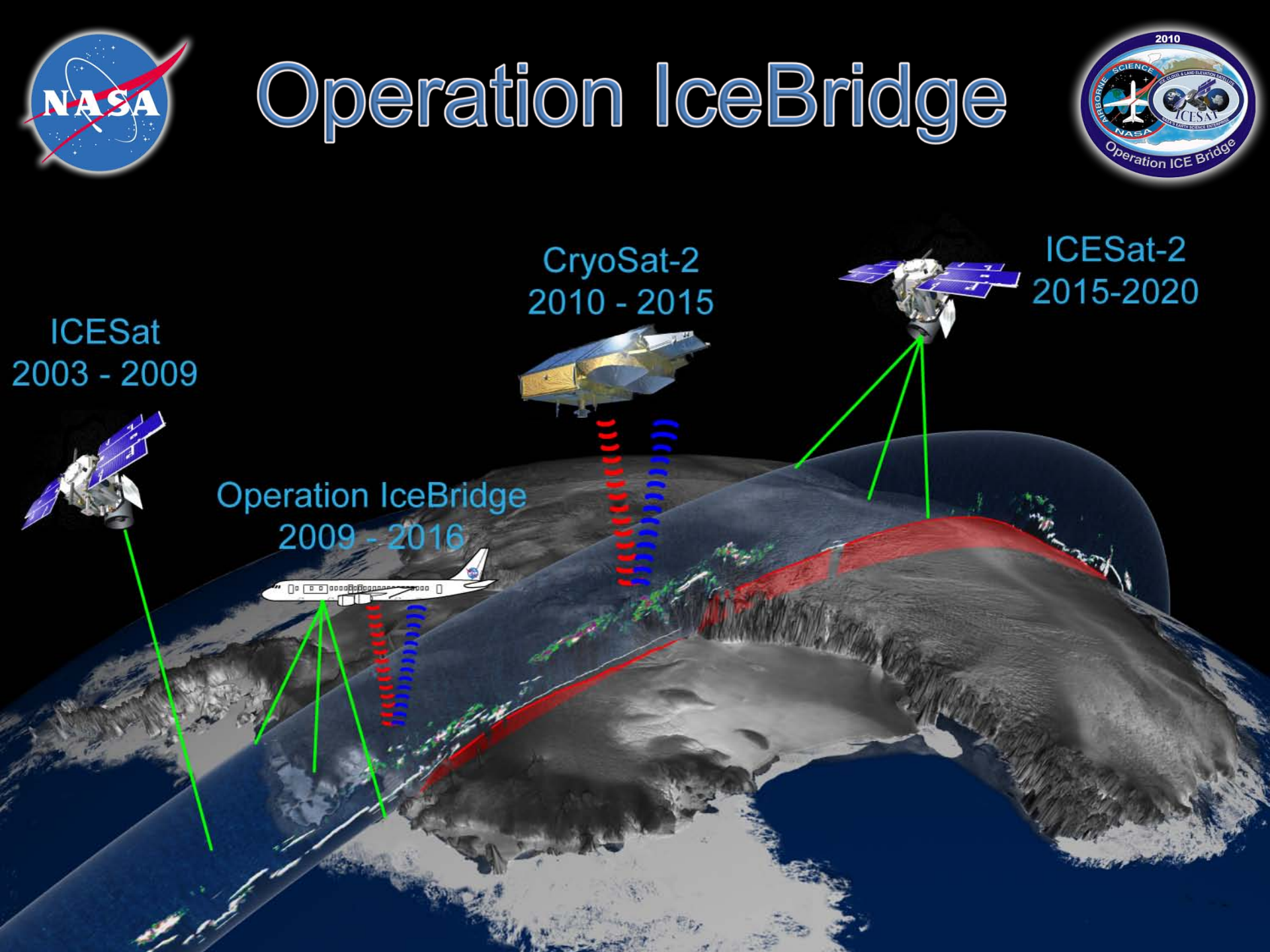
Operation IceBridge

NASA Earth Science Division

Image: M. Studinger

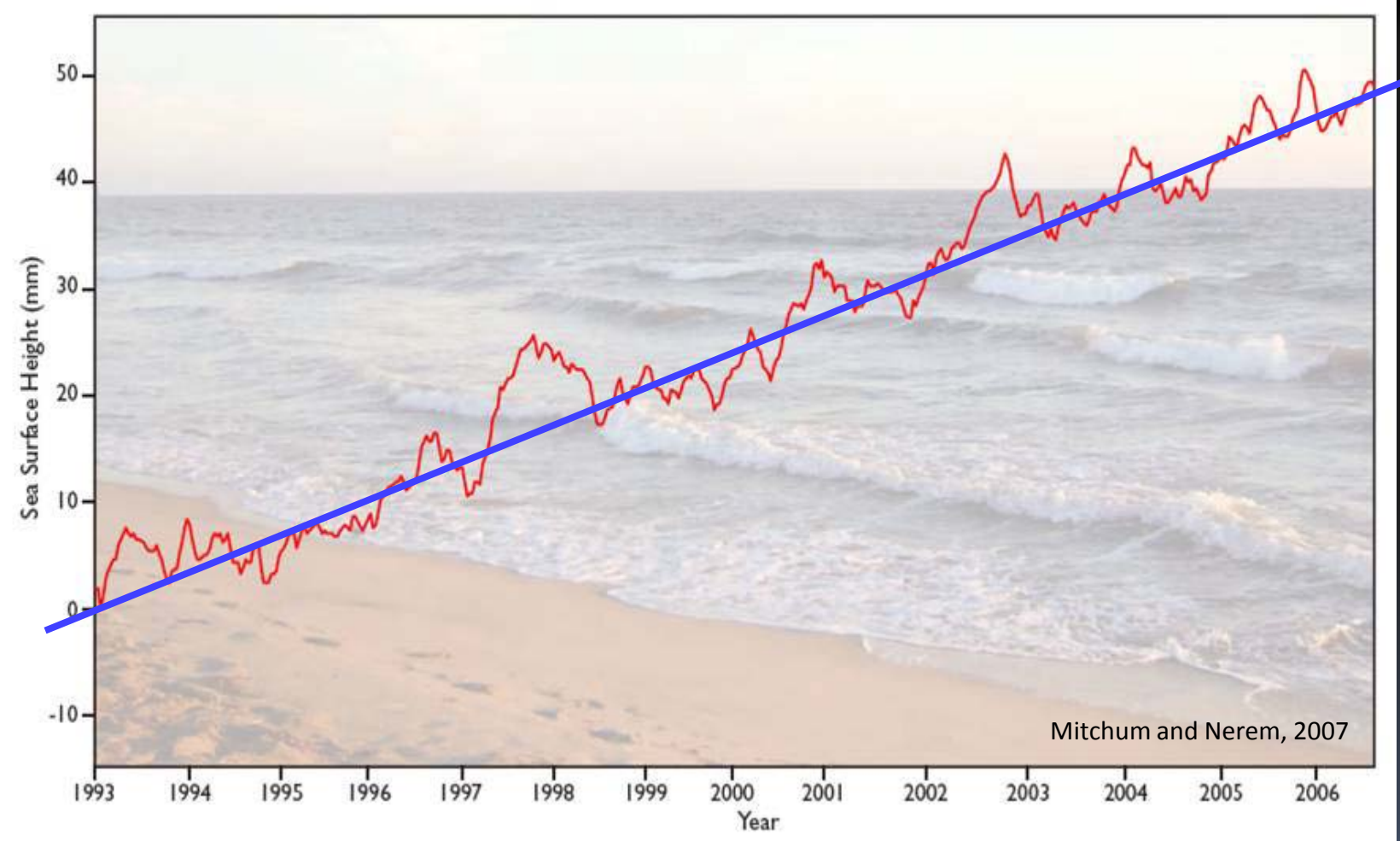
Universidad de Magallanes en Punta Arenas
15 November 2010

Operation IceBridge

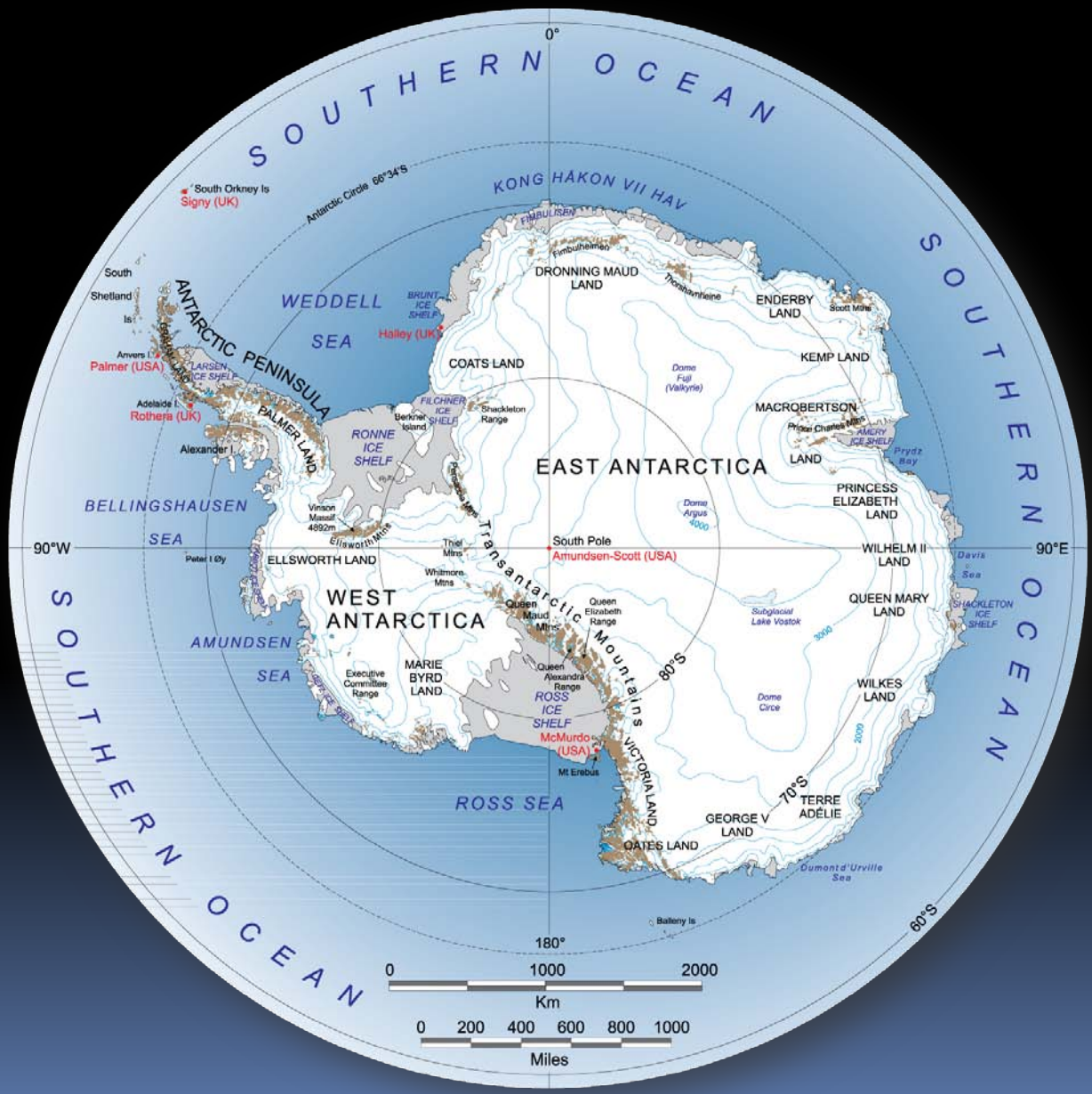


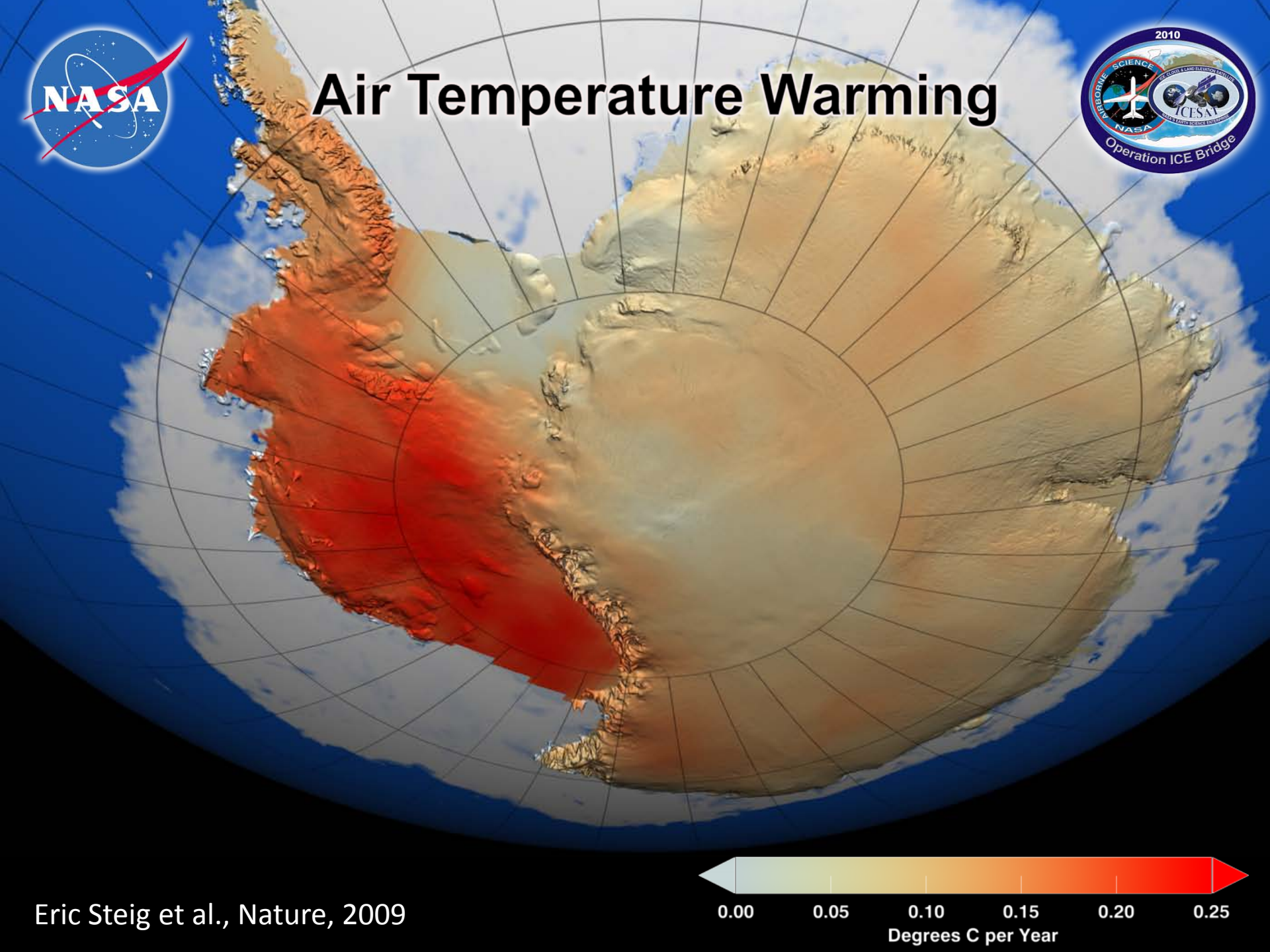
Sea Level Rise (1993-2007)

Photo: DMS



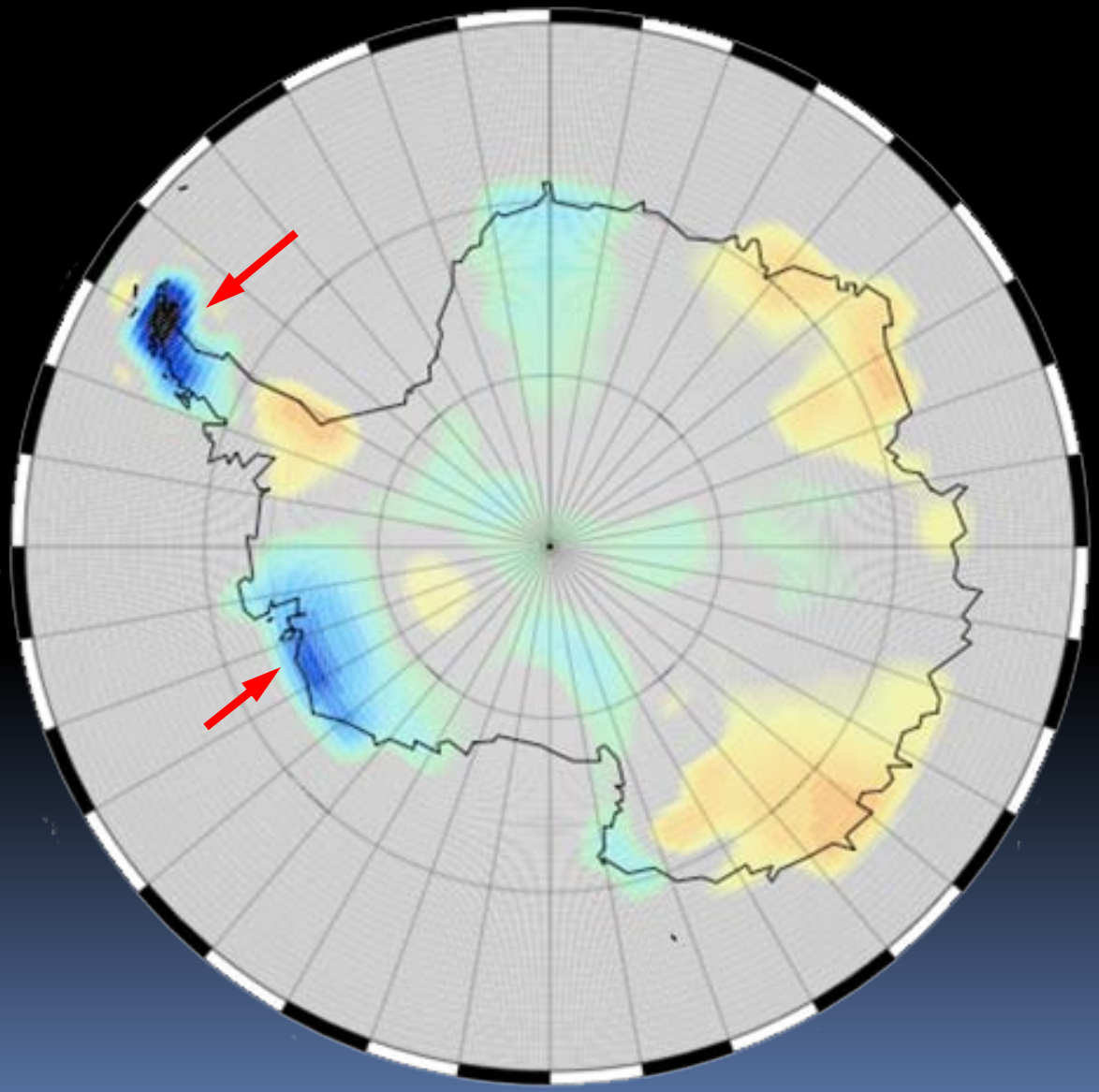
Antarctic Survey Areas





Eric Steig et al., Nature, 2009

Ice loss from GRACE Satellite



Antarctic Flights

Photo: M. Studinger

NASA DC-8 Cockpit during Weddell Sea Mission

Image: Michael Studinger

EXIT
ECUADOR
ALASKA
BOLIVIA
IHOP 2002
SOLVE II
Fort Worth
Para Vida
MAINE
PERTH
Air Tahiti Nui

Airborne Topographic Mapper (laser altimeter)

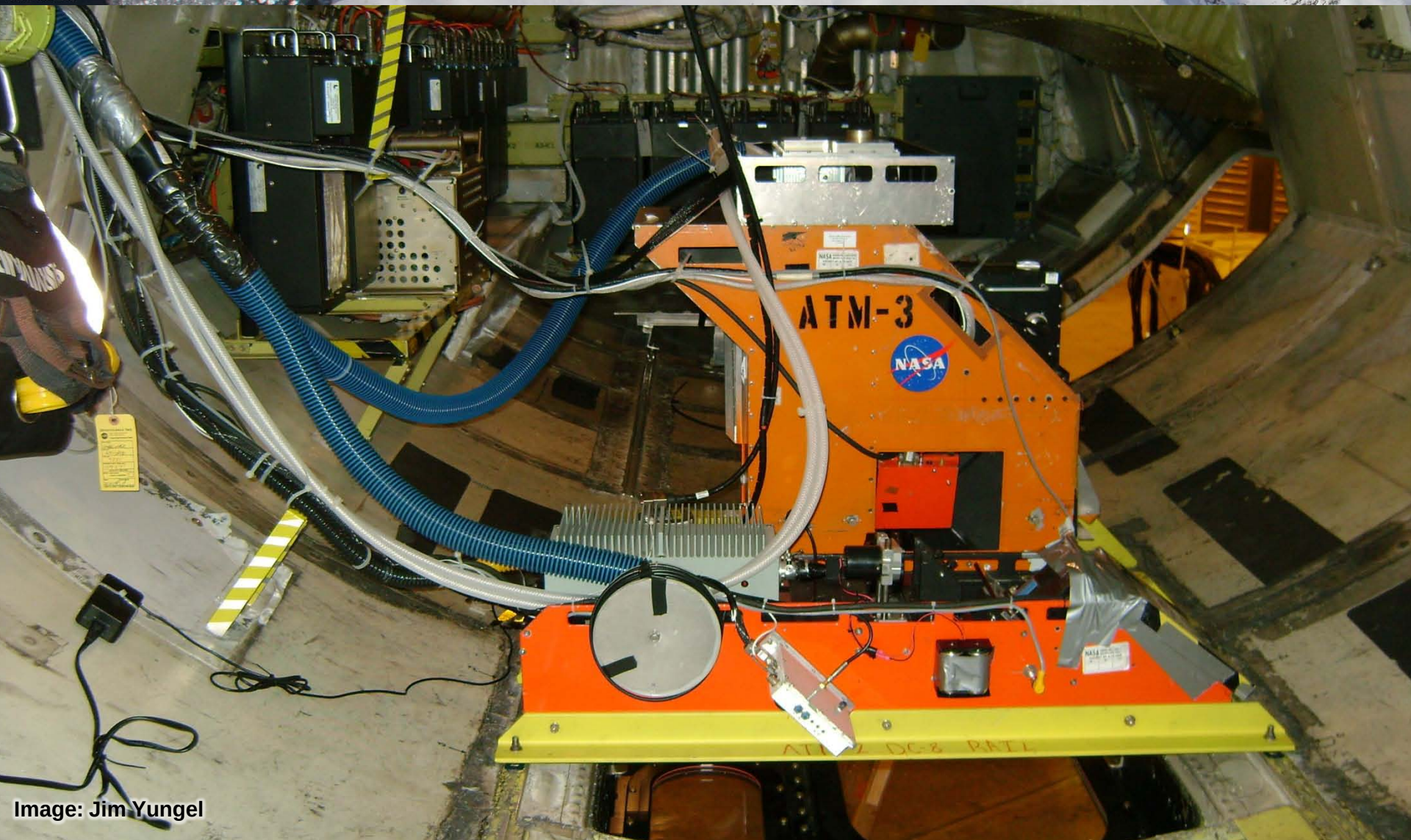


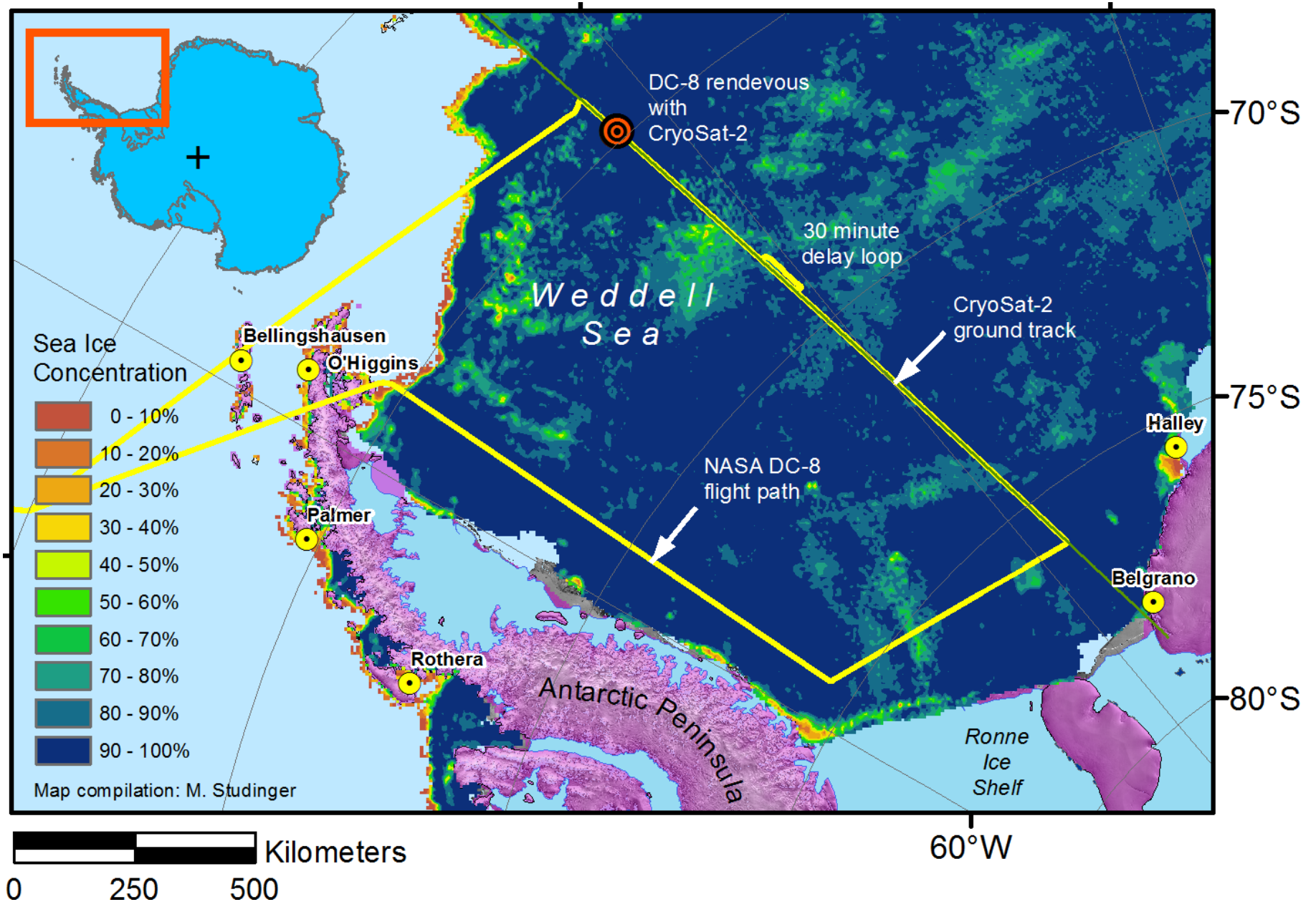
Photo: DMS

Image: Jim Yungel

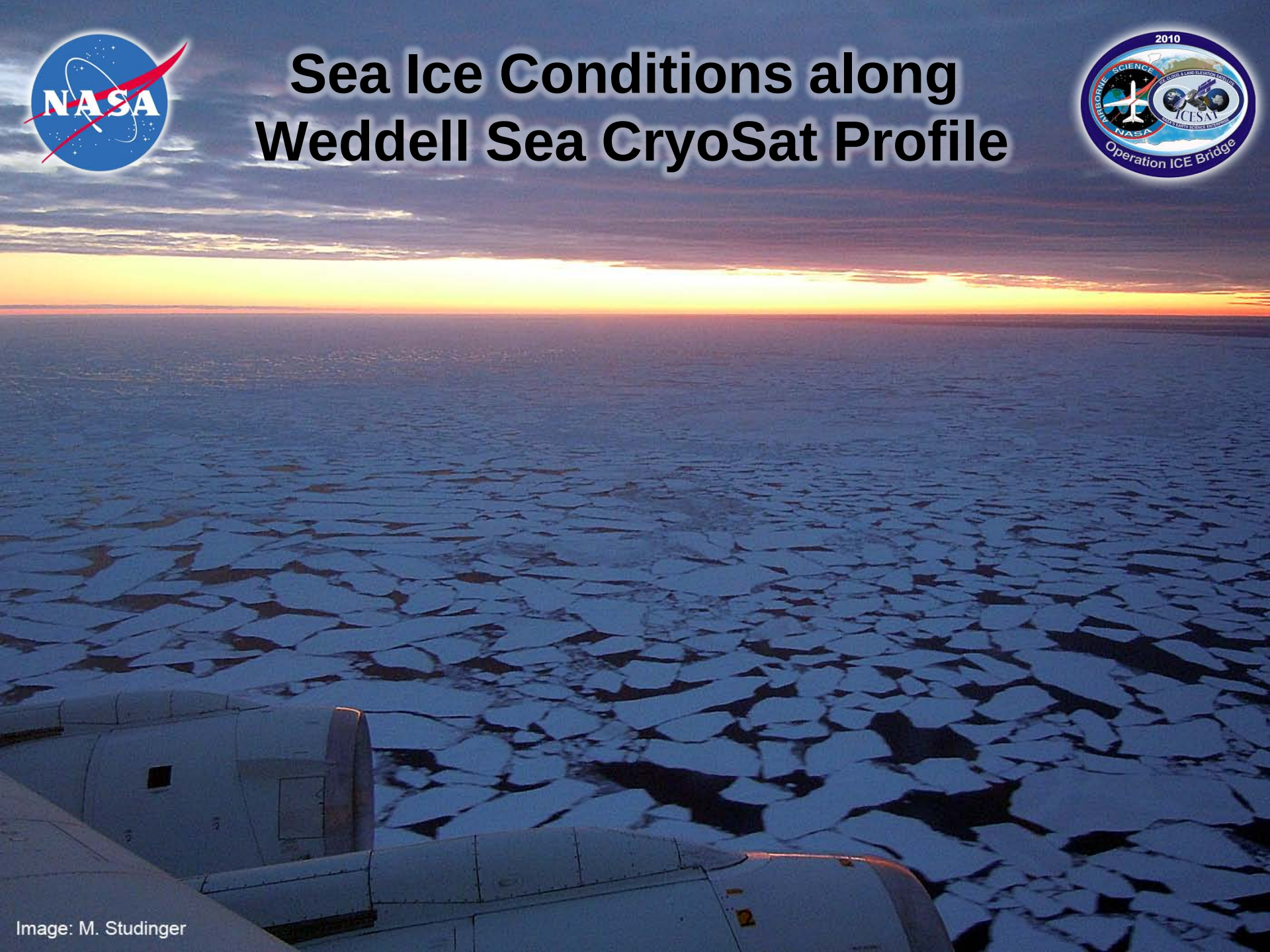
Ice Penetrating Radars contained in fairing below hull (snow-depth radar antennas in wing roots)

Photo: M. Studinger

Oct 28, 2010: Sea Ice Mission over Weddell Sea with CryoSat-2 underflight

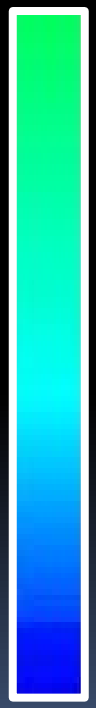


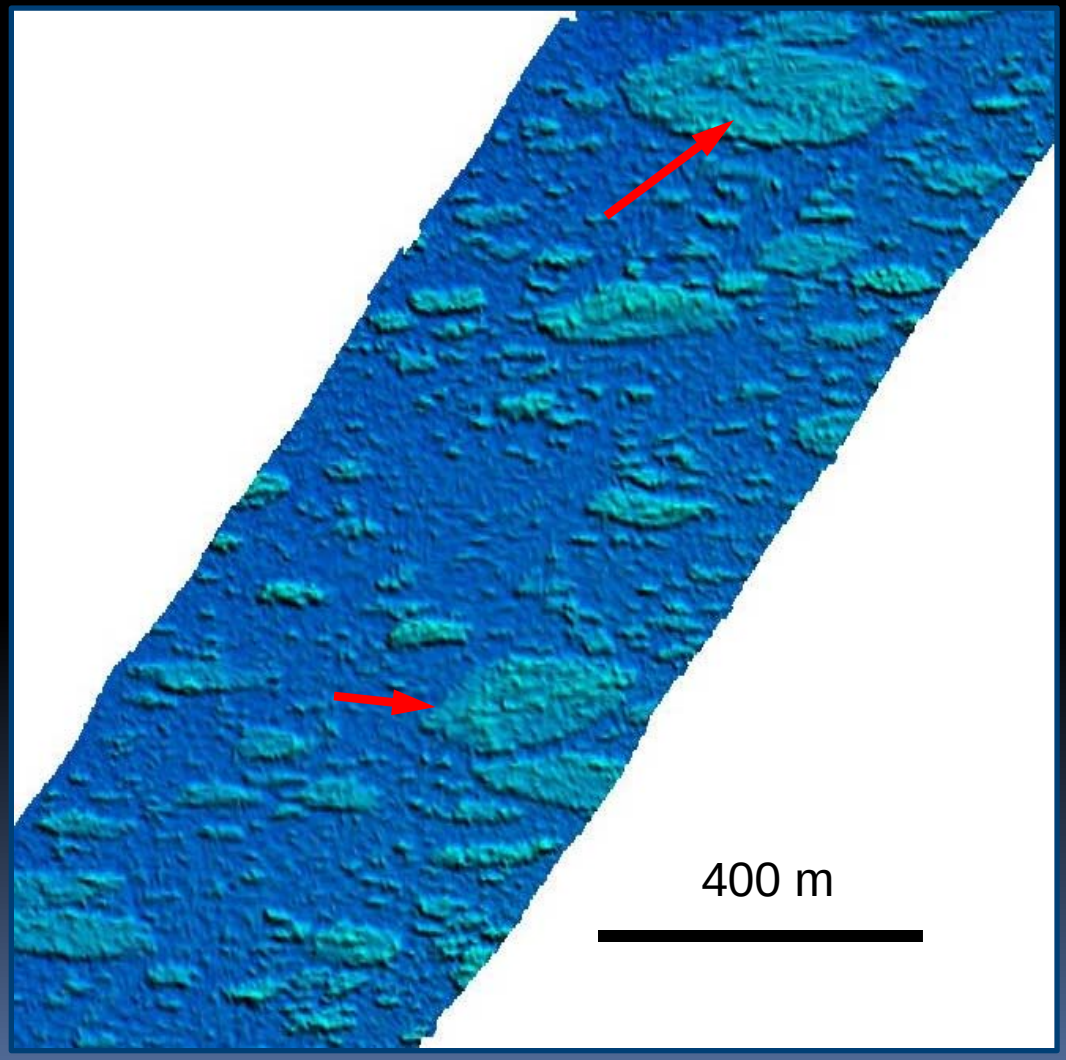
Sea Ice Conditions along Weddell Sea CryoSat Profile



ATM Airborne Laser Altimeter Scan of Sea Ice

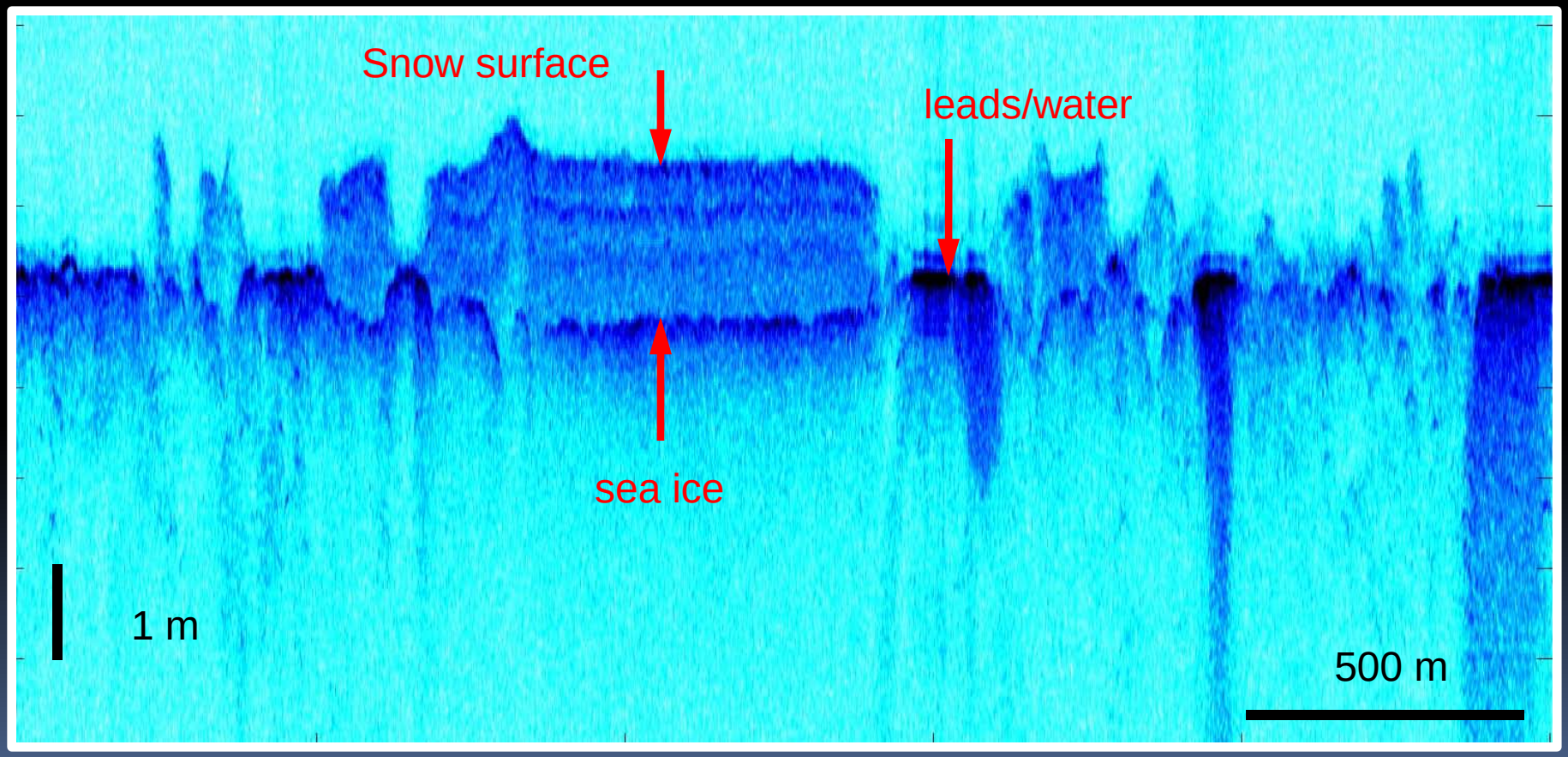
Freeboard measurement of sea ice for thickness estimation





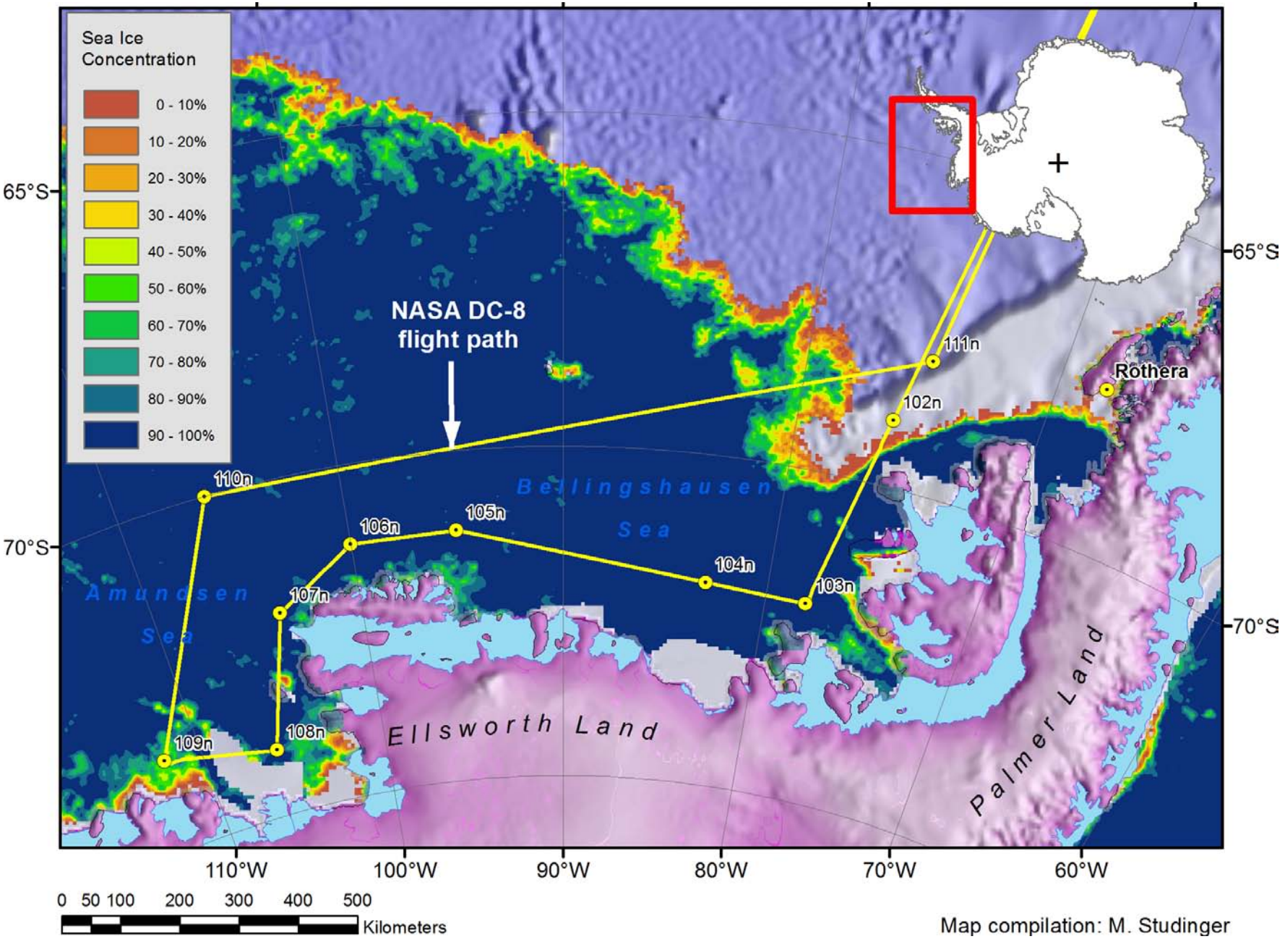
October 28, 2010 – Weddell Sea

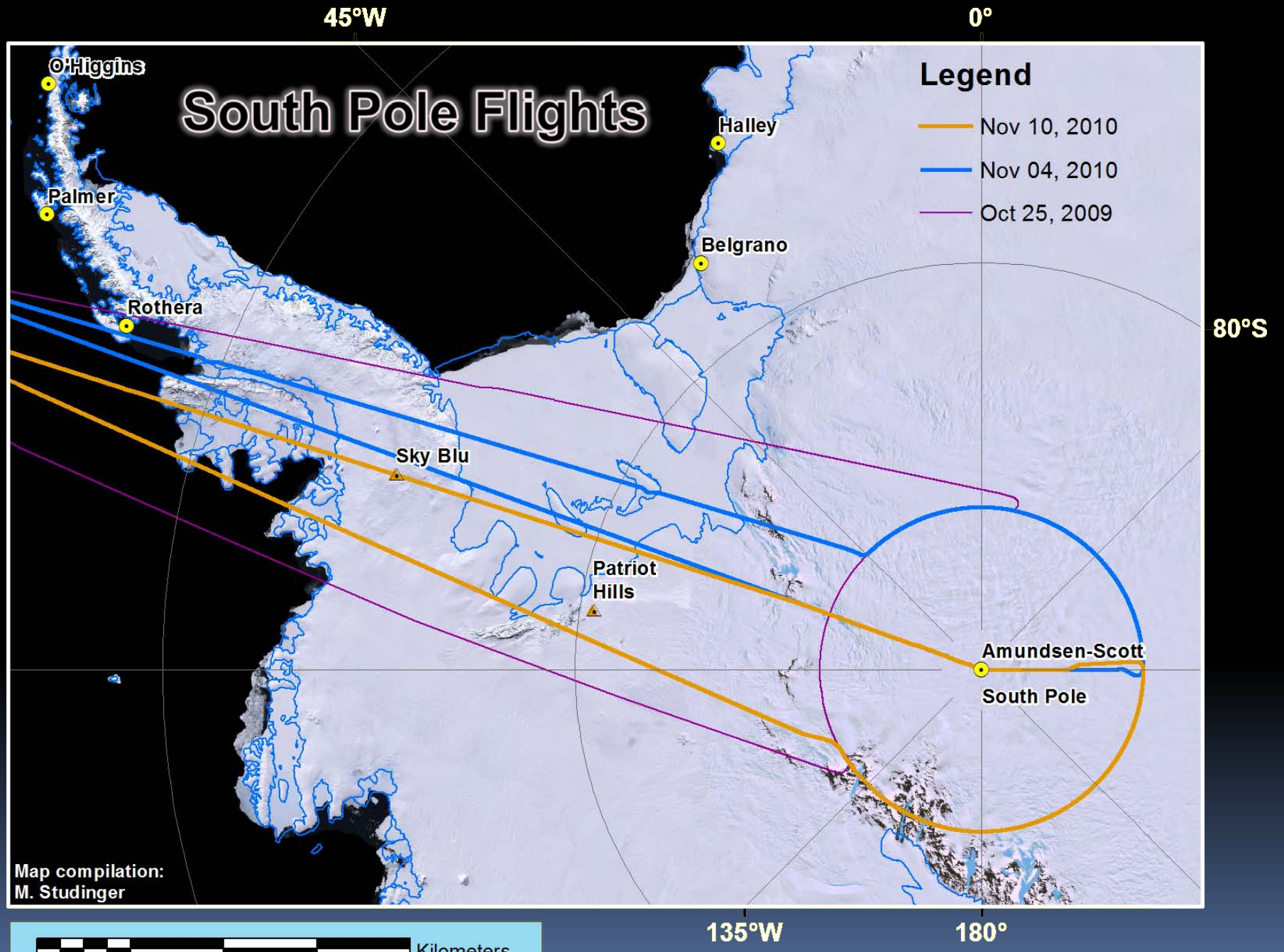
Measuring Snow Thickness over Sea Ice with Radar



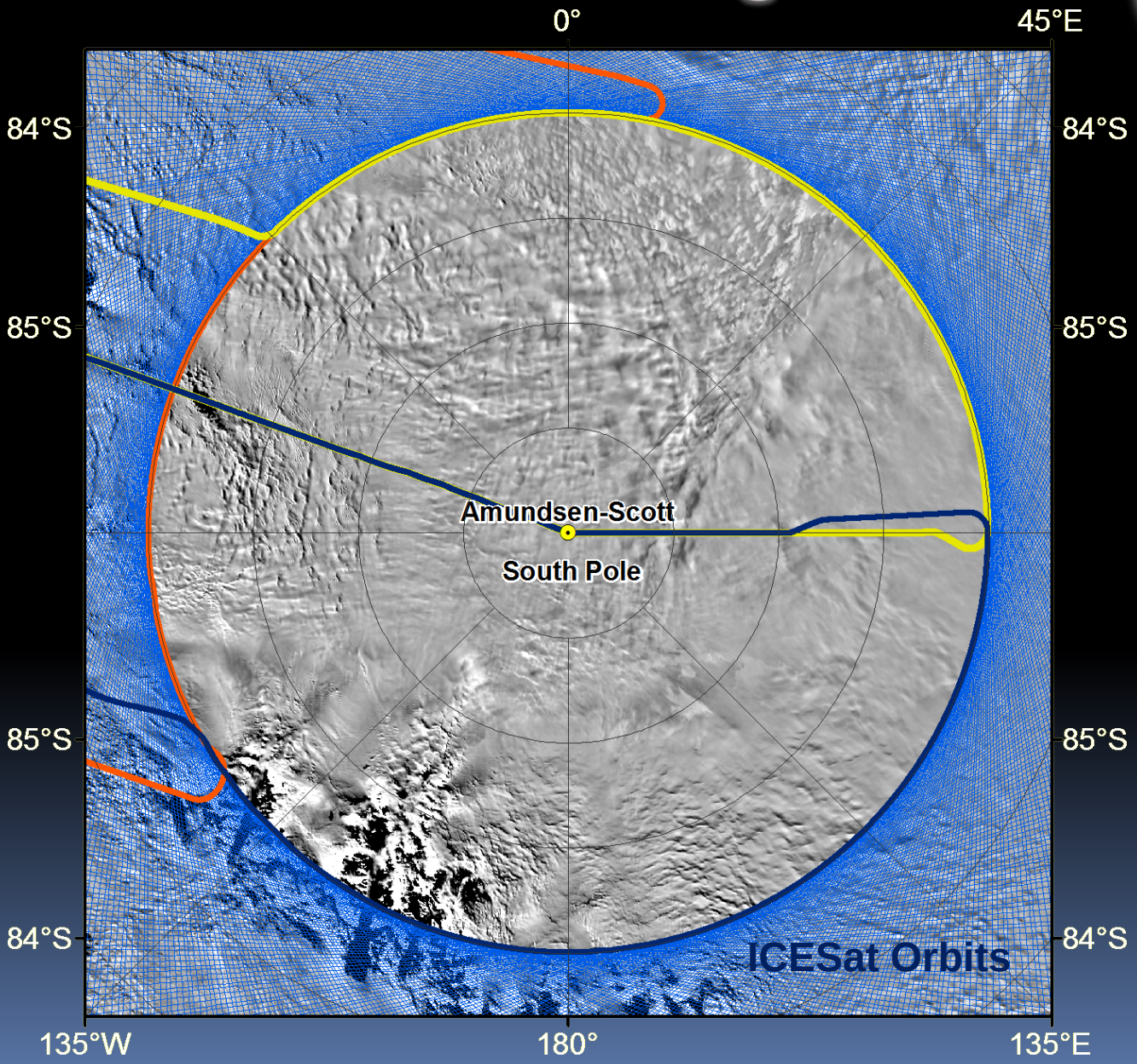
October 28, 2010 – Weddell Sea

Oct 30, 2010: Sea Ice Mission over Bellingshausen and Amundsen Seas

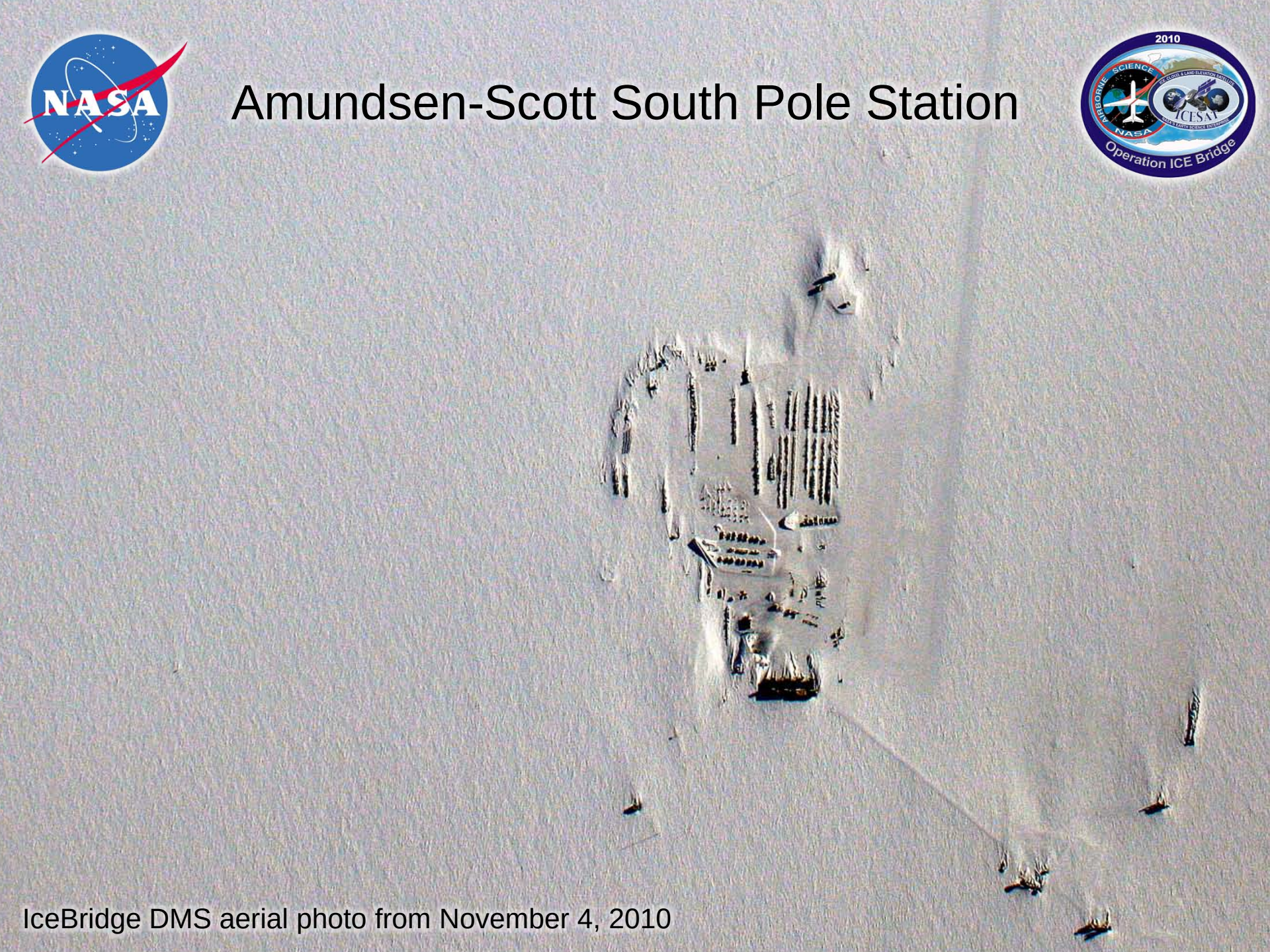



45°W
0°
O'Higgins
South Pole Flights
Halley
Palmer
Belgrano
Rothera
80°S
Sky Blu
Patriot
Hills
Amundsen-Scott
South Pole
Legend
Nov 10, 2010
Nov 04, 2010
Oct 25, 2009
Map compilation:
M. Studinger
135°W
180°
Kilometers
0 125 250 500 750 1,000

South Pole Flights



Amundsen-Scott South Pole Station

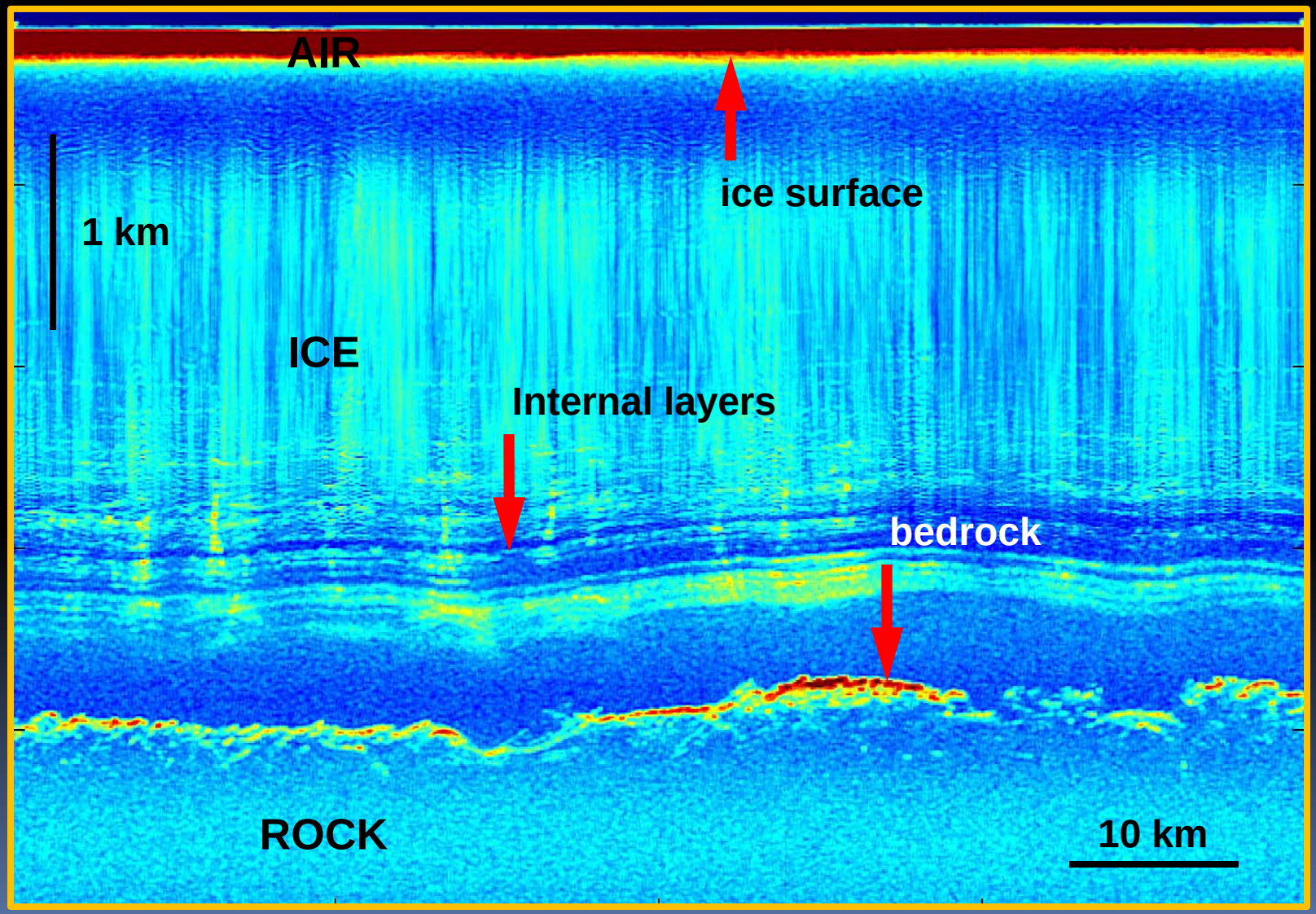


IceBridge DMS aerial photo from November 4, 2010

DC-8 overhead of South Pole Station

Image: David (Pablo) Cohn, South Pole Station

Mapping 3-km-thick ice at South Pole



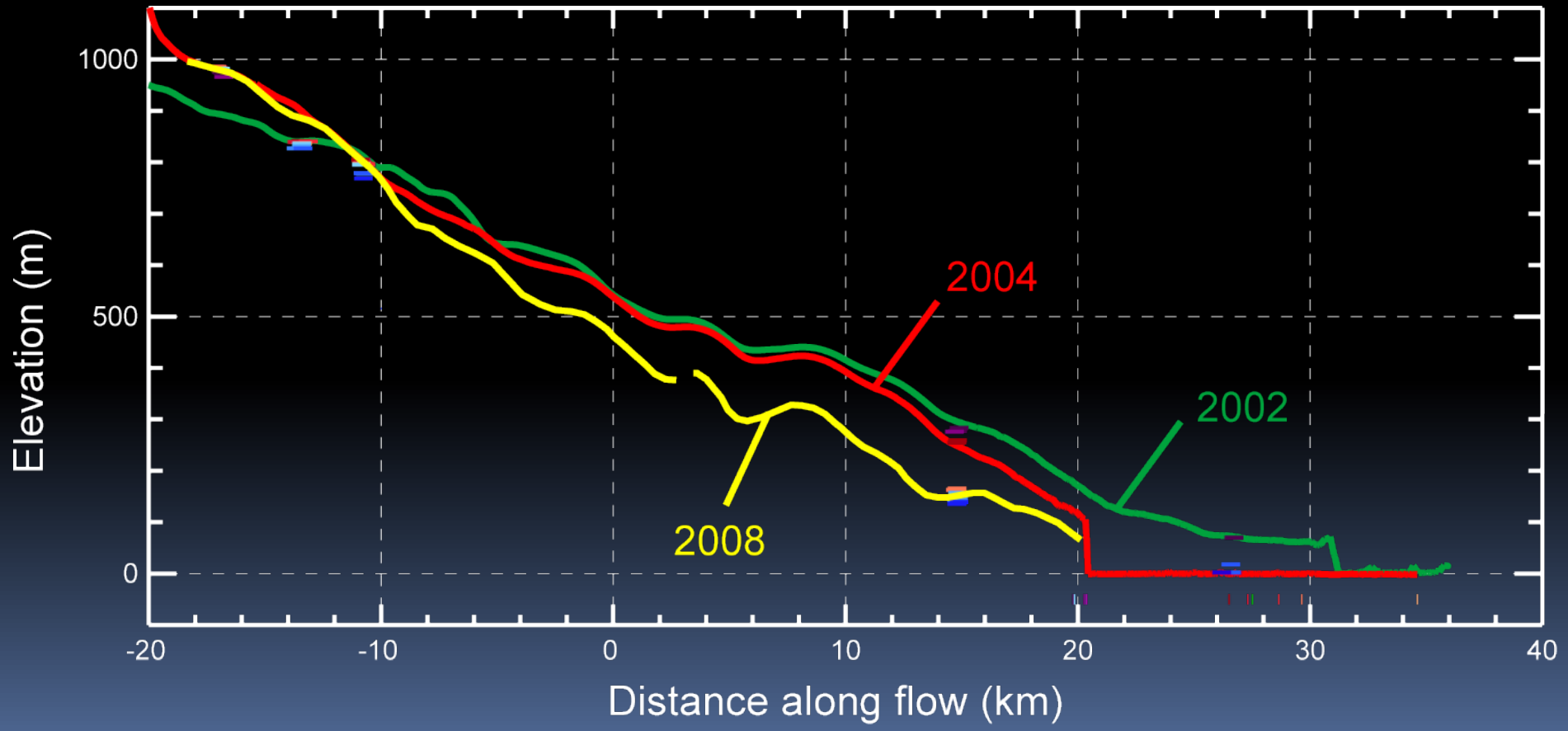
Thinning of Crane Glacier

Larsen B Ice Shelf
before collapse

© 2009 Michael Studinger

Thinning of Crane Glacier

Photo: M. Studinger



Operation IceBridge

Operation IceBridge:
http://www.nasa.gov/icebridge

Data is freely available at
National Snow and Ice Data Center (NSIDC)
http://nsidc.org/data/icebridge/