The Poles and the Planet
International Polar Year 2007-8

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International Science School, Sydney, Monday, July 2nd, 2007
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International Polar Year 2007-8
The Arctic and the Antarctic

<table>
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<th>What do I Know?</th>
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Photo: Students On Ice
The Arctic and the Antarctic

Photo: Students On Ice
The Arctic and the Antarctic

1. What do I know about the Arctic/ the Antarctic?
1. What do I know about the Arctic/ the Antarctic?

2. How does this place effect me and where I live?
International Polar Year
2007-2008

...how did we get here?!
First IPY, 1882-3

11 nations
14 stations
Carl Weyprecht – Polar Year visionary
11 nations, 14 research stations, 700 men

Primary IPY
Arctic Stations
1. Cap Thordsen (Swe)
2. Bossekop (Nor)
3. Sodankylä (Fin)
4. Maylye Karmakuly (Rus)
5. Kara Sea (Neth)
6. Ssagastyr (Rus)
7. Point Barrow (USA)
8. Fort Rae (Can/UK)
9. Fort Conger (USA)
10. Kingua Fjord (Ger)
11. Godthaab (Nor)
12. Jan Mayen (Aus)

Southern Hemisphere Sites
Royal Bay S. Georgia (Ger)
Orangebay, T. del Fuego (Fra)
Arktowski (1931) observed: “It may be that if the publication, and above all, the discussion of the observations had been left to a central office, possibly international, the scientific level of the work accomplished would have been better appreciated.”
First IPY, 1882-3

11 nations
14 stations
First IPY, 1882-3

Second IPY, 1932-3

11 nations
14 stations

40 nations both poles

1850 1900 1950 2000 2050
The Second International Polar Year 1932-1933

- 40 nations, both poles
- Focus on meteorology, magnetism, aurora, radio science.. and the Jet Stream
- Occurred during the Depression

UK scientist operating an ionosonde in Tromso, Norway
The Second International Polar Year 1932-1933

- 40 nations, both poles
- Focus on meteorology, magnetism, aurora, radio science.. and the Jet Stream
- Occurred during the Depression

Although not all the data from the Second International Polar Year could be analyzed because of the interruption of the world war, it has been estimated that the information gathered was worth 'hundreds of millions of dollars' world-wide for telecommunications alone.'
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First IPY, 1882-3

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Second IPY, 1932-3

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67 nations, 50 Antarctic stations
The International Geophysical Year
1957-1958

- 67 countries, global focus, special Antarctic attention
- Over 50 stations established in Antarctica, including Halley Bay
**Major IGY Achievements**

- Launch of the first artificial satellites
- Discovery of the Van Allen Belts
- Traverses to establish the mass of Antarctic ice
- Confirmation of the hypothesis of continental drift (plate tectonics)
- Post IGY establishment of the Antarctic Treaty
- Post IPY establishment of World Data Centres
"Knowest thou the ordinances of heaven? Canst thou set the dominion thereof in the earth?" JOB 38:33
“Our industrial civilization has been pouring carbon dioxide into the atmosphere at a great rate....

By the year 2000 we will have added 70 percent more carbon dioxide to the atmosphere...
If it remained, it would have a marked warming effect on the earth’s climate, but most of it would probably be absorbed by the oceans…”
Conceivably, however, it could cause significant melting of the great icecaps and raise sea levels in time.”
First IPY, 1882-3

Second IPY, 1932-3

11 nations, 14 stations

40 nations both poles

67 nations, 50 Antarctic stations
First IPY, 1882-3

Second IPY, 1932-3

Third IPY, 1957-8

Fourth IPY, 2007-8

1850 1900 1950 2000 2050

11 nations
14 stations

40 nations
both poles

67 nations, 50 Antarctic stations

?
The Fourth International Polar Year
International Polar Year
-the fourth one-
“dazzling science”
Participants from 63 Nations Involved

~50,000 participants

228 Large Projects

170 Science

57 Outreach
1. Why would I want to investigate this discipline?
1. Why would I want to investigate this discipline?

2. How would I carry out research in this area?

Photo: Bryan and Cherry Alexander arcticphoto.co.uk
Deep Antarctic Ice Cores

Dome Fuji

Vostok

Dome C
Oldest ice believed to be \(~900,000\) years old, i.e., twice as old as Vostok or Fuji.
Carbon dioxide (CO$_2$) over 50 years

CO$_2$ measurements in air at South Pole
Carbon dioxide \( (\text{CO}_2) \) over 1000 years

- South Pole Air Samples
Carbon dioxide (CO₂) over 1000 years

- South Pole Air Samples
- Law Dome Ice Core Data
Carbon dioxide ($\text{CO}_2$) over 700,000 years

Years before present

- South Pole
- Vostok CO2 (ppmv)
- Siple Dome
- Dome C CO2 (ppmv)

CO2 concentration (ppmv)
Carbon dioxide (CO$_2$) over 700,000 years

- South Pole
- Siple Dome
- Vostok CO$_2$ (ppmv)
- Dome C CO$_2$ (ppmv)

Years before present

CO$_2$ concentration (ppmv)
Carbon dioxide (CO$_2$) over 700,000 years

Years before present

CO$_2$ concentration (ppmv)

South Pole
Siple Dome
Vostok CO$_2$ (ppmv)
Dome C CO$_2$ (ppmv)
Carbon dioxide (CO$_2$) over 700,000 years

Years before present

CO$_2$ concentration (ppmv)

- South Pole
- Siple Dome
- Vostok CO$_2$ (ppmv)
- Dome C CO$_2$ (ppmv)
Carbon dioxide (CO$_2$) over 700,000 years

Years before present

CO$_2$ concentration (ppmv)

- South Pole
- Siple Dome
- Vostok CO$_2$ (ppmv)
- Dome C CO$_2$ (ppmv)
- Dome C high res II (ppmv)
- Dome C high res I (ppmv)
### The Arctic and the Antarctic

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Until tomorrow….