



**Welcome!**

**PolarConnect with  
Anne Marie Wotkyns  
and the Oden Antarctica Expedition**

**January 6, 2011**





# Oden Antarctic Expedition

## The Sea Ice System in Antarctic Summer



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# The Icebreaker *Oden*

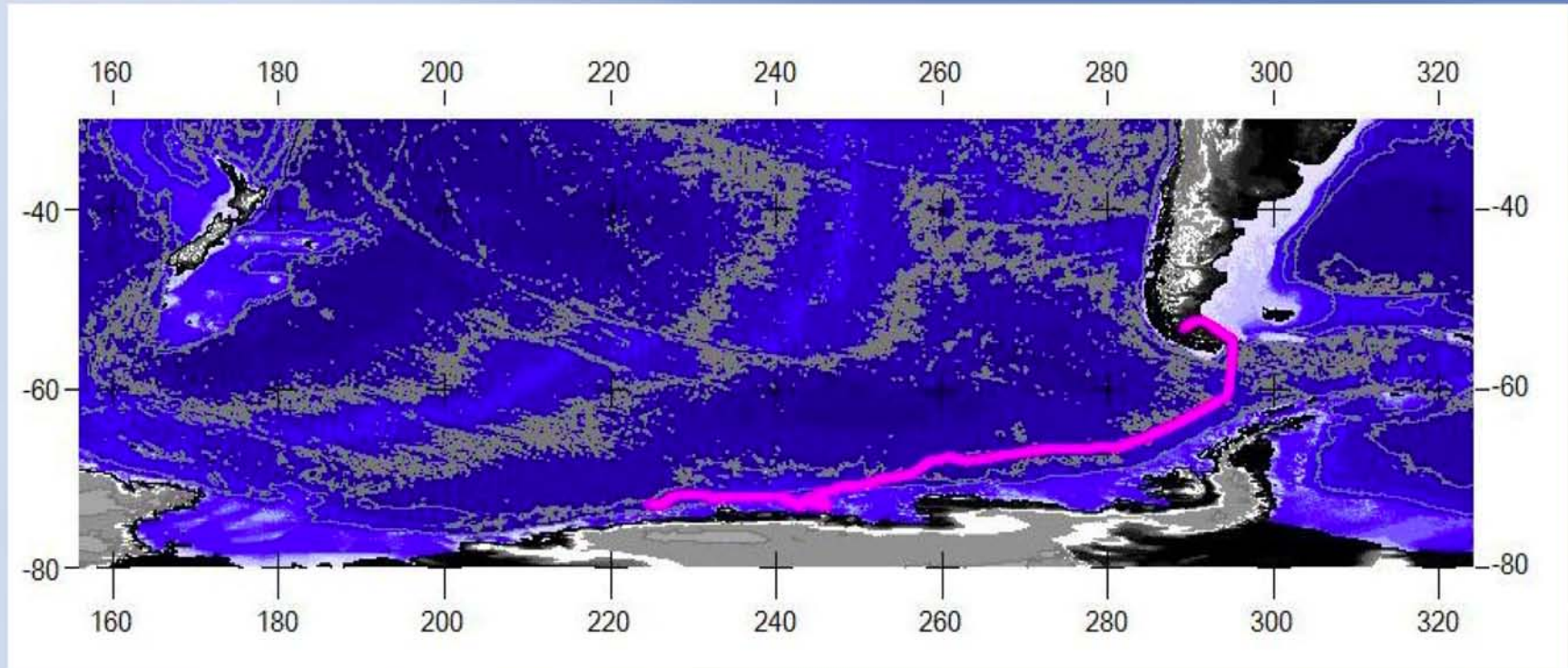
- The *Oden* is one of eight icebreakers operated by the Swedish Maritime Administration. The vessel is designed for escort, ice breaking and for Arctic research operations. The *Oden* is 300 feet long and is carrying 62 people on this trip. It has a dining room, gym, library, medical office, and even carries its own helicopter.







# Our Travels



The Oden left Punta Arenas, Chile on December 8. On December 10, we started crossing Drake's Passage, the open water between South America and Antarctica. The seas were very calm for that area. We started seeing icebergs and bergy bits on December 13. We are continuing to travel south west, finishing on January 14 at McMurdo Station, located at 77° S, 165° W.



# Life on Board



Safety Drills and Survival Suits



Science Seminars and Information Meetings



3 Meals a Day, plus  
Coffee Breaks – serve yourself,  
clear your table, rinse dishes



No Outdoor Shoes Inside



Calling Classrooms on a  
Satellite Phone

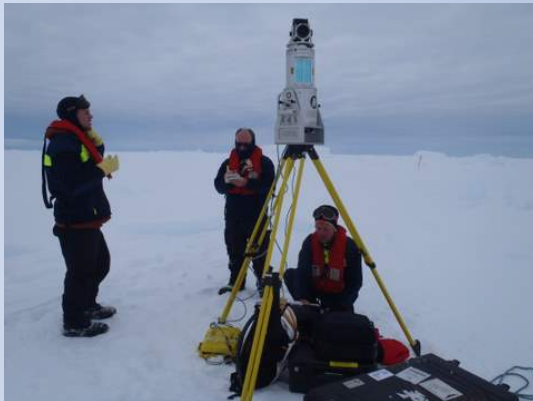




# The Sea Ice Team's Objectives

## Cruise objectives:

- Collect sea ice geophysical data (eg. sea ice/snow thickness and structure, ice concentration, floe sizes, sea ice topography)
- Validate/develop algorithms for remote sensing of Antarctic sea ice and for sea ice modeling using the surface measurements as ground truth
- Install 4 Ice Mass Balance Buoys (IMBs) on ice floes in different areas of the Amundsen Sea
- Conduct LiDAR scanning of ice floes









# Ice Observations - Camera

Underway sea ice digital ortho-photography  
– EISCam (Evaluative Imagery Support Camera)







# What Are Ice Stations?

The ship finds a suitable ice floe, uses mooring lines to tie up to the ice, then a gangway is put in place for us to go onto the ice. We must wear a floatation device or floatation coveralls, carry a radio, and stay in touch with the bridge at all times. We carry our gear out to the study site in sleds that slide on the ice.





# EMI

## EM Profiler, EM 31

These are both handheld devices that use electromagnetic induction to determine the thickness of the sea ice. We also use hand drilled holes to physically measure the ice thickness.



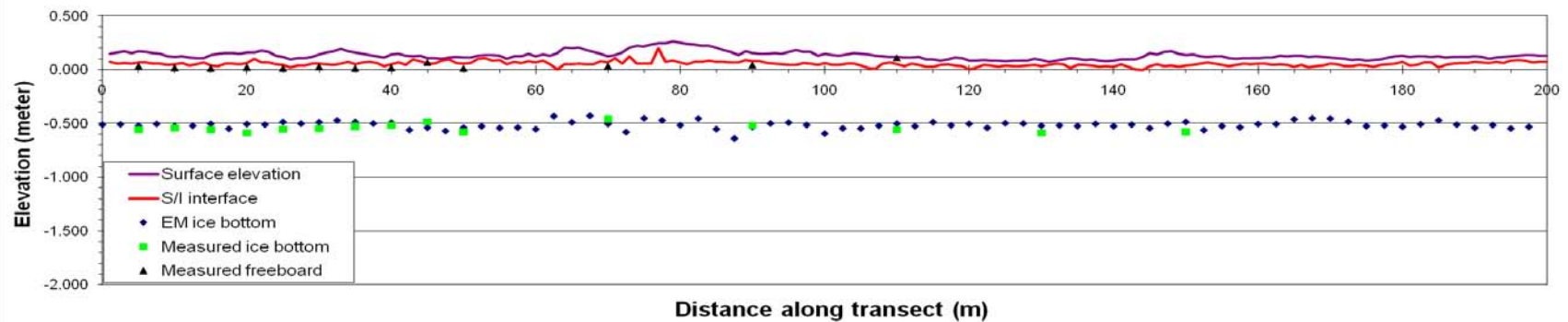


# EMI

## Electromagnetic induction (EMI) sounding for sea ice thickness



Brussels Site - Line 2 (3 October 2007)





# Ice Mass Balance Buoys

We have installed 4 ice mass balance buoys (IMB's) for long term remote sensing (ice thickness, snow depth, meteorology, temp/thermal properties, GPS positioning, Iridium com link)



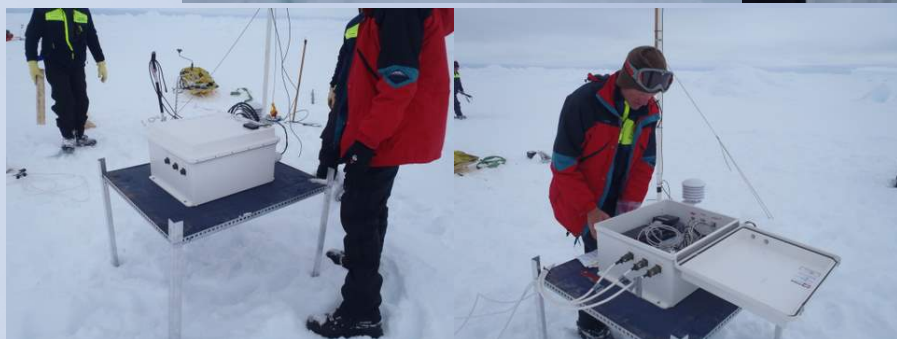
Smaller SAMs buoys can be tracked on <http://dalriada.sams.ac.UK/icebell>

Buoys are icebell 12 and icebell 13





# IMB's



Installing the larger IMB takes several hours and a lot of teamwork!



# Light Detection and Ranging

Terrestrial LiDAR Scanning (TLS) for sea ice/  
snow surface topography and morphology

We set up the LiDAR camera system and 8 reflective targets on tripods spread over a large area on an ice floe.







# LiDAR

We take a generator (and gasoline) out on the ice to provide electricity for the laptop computer, camera, and laser scanning system that takes multiple scans and photographs to provide a 3-D model of the ice floe topography which is accurate to within a few centimeters.



This is a LiDAR image from one scan position. We do 5-7 scans which provide a complete 360 \* view of the study site.



## What Else Do We See Down Here?

Icebergs are pieces of glaciers or the ice sheet that break off and are free floating in the ocean.







# Seals

Crabeater Seals, Leopard Seals, Ross Seals, and Weddell Seals





# Penguins

Chinstrap Penguins, Adelie Penguins, Emperor Penguins





# Next Webinar – Jan. 12

Please join us for another live webinar on Weds., January 12 at 10:00 am PST

See [www.polartrec.com](http://www.polartrec.com) to register

Next topics will include: special events onboard the Oden, the other science projects and research from this expedition, more about the ship and crew, icebreaking, and MORE...







## Questions?

- Be sure to “raise” your hand
- If using VOIP, hold down “TALK” button entire time you are asking question
- State your name before you ask your question
- Speak clearly and slowly