POLAR TREC

TEACHERS AND RESEARCHERS EXPLORING AND COLLABORATING

Welcome to ***PolarConnect***

With Kelly McCarthy and
NASA's Operation IceBridge

5 May 2016

Getting to Know Adobe Connect

If you are joining by phone, please mute your phone. Press *6 to mute and *6 to unmute.

Participant Introductions

In the chat box please introduce yourself by typing your:

- ✓Name
- ✓School / Institution
- ✓The number of students and adults participating with you in the same location

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POLAR TREC

What is PolarTREC?

PolarTREC is a professional development experience in which K-12 teachers are paired with researchers for 2-6 week research experiences in the polar regions.

From 2010-2013, nearly 50 teachers from around the United States will join scientists in the Arctic and Antarctica to learn about science, the polar regions, and to share what they have learned with their students and communities.

Questions

During the Presentation:

- Type your question in the text chat box

At the End of the Presentation:

- Raise your hand with the "hand button".
- PolarTREC staff will call on you and activate your microphone.
- Speak loud and clear and directly into the microphone or phone to ask your question.

- Welcome to our PolarCONNECT Event from Thule, Greenland!

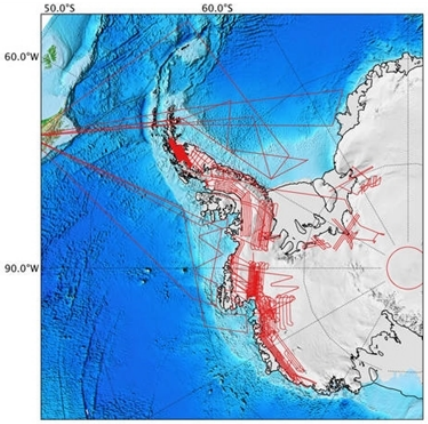
+ PolarTREC Teacher Kelly McCarthy

  Our Lady of Lourdes Regional School in Coal Township, PA

+ Researcher: John Woods and NASA's Operation IceBridge (Arctic 2016 Campaign)

Operation IceBridge Mission Overview

- Largest airborne survey of polar ice ever conducted!
- 10 year campaign to measure ice over the Arctic and Antarctica
- Uses remote sensing methods to collect data supporting a 3 dimensional model of polar sea and land ice surfaces as well as the bedrock beneath the ice sheets
- Bridges 'gap' in data between ICESat 1 which stopped collecting data in 2009 and ICESat 2 which is set for launch in 2017



Role of Airborne Science in the Polar Regions

- Field research can provide localized measurements to understand what is happening to our Earth at different points of interest
- Satellite imagery and data can provide a wide scale observation over a large region based on remote instruments orbiting our Earth
- Airborne Science completes the profile. By mapping a large region of earth with instruments attached to a suborbital aircraft we gain key information about our dynamic planet that we don't get from ground studies or satellite data.

Science Goals of Operation IceBridge

- Maintain continuous data flow of land and sea ice surface topography, thickness, and underlying bedrock
- Focus on priority sea and land ice paths chosen by a panel of scientists called the Operation IceBridge Science Team.
  - Satellite "underflights"
  - Paths covering a broad scope of sea and land ice
  - Critically changing land glaciers or ice shelves
- Improve current models of land and sea ice at the poles.

NASA OIB's 2016 Arctic Campaign

- Aircraft: NOAA P-3 (Miss Piggy)
  - "Hurricane Hunter"
  - Based out of Tampa, FL
- Instruments:
  - Airborne Topographic Mapper (ATM)
  - FLIR Infrared Camera
  - Digital Mapping System (DMS)
  - CReSIS Snow Radar
  - MCoRDS
- Locations:
  - Thule Air Base, Greenland
  - Kangerlussuaq, Greenland

Photo credit: NASA/ATM

LIFE IN THE FIELD

Working from the ground and in the air, living on the edge of an ice sheet, experiencing the 'culture of the north'.

Life in the Field: GPS Ground Station

A GPS ground station is used to support data collected during an OIB airborne campaign:

- Antenna fixed at precise, known location receives position data from satellites starting one hour pre-flight to one hour post-flight
- Receivers located inside the ground station collect position data, which is downloaded at the end of each day
- The data collected at the ground station is compared to the airborne GPS data collected in a method called differential GPS correction

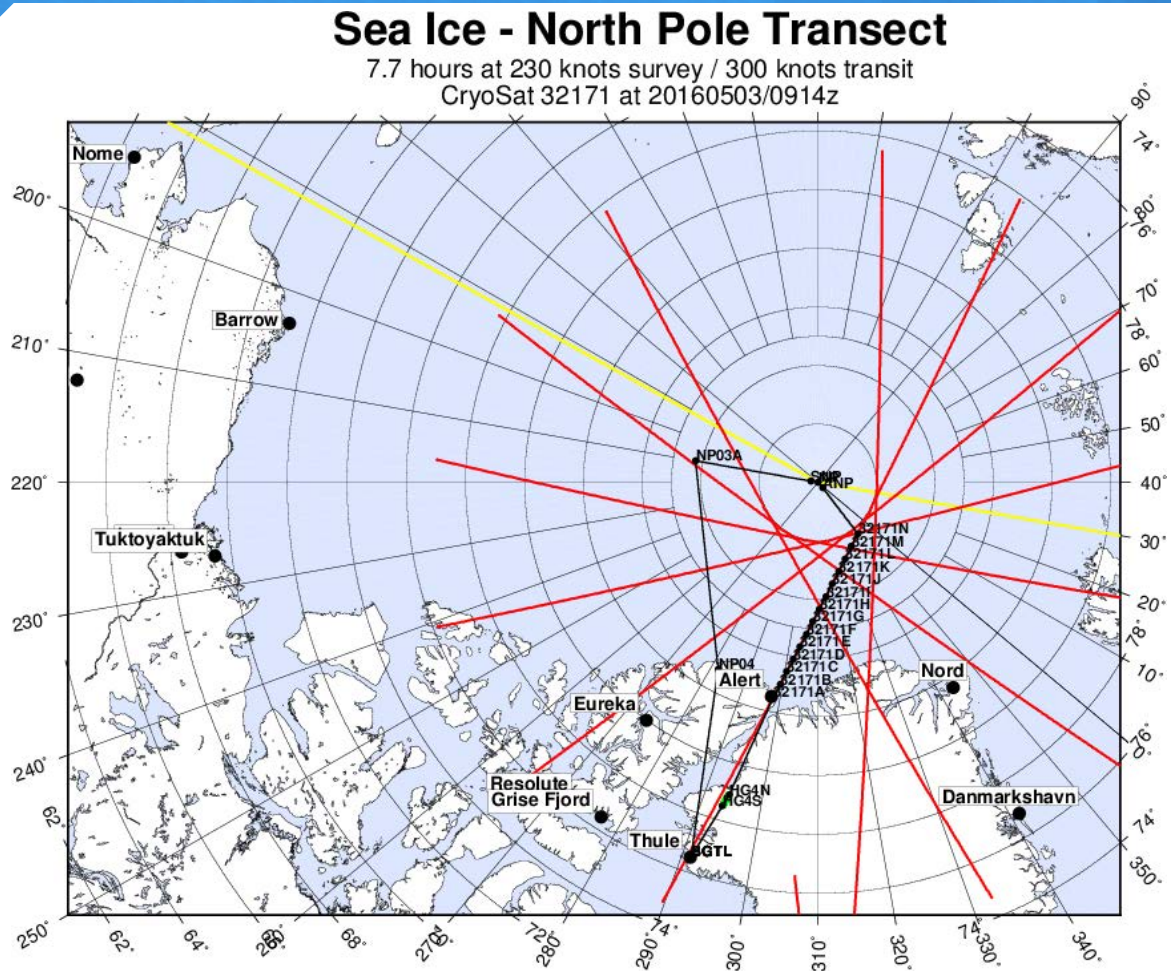
Life in the field: Culture of the North

A Special Guest: Dr. Piers Sellers

- Director of NASA's Earth Sciences Division at NASA Goddard Space Flight Center, Astronaut Dr. Piers Sellers spent a week in Thule to see first hand the region out of which the largest airborne polar science campaign is based.

- Visit NASA.gov to view a video short about his stay.

First Flight: The North Pole Transect!



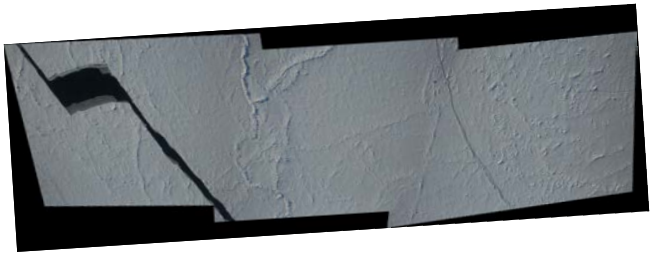
Black line: Selected "North Pole Transect" flight plan

Red lines: Satellite tracks from CryoSat 2, a European Space Agency satellite also used to measure polar ice that align to our time in flight.

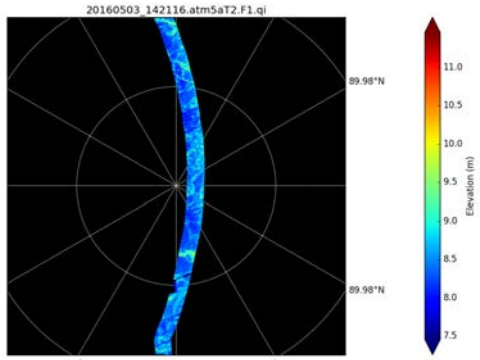
Successful, clear flight with >90% useful data!

THE NORTH POLE TRANSECT PRELIMINARY DATA

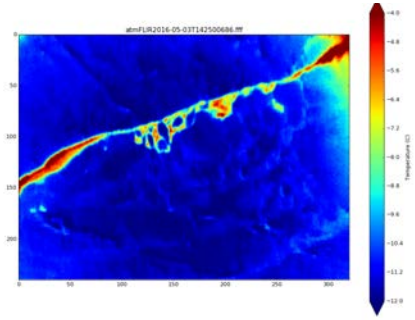
- DMS Mosaic of images captured over the North Pole



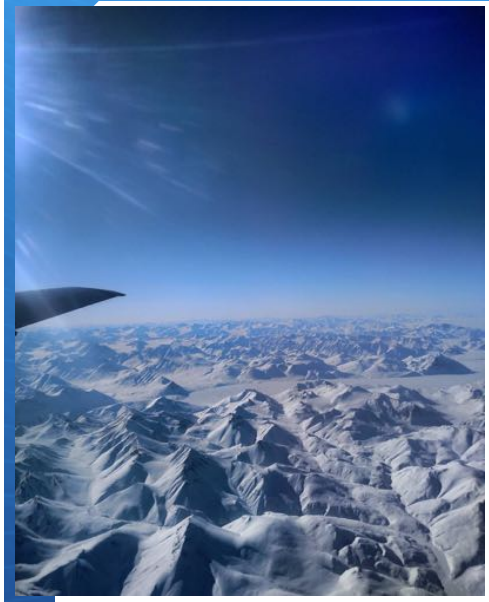
- ATM plot of latitude, longitude, and height with respect to the ellipsoid of the earth over the pole.



- FLIR Infrared camera image captured near the pole showing a warmer line of open water called a 'lead'

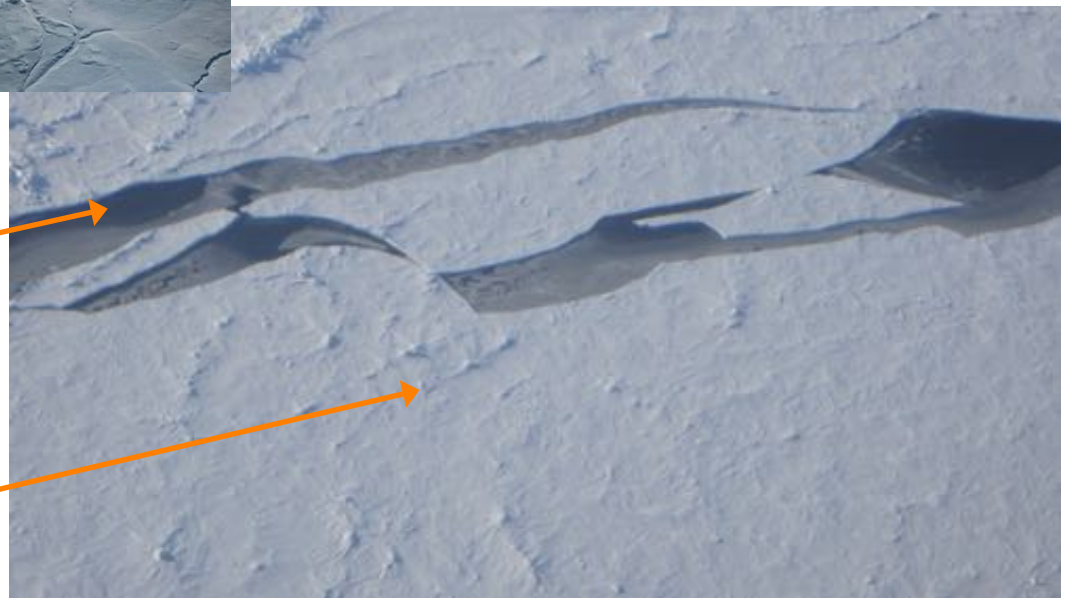


The North Pole Transect From the P-3



Land Ice (Ridges along Northern coast of Greenland
And Peterman's Glacier in Northern Greenland)

Sea Ice: Open water **Leads** (linear fracture in sea ice revealing open water)
Pressure Ridges Ridges created by moving ice masses over arctic ocean



Life On the NOAA P-3

SAFETY DRILLS ARE KEY IN A SMOOTH SCIENCE FLIGHT, ESPECIALLY OVER COLD OPEN WATER

OIB TEAMS RUN DATA THROUGHOUT THE FLIGHT, MONITORING DATA COLLECTION USING RADAR, LIDAR, AND IMAGING INSTRUMENTS

LOOKING FORWARD (ARCTIC 2016)

- COMPLETE PRIORITY SEA AND LAND ICE MISSIONS IN THULE, GREENLAND
- TRANSIT TO KANGERLUSSUAQ, GREENLAND TO COMPLETE LAND ICE MISSIONS BASED THROUGHOUT THE GREENLAND INTERIOR
- STAY CONNECTED TO US THROUGHOUT THE REST OF THE EXPEDITION!WWW.POLARTREC.COM/EXPEDITIONS/OPERATION-ICEBRIDGE-ARCTIC

Questions

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Teachers: Join PolarTREC!

www.polartrec.com/about/join

Every teacher can participate in different ways:

- **Following Expeditions**
- **Participate in PolarConnect Events**
- **Join the Polar Education Email List**
- **Take Online Professional Development Courses**
- **Become a PolarTREC Teacher!**

Upcoming Events

Date: 9 May 2016

Time: 10:00 am Alaska Daylight Time (AKST)

Duration: 1 hour

Topic: Event with teacher Alex Eilers and the research team studying Weddell Seals in Antarctica.

Age Group: Open to all ages.

Thank You!

An archive of the event will be available shortly.

http://www.polartrec.com/polar-connect/archive