Agenda

• Geography
• Research Stations
• Transportation
• Scientific Research
• Questions?
Size and Distance

Antarctica Area = 13,829,430 km²

US Area = 9,826,675 km² including Alaska

Canada Area = 9,984,670 km²

1 ½ times the size of either the United States or Canada
It *is* a continent, compared to the Arctic.
Antarctica is the... 

highest  over a mile above sea level  
driest   less than 2” precipitation a year  
coldest  -128.6° F at Vostok in 1983  
windiest over 200 mph  
emptiest no native people, no Qaujimajatuqangit  

... continent.
One LONG day
6 months
and
One LONG night
6 months
South Pole is in the Auroral Oval
Agenda

• Geography

• Research Stations
  – Plus some history

• Scientific Research

• Questions?
History

Amundsen

Logistics was Skis/Foot, Dogs & Horses

Age of Polar Exploration
~1900 - 1915
International Geophysical Year (IGY) 1957-58

- 1930 to 1950 introduced airplane travel to Antarctica
- From 1950 onward, Scientists wanted to study this continent
- 60 nations became involved
- International cooperation – during Cold War

Continuous presence since
IGY - 1957
7 US Stations

Ellsworth
South Pole
Byrd
McMurdo
Little America V
Hallett
Wilkes
U.S. Presence Today

30 Countries have stations in Antarctica as of 2012

Palmer
South Pole
McMurdo
Antarctic Treaty - 1959

• No one nation owns Antarctica
• Prohibits nuclear and military action
• All for science and environment, not meant for mineral exploration or resource extraction
• 49 nations follow the Treaty
US Antarctic Program

- National Science Foundation manages the US Antarctic Program
- 200 science projects funded annually
- 3,000 people to/from US stations each year
- 3 stations, 2 ships, many field camps
- Annual fuel & re-supply ships
- Ice Breaker Support is needed and crucial
US Stations

• McMurodo Station – 1,100/200
• South Pole Station
• Palmer Station
McMurdo Station
Mt. Erebus is the main active volcano in Antarctica. Contributed to the formation of Ross Island.
US Stations

• McMurdoo Station

• South Pole Station - 250/50

• Palmer Station
South Pole Station

Ceremonial Pole

Geographic Pole
Transportation

1. Ship/Vessel (Resupply & Scientific)
2. Plane (C-17, LC-130, Basler, Twin Otter)
3. Helicopter
4. Surface Vehicles
2 research ships
US Air Force C-17
LC130 flown by New York Air National Guard
Basler’s (Ken Borek Air-Canada)
Twin Otter’s (Ken Borek Air-Canada)
Helo Sling Load (PHI)
Traverse 1,000 miles over snow, ice and crevasses
43 days to Pole
Leverett Glacier: 80km length
4-6 km width
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Geology
ANDRILL
Antarctic Drilling
ANDRILL sediment cores record major changes in past ice shelf and ice sheet size over the last 20 million years. Details of one climate cycle are recorded in these three sediment layers.

ANDRILL is an international program drilling deep into the sediments around Antarctica to better understand the dynamic history and future of Earth’s climate. Features of these sediments and enclosed fossils indicate past changes in the Antarctic environment.
Biology
Long Duration Balloon (LDB)
Circumpolar Winds drive LDB
The West Antarctic Ice Sheet

Pine Island Glacier (PIG)

West Antarctic Ice Sheet (WAIS)

WAIS Divide Camp was the staging area between McMurdo and PIG
South Pole was the staging area between McMurdo and AGAP.
Antarctic Gamburtsev Province (AGAP)
South Pole Telescope (SPT)

Astrophysics
IceCube is the world’s largest science experiment.
Clean Air Sector

Atmospheric Research Observatory

The Global Monitoring Division of the
NOAA Earth System Research Laboratory

Research topics:

- Carbon Dioxide, Carbon Monoxide, Methane
- Aerosol particle size and count
- Surface, Total Column, & Stratospheric Ozone
- Solar & Terrestrial Radiation
- Air Quality and Meteorology
- Ozone-depleting Compounds (CFCs and HCFCs)
- Other Trace Constituents

Main Objective: Monitoring long-term changes in atmospheric constituents that impact climate change