



SIMBA

SEA ICE Mass Balance in the Antarctic





September 26 we arrived at Ice Station Belgica

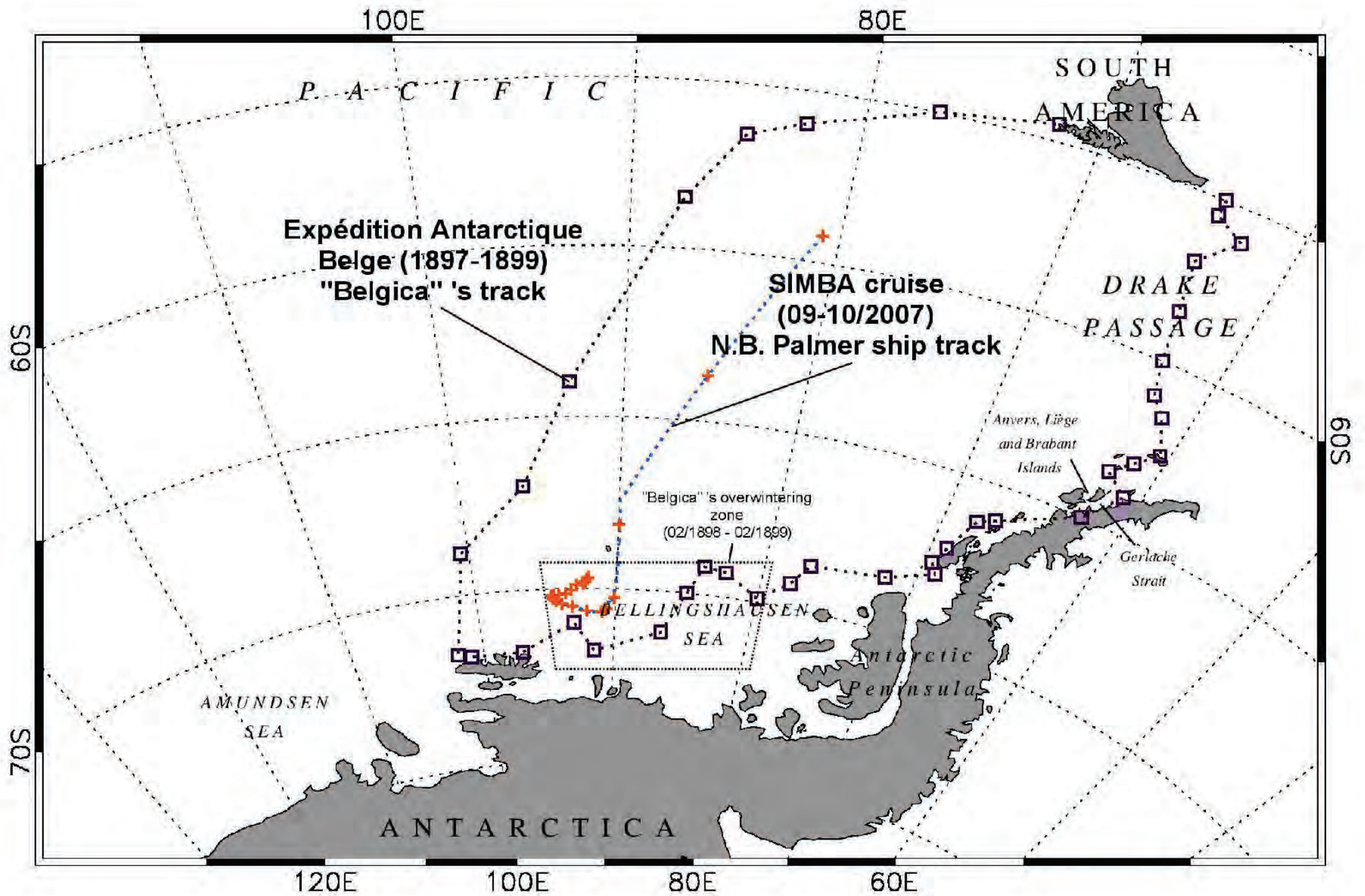
Latitude 71 South Longitude 90 West

25 days after first departing Punta Arenas

No human has ventured into this region in wintertime since the first Belgica expedition arrived in 1898



Note: they got trapped in the ice for 18 months!



Courtesy of Martin VanCoppennelle

SIMBA

Baseline data from which to monitor future change in Antarctic sea ice:

- **Geophysical processes** (snow & ice thickness and extent, physical properties, heat flux, energy balance)
- **Biogeochemical processes** (biological habitats, DMS production, trace metals, CO₂ Flux)
- **Satellite Remote Sensing** (validating tools for long-term monitoring of sea ice / climate systems)

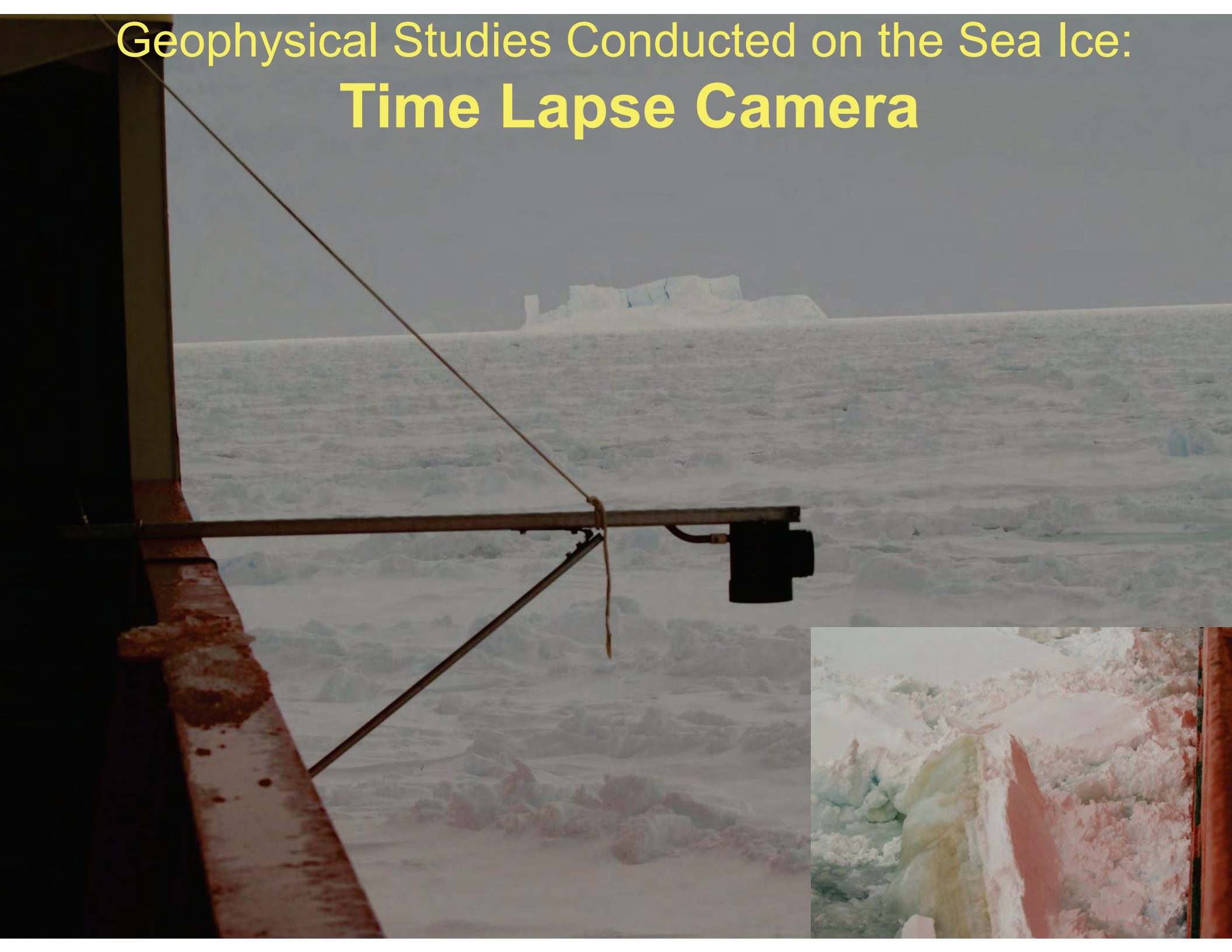
En Route to Final Ice Camp: Ice Observations



En Route to Final Ice Camp: Ice Observations



Geophysical Studies Conducted on the Sea Ice: Time Lapse Camera



ROV'S and AUV'S



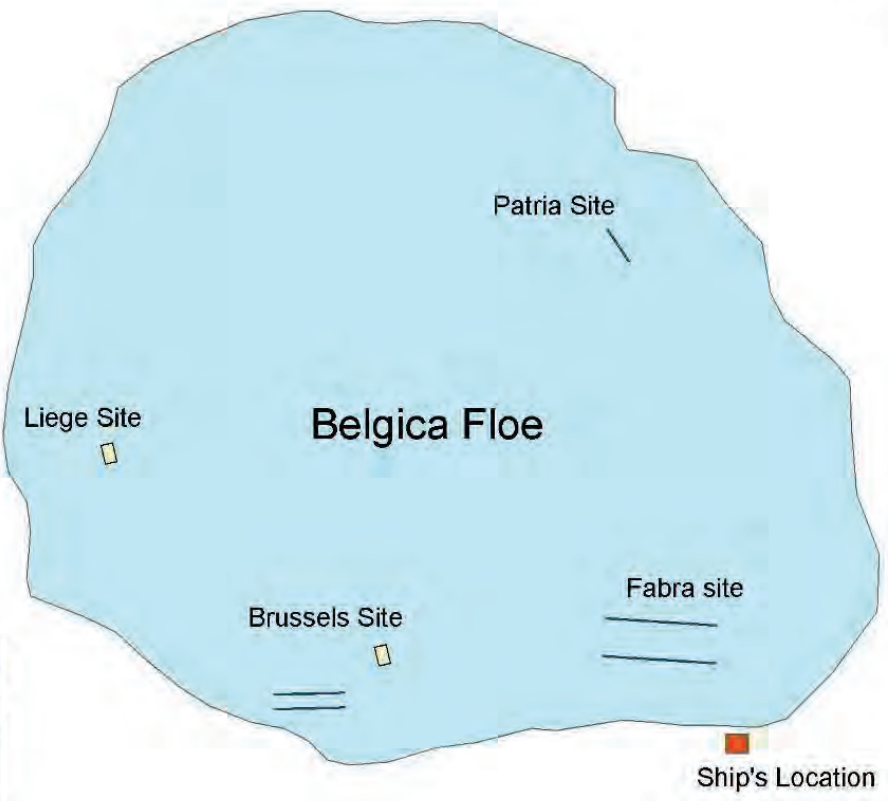
SIMBA Geophysical Assessment



Emperor penguins lined up to assist with measurements

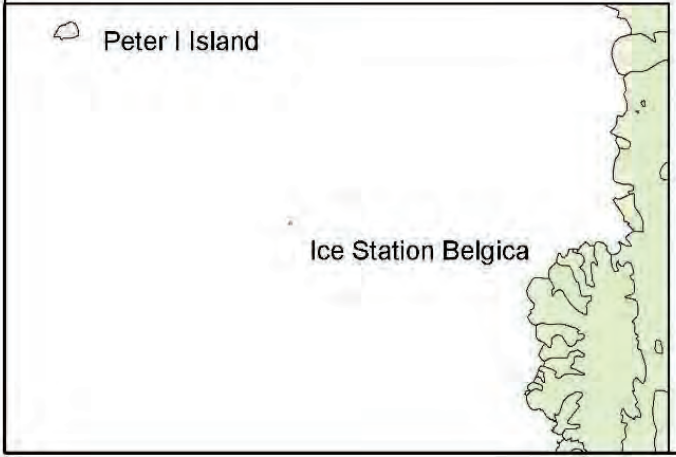
Photo by: Glenn Grant

Ice Station Belgica

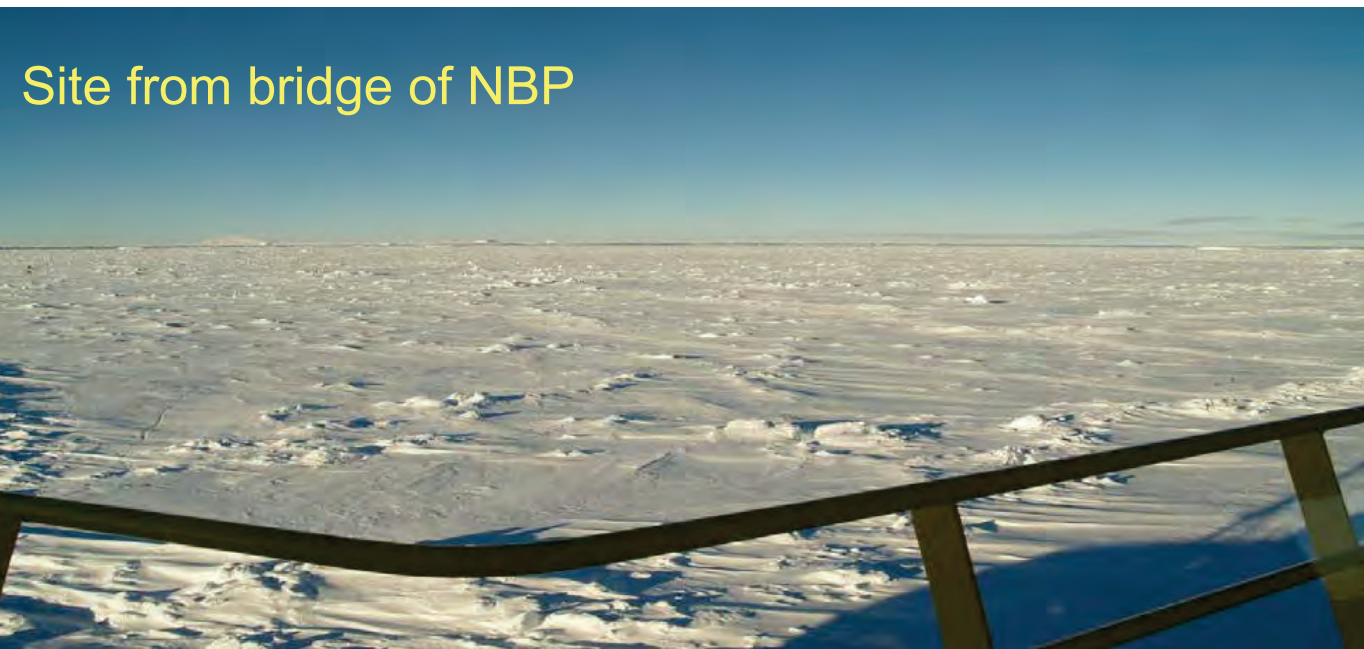


Legend

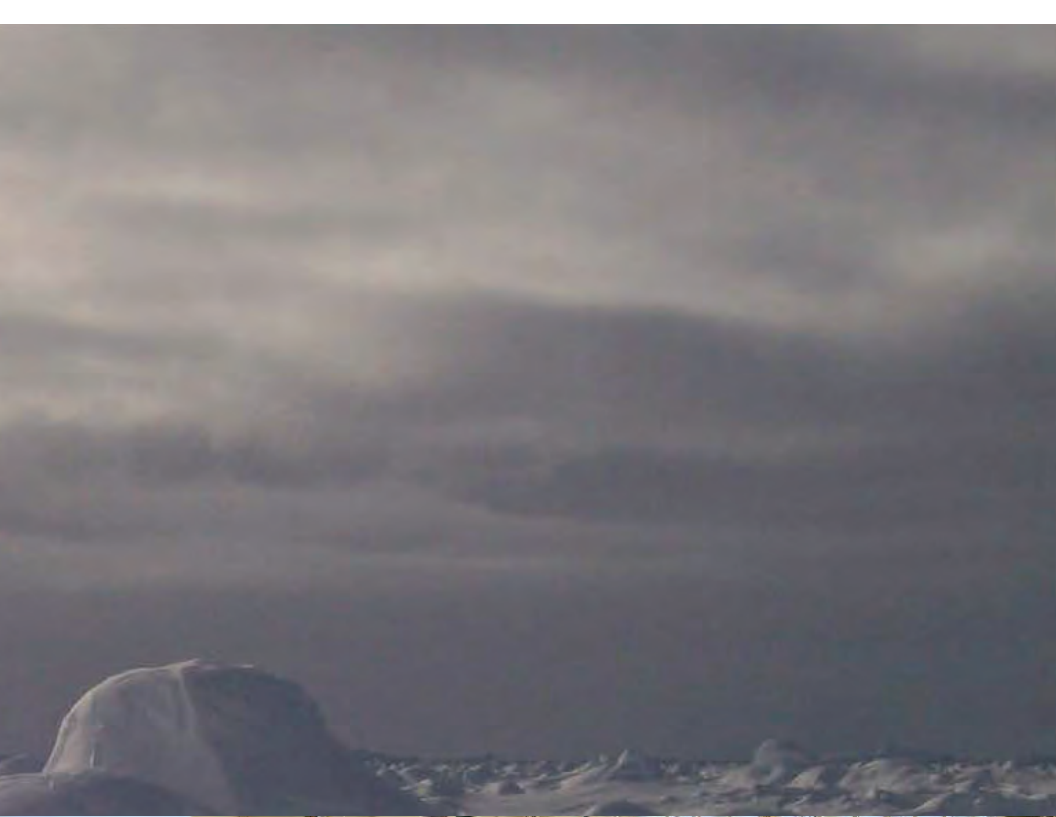
— Geophysical Lines



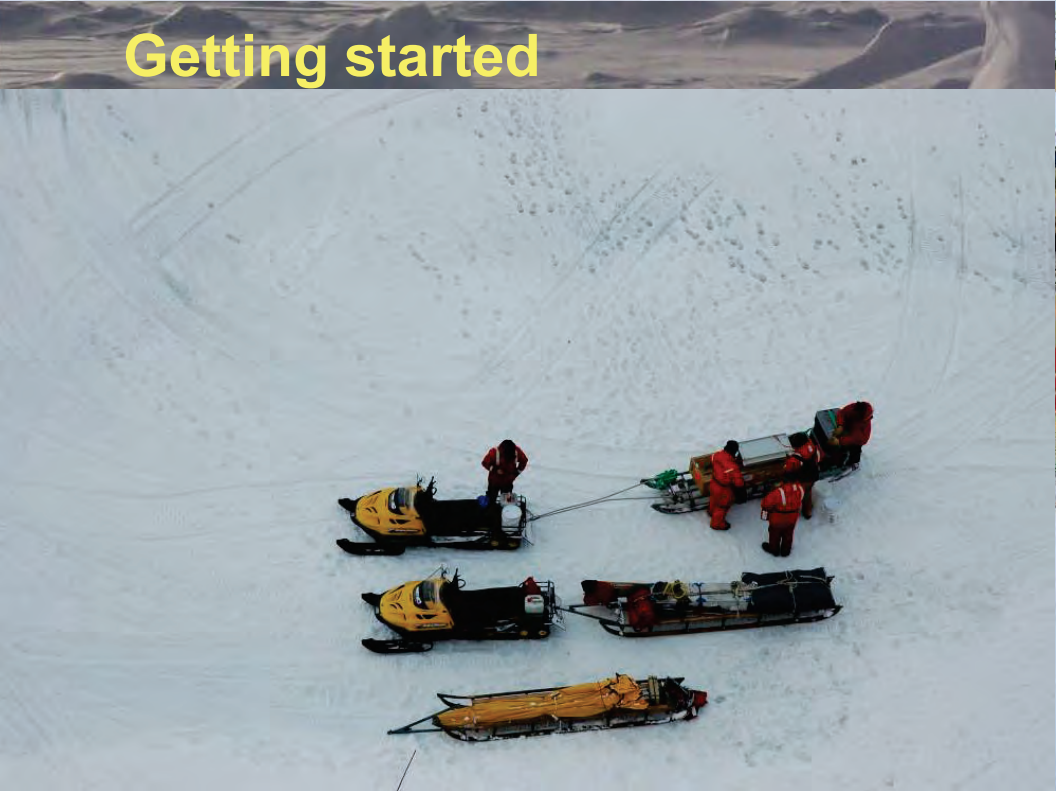
Site from bridge of NBP



Surface roughness across Site



Getting started



Geophysical Studies Conducted on the Sea Ice: **Snow Depth and Ice Thickness**

View from Transect line 1



Geophysical Studies Conducted on the Sea Ice: Snow Depth and Ice Thickness

Step 4: Drill

+2 meter = 6 ft drill bit

ill bits

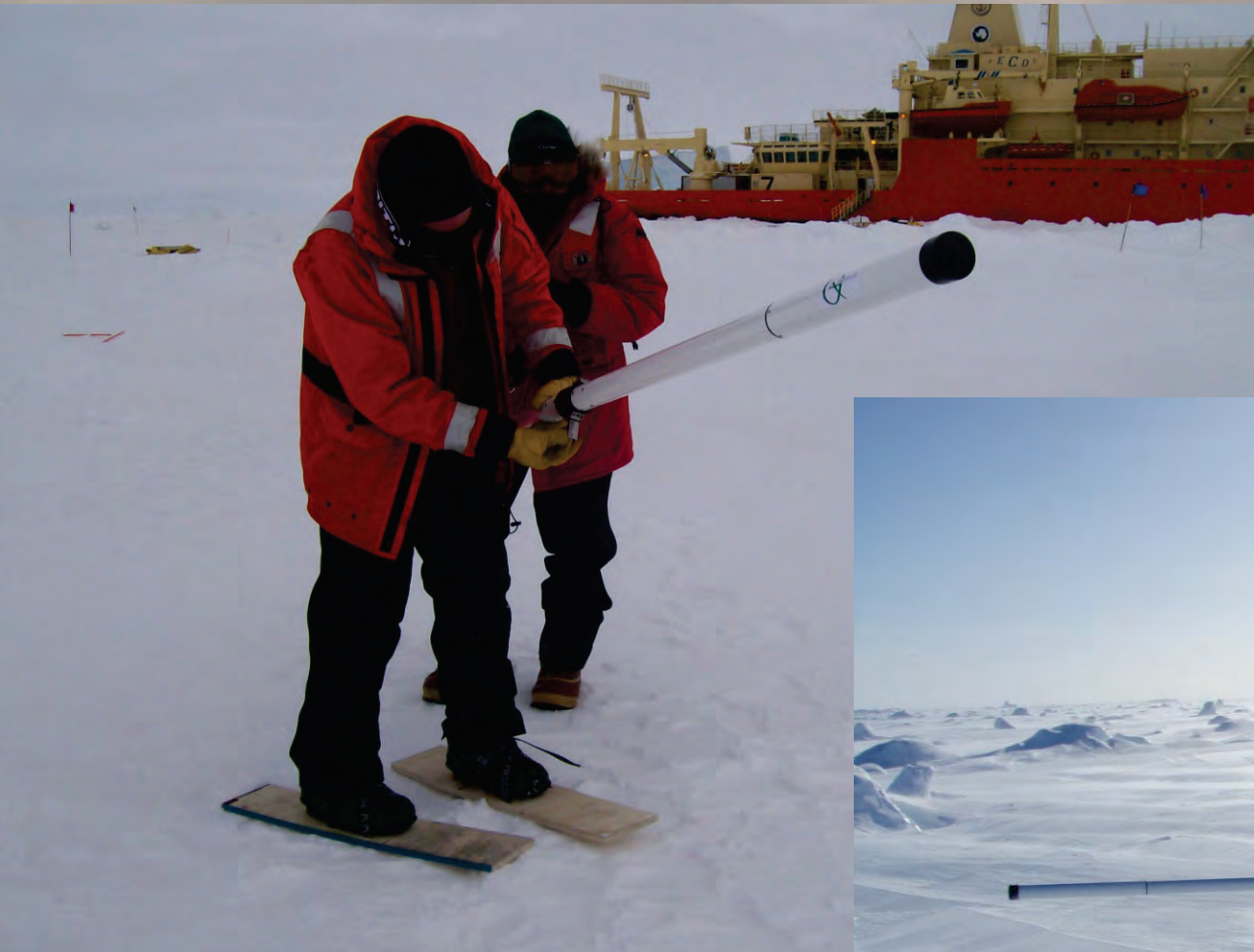


Geophysical Studies Conducted on the Sea Ice: Snow Depth and Ice Thickness

Snow thickness can get up to $\sim 1.5 \text{ m} = \sim 4.5 \text{ ft}$



Geophysical Studies Conducted on the Sea Ice: Snow Depth and Ice Thickness – EM 31

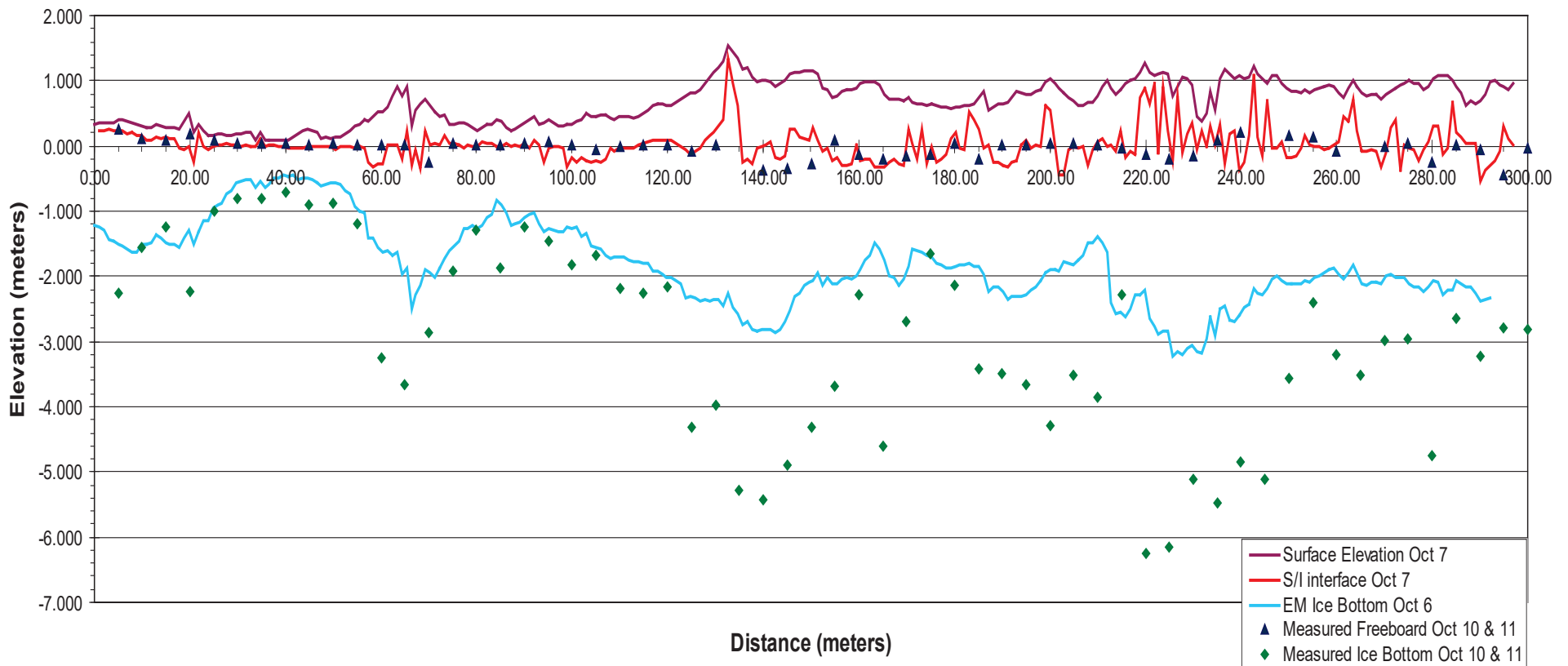


Concurrent measuring of ice thickness to compare with in situ measurements



Typical Profile of Snow Depth and Ice Thickness

Fabra Site - Line 1B (10/07/07)



Geophysical Studies Conducted on the Sea Ice: **Snow Pits**



Geophysical Studies Conducted on the Sea Ice: **Resistivity**



Various Teams Required to Each Job



Biogeophysical Studies Conducted on the Sea Ice: Ice Coring



Biogeophysical Studies Conducted on the Sea Ice: Ice Coring

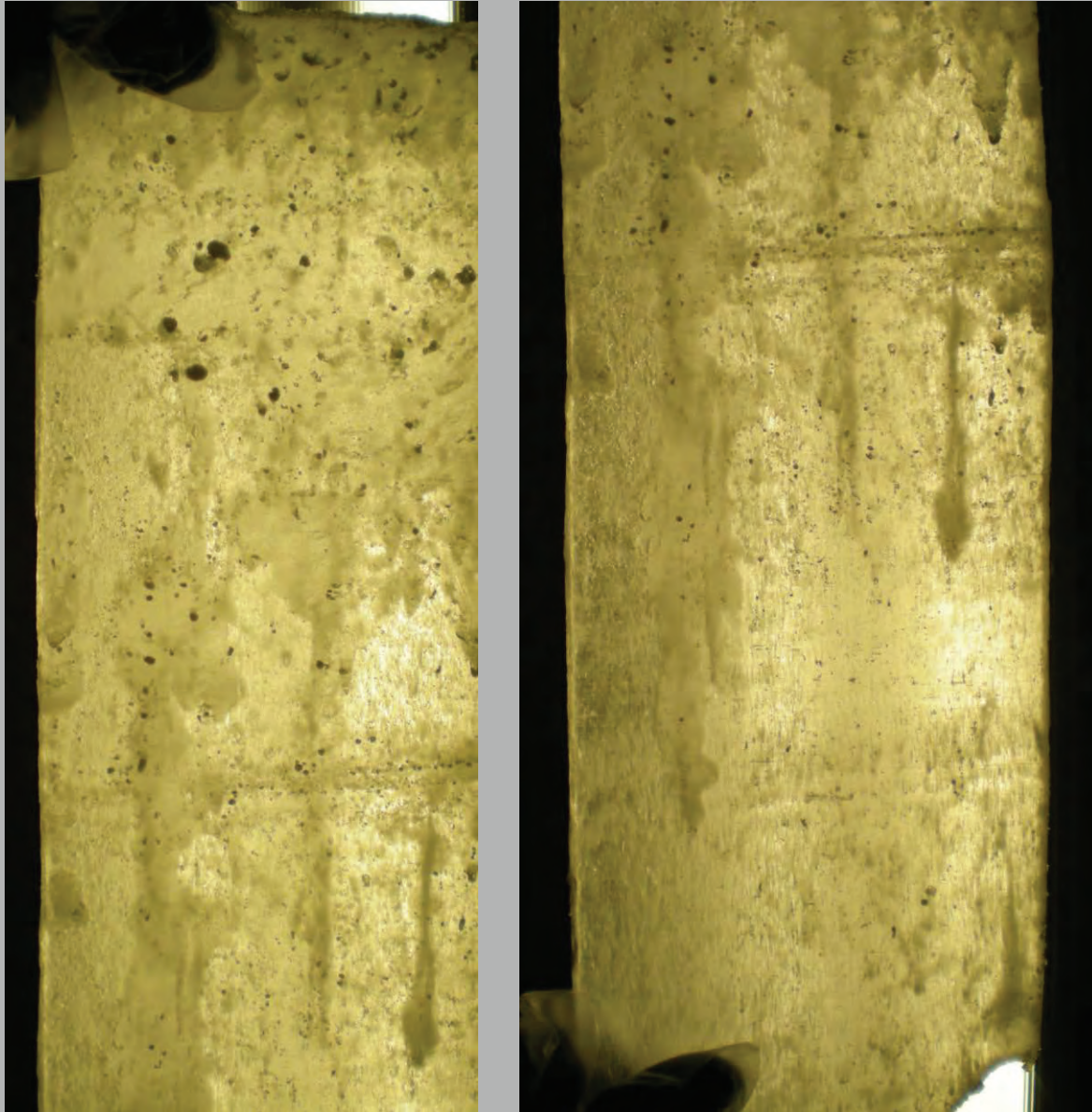


Figure 8 : 1 cm-thick section of the Brussels 4 core clearly showing the descending refrozen brine tubes. Fingers for scale.



The End

Good Luck on your Antarctica Challenge

Thanks:

UTSA:

Stephen F. Ackley, Blake Weissling, Mike Lewis,
Burcu Cicek, and Hongjie Xie.

ULB:

Jean-Louis Tison and Martin VanCoppennelle

Photo Credits:

Penny Wagner, Mike Lewis, Stephen F. Ackley, and
Jean-Louis Tison