

The polar regions have **unique geodynamic environments** where the solid earth, the **cryosphere, the oceans, the atmosphere and the global climate system** are intimately linked.

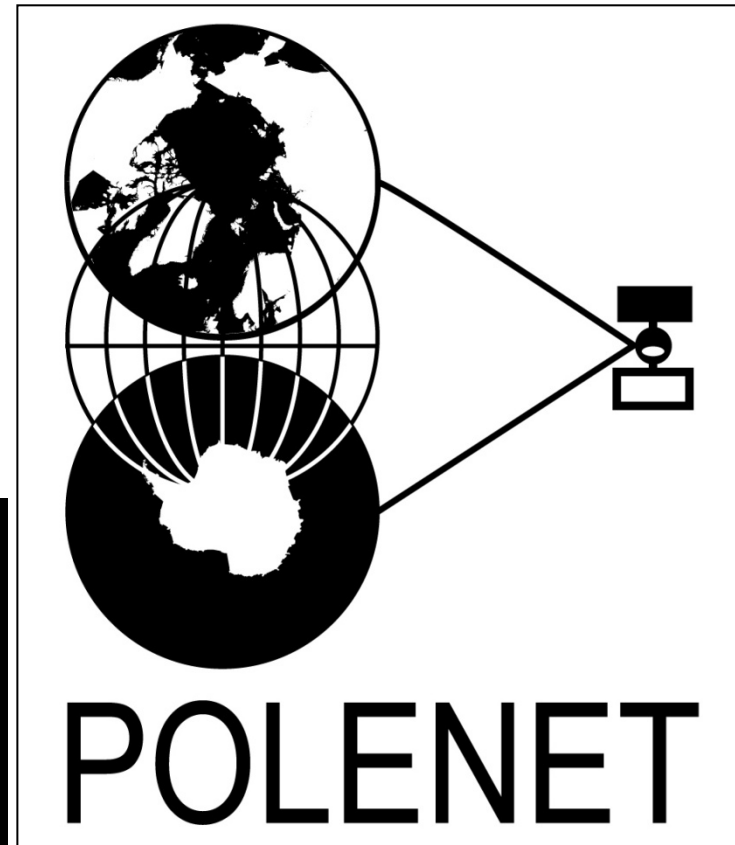
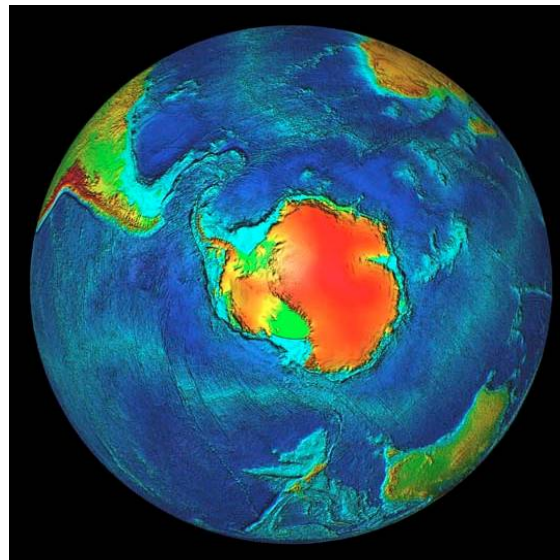
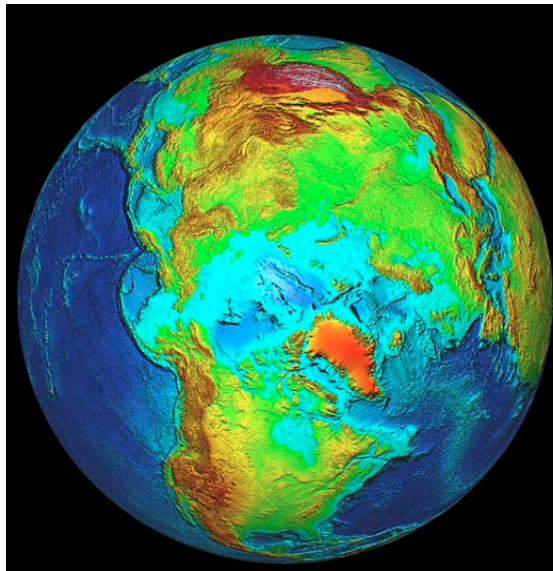
The efforts of the **ANTEC** group culminated in the Polar Earth Observing Network (**POLENET**) International Polar Year core activity, in which 28 nations are collaborating in the Arctic and the Antarctic to obtain data from geophysical observatories.

POLENET is acquiring systems-scale observational data in the Earth's polar regions and aims to provide a legacy in observational infrastructure and technological capability in autonomous monitoring in extreme environments.

Bipolar field activities are focused on deployment of autonomous observatories at remote sites on the continents, coordinated with measurements made at permanent station observatories and by satellite campaigns.



IPY
International Polar Year



POLar Earth observing NETwork
for the International Polar Year

Observation Techniques



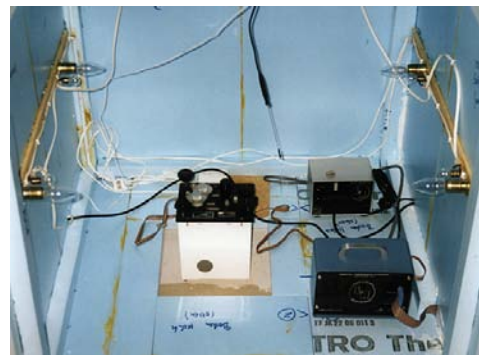
GPS



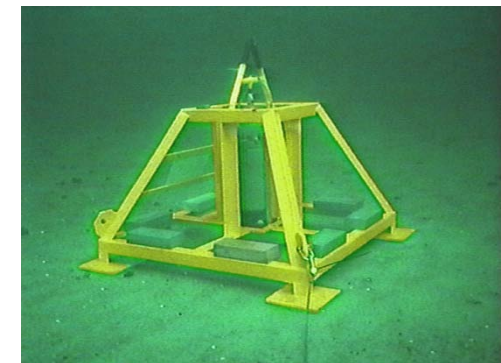
Seismometer



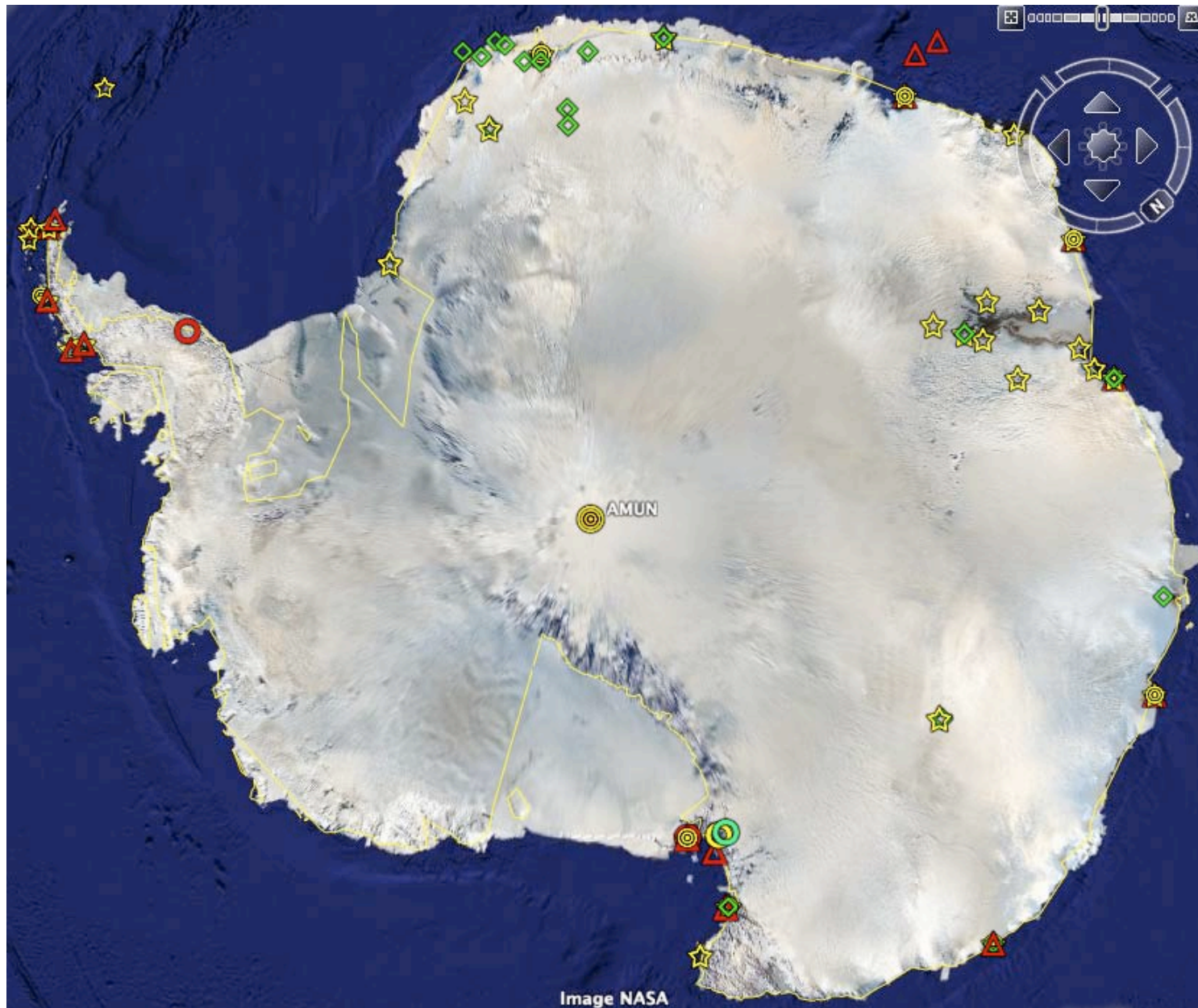
Met package



Gravimeter

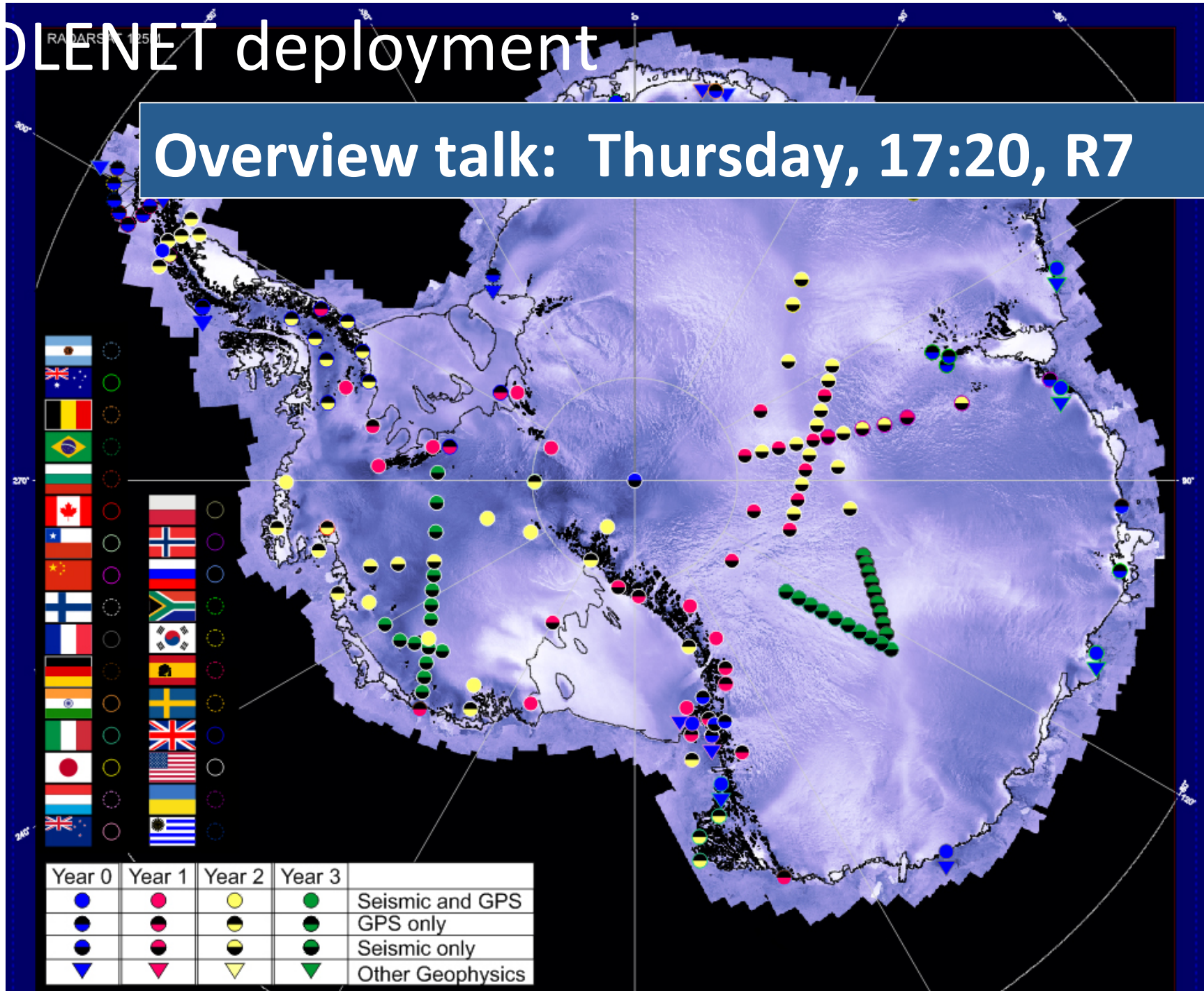


Tide Gauge



OLENET deployment

Overview talk: Thursday, 17:20, R7



Project Support

Polar Services

- What's New
- Remote Station Engineering
- GPS Support
- LIDAR Support
- Geodetic Data
- GPS Base Stations
- Reports
- Polar Links

Polar Services - Remote Station Engineering



GPS Prototype Station MIN0 at Minna Bluff, Antarctica.
First prototype station deployed under UNAVCO/PASSCAL Remote Stations MRI project. A moderately sized battery bank with charging from solar and wind provided nearly continuous year-round operation and communications during 2007.



Permanent GPS station BURI at Butcher Ridge, Antarctica.
POLENET GPS station BURI at Butcher Ridge in the Transantarctic Mountains features wind and solar power, and Iridium communications for year-round autonomous operation. This station was installed by UNAVCO for Land Information New Zealand, and is part of the New Zealand contribution to the international POLENET project. A goal of the POLENET project is using bedrock geodesy to constrain past and present day changes in Antarctica's ice mass.

GPS REMOTE POLAR PERMANENT STATION DESIGN

| | | | | | |
|-----------------------------|---------------------------|-------------------------------|--------------------------------|------------------------------------|------------------------------------|
| Instruments | Monuments | Power Systems | Communications | Structural Systems | Testing Facilities |
|-----------------------------|---------------------------|-------------------------------|--------------------------------|------------------------------------|------------------------------------|

GPS/SEISMIC REMOTE STATIONS MRI PROJECT

| | | | | |
|--|---------------------------------|--|------------------------------|---|
| IRIS/PASSCAL Polar Support | Project Reports | Polar Networks Science Committee | MRI Proposal | State of Health Plots for Remote Polar GPS Stations |
|--|---------------------------------|--|------------------------------|---|

POLAR TECHNOLOGY LINKS

| | | | |
|---|--|---|---|
| Polar Earth Observing Network (POLENET) | PolarPower Community Website | Polar Technology Conference | Subscribe to the "ant-obs" Mailing List |
|---|--|---|---|

Geodetic studies from POLENET, including GPS measurements of crustal motion, tide-gauge measurements of relative sea-level change, and gravity measurements of mass change, constitute essential elements in developing an understanding of the stability and mass balance of the cryosphere and of ongoing sea-level change.

By the middle of the next decade many new data sets will have been collected that will serve to advance our understanding of **GIA**.

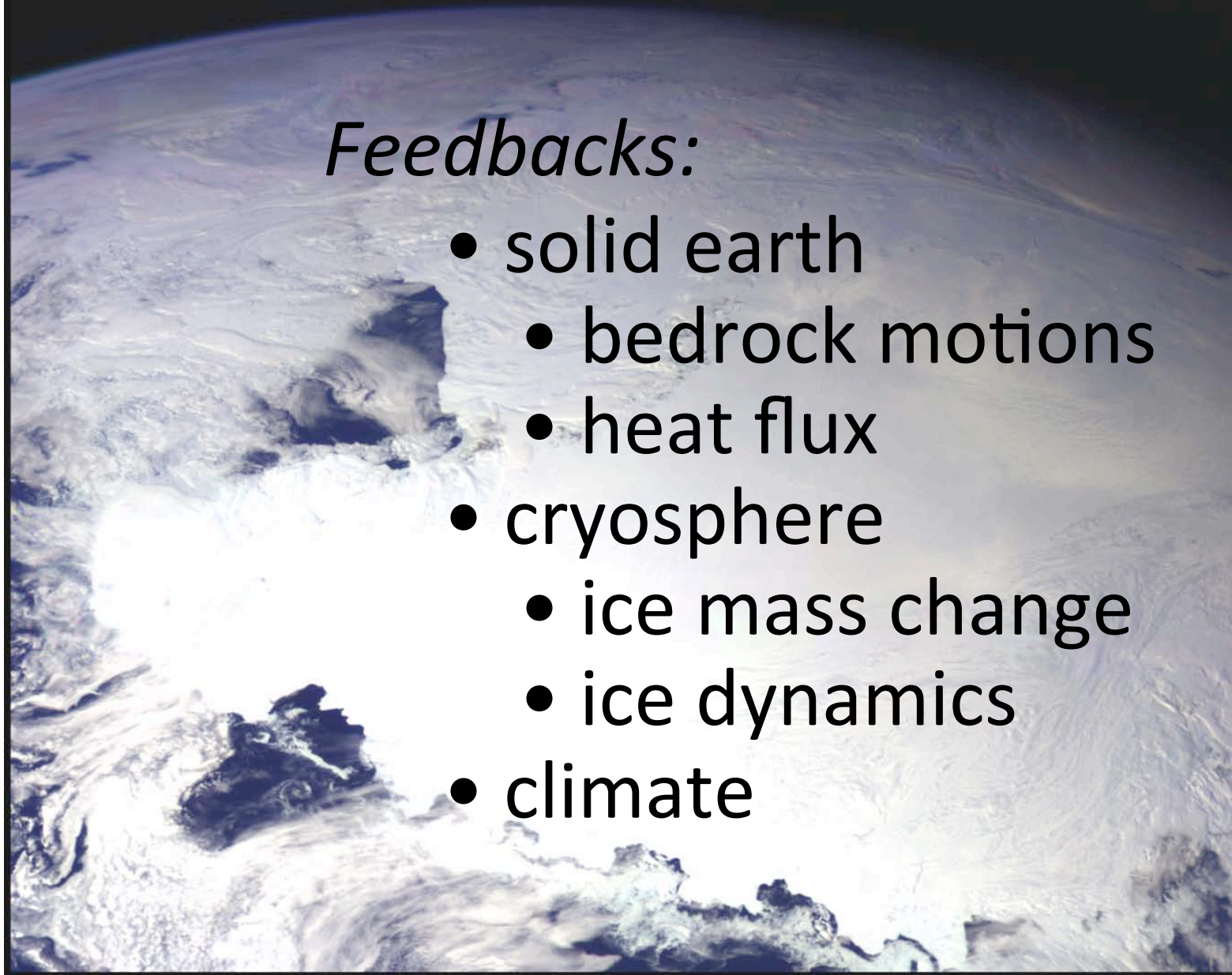
These include those from glacial geology (e.g., new and planned cosmogenic dating studies), marine geophysical surveys of ice sheet extent and retreat timing and direct observations of GIA using GPS.

The proposed **SERCE** scientific research programme will provide the international framework and scientific leadership to investigate systems-scale solid earth – ice sheet interactions across Antarctica and relate these results to global earth system and geodynamic processes

Understanding Polar Earth Systems

Feedbacks:

- solid earth
 - bedrock motions
 - heat flux
- cryosphere
 - ice mass change
 - ice dynamics
- climate



SERCE

Scientific Programme Planning Group

Goals:

- Interactions ice sheets & Solid nEarth
- Glacial Isostatic adjustment & ice mass change
- Feedbacks ice dynamics & solid earth
- Advocate for maintaining (augmenting)
- POLENET infrastructure; coordination
- Interdisciplinary science using POLENET data

Interdisciplinary science using POLENET data

- GPS uplift – Ice Sheet Histories- GIA
- ISMASS
- GPS-Troposphere: Space Weather
- ICESTAR
- Ice/bedrock interactions- Heat Flow, substrate
- Ice dynamics, ice sheet modelling
- Remote network: platform for additional sensors

Implementation plan

SP Planning Group 2008-2010:

- Field deployments
- Interdisciplinary Research using POLENET observations
 - (Workshop in april 09)
- Workshop on common reference frame (2010)
- Thematic Science sessions:
 - AGU & EGU
 - IPY Oslo 2010
 - SCAR - 2010

Recommend that SCAR approve the Programme Planning Group on “Solid Earth Responses and influences on Cryospheric Evolution (SERCE)”

The future SERCE Scientific Research Programme will be aimed at improving understanding of the solid Earth response to cryospheric and tectonic forcing.

The proposed Programme Planning Group will:

Identify and develop key disciplinary and interdisciplinary science components of a science programme aimed at advancing understanding of the interactions between the solid earth and the cryosphere, including glacial isostatic adjustment (GIA) and ice mass change and the influence of solid earth parameters (heat flow, disposition of sediments) on ice sheet dynamics.

Communicate and coordinate with other international groups investigating ice mass change, ice sheet contributions to global sea level rise, glacial isostatic adjustment models of Greenland and other ice caps, and other pertinent research efforts.

Provide an international framework for maintaining, and potentially augmenting, the remote autonomous **POLENET infrastructure** as the International Polar Year (IPY) ends.

In appendix 3 is a detailed description of SERCE.