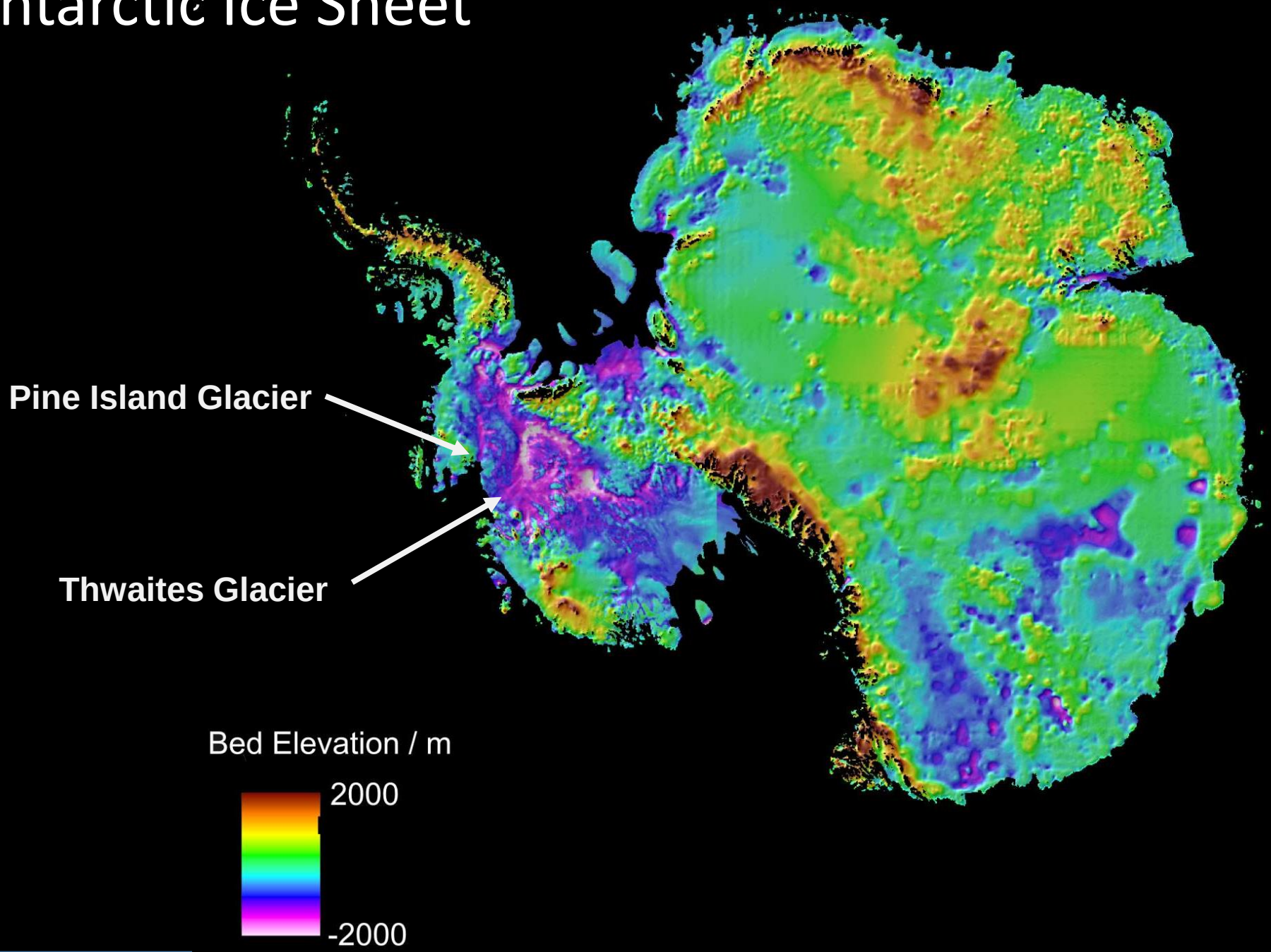
Antarctica

Greenland



Rest of world

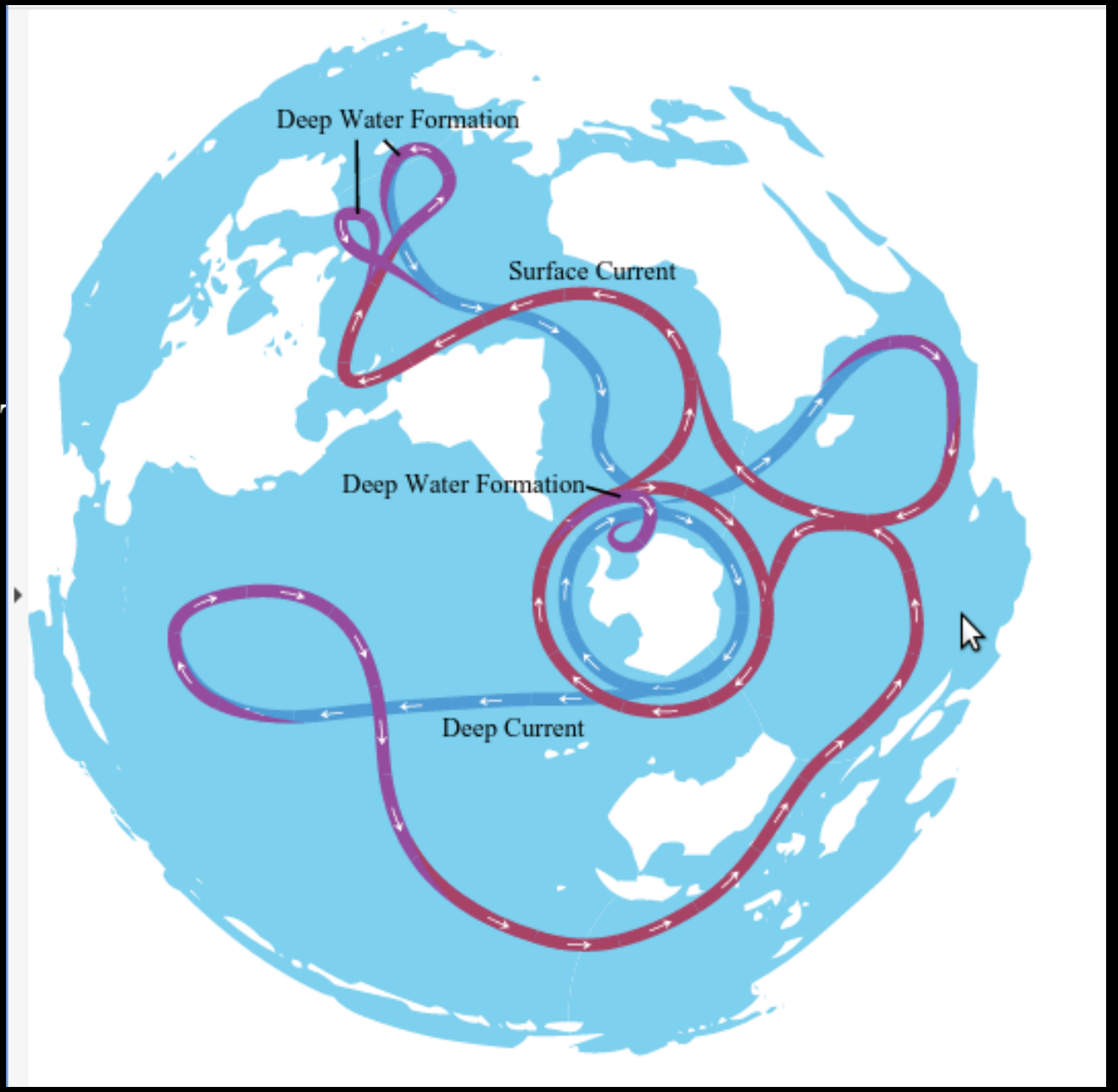
West Antarctic Ice Sheet



100th closure of the Thames Barrier

Photo: UK Environment Agency

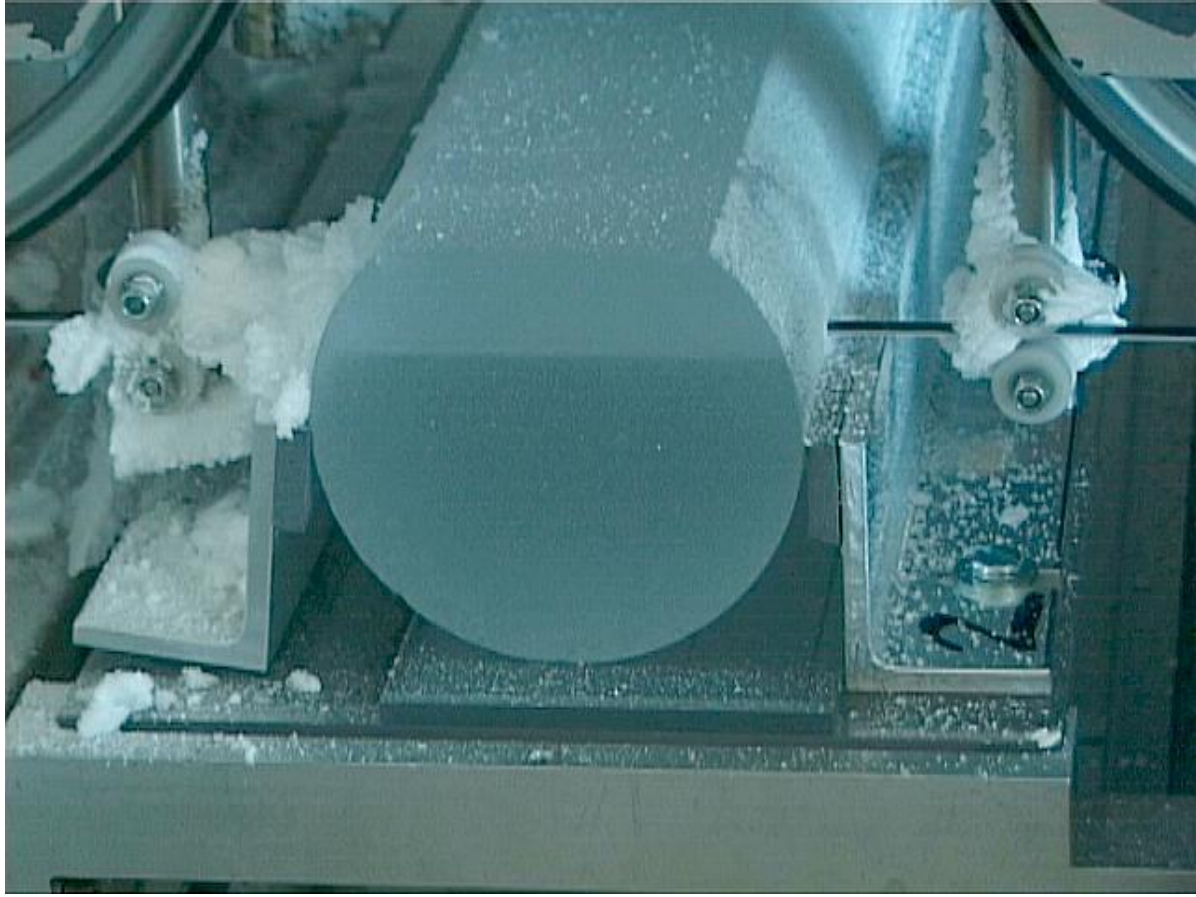
The Southern Ocean is key for carbon dioxide and heat uptake



The inland Antarctic ice sheet is up to 4 km thick

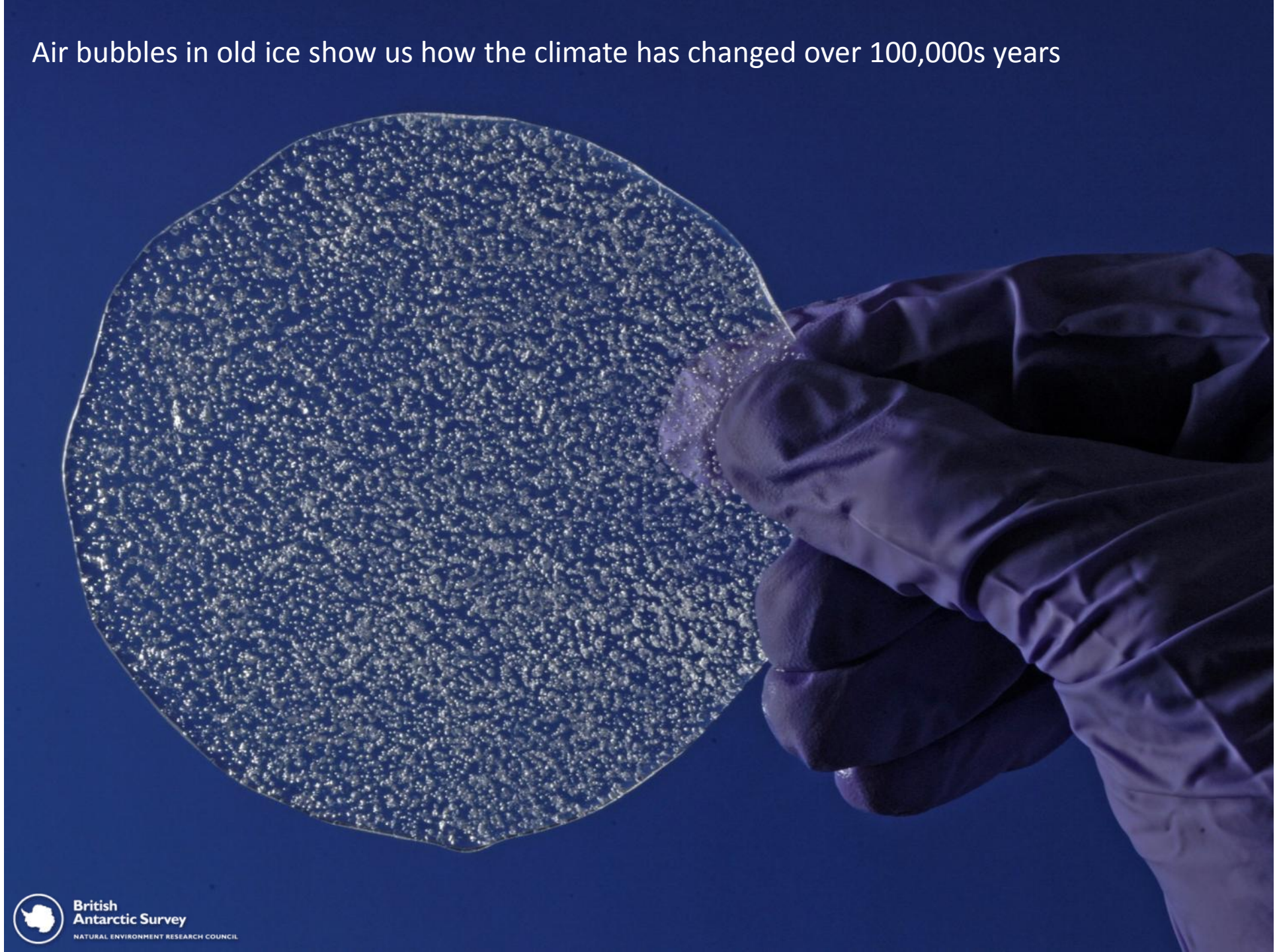
When snow falls, air is trapped in the ice

Dome C ice core



- Ice core is 3270 m in length
- Oldest ice retrieved was 800,000 years old

Air bubbles in old ice show us how the climate has changed over 100,000s years



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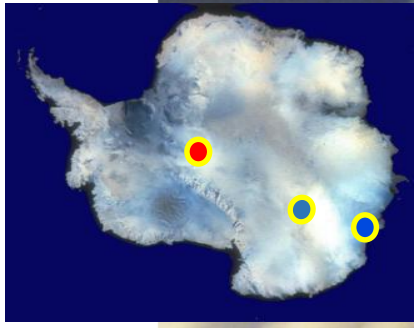
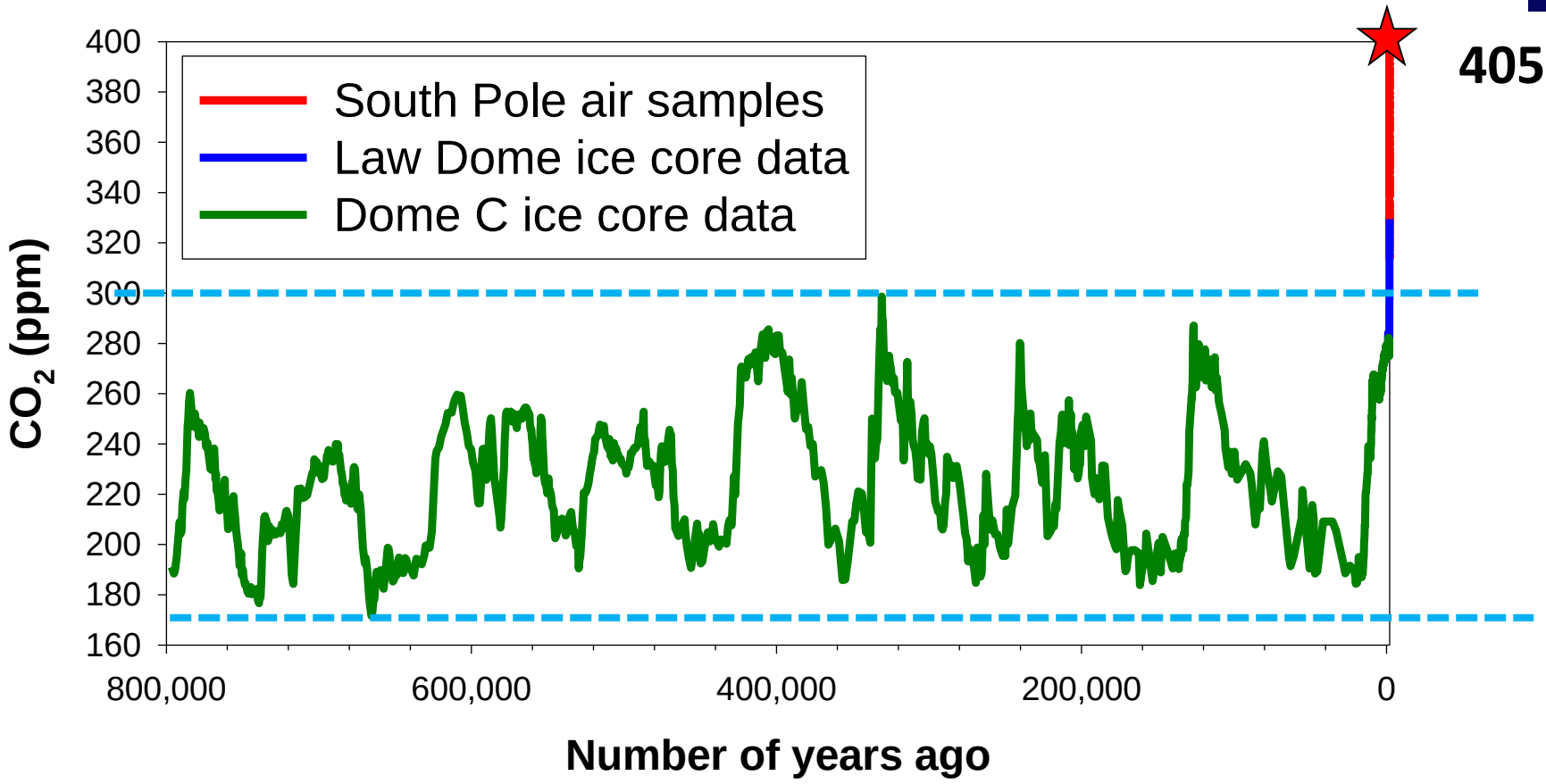
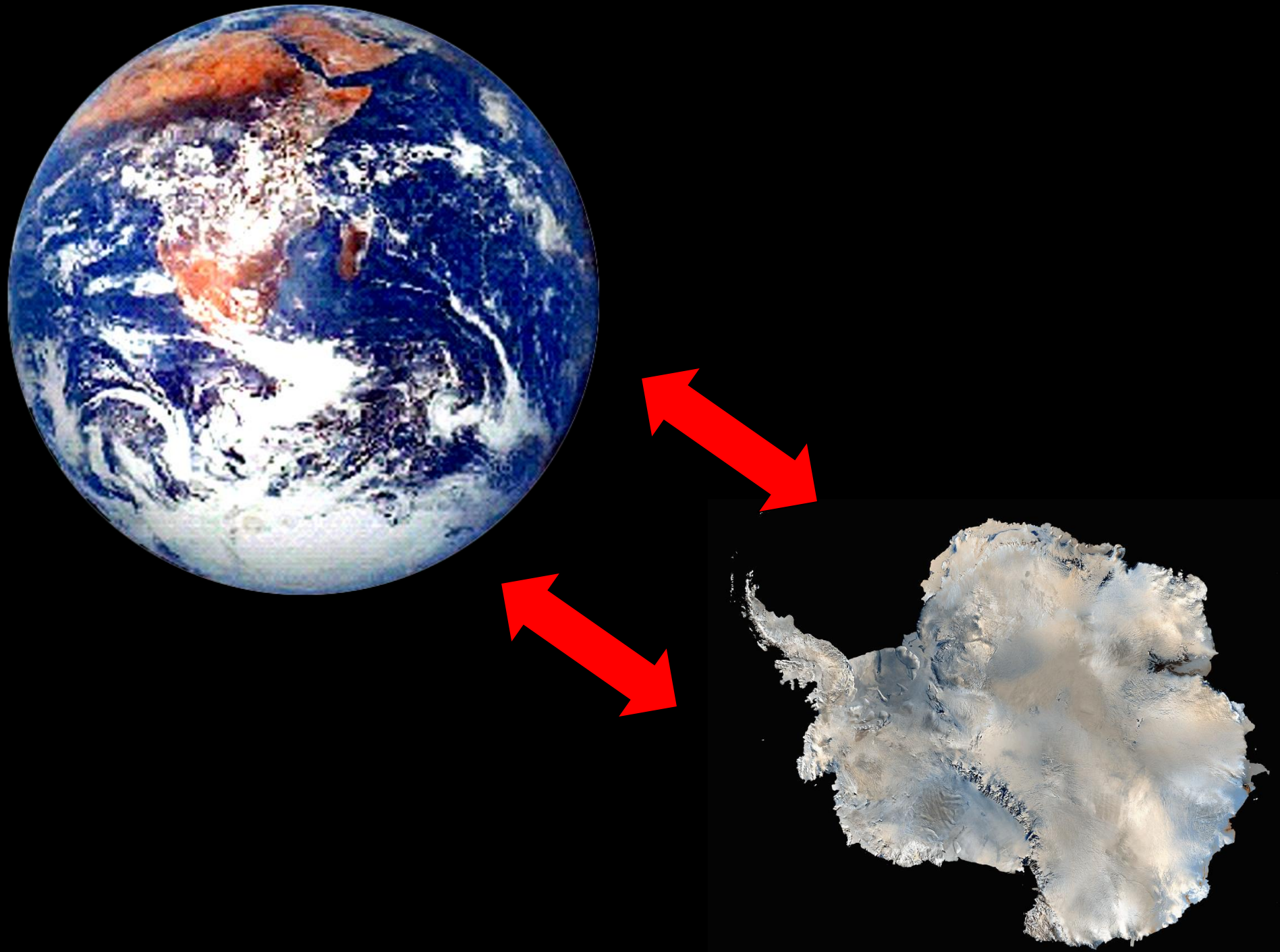
How carbon dioxide (CO_2) has changed through time…

30% higher than at any time in previous 800,000 years





Data:
South Pole courtesy NOAA
Law Dome data from Etheridge et al. JGR, 1996
Dome C data courtesy European Project for Ice Coring in Antarctica, (EPICA)



BAS infrastructure

- 5 Antarctic research stations (3 sub-Antarctic)
- 1 Arctic research station
- Deep-field facilities
- 2 polar ships (soon 1)
- 5 polar aircraft (2 instrumented)
- Expert polar support teams

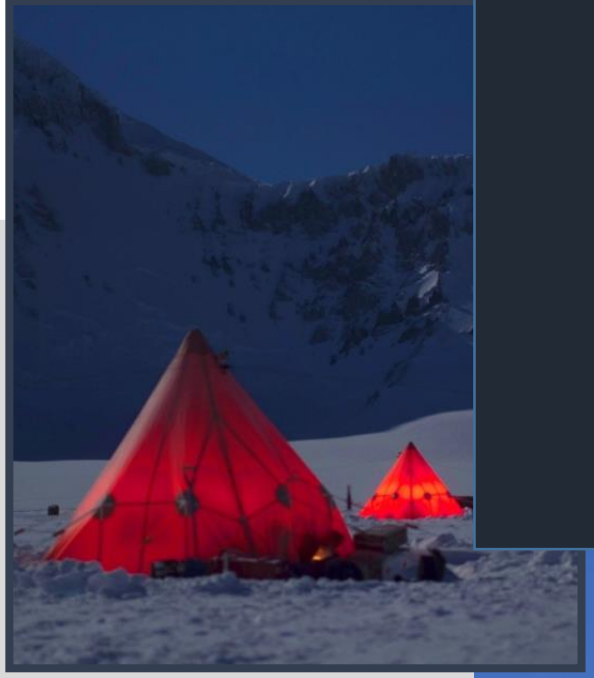
Instrumented Twin Otter Aircraft: Meteorology and Atmospheric Science Instrumentation

RRS James Clark Ross and RRS Ernest Shackleton – *logistical support and science cruises*

Sir David Attenborough – the UK's new polar research vessel

BAS logistics supports a whole range of deep field projects

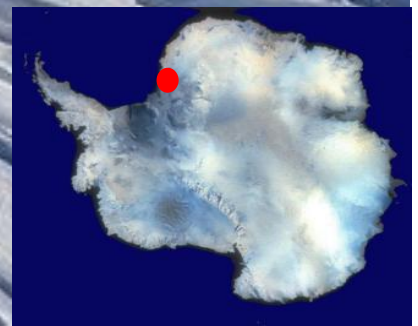
Deep field facilities



Rothera research station

Halley research station

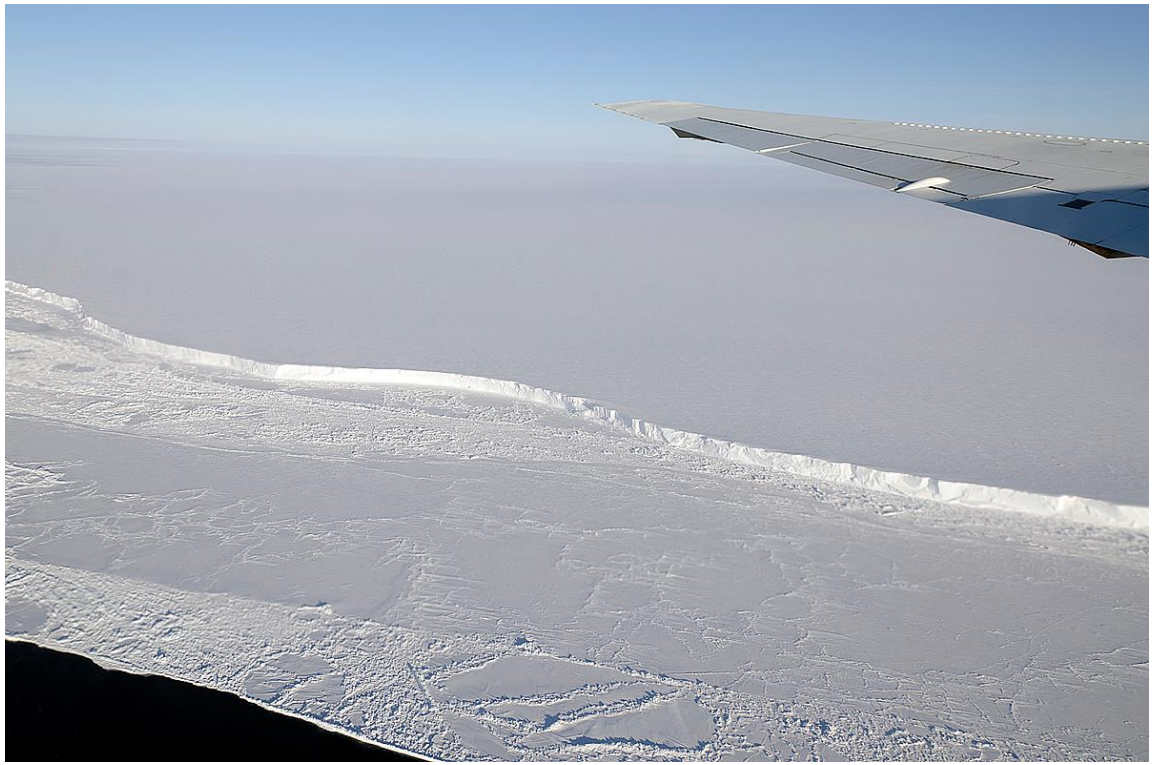
… this is Halley VI



Halley Research Station

I.G.Y. Halley Bay. Close-up of the exterior of the completed station hut. 1955/1956

The Brunt Ice Shelf



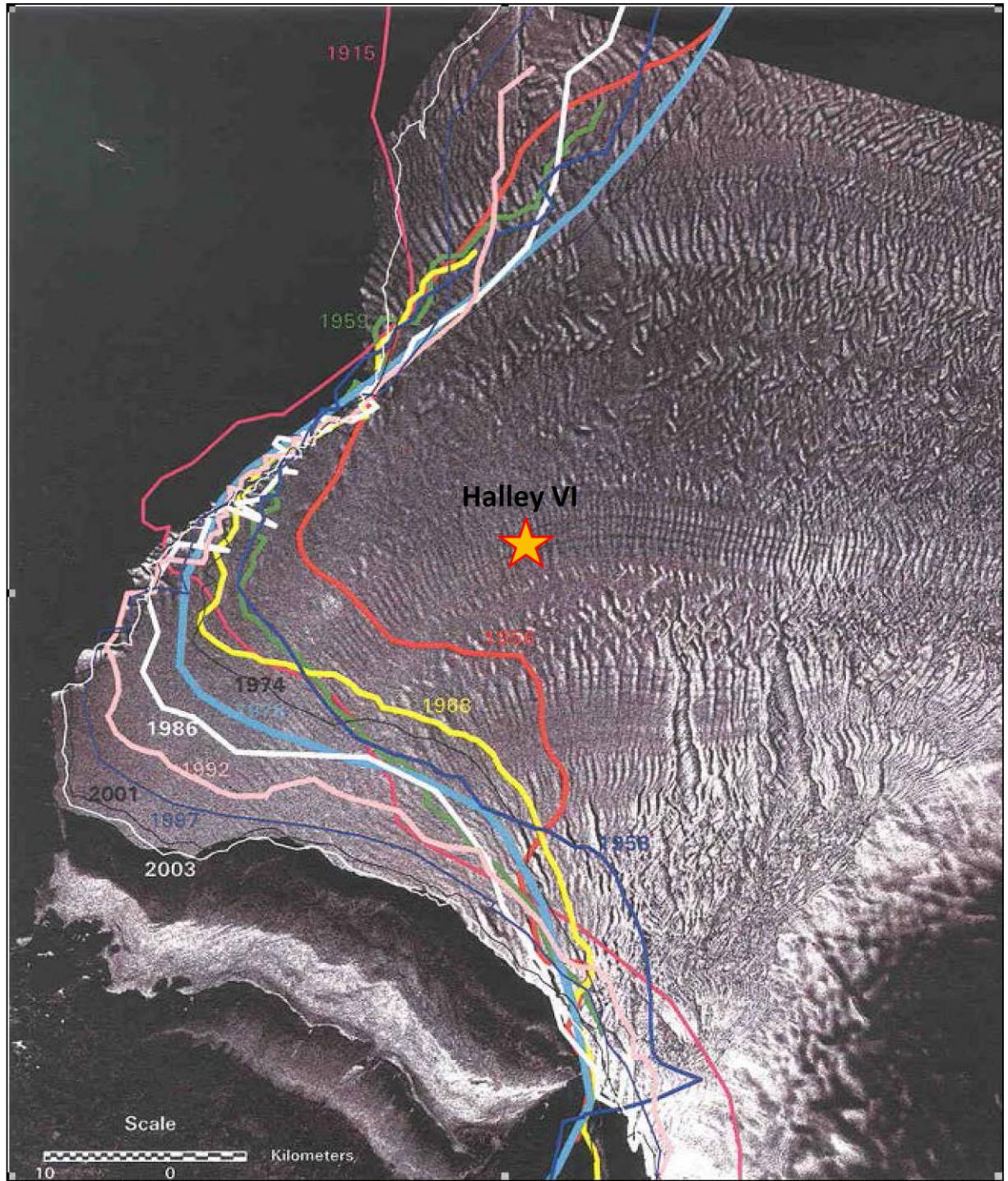
So what's it like at Halley..?

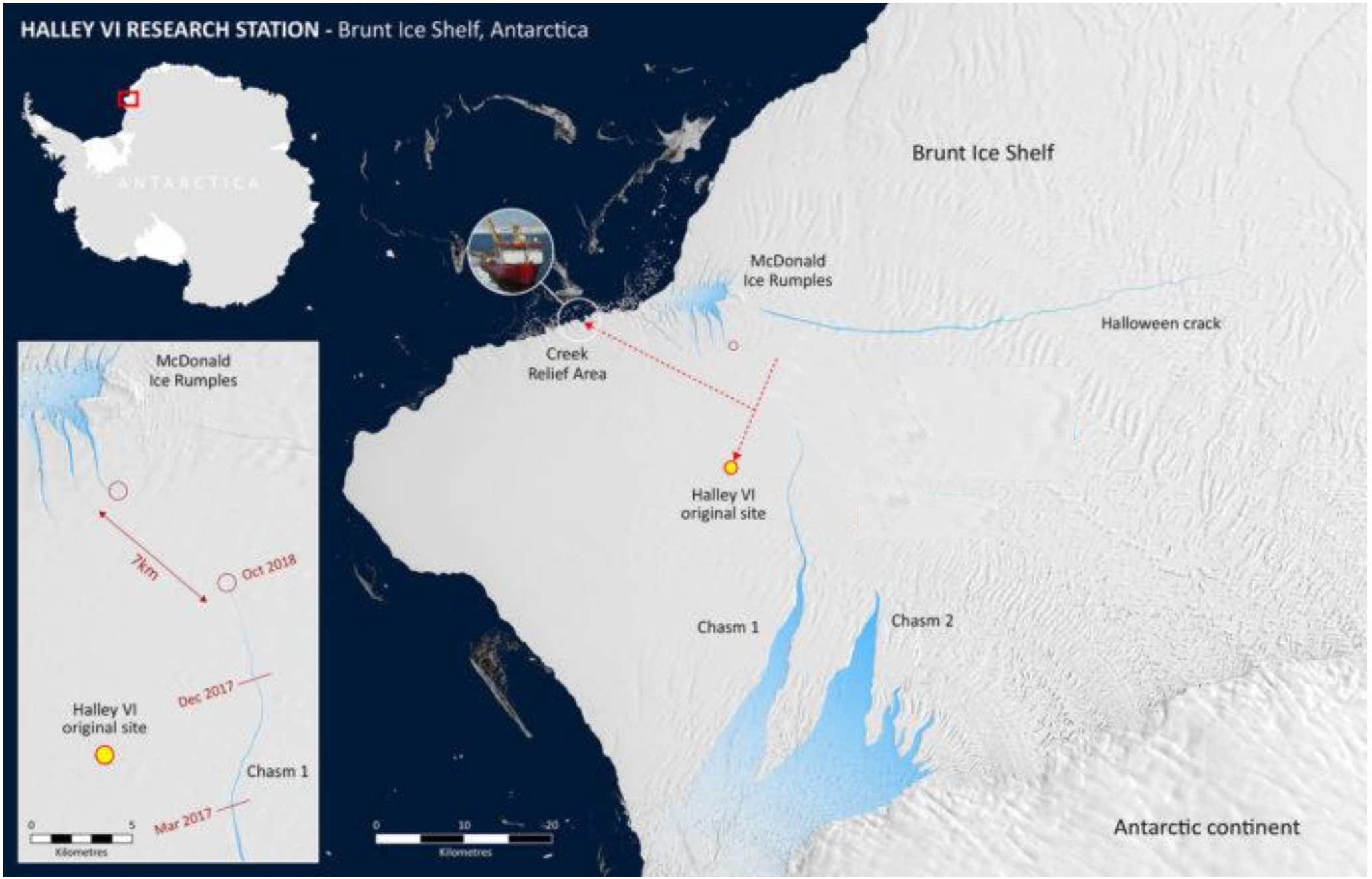
Extreme working: Halley Research Station during winter

- Temperature: average winter –25°C
- Extreme: to –55°C
- Wind speed gusts to 80 knots
- 3 months darkness
- Weather: Drift/Blowing snow, fog, rime
- Snow Accumulation: ~1 metre per year

Extreme working: Halley Research Station during winter
Cold, dark, small tight-knit community…

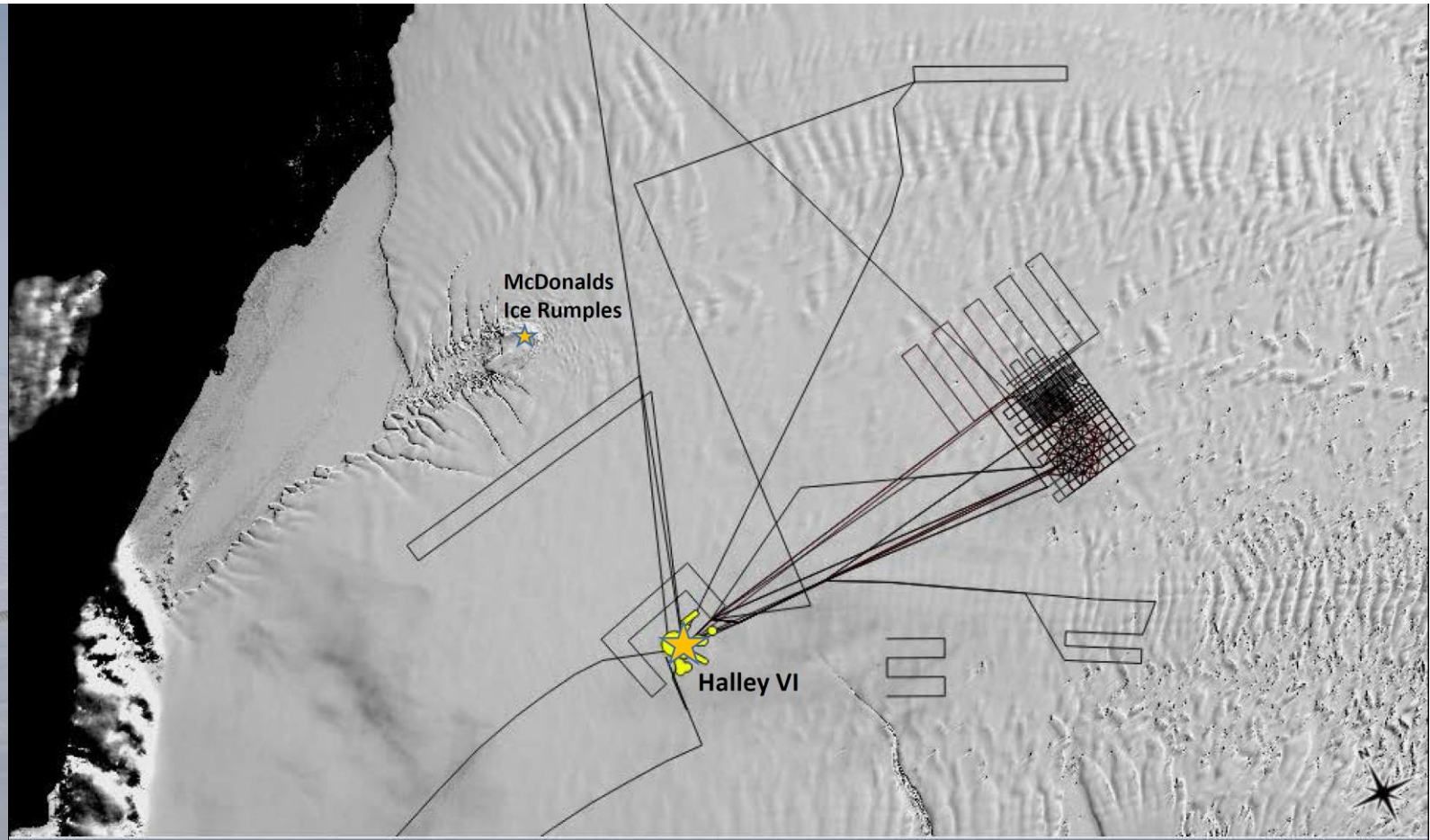
A living ice shelf

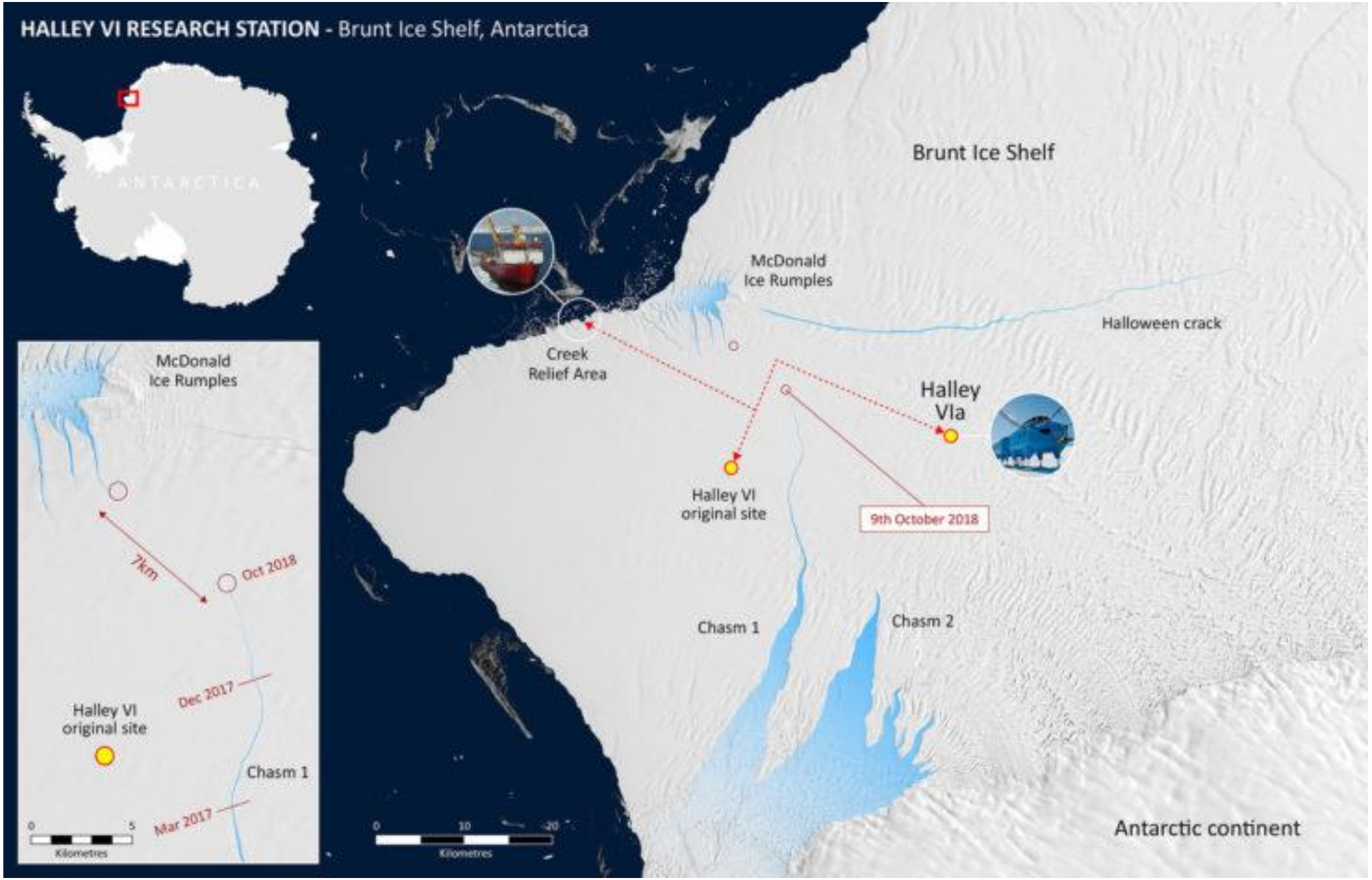



HALLEY VI RESEARCH STATION - Brunt Ice Shelf, Antarctica
ANTARCTICA
Brunt Ice Shelf
McDonald
Ice Rumples
Halloween crack
Creek
Relief Area
Halley VI
original site
Chasm 1
Chasm 2
Antarctic continent
McDonald
Ice Rumples
7km
Oct 2018
Dec 2017
Halley VI
original site
Chasm 1
Mar 2017
0
5
Kilometres
0
10
20
Kilometres

Quadcopter surveys of the cracks

2,500 km of radar lines investigating structure and thickness of ice shelf

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7km
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original site
Chasm 1
Mar 2017
0
5
Kilometres
0
10
20
Kilometres

Short video:

Extreme Antarctica and extreme engineering


Thank you!!