



Polar Science with Global Impact

Sensor Networks in Polar Regions: Urgent Needs, Difficult Challenges

> David Carlson, Director International Programme Office



World Meteorological Organization:



World Meteorological Organization:

▶ PROCLAIM: International Polar Year 2007-2008



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- ▶ PROCLAIM: International Polar Year 2007-2008
- ▶ CONVENE: Joint Science Committee



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- ▶ PROCLAIM: International Polar Year 2007-2008
- ▶ CONVENE: Joint Science Committee
- ▶ ESTABLISH: International Programme Office





Draw Scientific and Public Attention to Polar Regions

**▶** Current Environmental Status



- **▶** Current Environmental Status
- ▶ Recent and Future Changes



- ▶ Current Environmental Status
- ▶ Recent and Future Changes
- ▶ Linkages to Global Processes



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- Recent and Future Changes
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- ▶ Push Scientific Frontiers



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- ▶ Vantage Point to Earth History and to Space



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- ▶ Recent and Future Changes
- ▶ Linkages to Global Processes
- ▶ Push Scientific Frontiers
- ▶ Vantage Point to Earth History and to Space
- Understand Social and Cultural Vulnerabilities

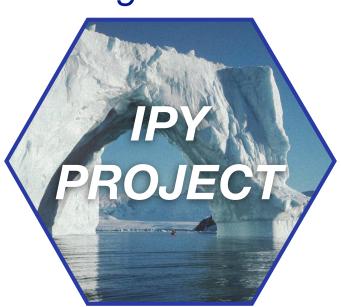














International Partnerships



International Partnerships





International Partnerships

Builds Connections IPY PROJECT

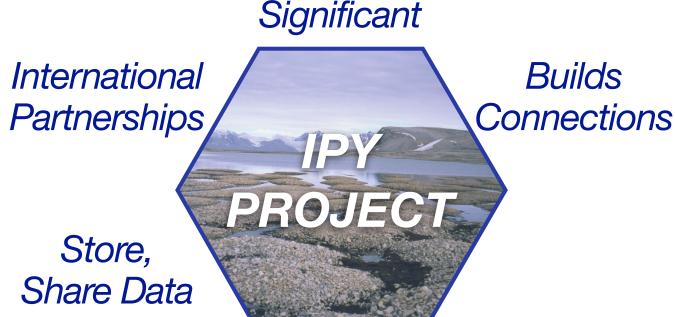


PROJECT

International Partnerships

Builds Connections







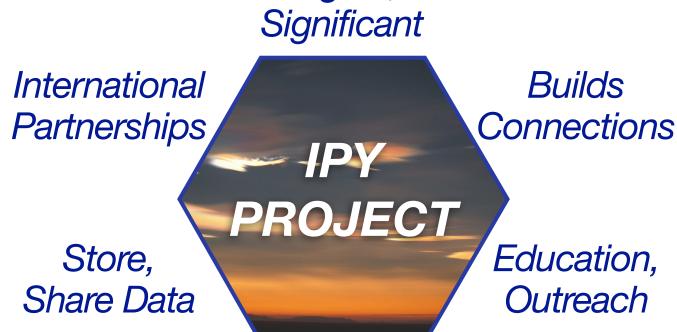
## Urgent, Significant International Partnerships

PROJECT

Store, Share Data Builds Connections



## Urgent,







Store, Share Data



Builds Connections

Education, Outreach

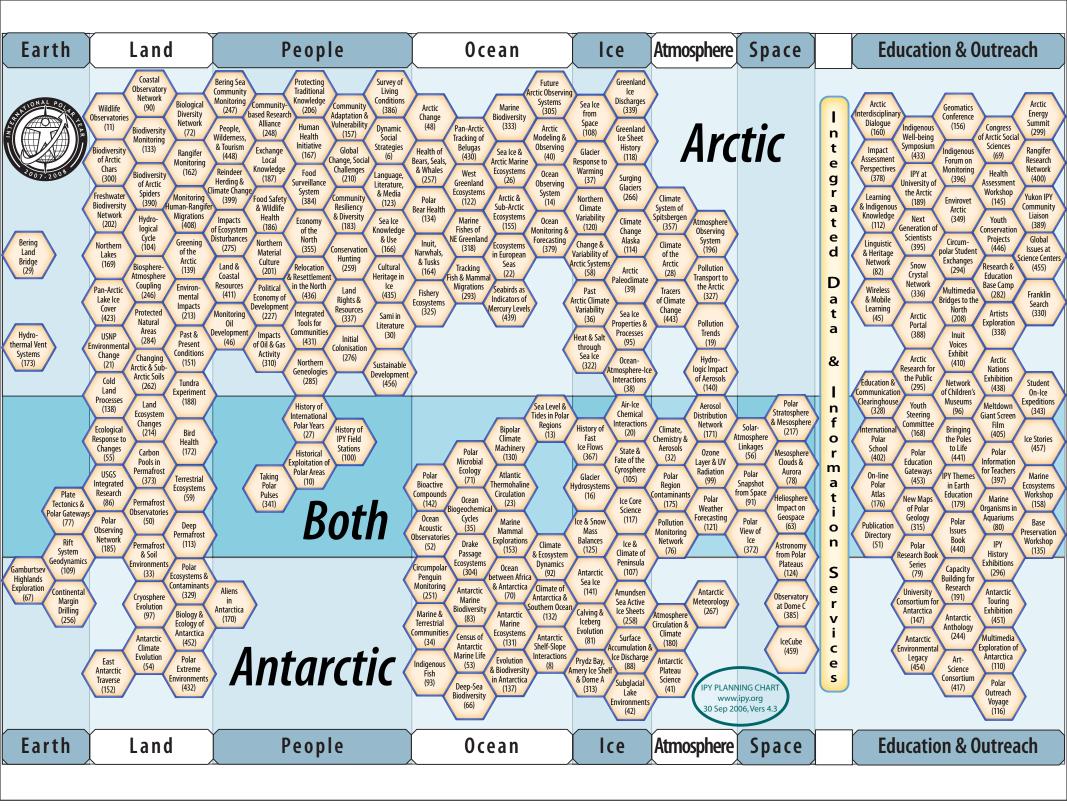


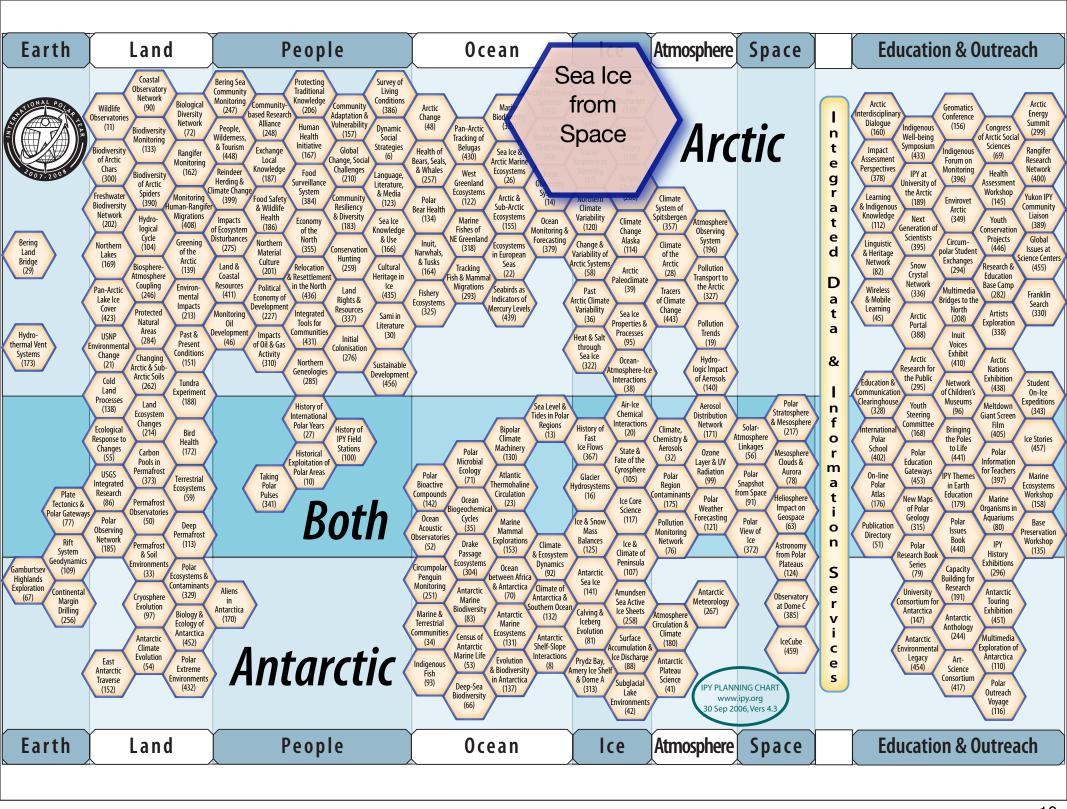


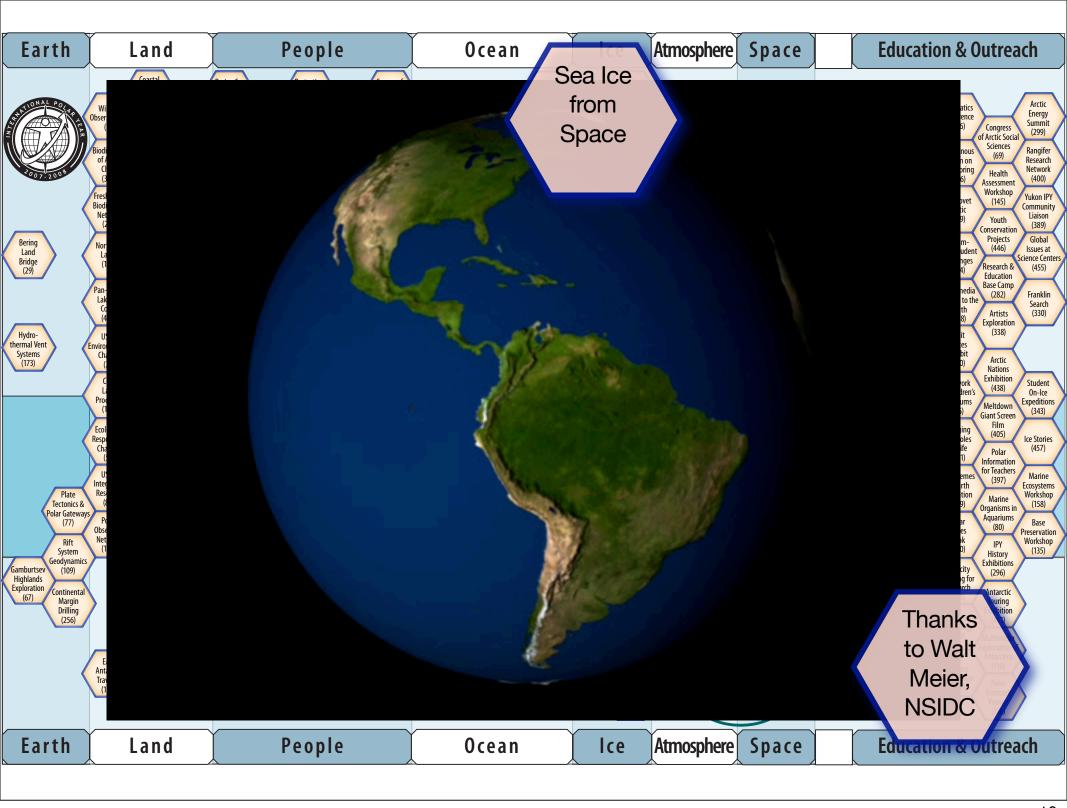
Store, Share Data Builds Connections

> Education, Outreach

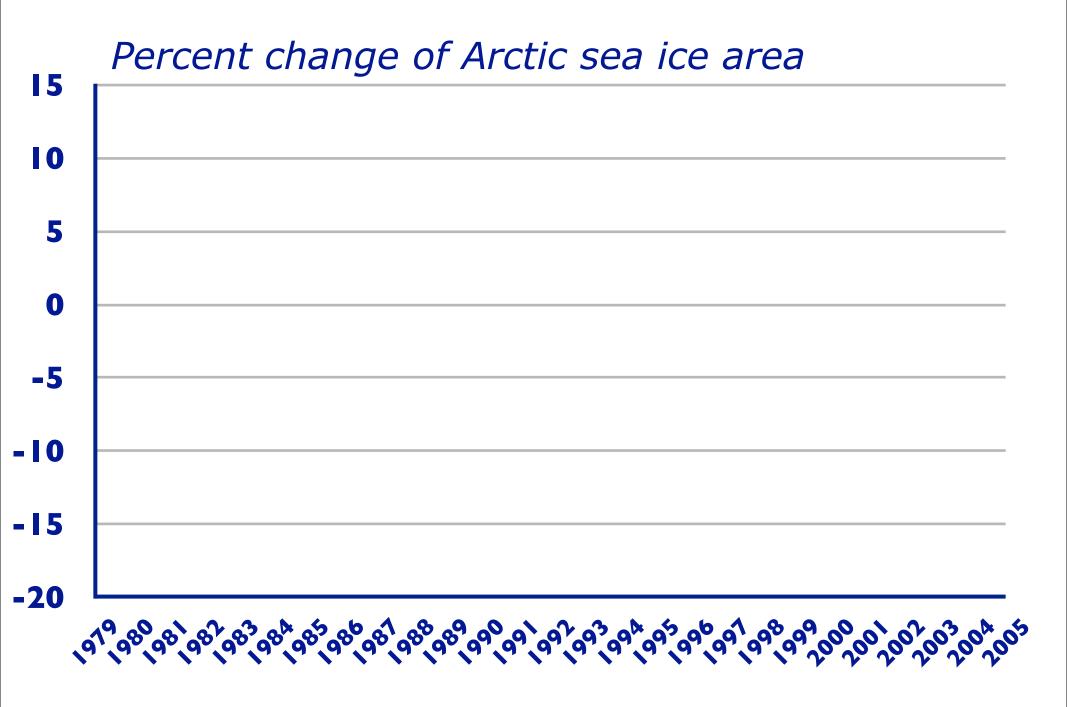
Expand Polar Community

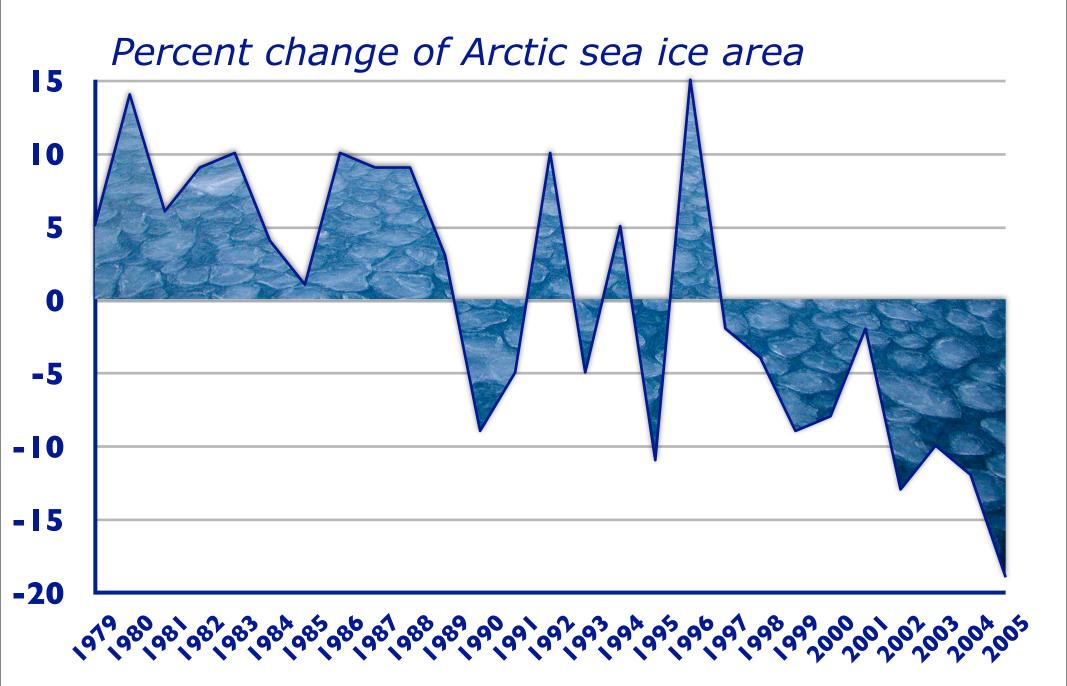


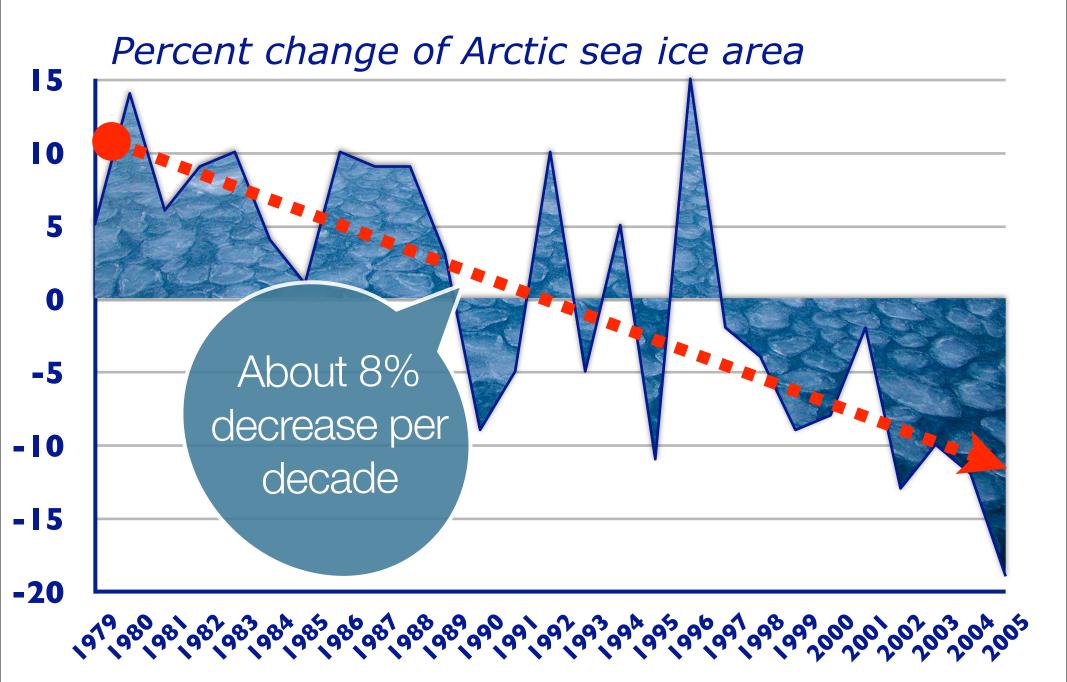


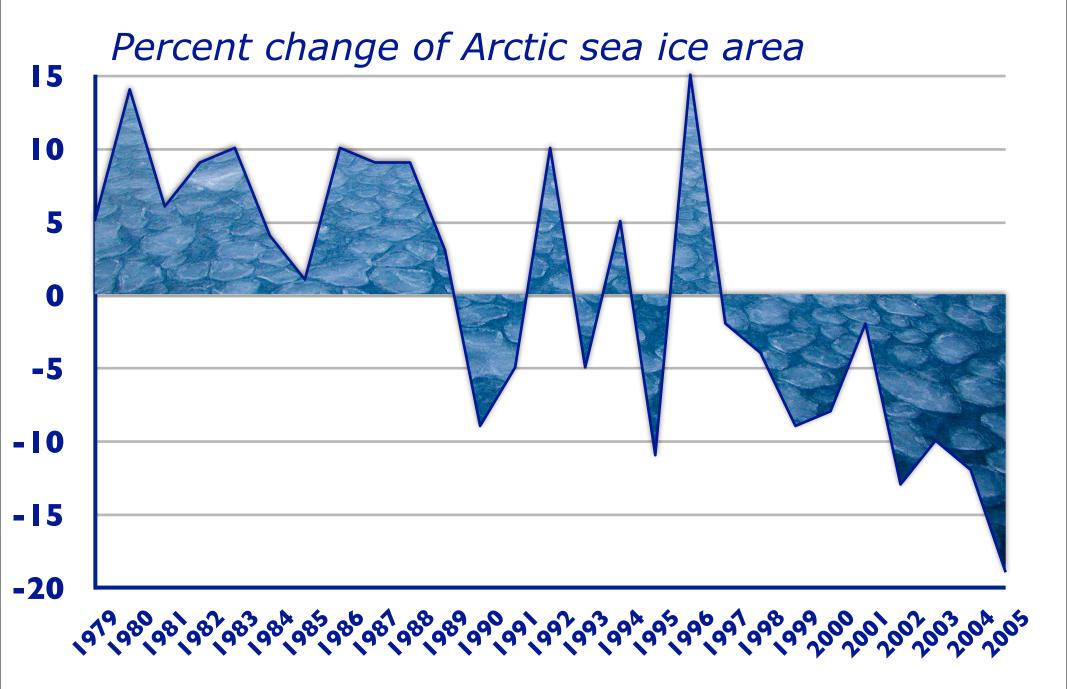


### Percent change of Arctic sea ice area

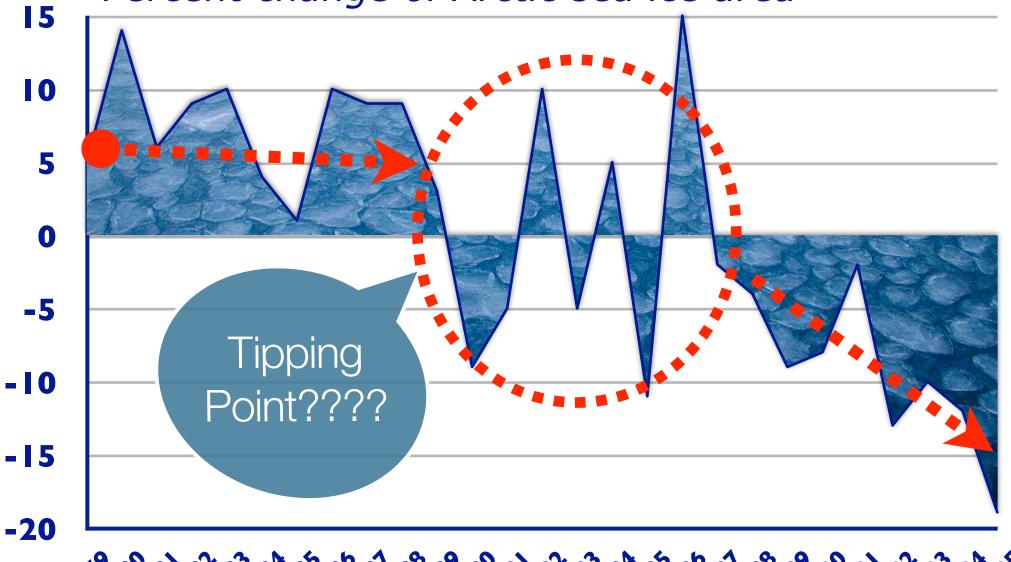


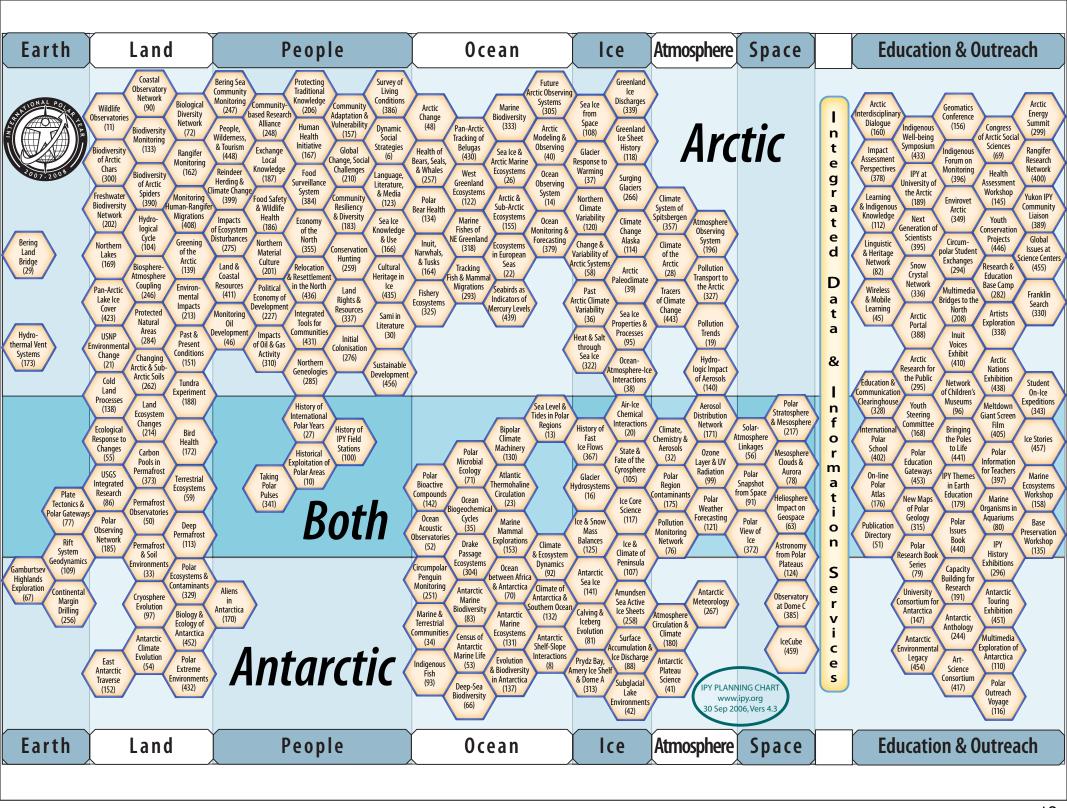


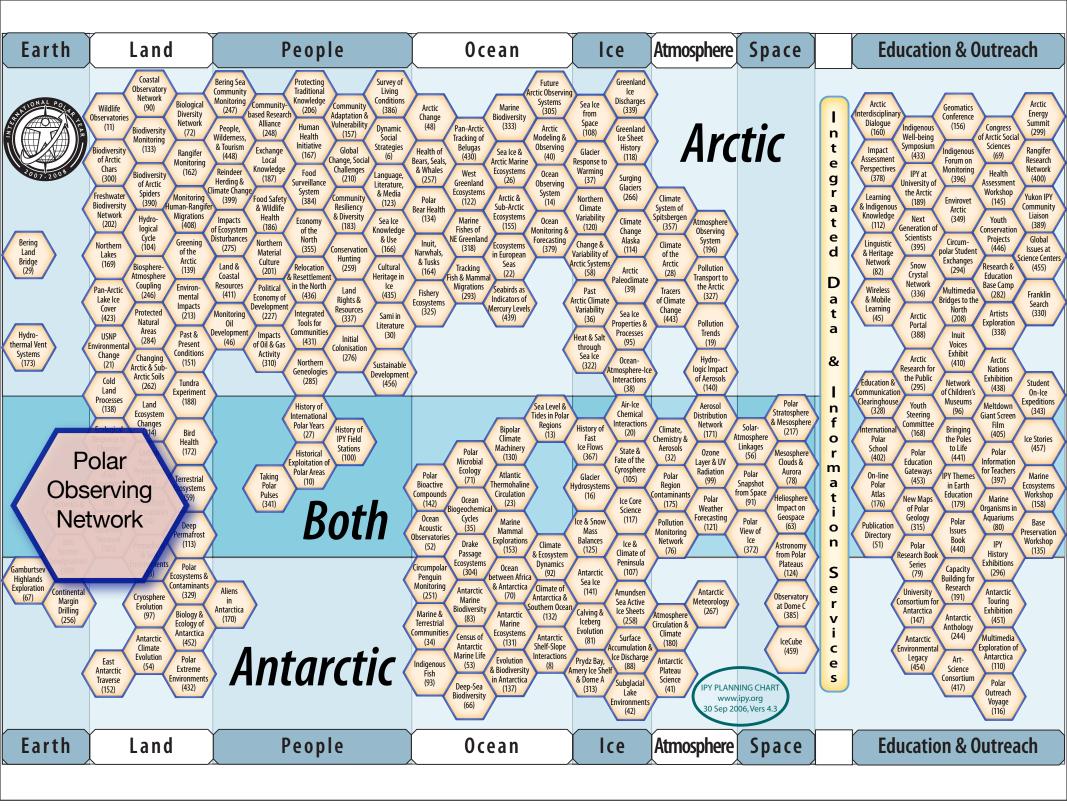




### Percent change of Arctic sea ice area

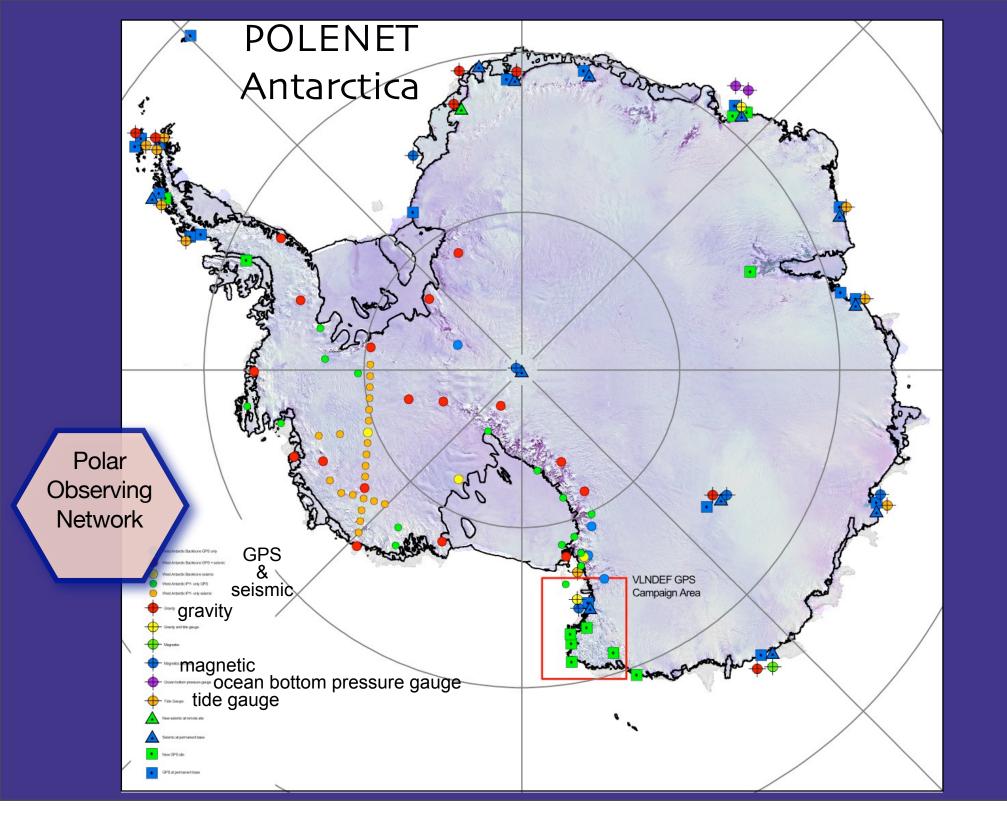


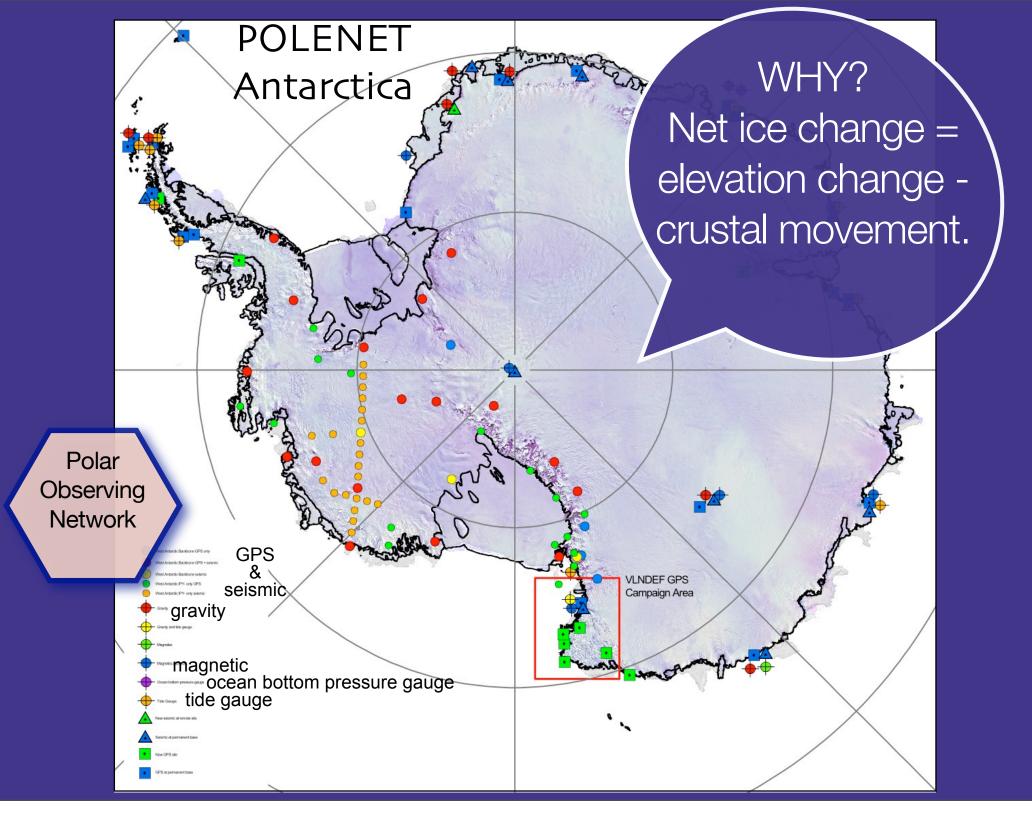


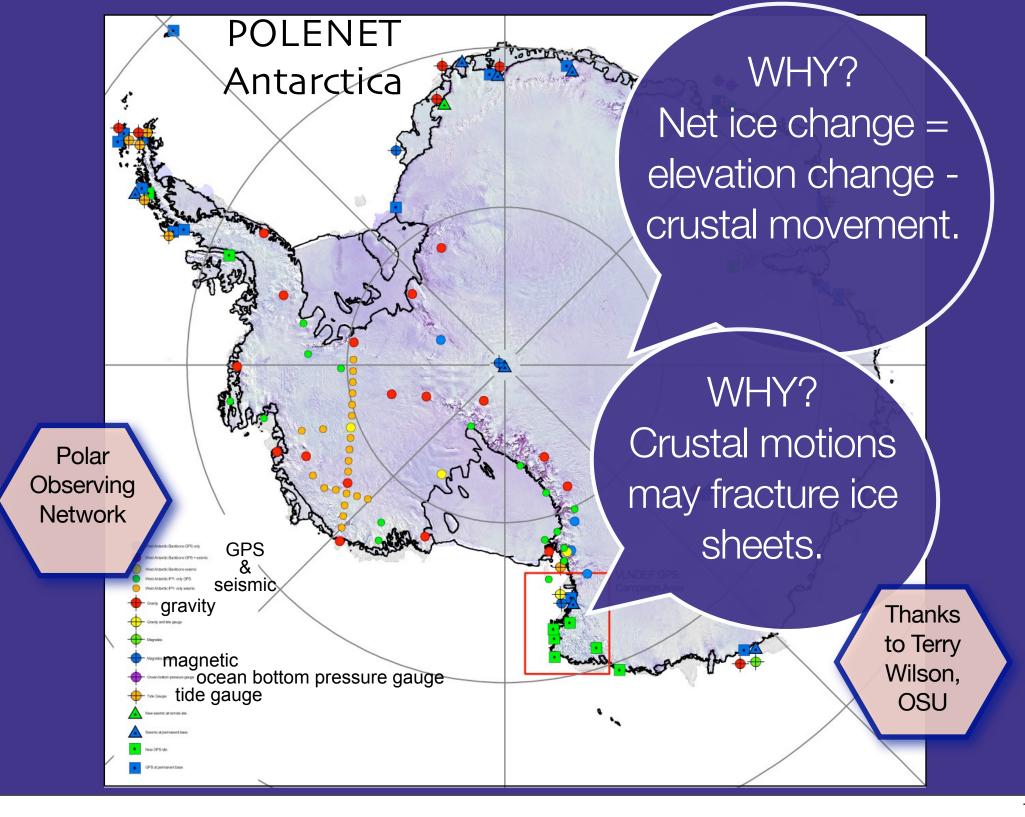


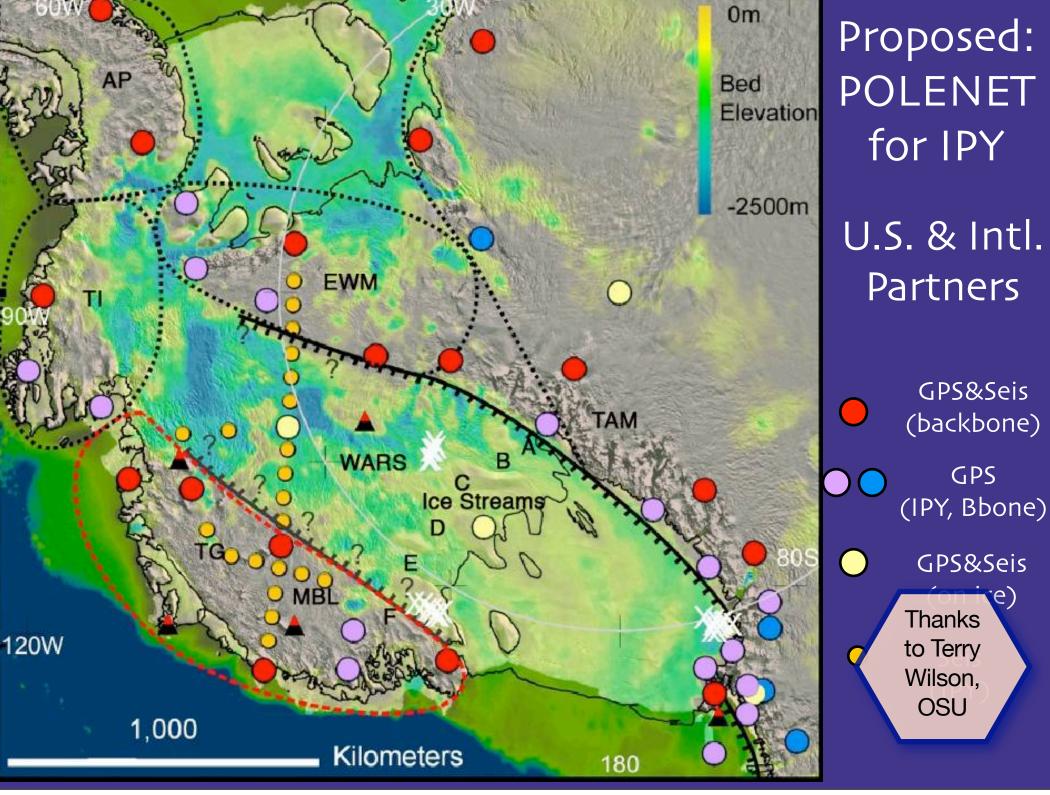
Polar Observing Network

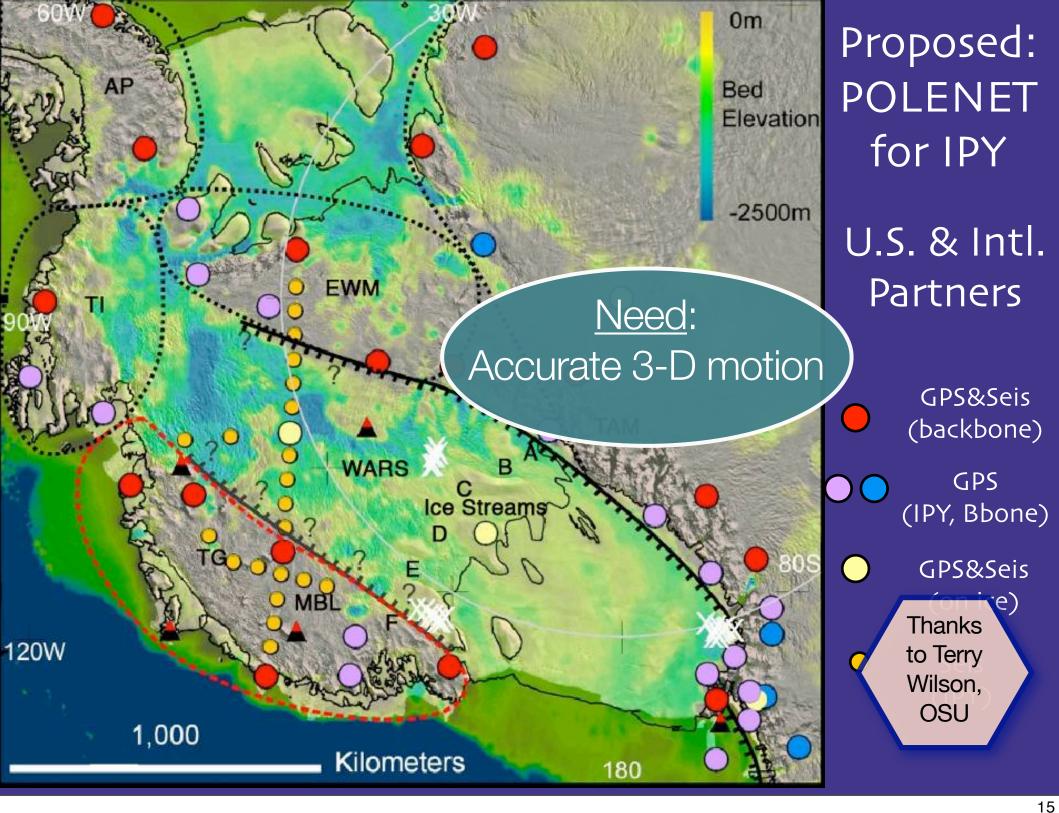
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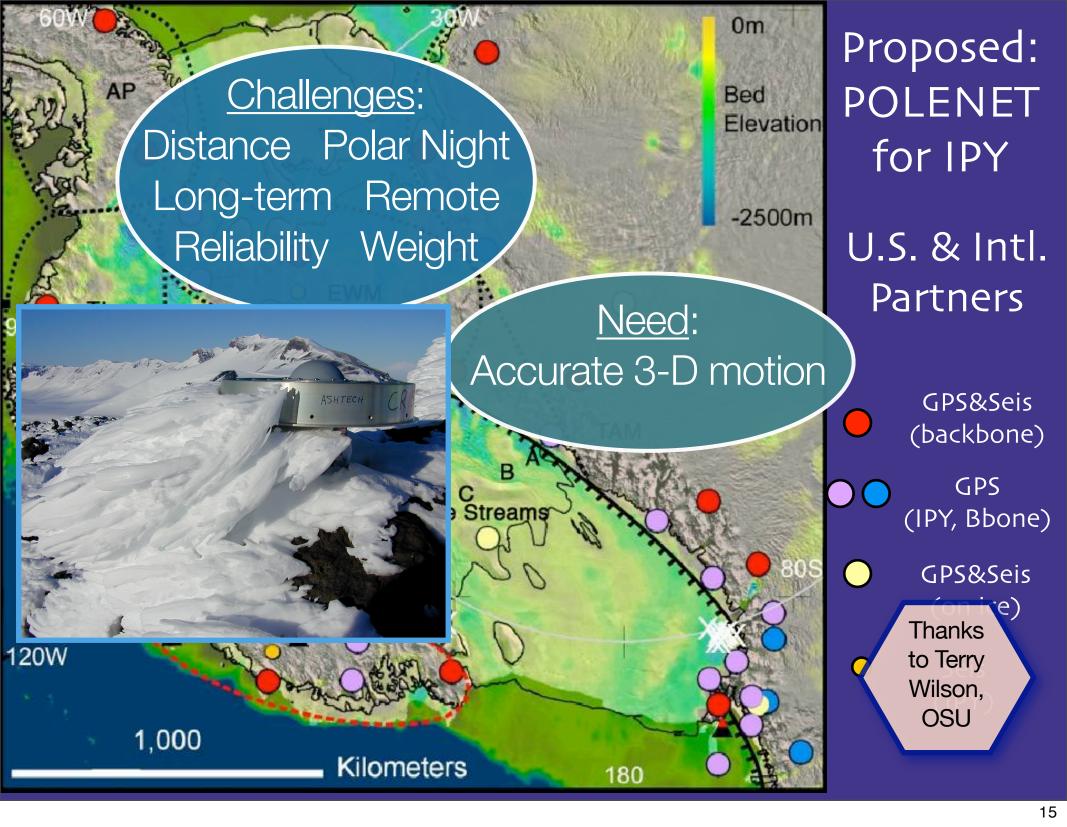


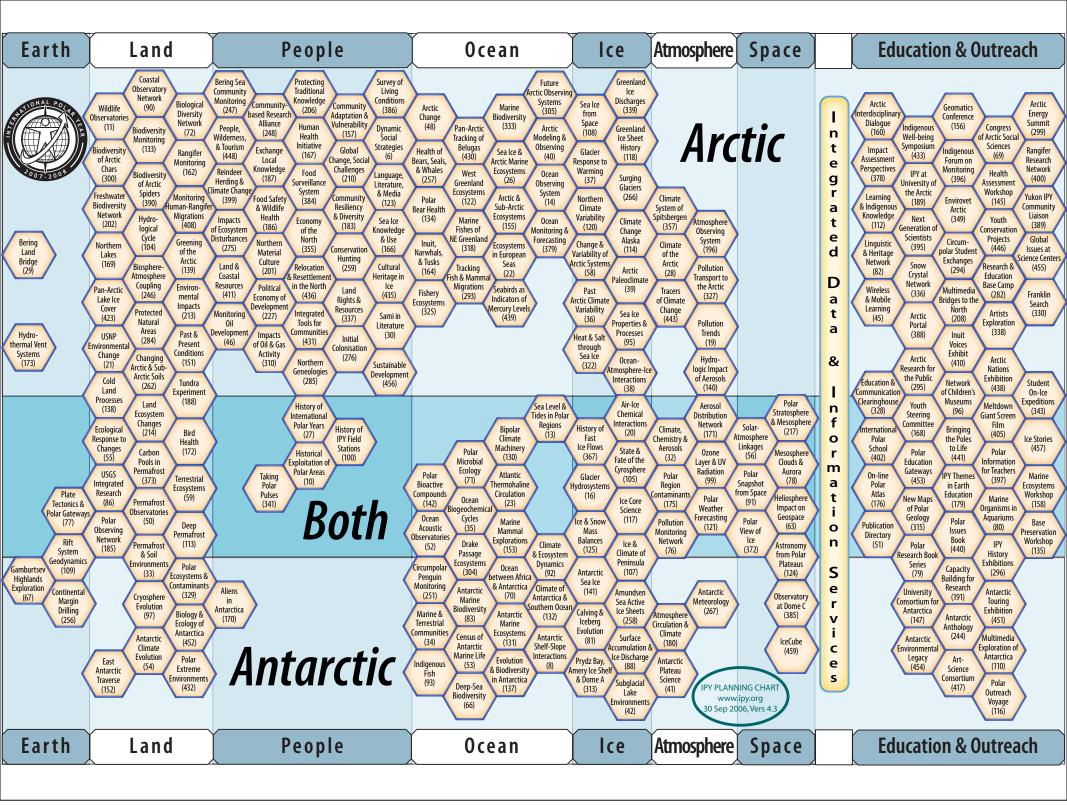


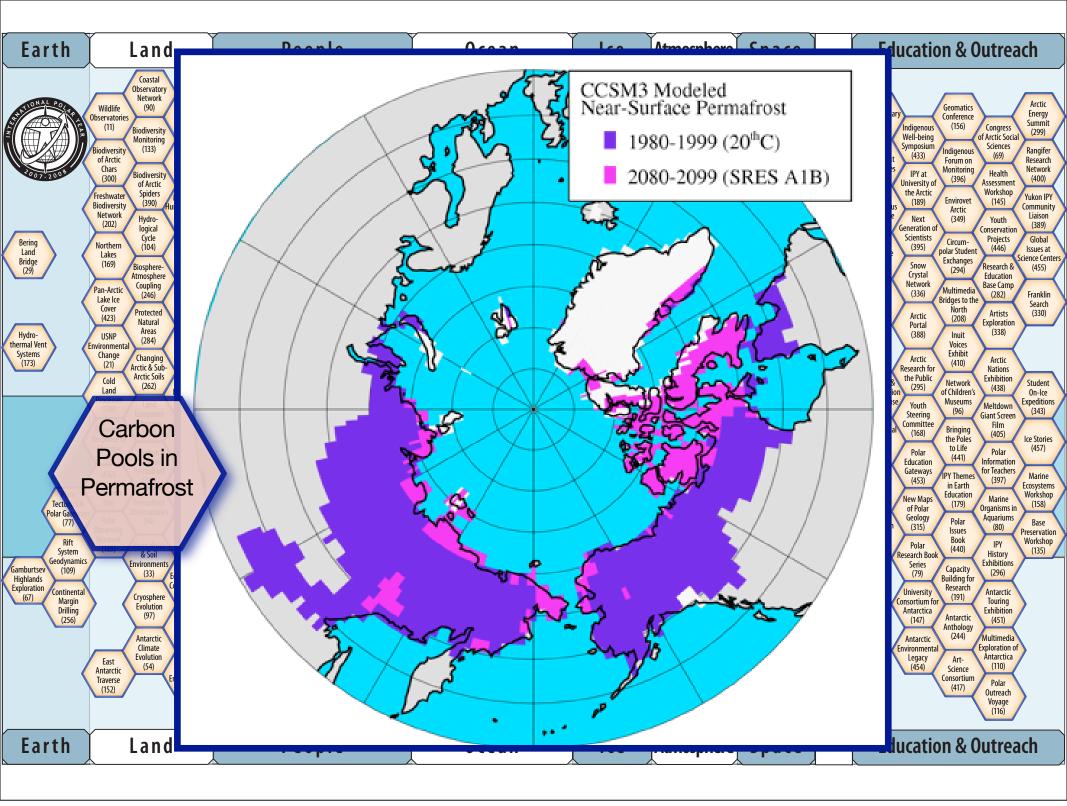


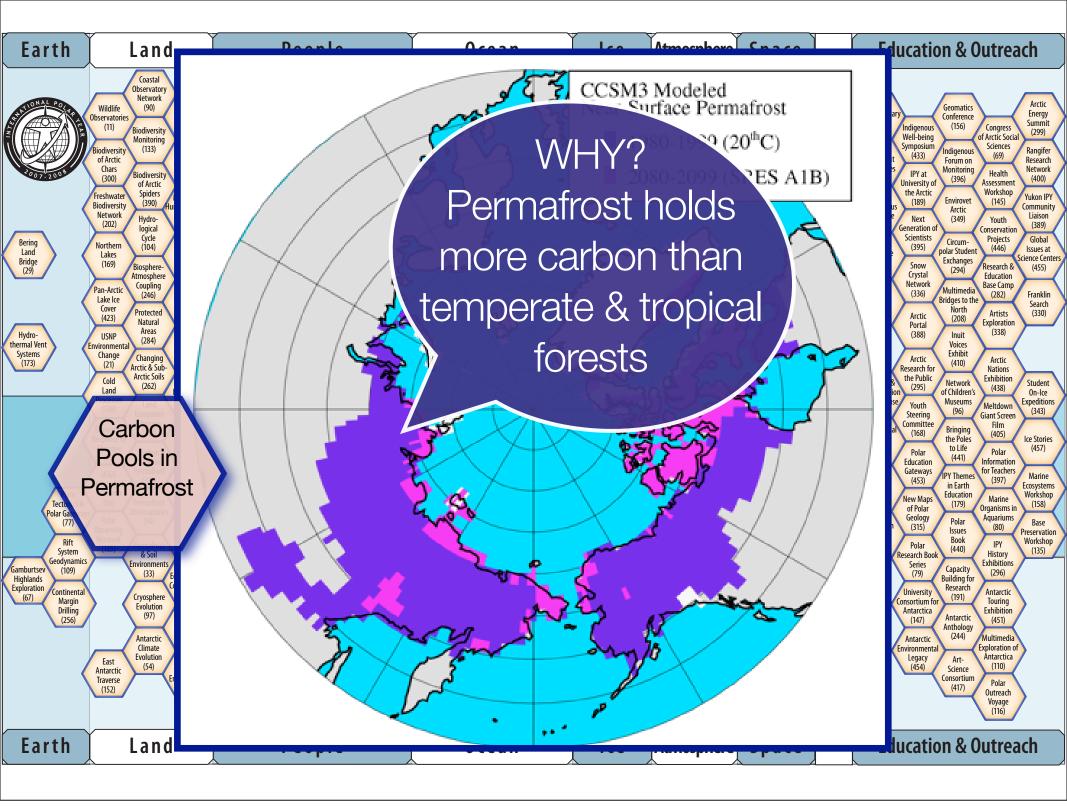








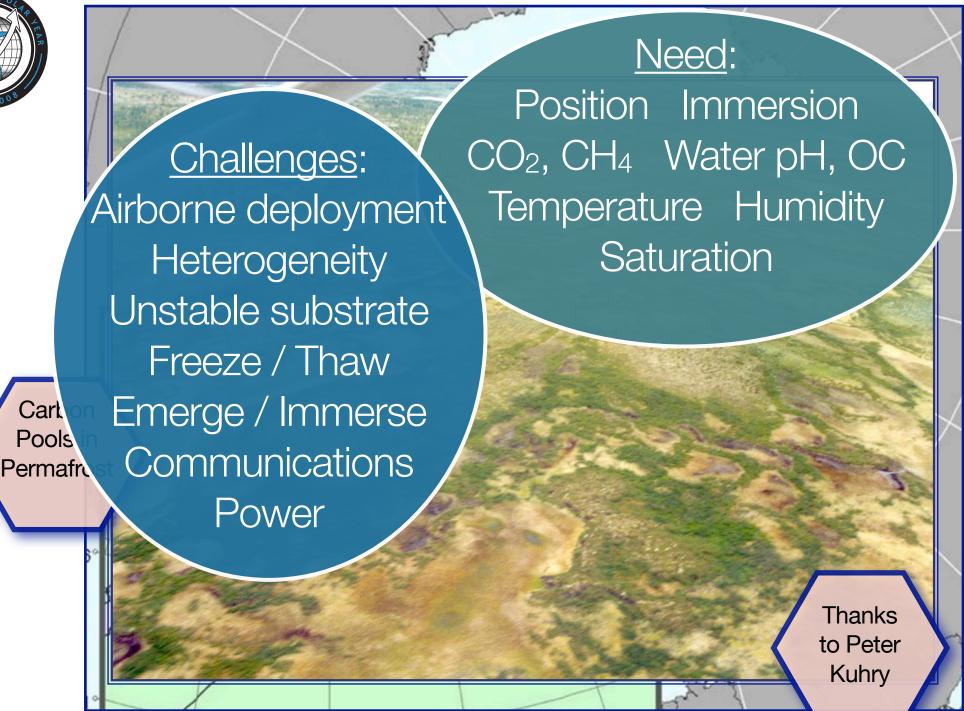


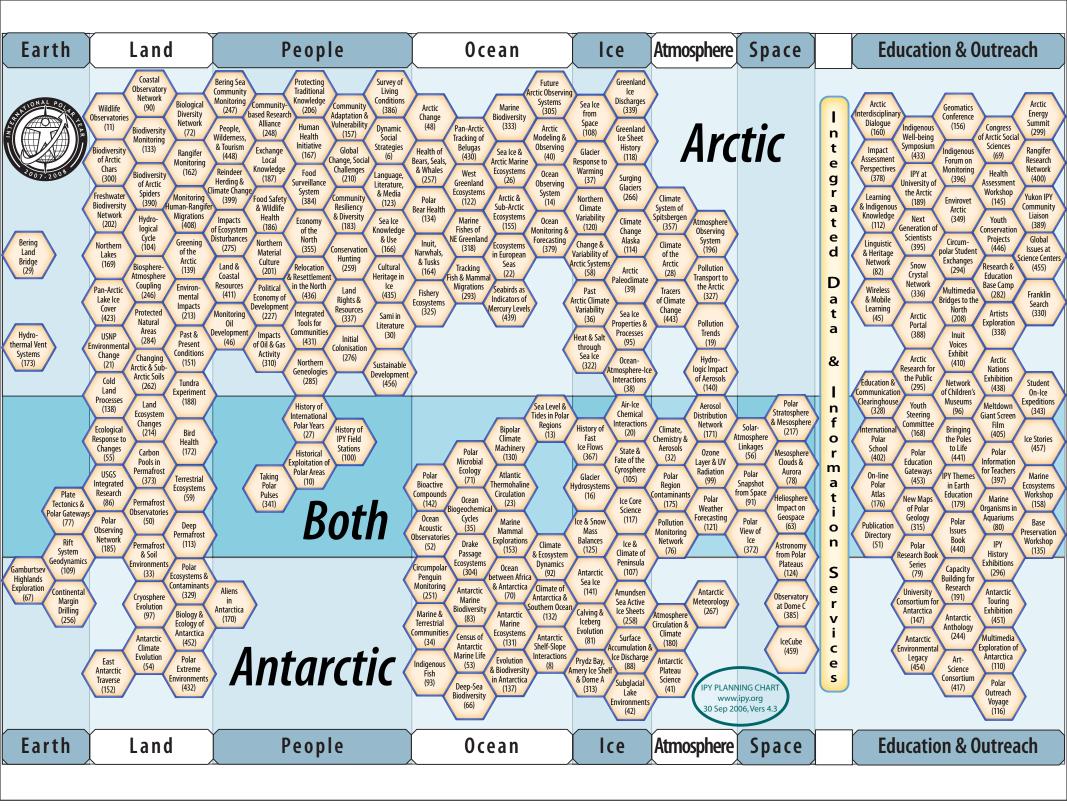


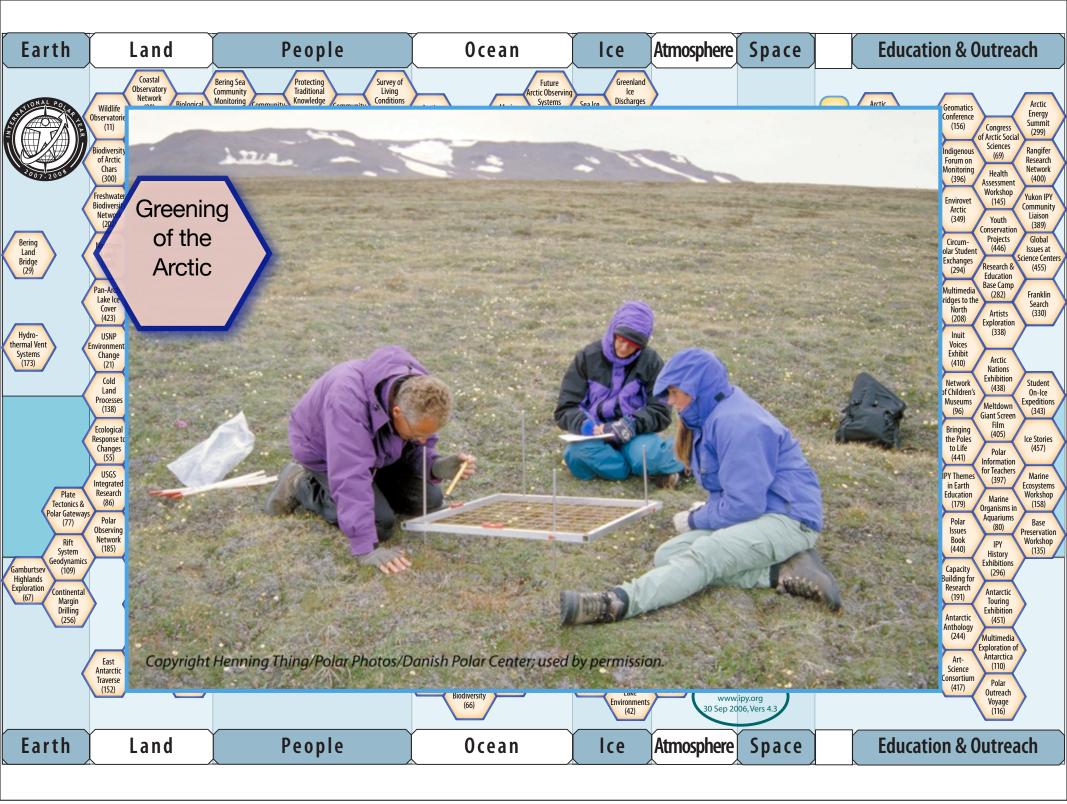


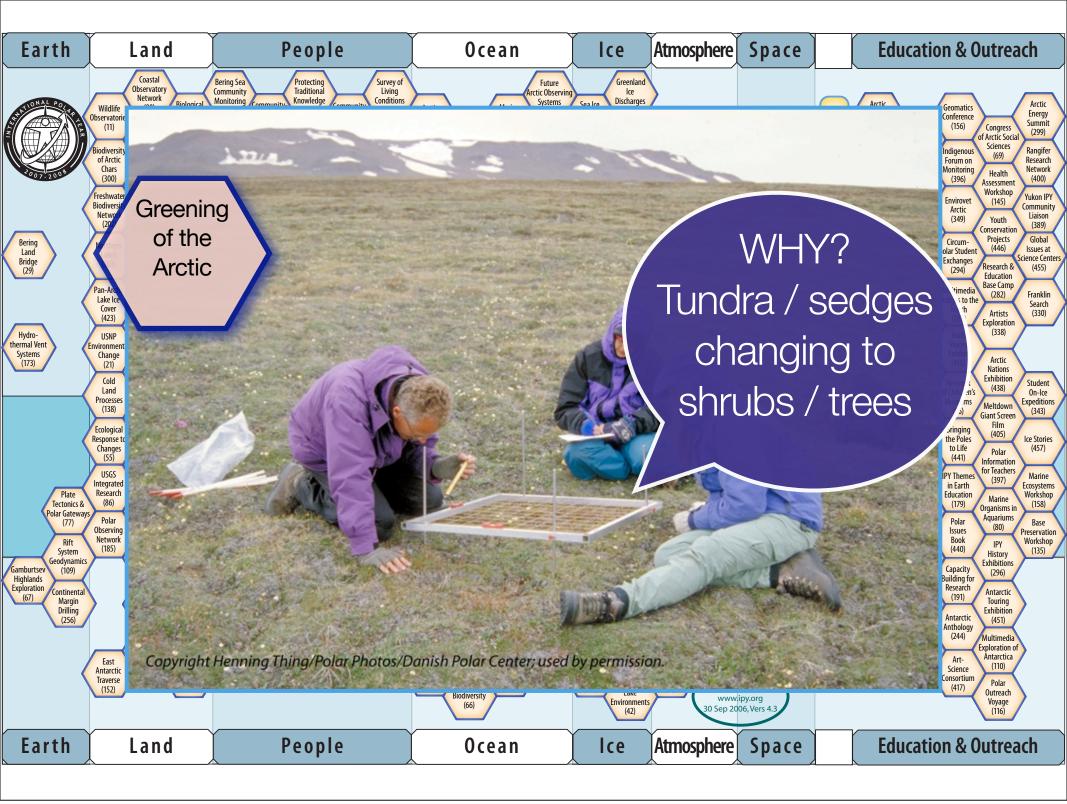


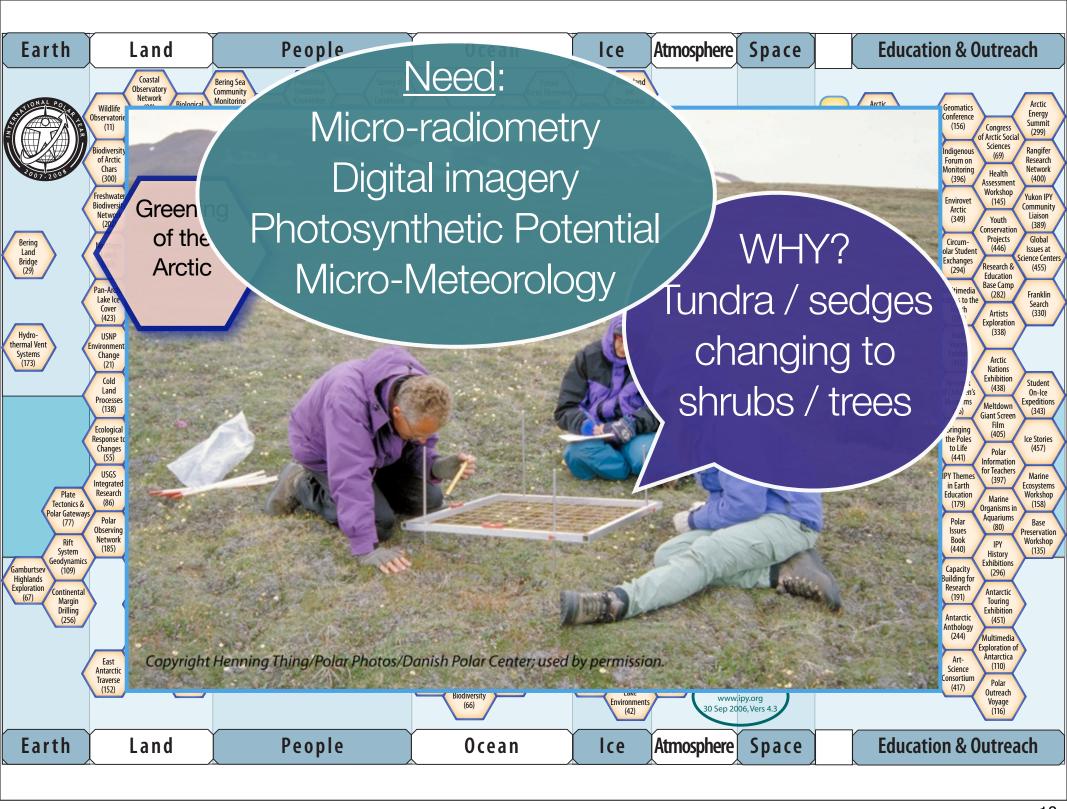


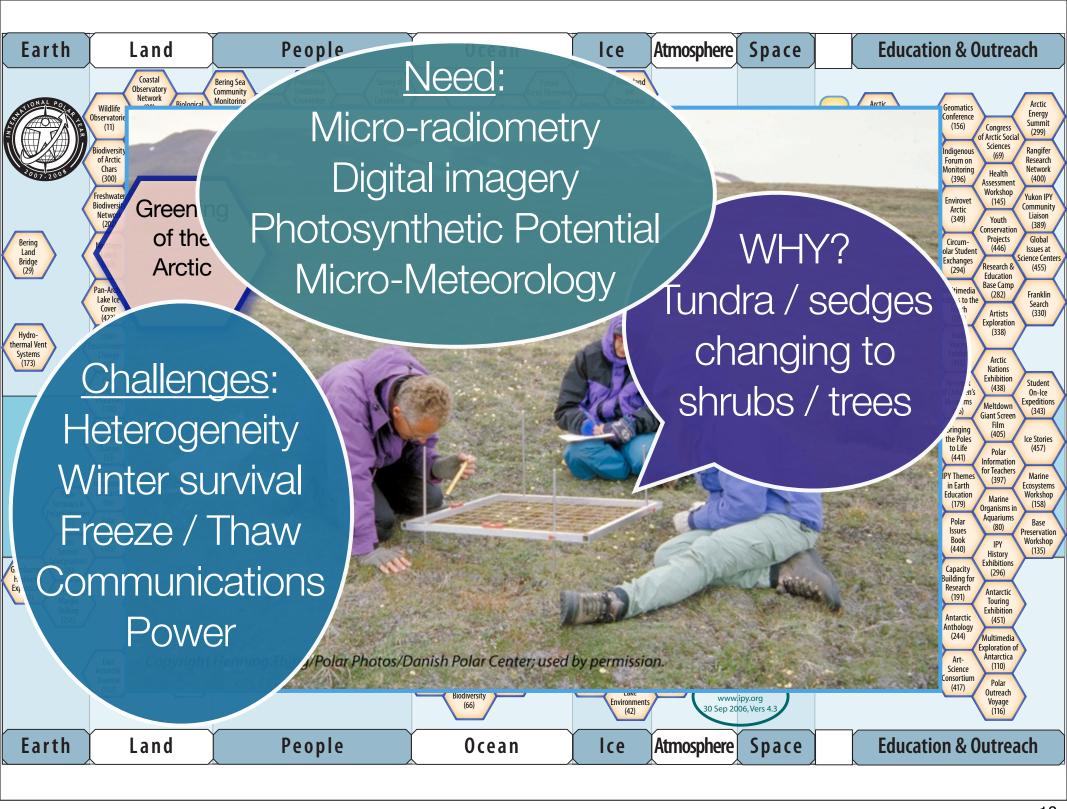


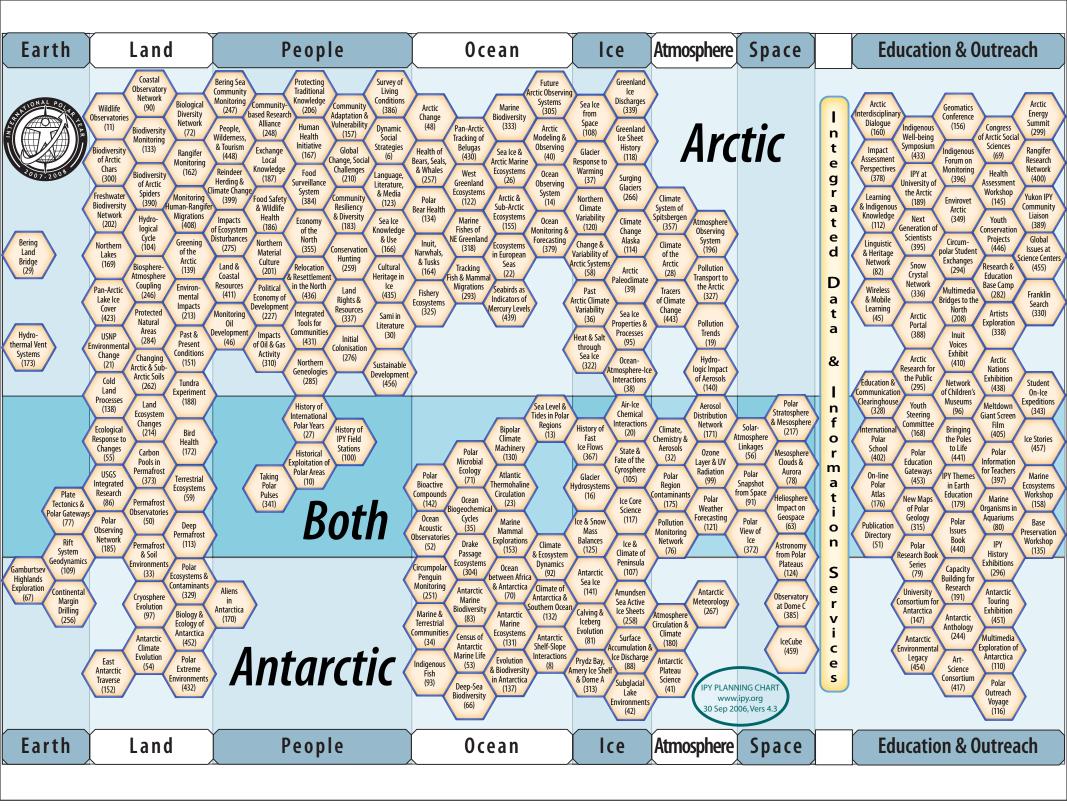


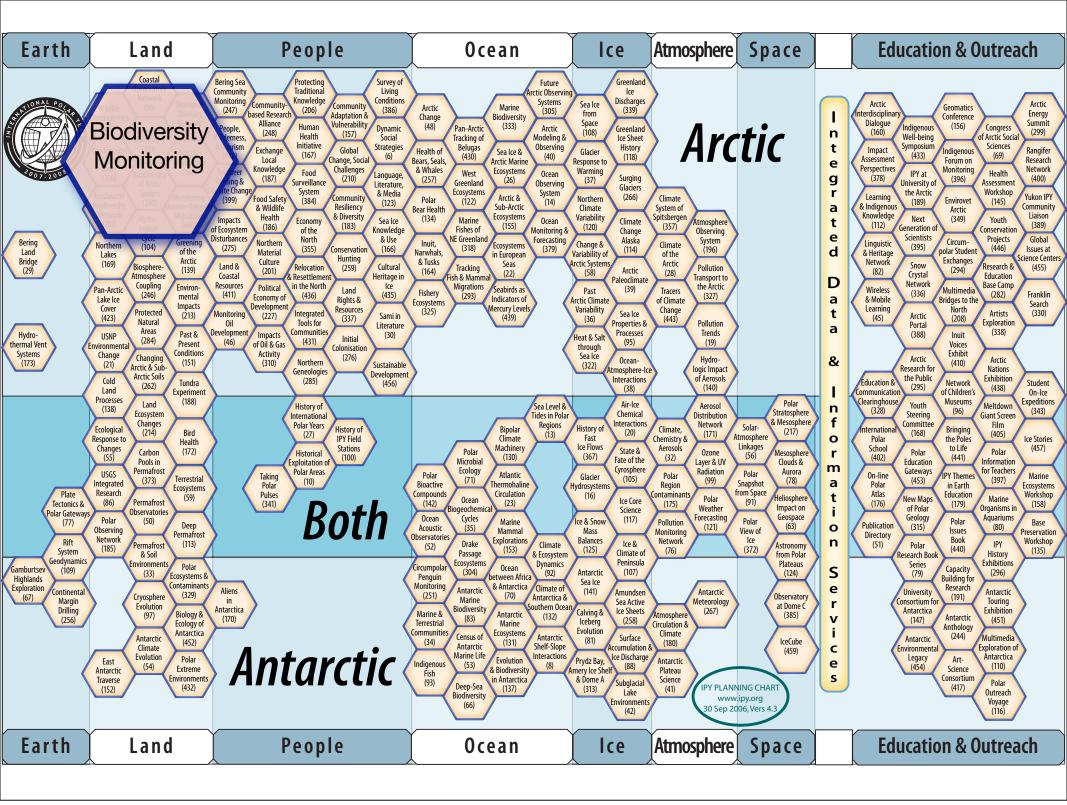


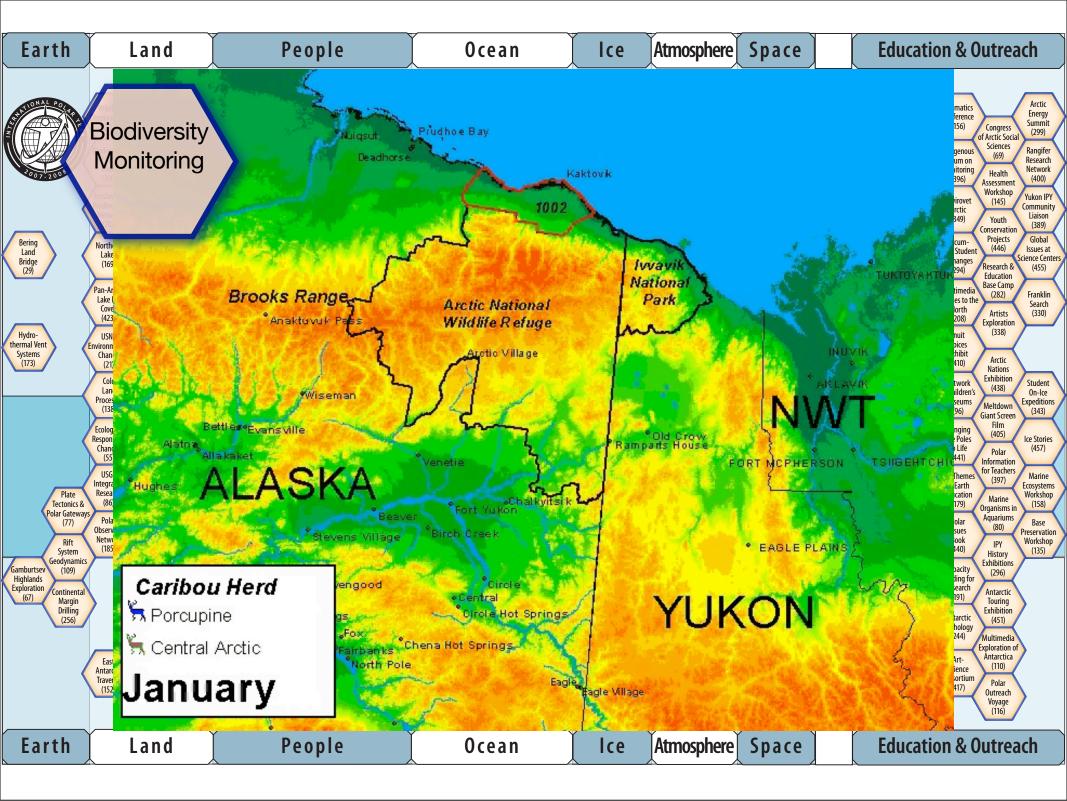


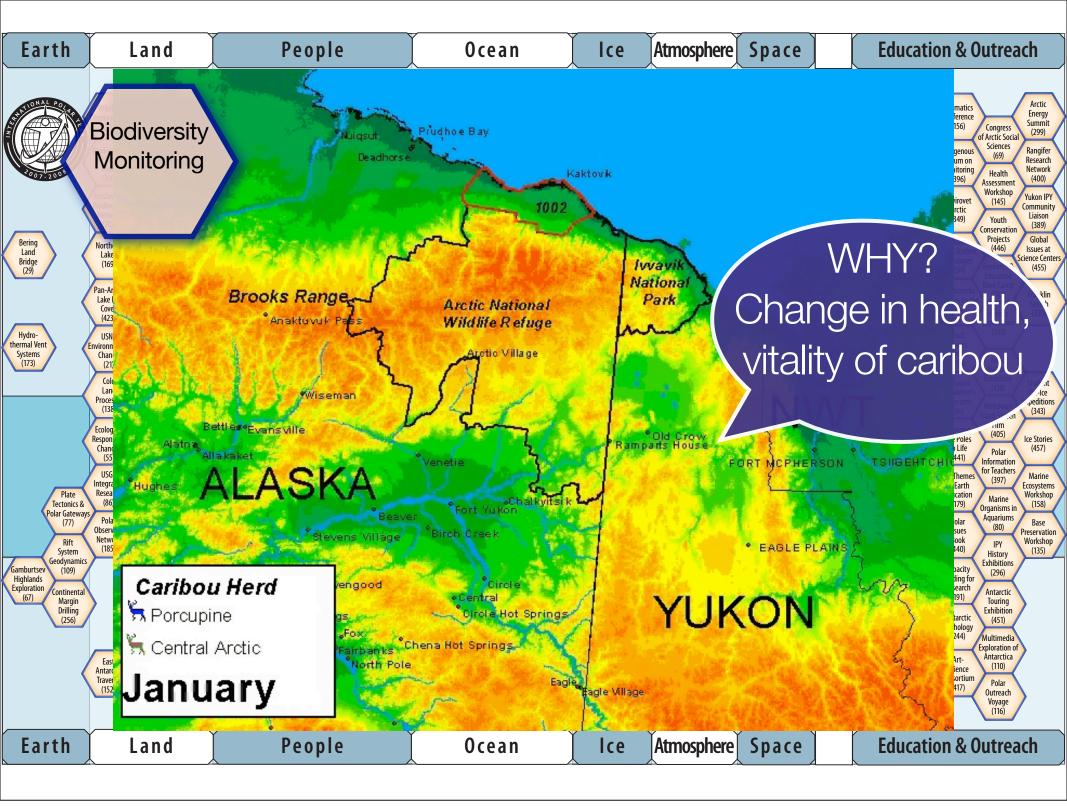


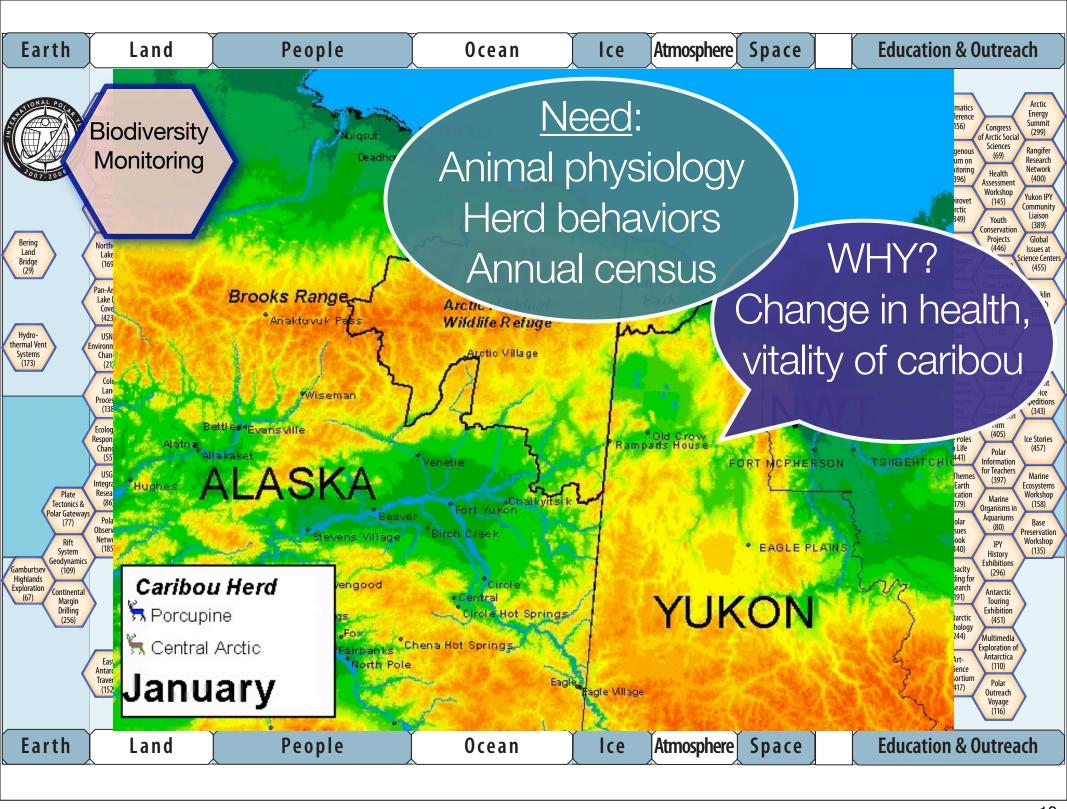


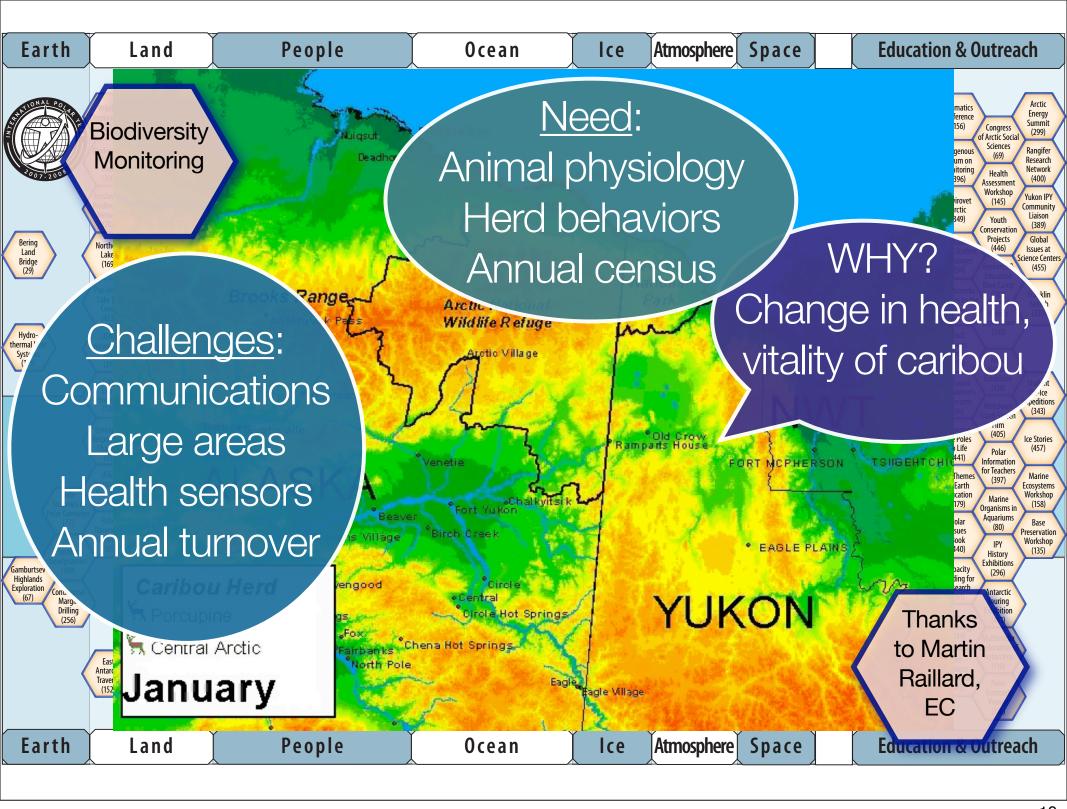


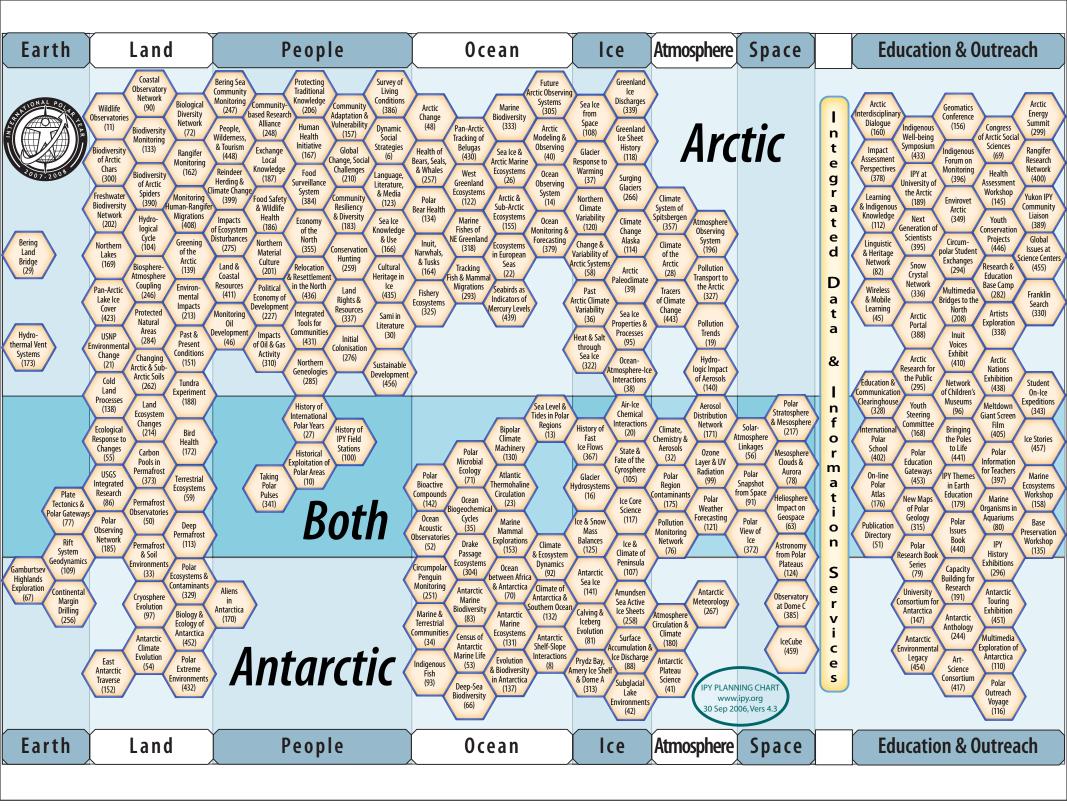


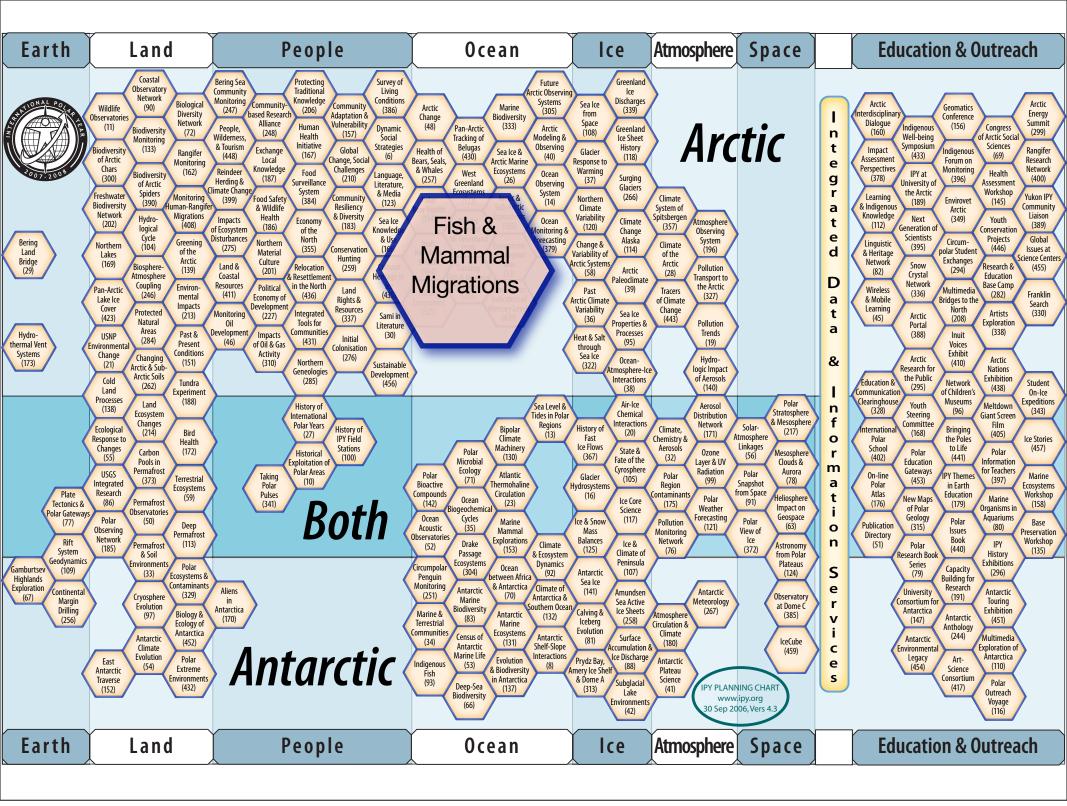




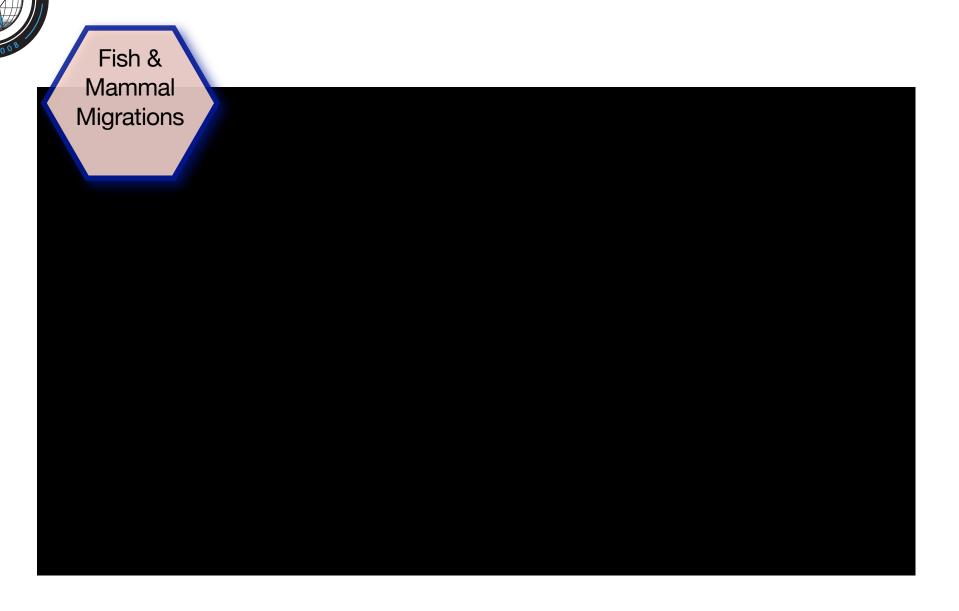








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WHY?
Migrations of temperate species



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Migrations of temperate species

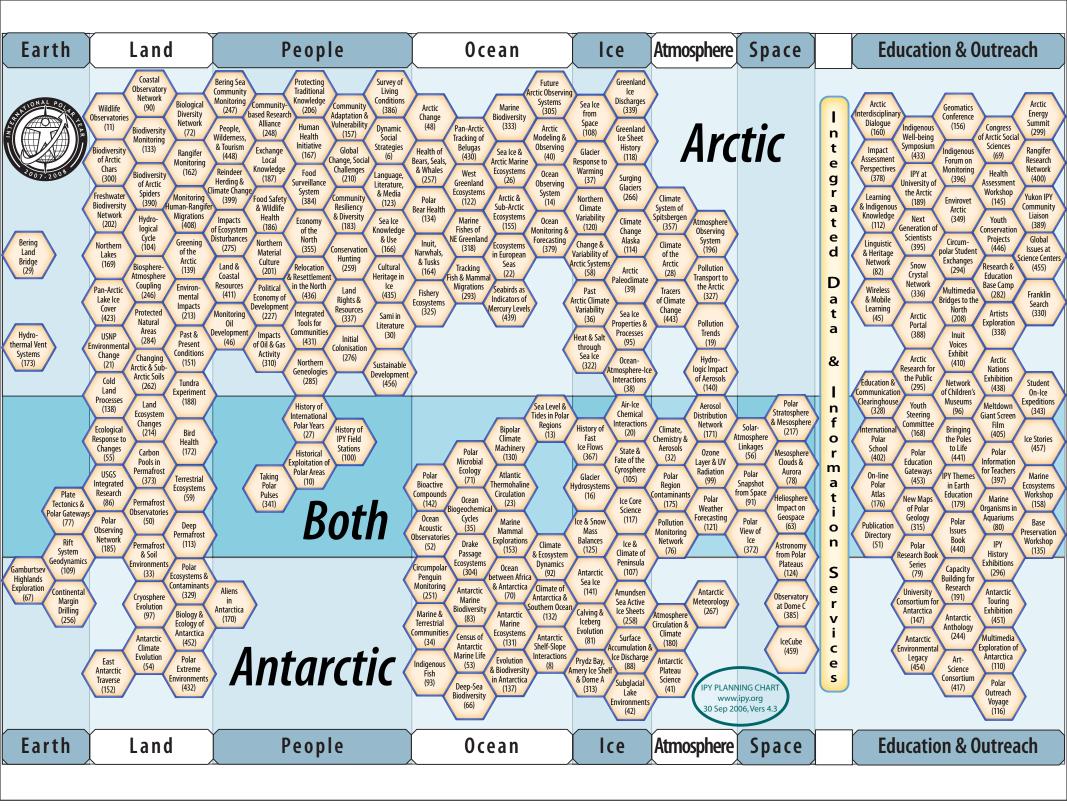
Need:
Species abundance
Migratory patterns

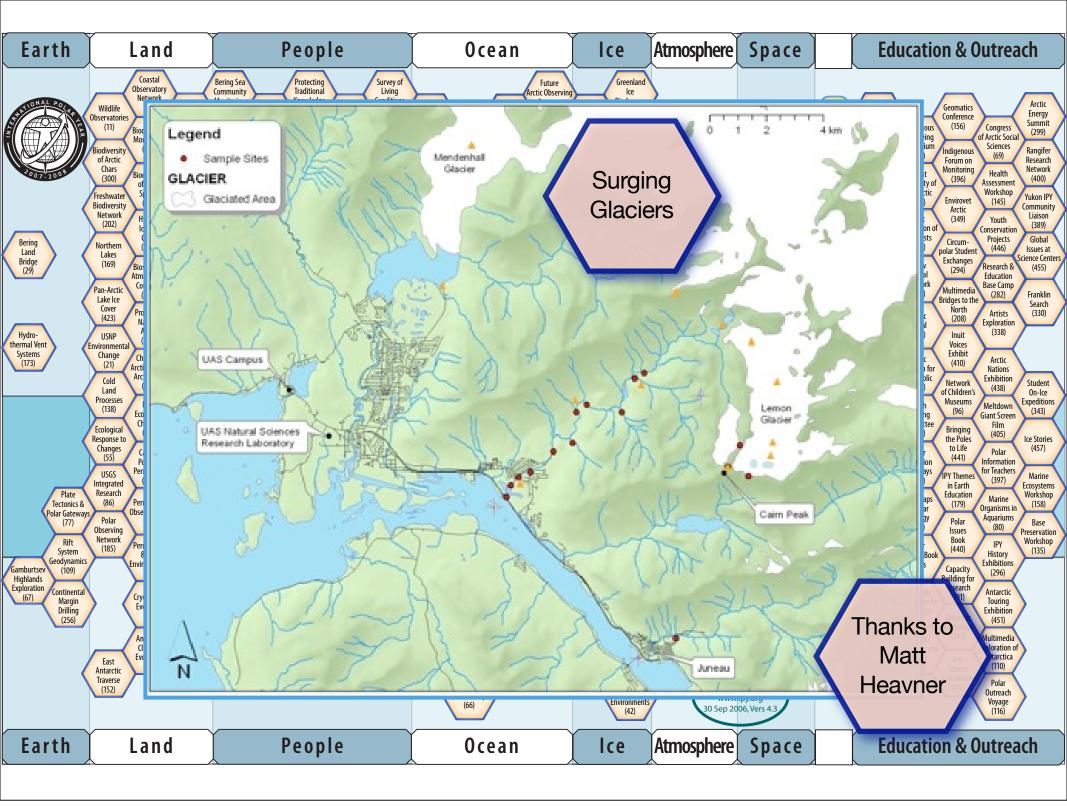


WHY?
Migrations of temperate species

Challenges:
Tagging animals
Transponder lifetimes
Communications

Need:
Species abundance
Migratory patterns



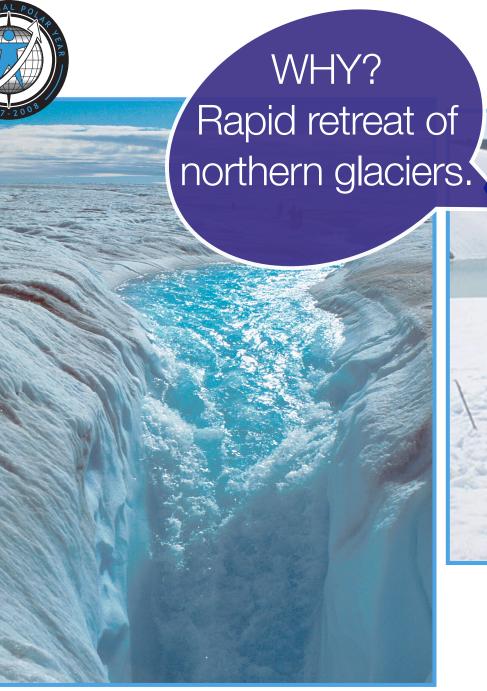




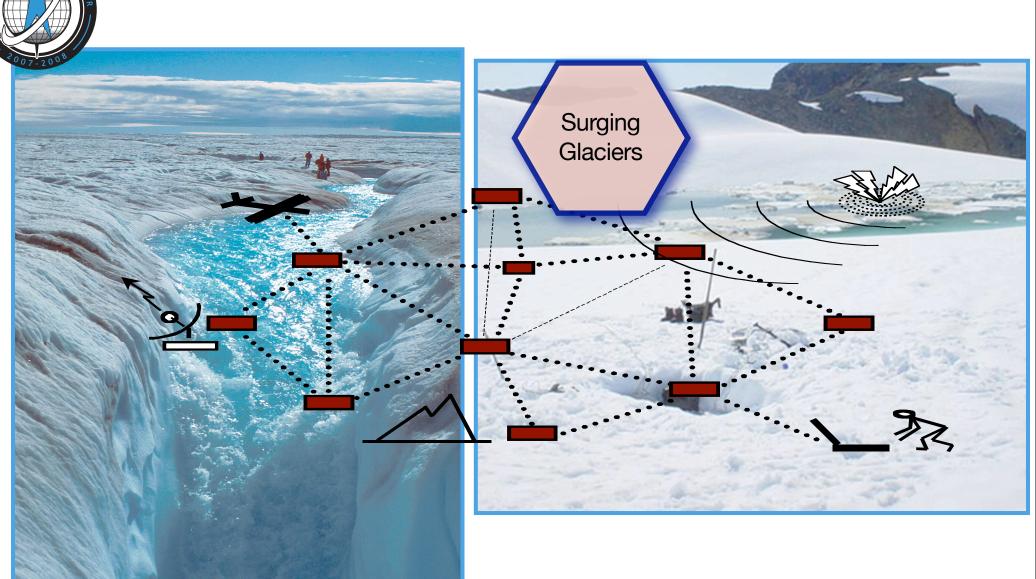


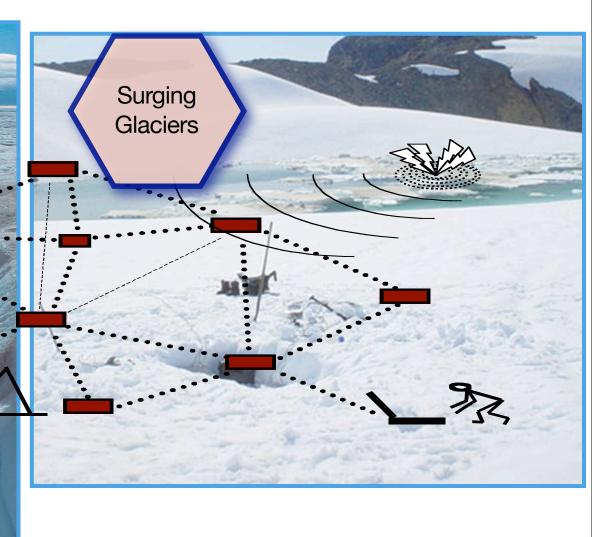






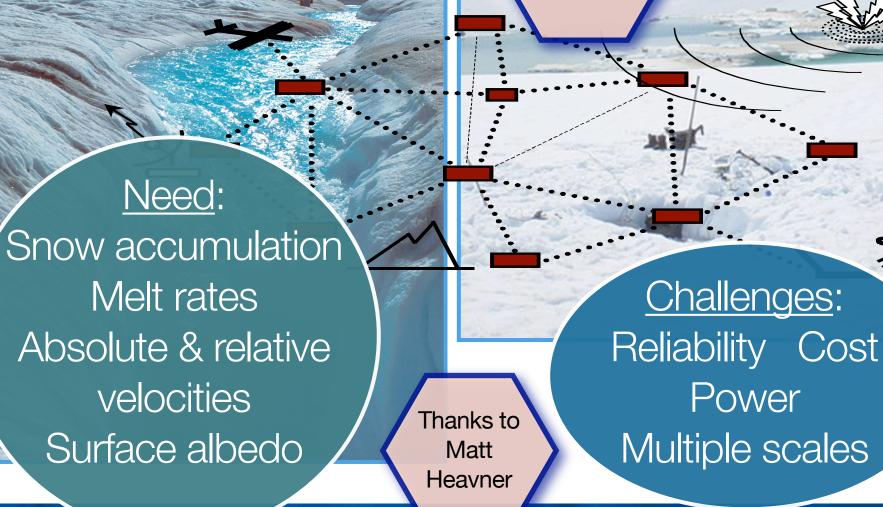






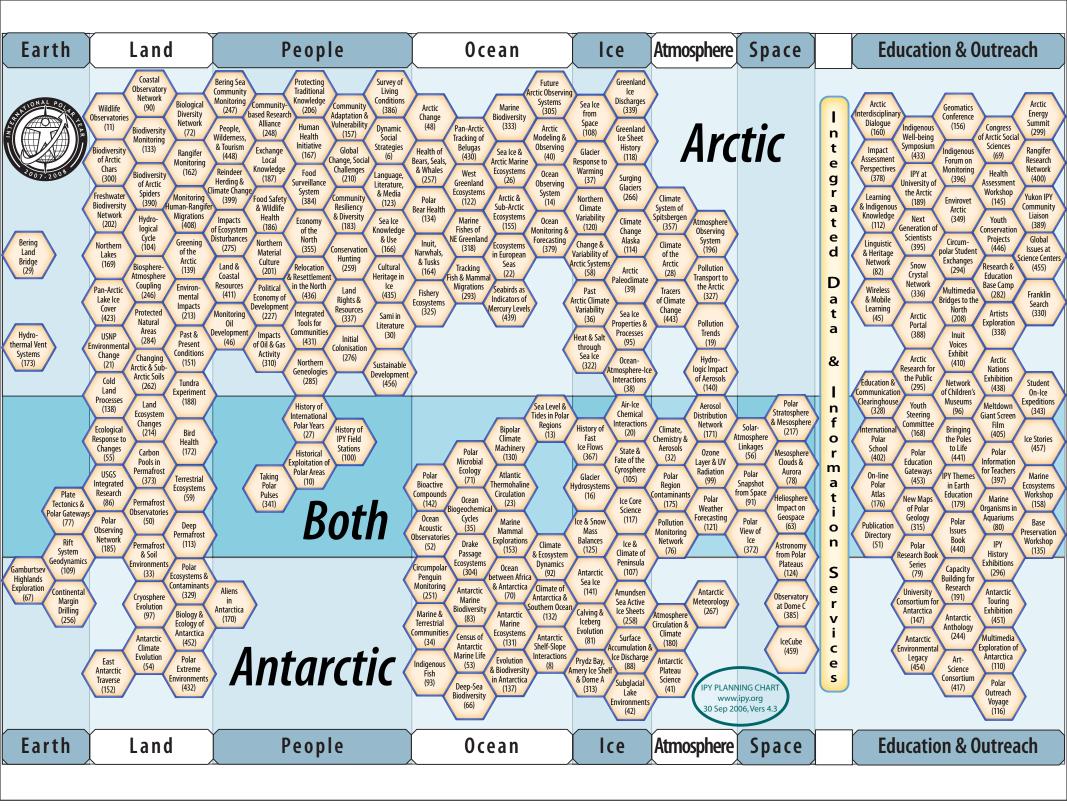
## Need: Snow accumulation Melt rates Absolute & relative velocities Surface albedo

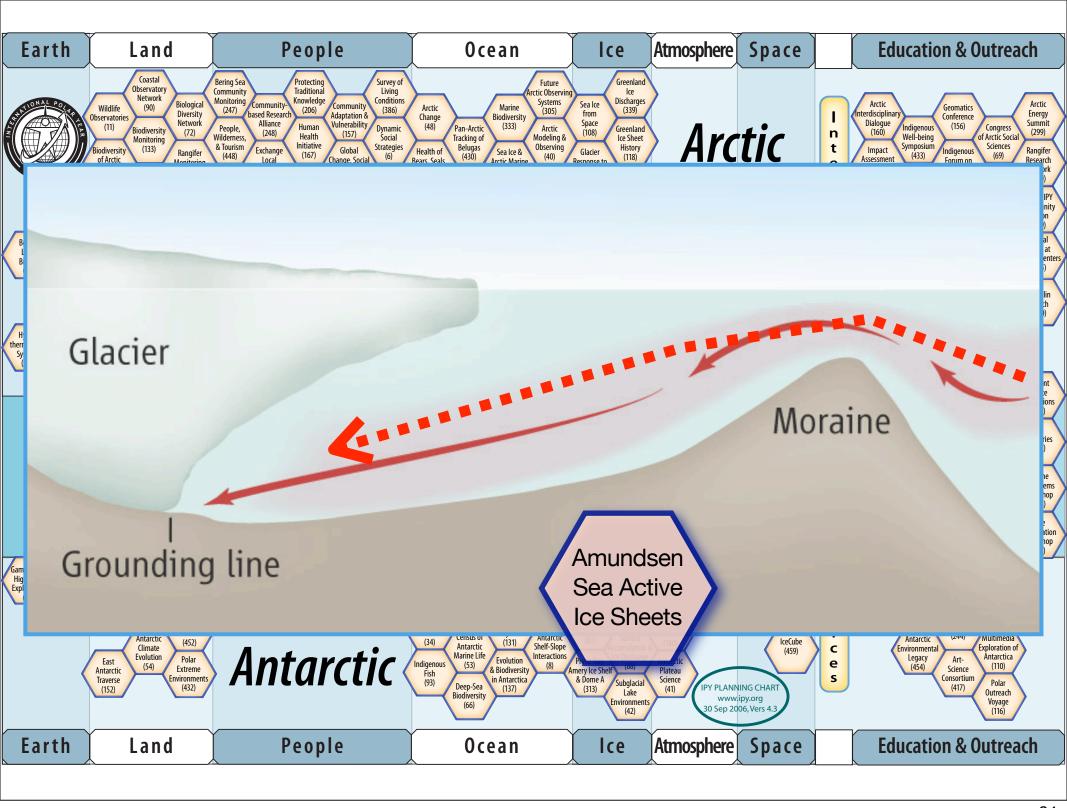


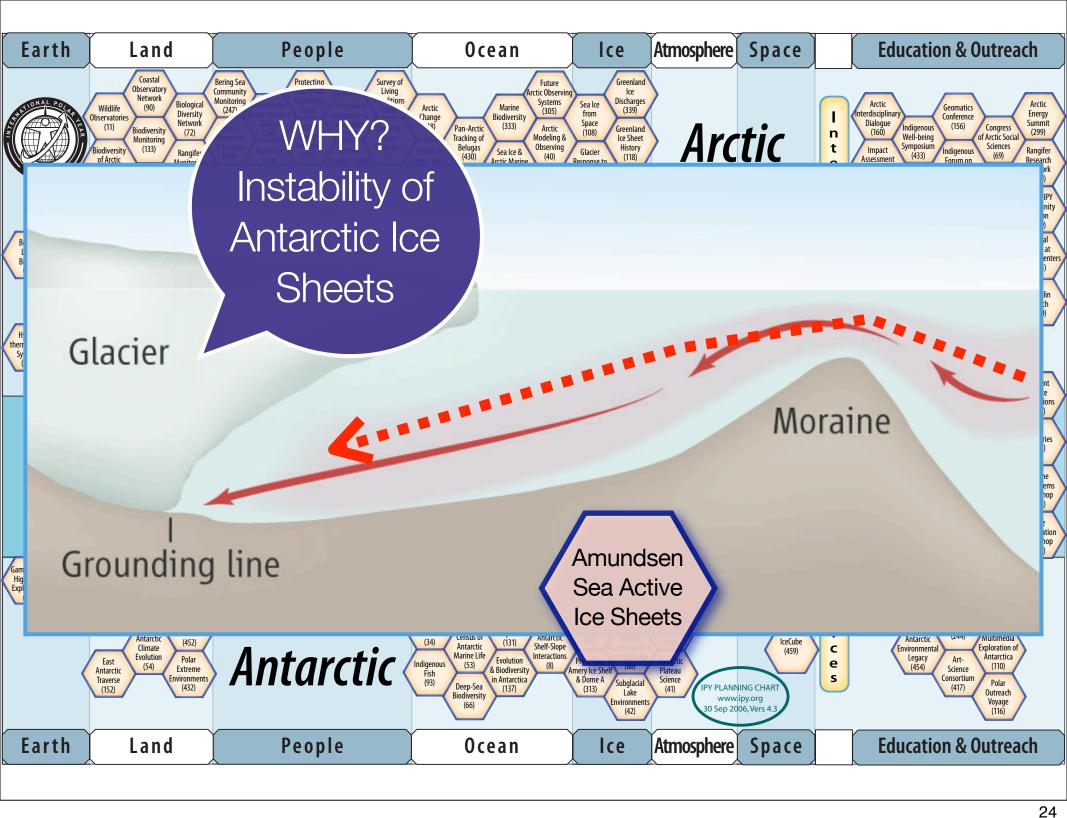


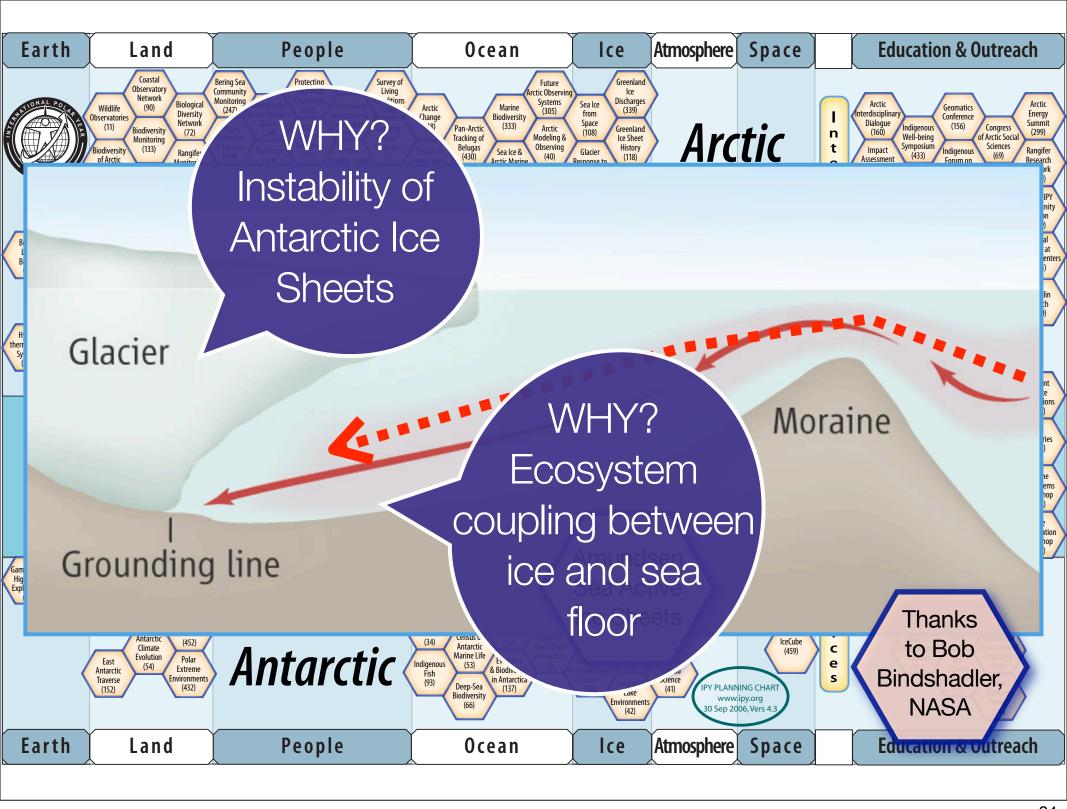
Surging

Glaciers





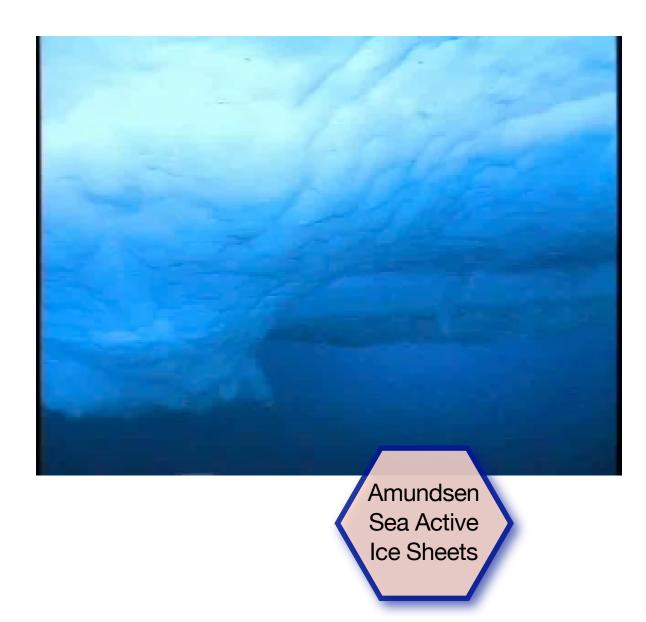














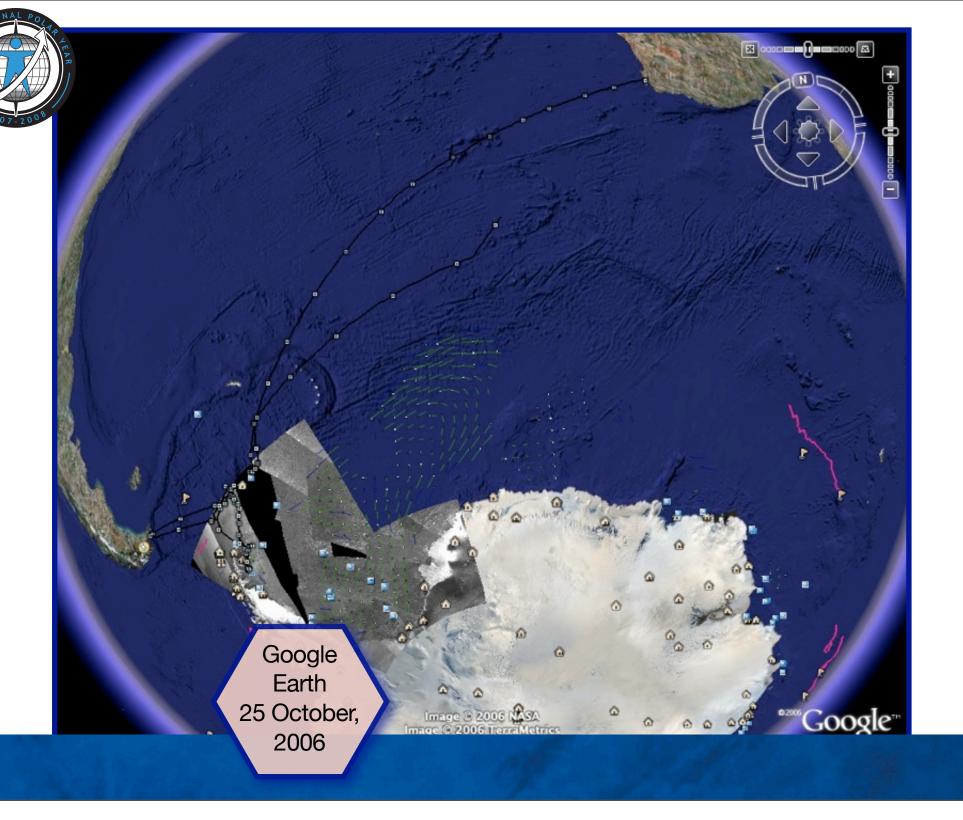




Challenges:
Deployment
Communications
Buoyancy
Complex terrain

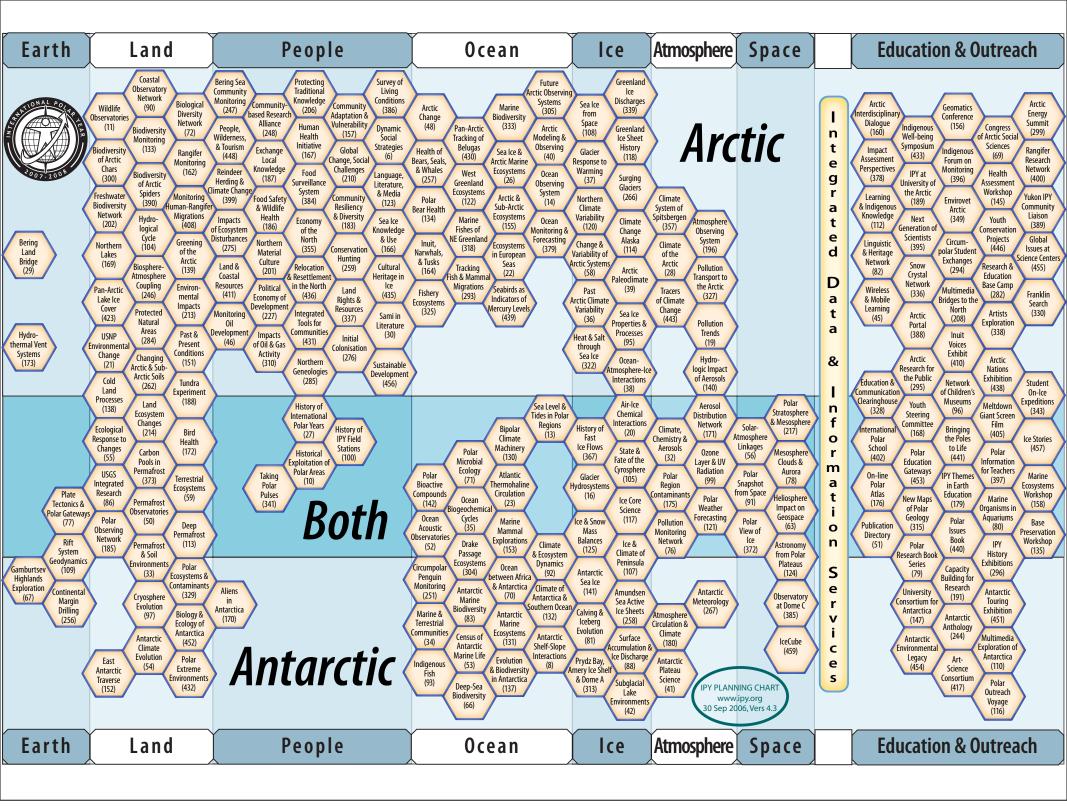
Need:
Temperature
Salinity
Water velocity
Ice thickness
Biology

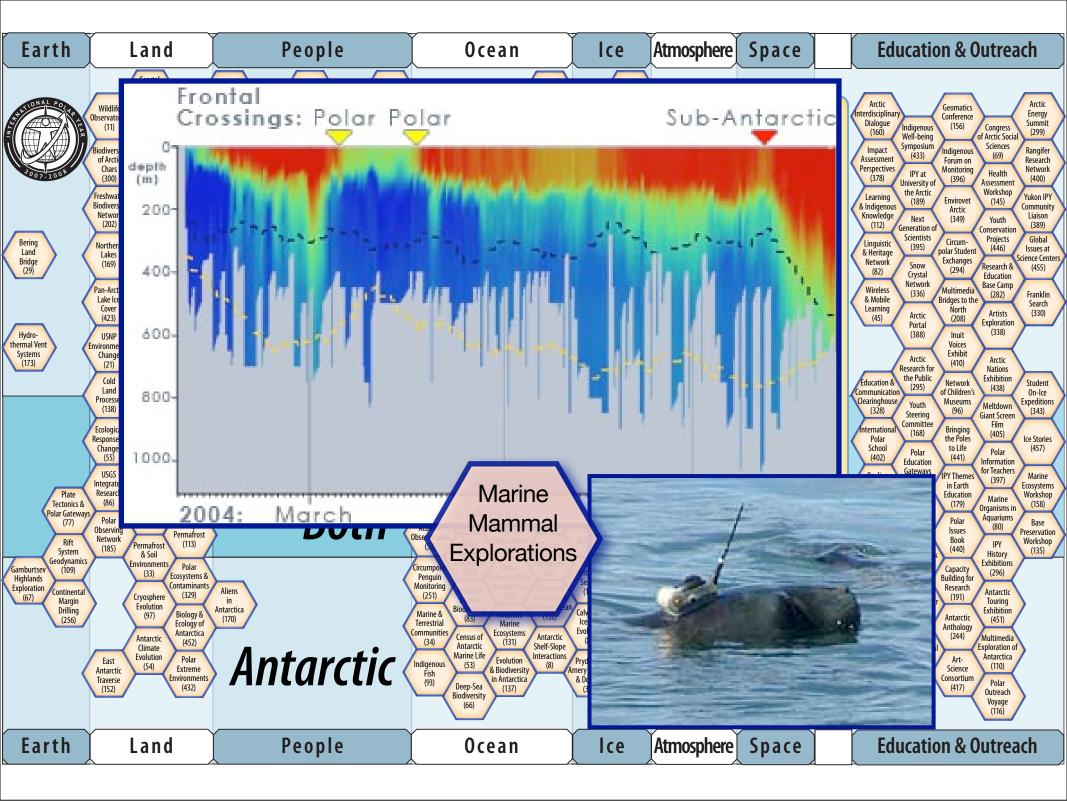
Amundsen Sea Active Ice Sheets





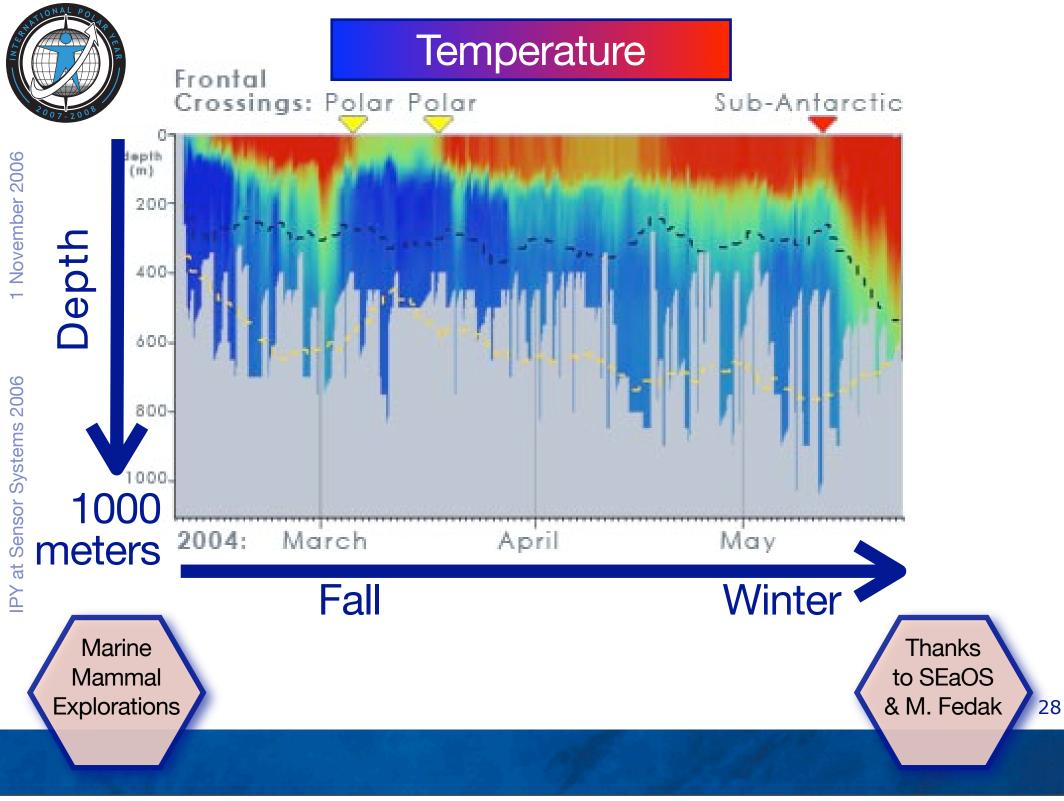


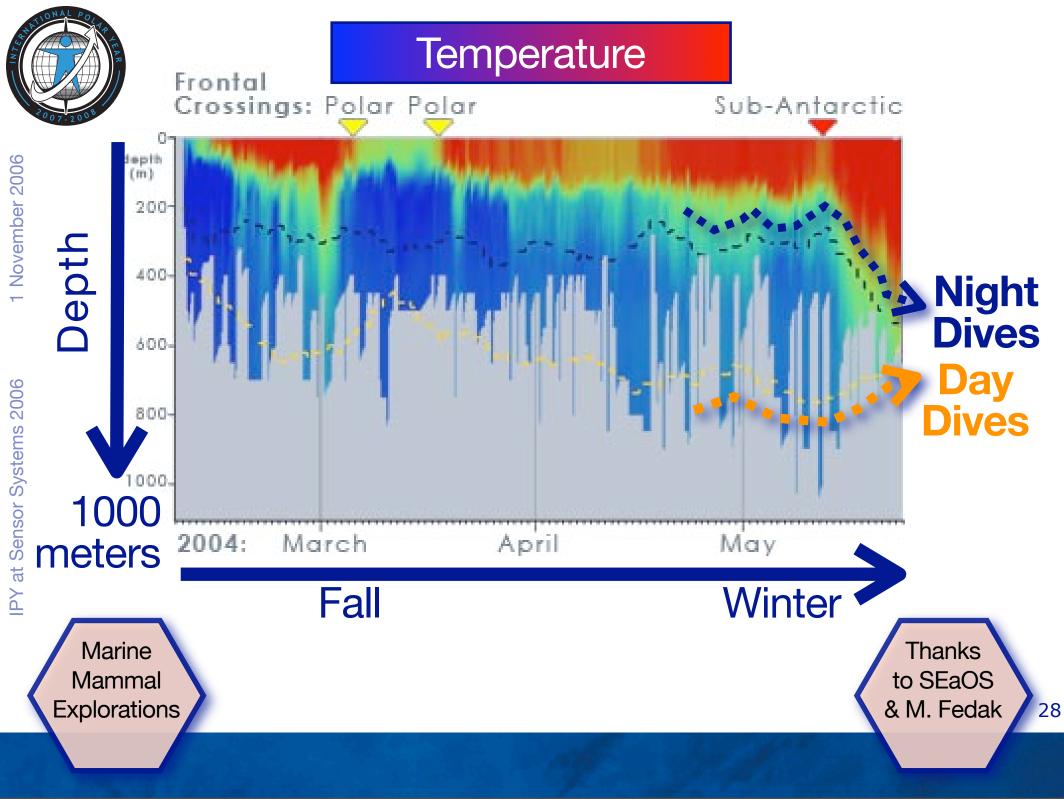


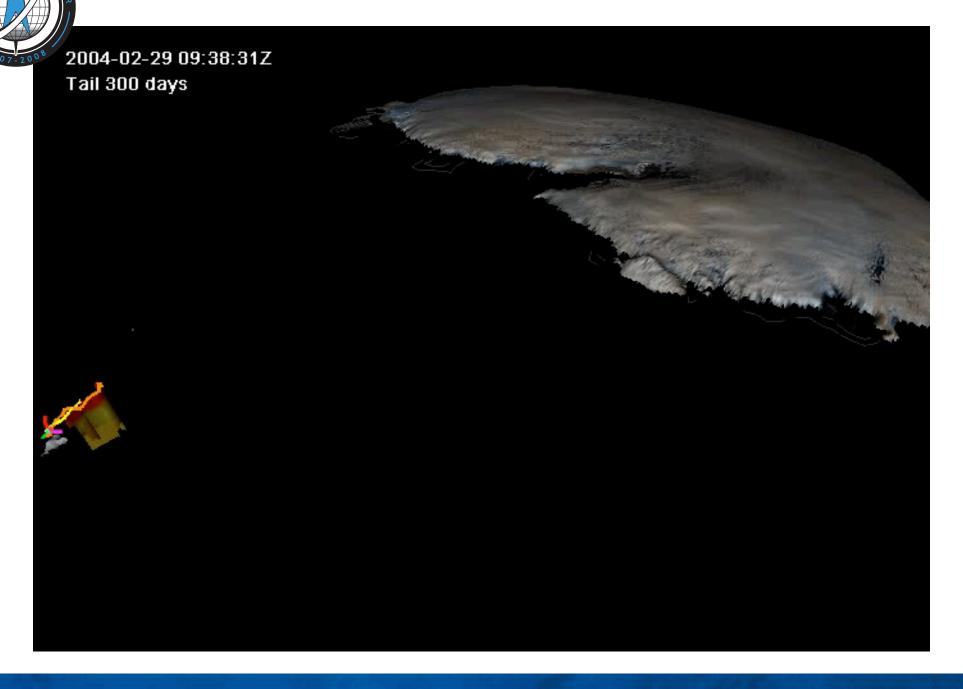




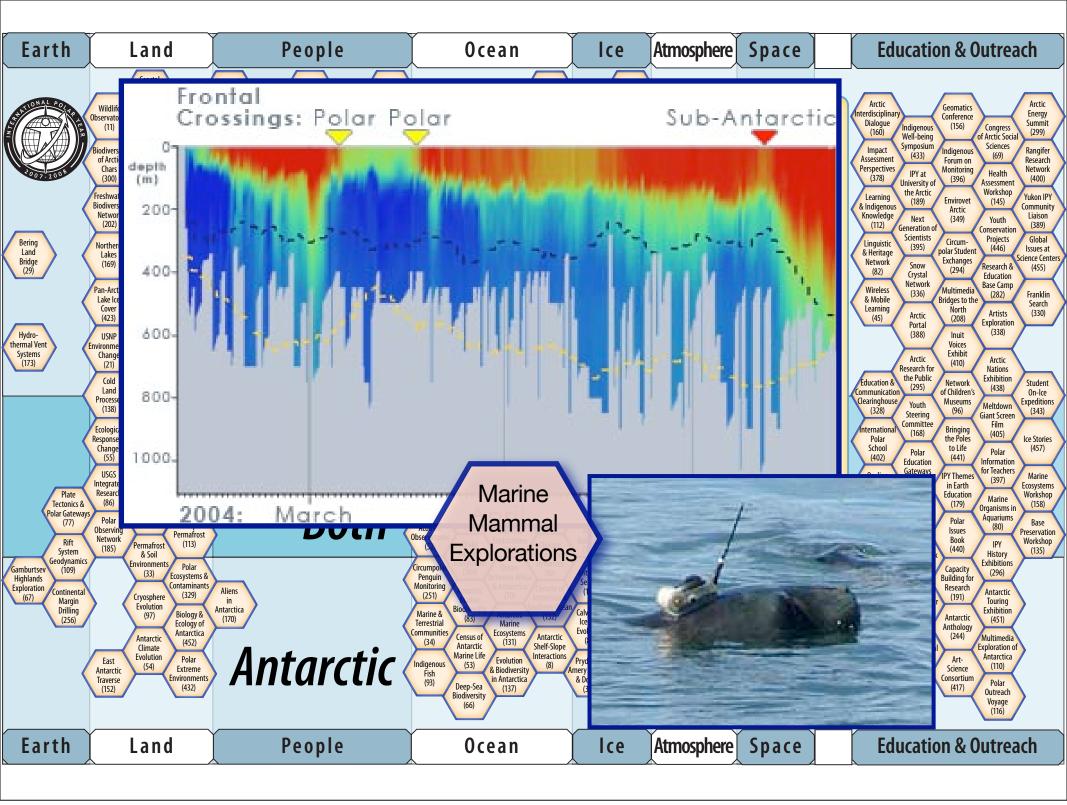
Marine Mammal Explorations Thanks to SEaOS & M. Fedak

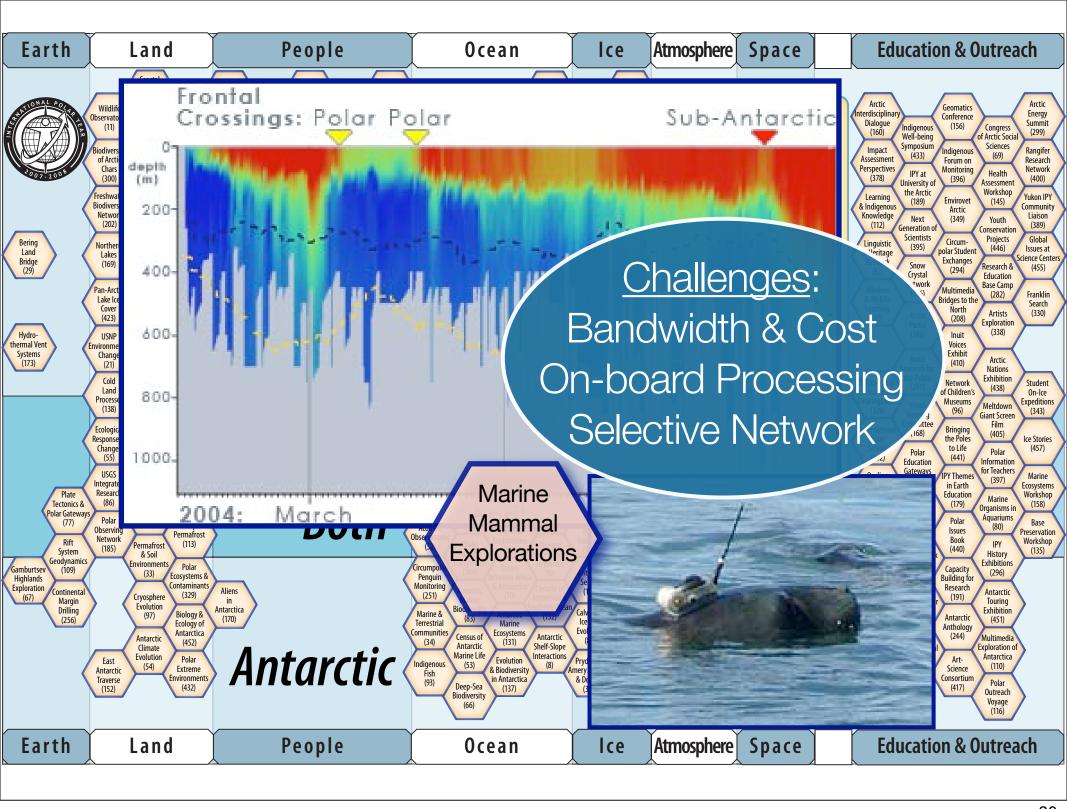


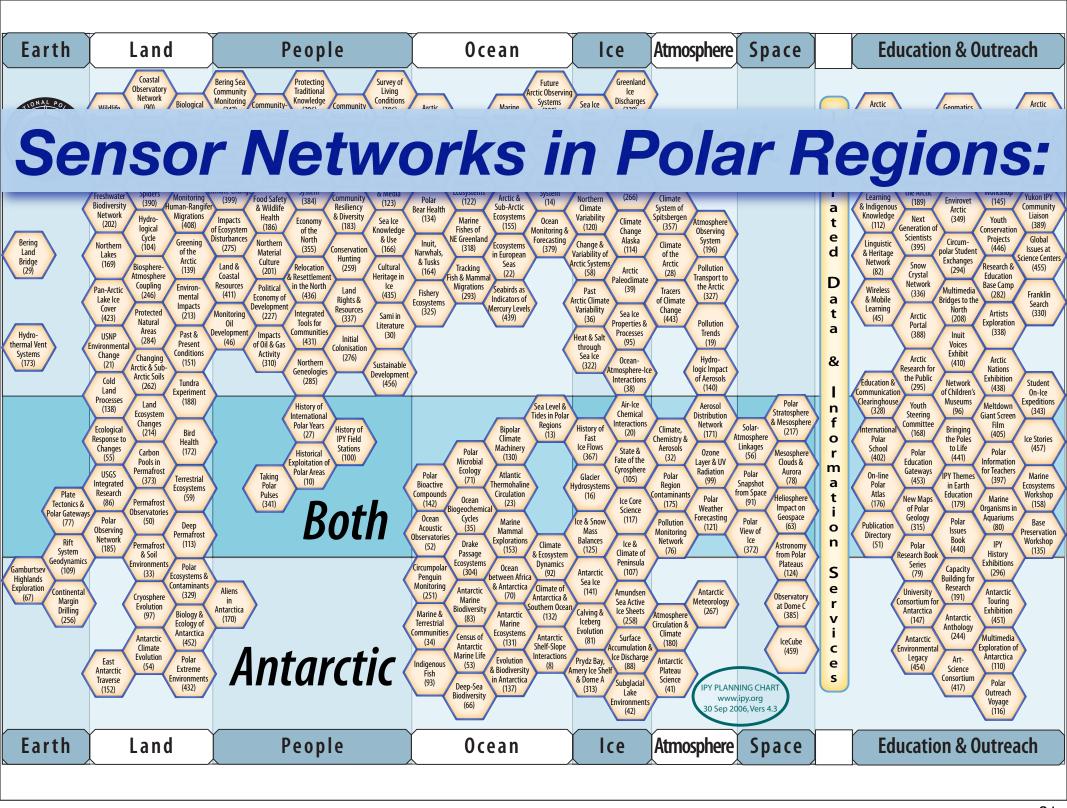


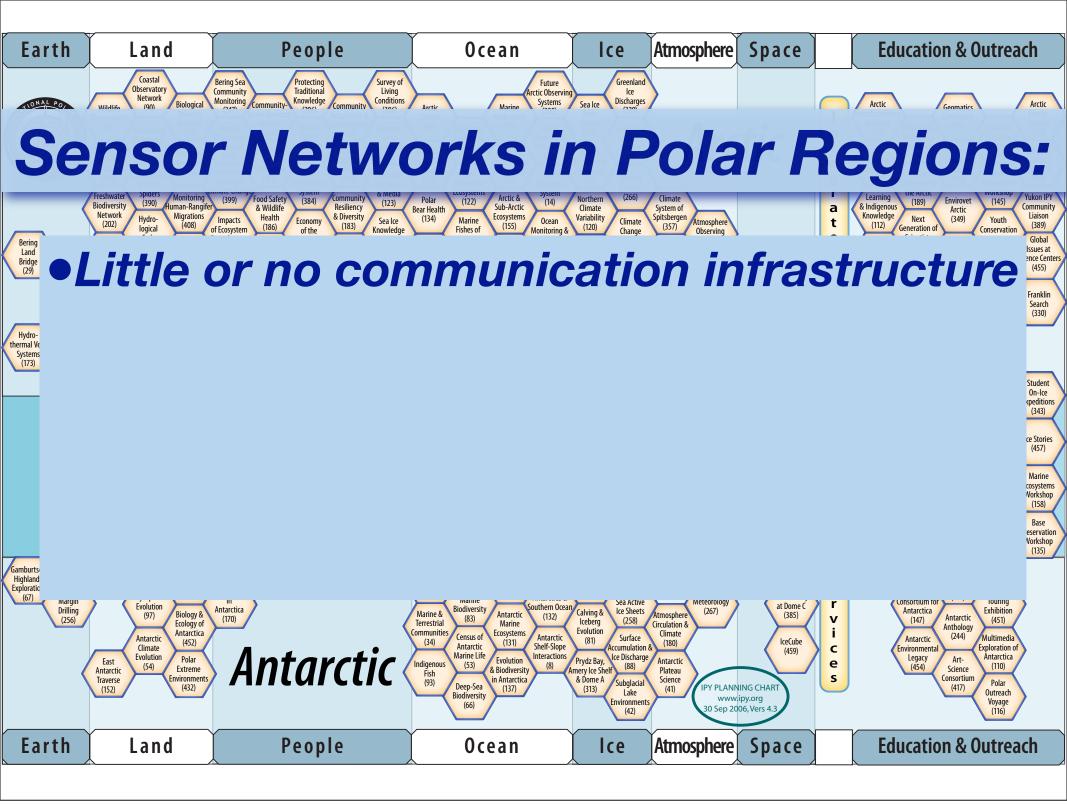


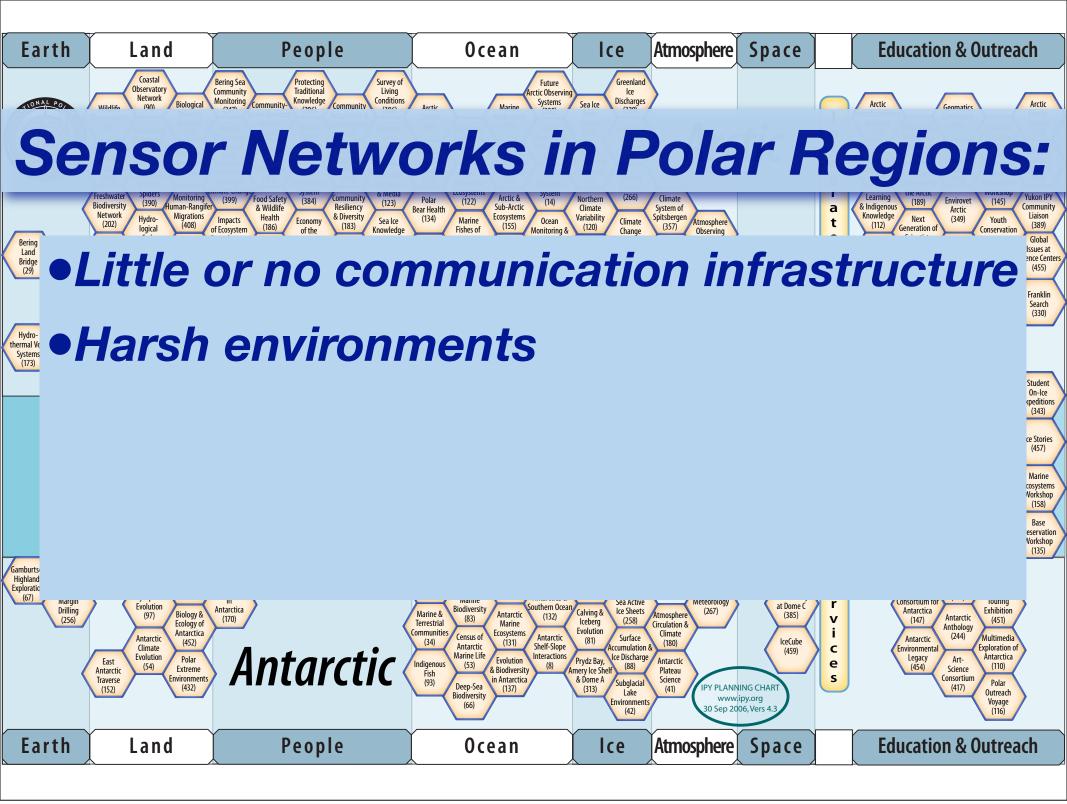


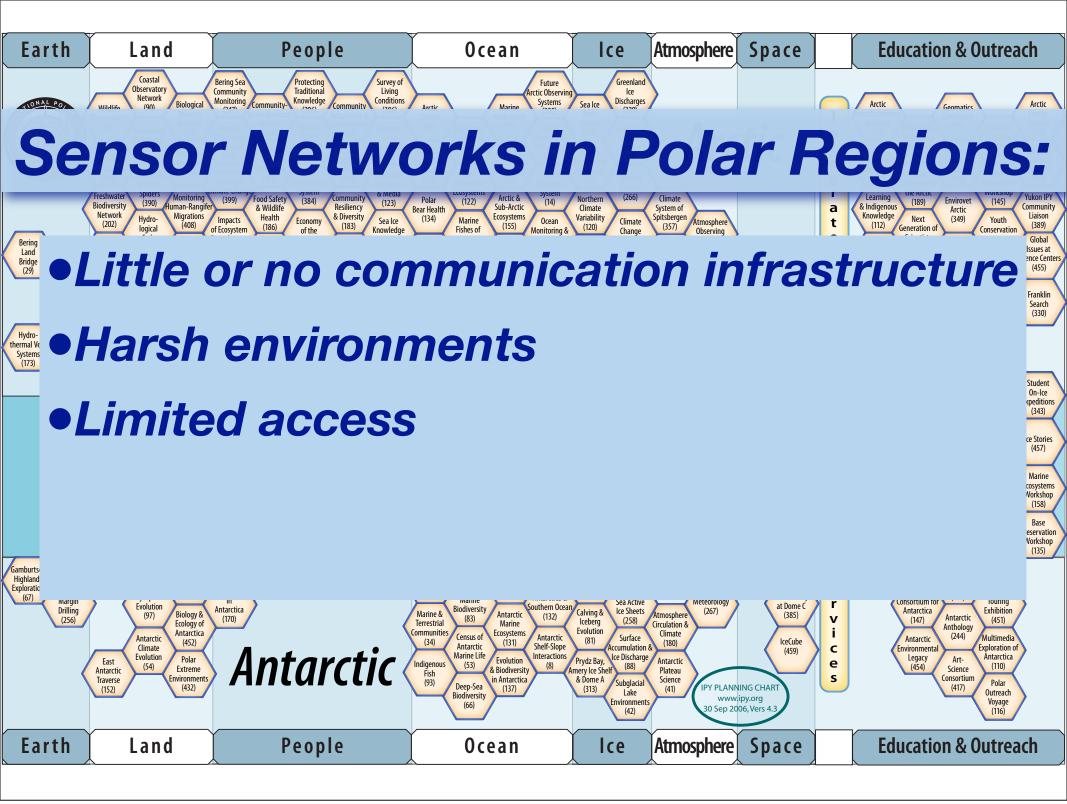


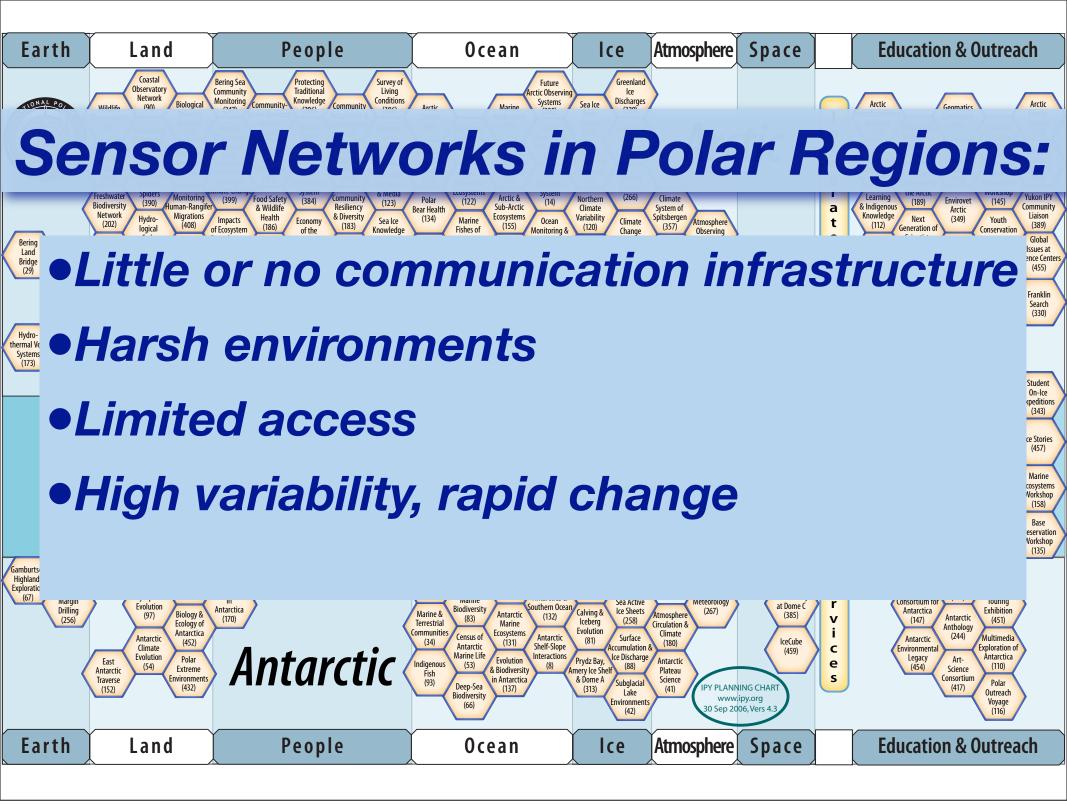


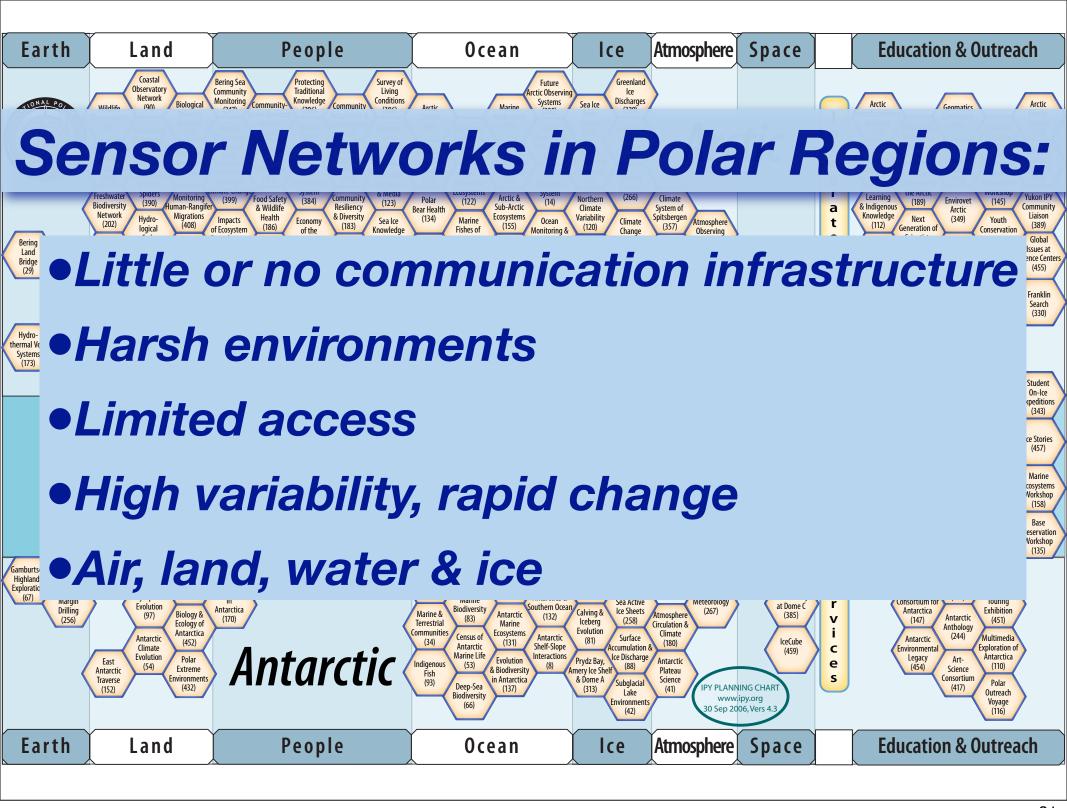




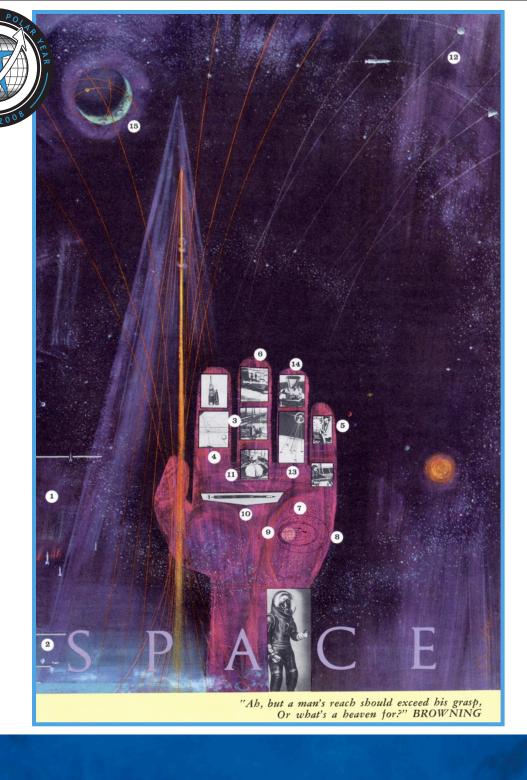












IGY (1957 - 1958) Poster



