The Potential Role of the World Data Centers in the Global Earth Observing System of Systems and the International Polar Year: CIESIN Experience to Date

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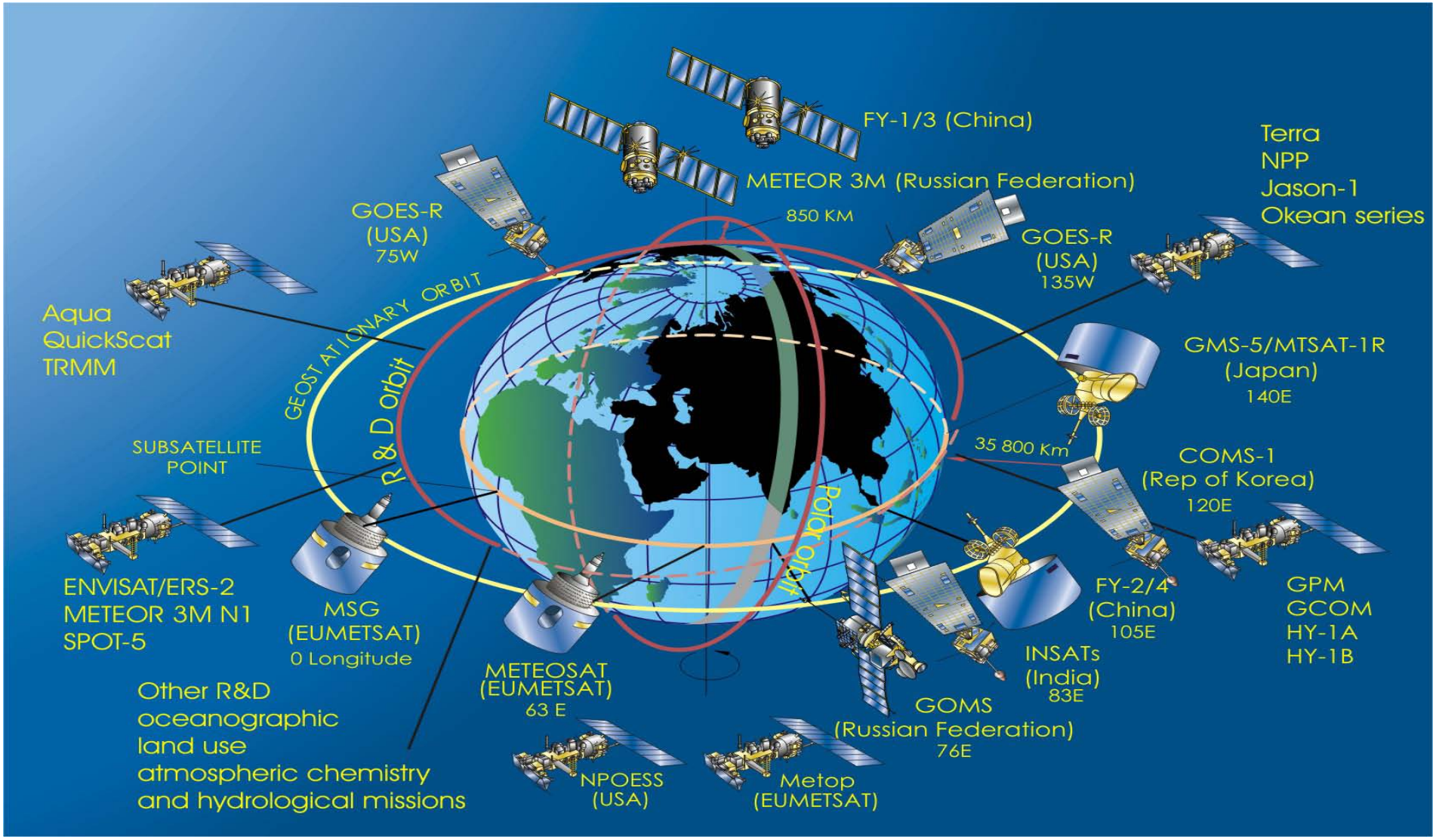
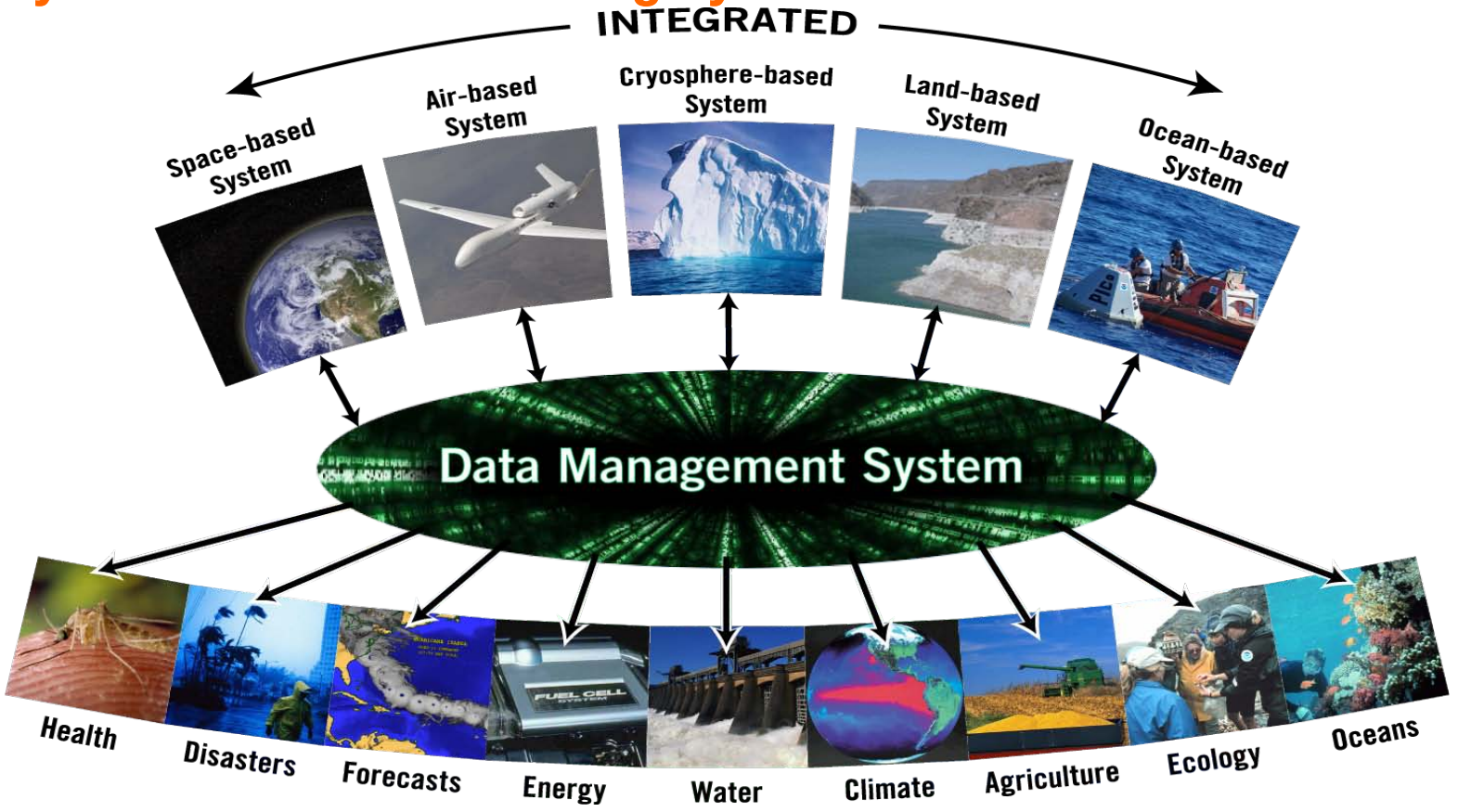
Growing Variety and Volume of Remote Sensing and In Situ Data



Global Earth Observing System of Systems (GEOSS)

A Global, Coordinated, Comprehensive and Sustained System of Earth Observing Systems



Address the need for timely, quality, long-term, global information as a basis for sound decision making.

The Tower of Babel Problem!

There is a Need for a System which Provides Access to all Earth Observation Data in Standard Interoperable Formats

What's the foundation?? Past data!

Need for a Portal and Clearinghouse

- For Access to all Earth Observation Data
- Based on Existing Portals, Systems and Networks
- Designed to Increase Quality and Accessibility of Information
- Providing Tools

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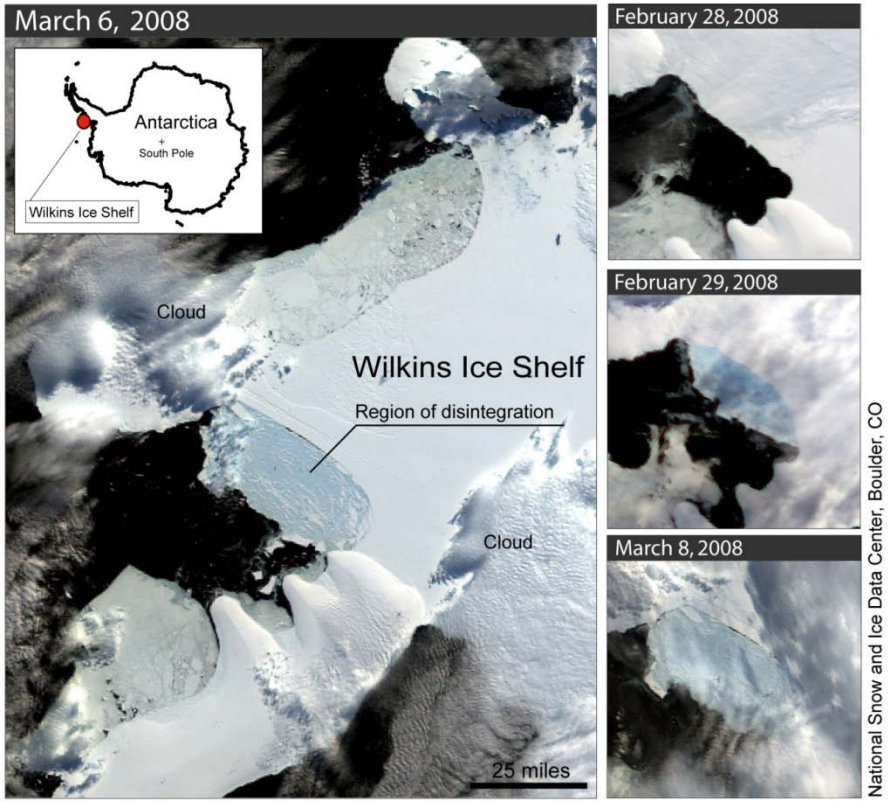
International Polar Year, 2007-2008

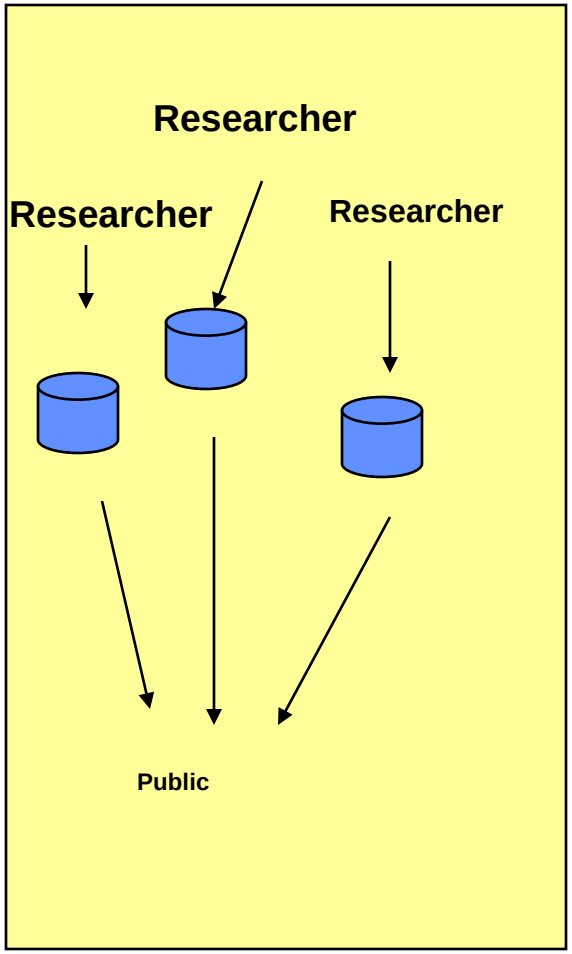
- An intensive burst of internationally coordinated, interdisciplinary, scientific research and observations focused on the Earth's polar regions
- Aimed at making major advances in polar knowledge and understanding, while leaving a legacy of new or enhanced observational systems, facilities and infrastructure
- History:
  - First IPY: 1882-1883
  - Second IPY: 1932-1933
  - IGY: 1957-1958

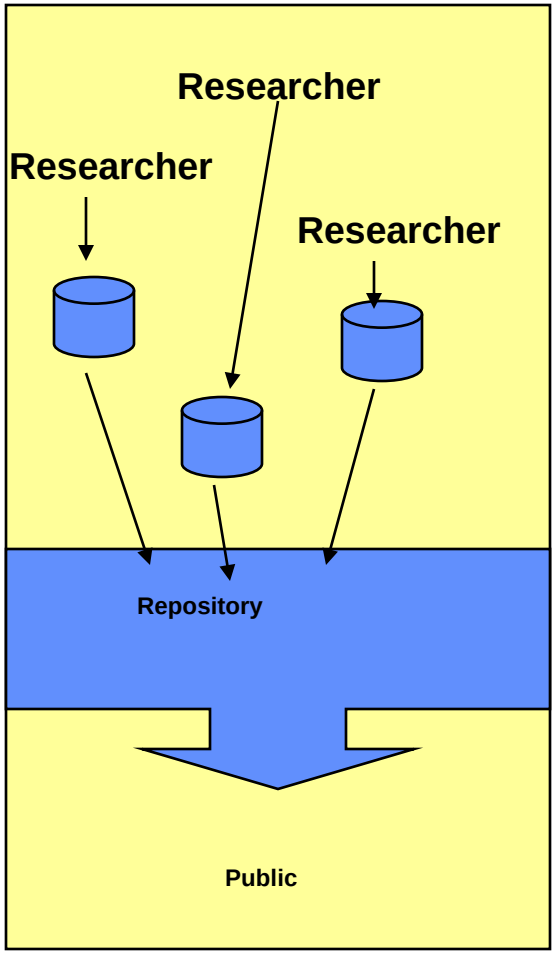


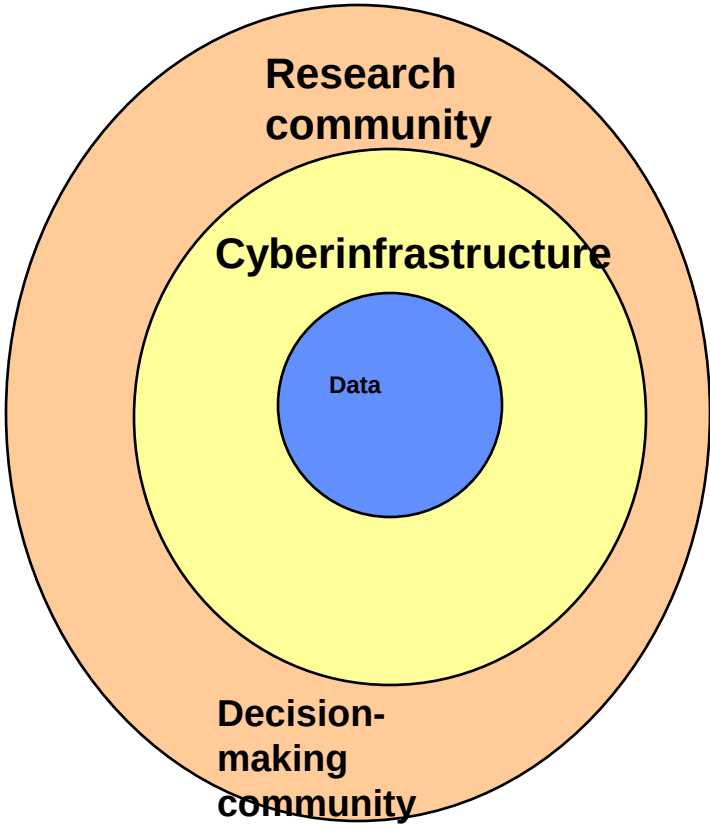
CIESIN World Data Center on Human Interactions in the Environment

- Established 1995
- Premised on the need to complement and integrate environmental and Earth science data with social science data
- Current focus is on access to *global* environmental and socioeconomic data, especially related to:
  - Climate
  - Conservation
  - Governance
  - Hazards
  - Health
  - Population
  - Poverty
  - Sustainability

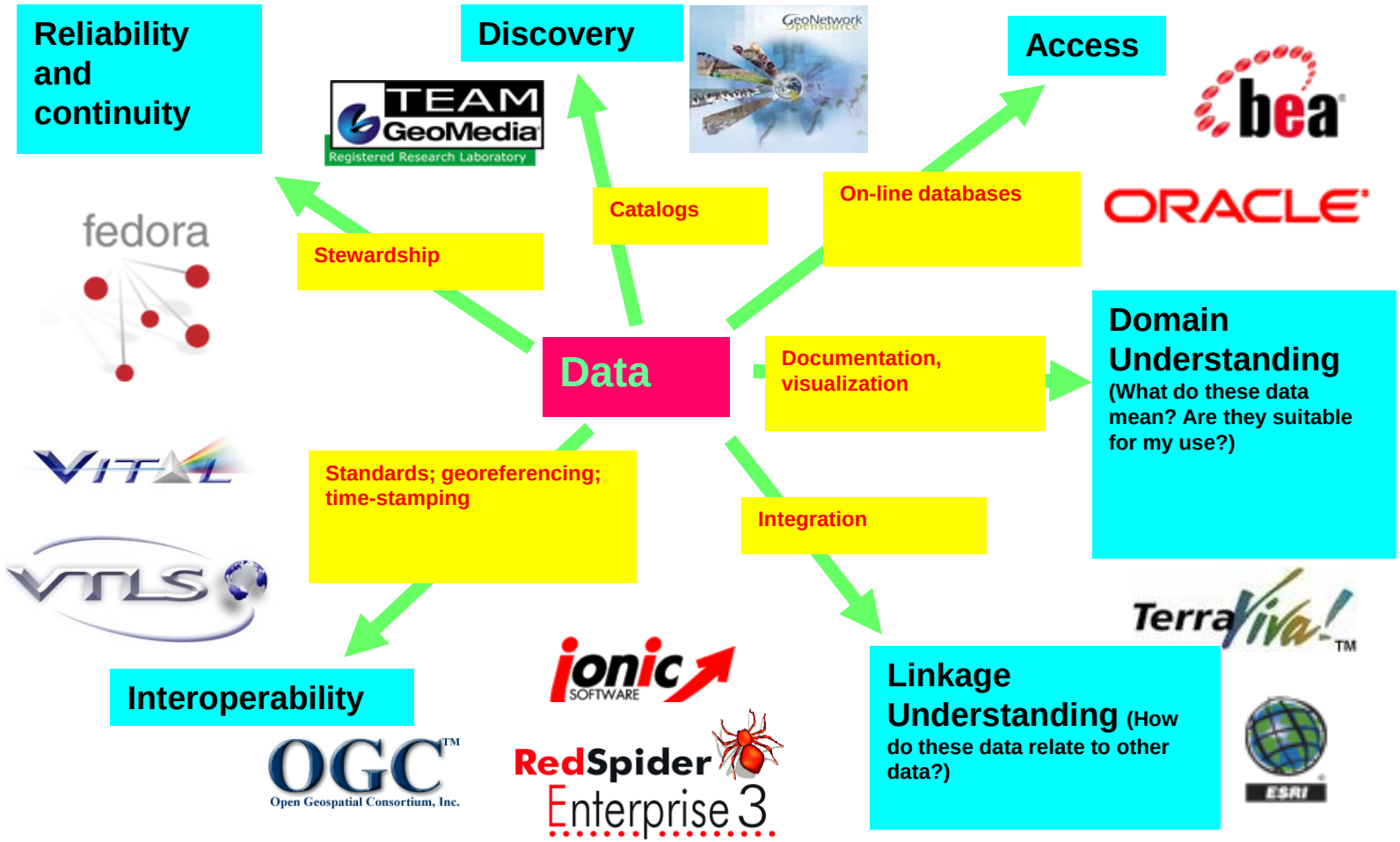
Evolution of the Data Provider Model





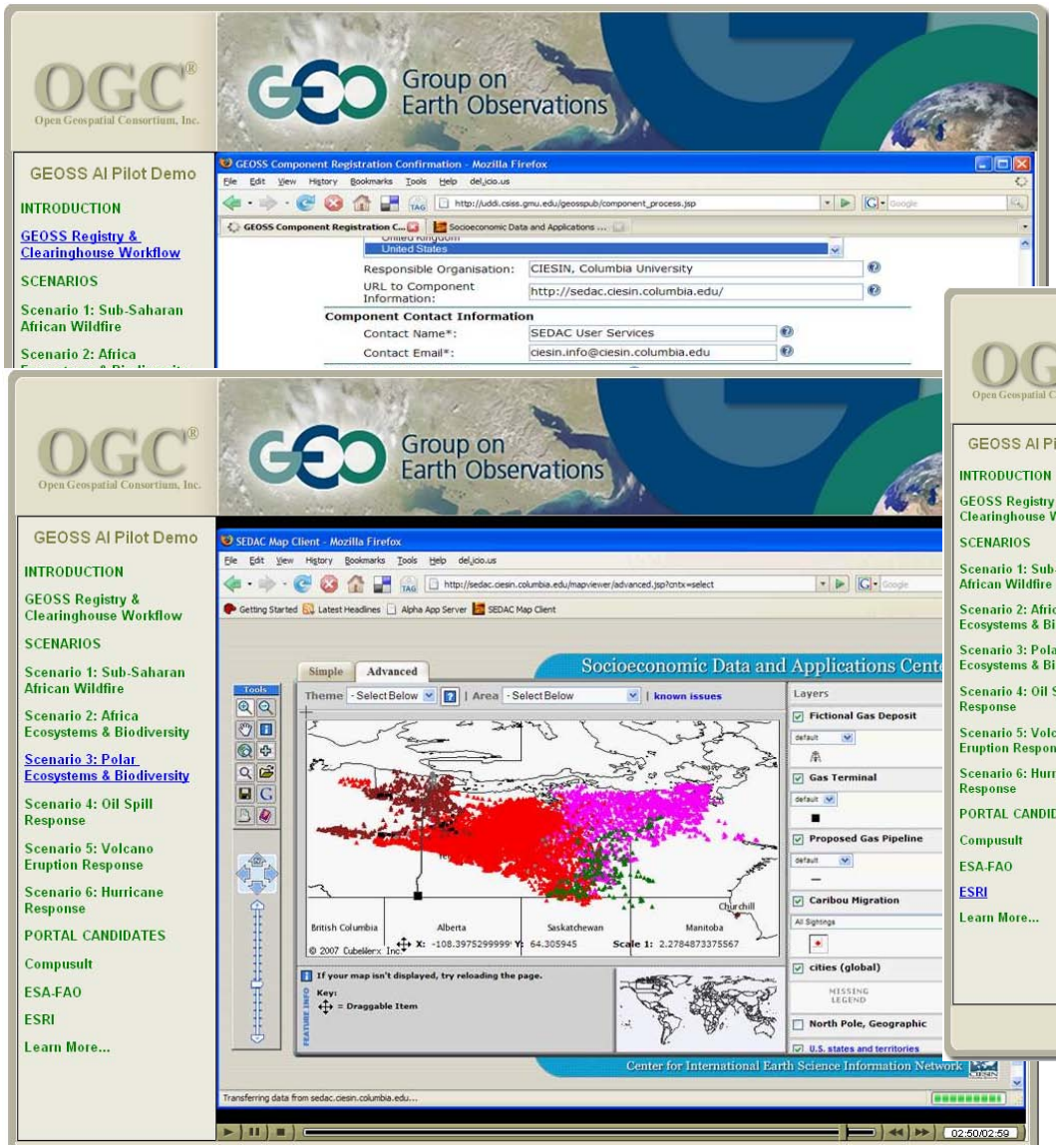


Cyberinfrastructure Components



Recent CIESIN Infrastructure Development

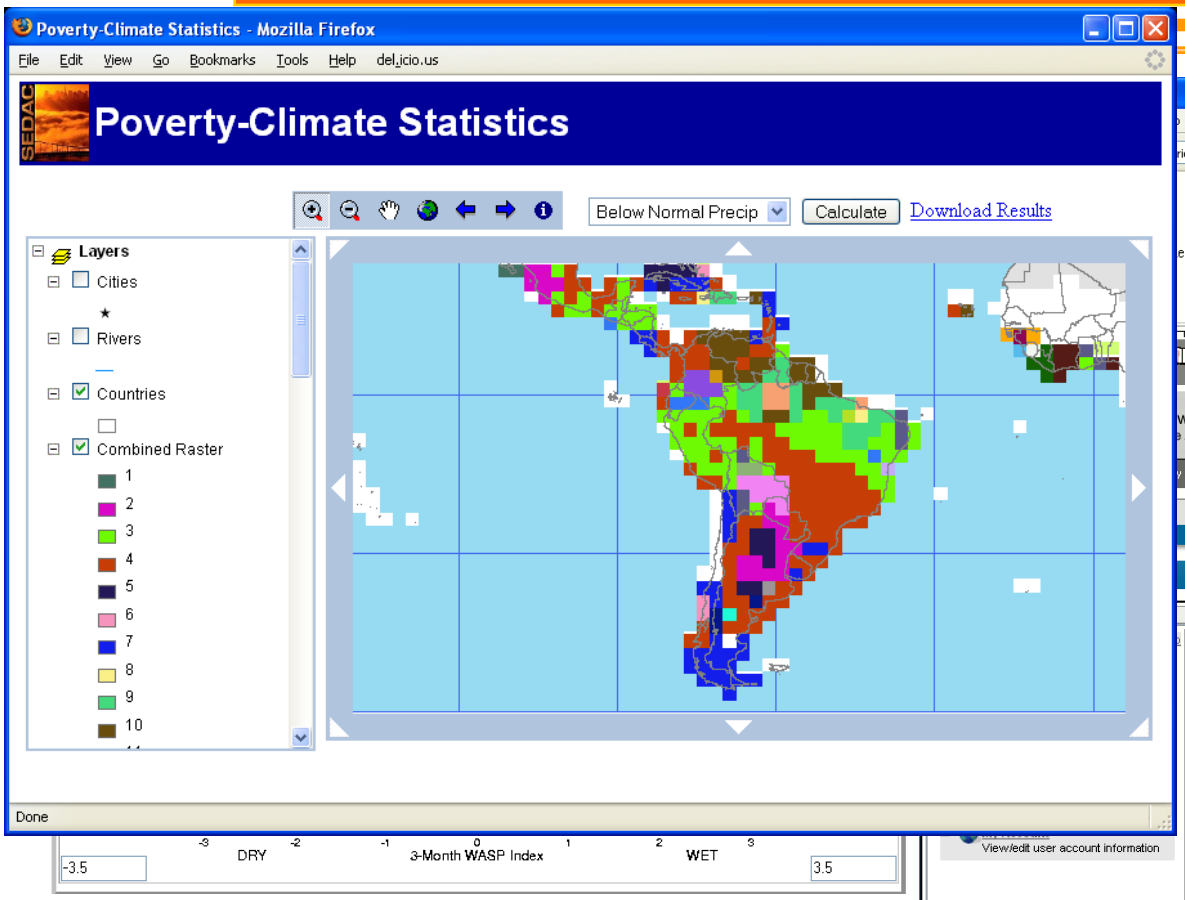
GEO Architecture Implementation Pilot – Phase 1

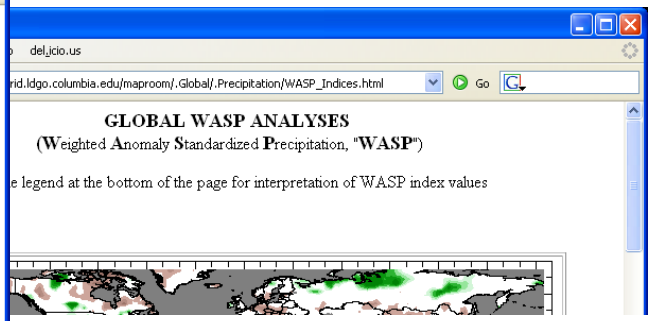


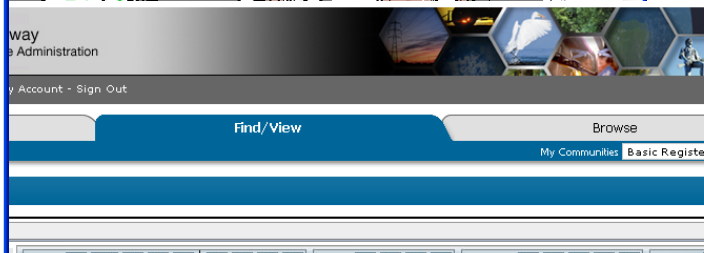
- Set of videos prepared by OGC in support of the GEOSS Architecture Implementation Pilot (AIP)
- SEDAC features prominently in 5 of the 10 videos

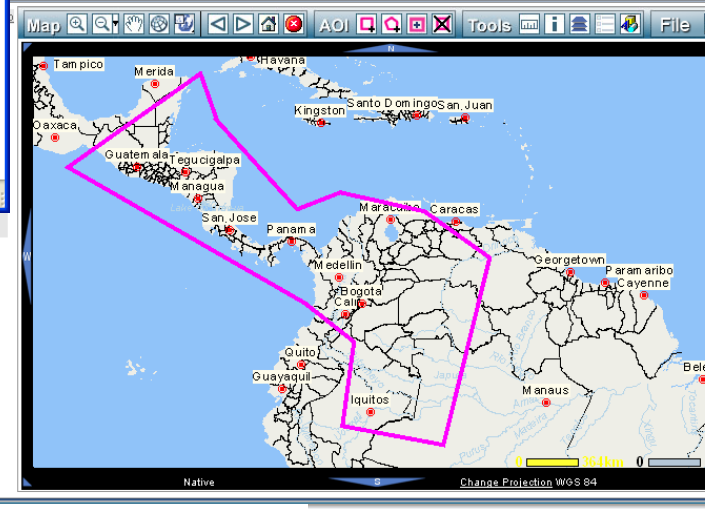
http://www.ogcnetwork.net/pub/ogcnetwork/GEOSS/AI_Pilot_Demo/index.html

GEOSS AIP Phase 2: Focus on Web Processing Services and Workflow





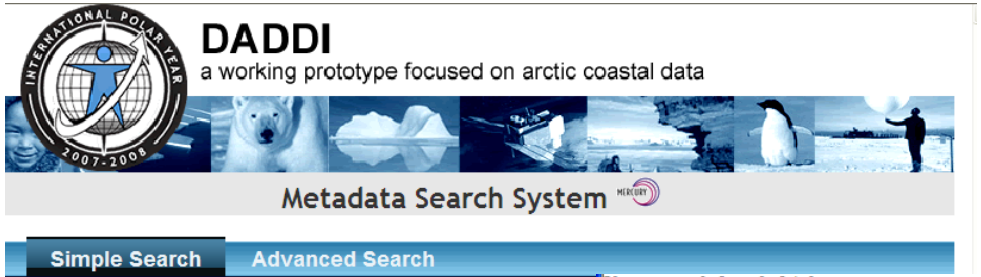


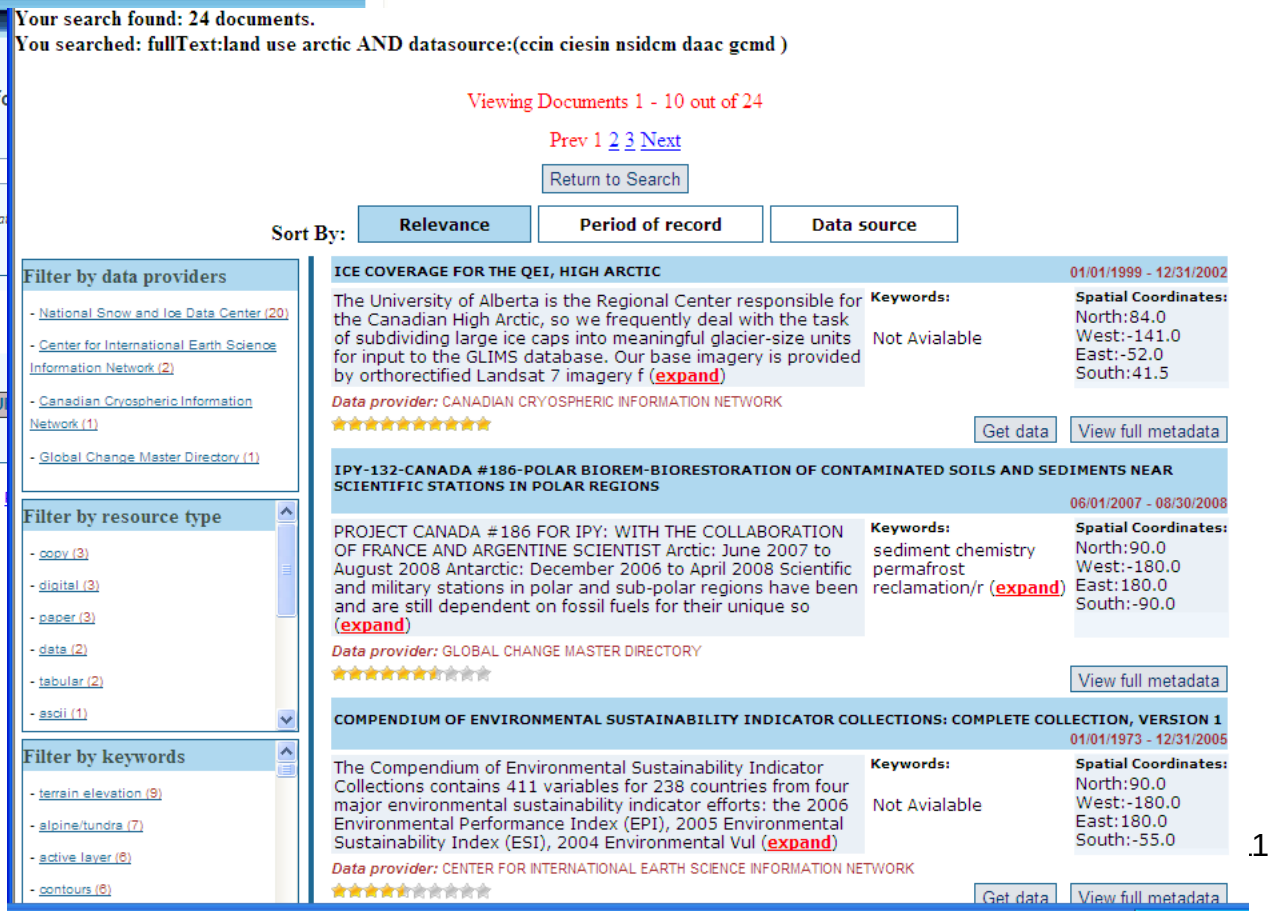


Data/policy analyst monitoring populations that may be at risk from drought

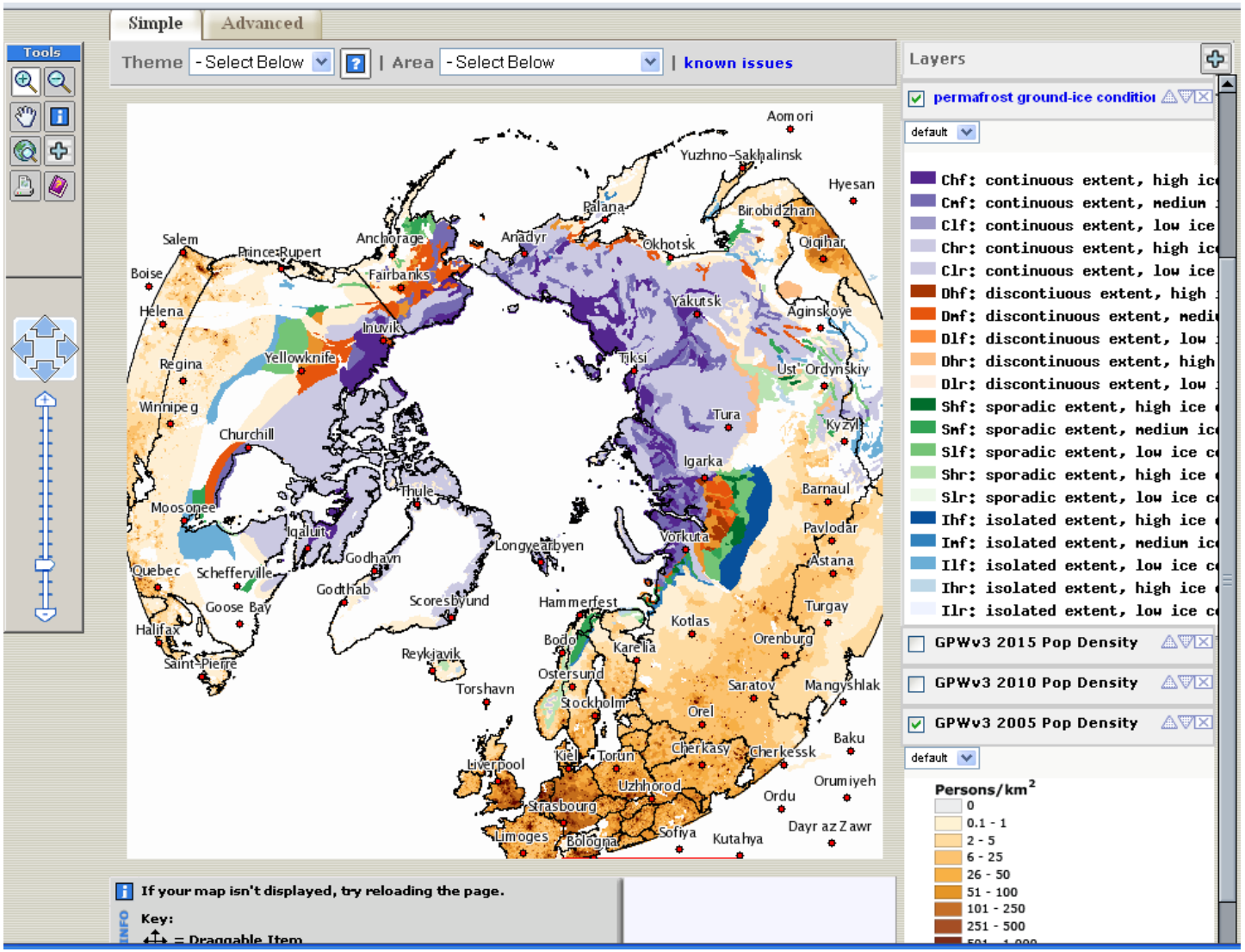
Developed by Greg Yetman, CIESIN, Columbia University

Collaboration with NSIDC and ORNL DAAC on Polar Data Search & Access



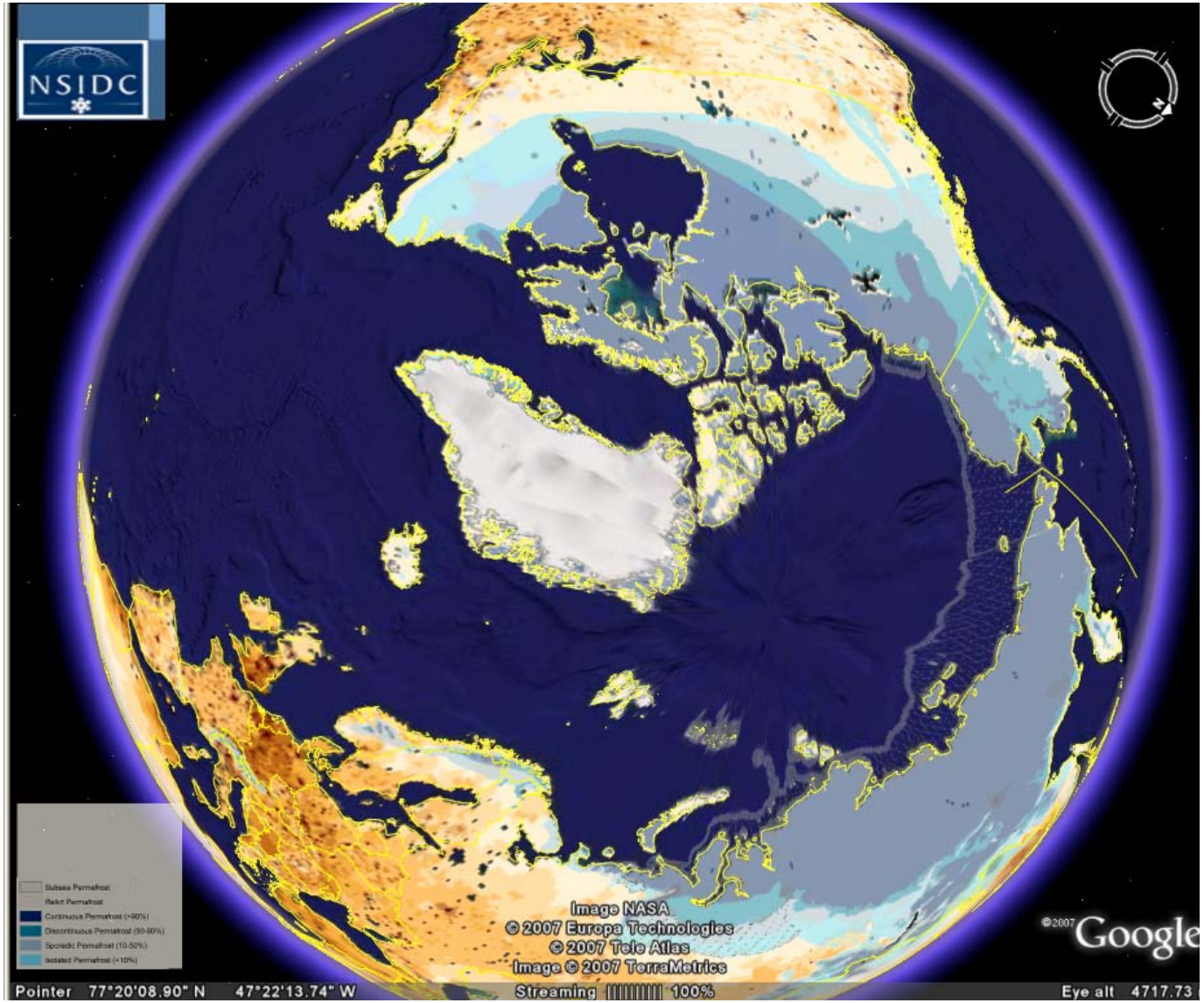


SEDAC Polar Map Viewer Prototype



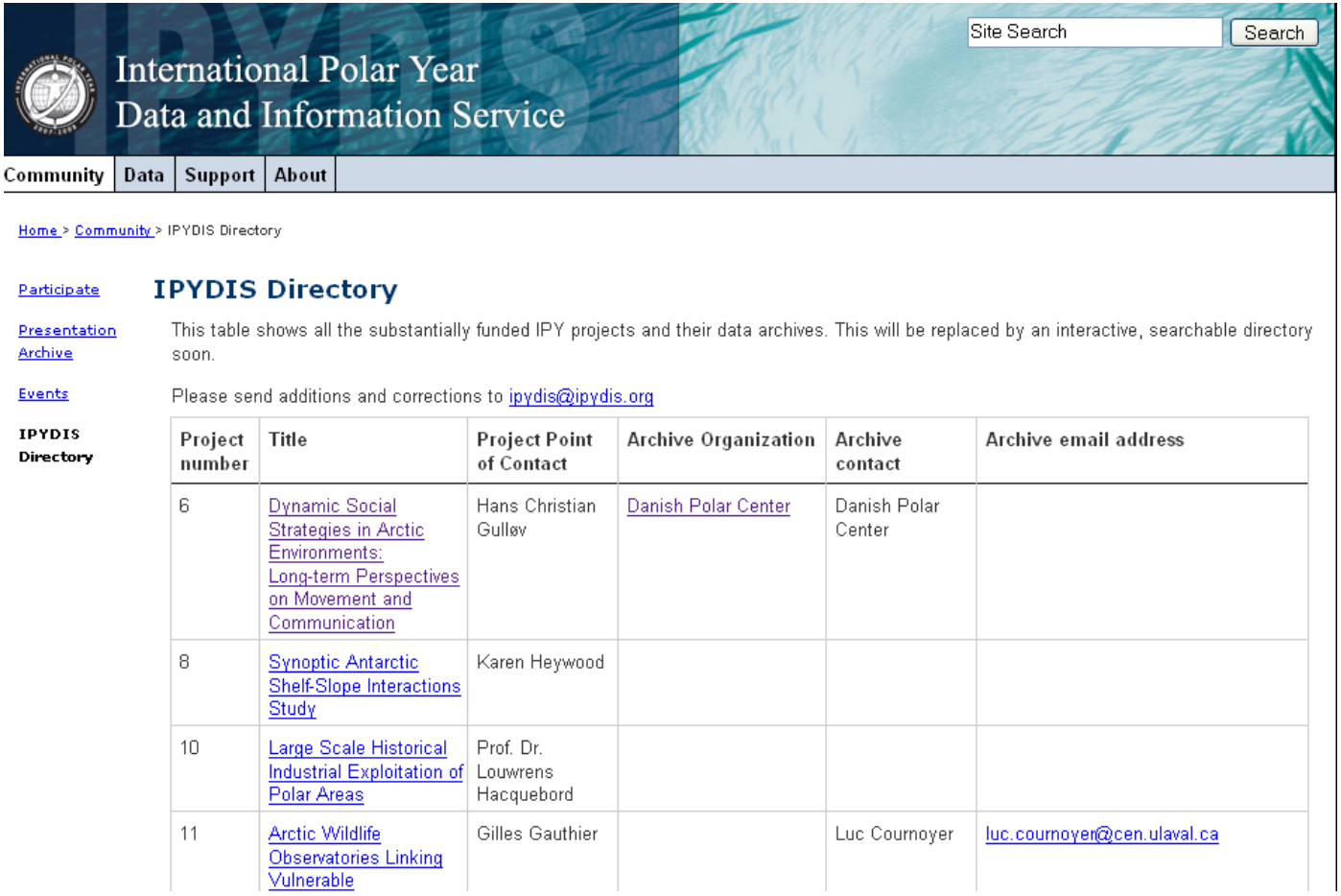
- Supports WMS, WFS
- Supports Web Map Context (WMC)

Permafrost and Population Data via Google Earth



- SEDAC and NSIDC data served via WMS
- Simple KML file to provide access to data

IPY Data and Information Service



- IPY data access organized by IPY-DIS
  - Co-chairs, Mark Parsons & Taco de Bruin
  - Also a CODATA Working Group
- Requested CIESIN to reach out to 4 IPY projects
- Offered support on data archiving, integration, dissemination, stewardship, etc.

IPYDIS Directory: http://ipydis.org/community/directory.html

CAVIAR: Community Adaptation & Vulnerability in Arctic Regions

- Eight countries involved
- Set of case studies focused on people & livelihoods in community context
  - Current and future exposure and sensitivity
  - Current and future adaptive capacities
- Data from interviews, focus groups, participant observations, selected “informants”, archival records, secondary sources

Some Challenges for WDCs in Working with GEOSS & IPY

- GEOSS
  - Open architecture under development – requires rapid technological development and response
  - Difficulties of merging past, near real time, real-time, and model data
  - Coping with potentially large amounts of new data and metadata
  - Reconciling GEOSS focus on societal benefits with traditional research focus of WDCs
  - Keeping up with a large and diverse set of GEO tasks & activities
- IPY
  - Scattered participants, activities
  - Complex, varied data, including many field studies, multi-institutional efforts
  - Potential loss of key data and metadata after data collection and analysis period
  - Resource and time limitations that limit response, cooperation
  - Unwillingness of researchers to contribute, especially before publication of results or before data analysis and clean-up

On the other hand…

- WDCs have the expertise and experience to deal with these challenges
- GEOSS and IPY data would complement and extend existing WDC holdings, increasing the utility of the WDCs for both research and applications and expanding their user base
- GEOSS represents a major effort to open up data systems and implement the vision of seamless data access and use
- The IPY constitutes a unique opportunity to demonstrate that cross-disciplinary data access and integration can benefit both science and sustainable development

➢ **BOTTOM LINE: If the WDCs don't participate, who will?!?**

THANKS!