



NOAA RESEARCH • ESRL • PHYSICAL SCIENCES DIVISION

Theme 1: Observing the Physical System

Arctic - Overview

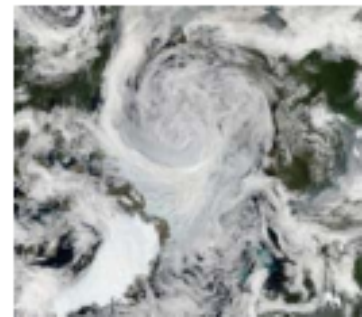
Taneil Uttal

Science Review
12-14 May 2015
Boulder, Colorado



Why NOAA Cares About the Arctic

- The Arctic is rapidly changing
- *Changes in the Arctic do not occur in isolation –they can affect, and be affected by, processes at lower-latitudes*
- A more accessible Arctic elevates NOAA's requirements *to provide information and skilled weather and climate forecasts for safety, transportation, resource management, search and rescue, coastal communities, ecosystems, and economic concerns and stakeholders*



What does PSD do to Address NOAA's and the Nation's Arctic Needs

- PSD provides long-term, continuous, high-quality observations *of key aspects of the atmosphere across the Arctic*
- PSD carries out intensive observations of the coupled ice-ocean-wave-atmosphere *processes to quantify key unknowns in the system*
- PSD uses observations to improve models *through improved representation of critical processes and verification of forecast products of the highly-coupled and complex Arctic system*

PSD's Key Arctic Roles and End-to-End Research Foci

- **PSD provides leadership** to NOAA, National, and International efforts for improving the understanding, modeling and forecasting of the Arctic coupled system
- **PSD uses observations** to detect emergent processes and understand properties of Arctic clouds, aerosols and atmosphere-ocean- sea ice exchanges of heat, energy, and gases that drive changes in the Arctic
- **PSD applies observation-based understanding to improve forecasts** from the weather to climate scales and to the understanding of two-way linkages between the Arctic and lower-latitudes from daily to decadal timescales

PSD Arctic team provides leadership by responding and contributing to NOAA, national, and international strategies



PSD Observational Assets

Year-round Arctic Observatories



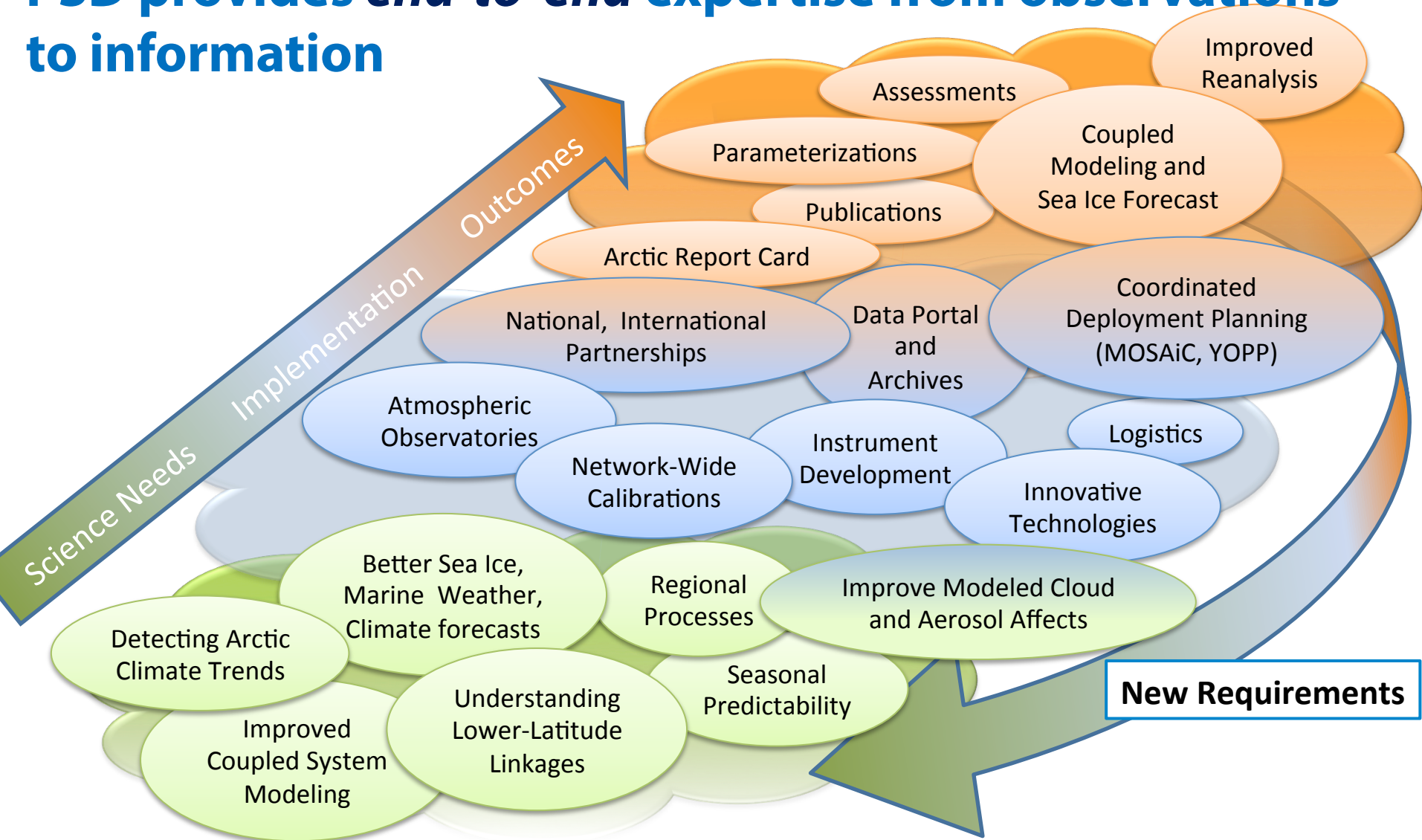
...to capture and understand atmospheric properties and trends

Arctic Ocean Cruises and Ice Camps



...to unravel the details of cloud, aerosol, and surface energy processes that affect sea ice

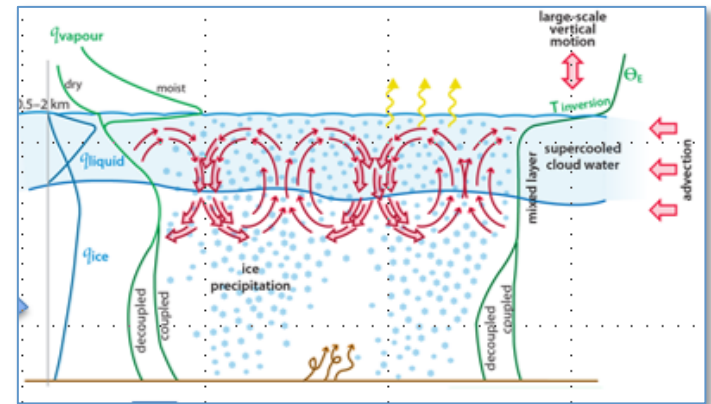
PSD provides *end-to-end* expertise from observations to information



What You Will Hear

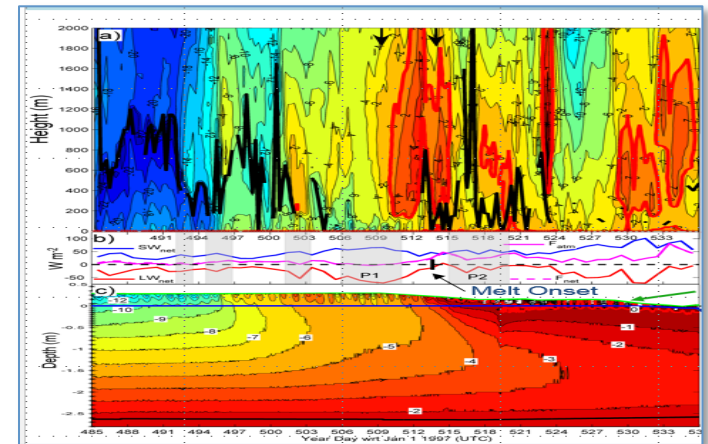
2-1. Matthew Shupe

Scientific Expertise: *The most recent IPCC reports that clouds continue to confound numerical models. NOAA PSD has unique expertise in quantifying the properties and processes of Arctic clouds.*



2-2. Ola Persson

Synthesis Challenge: *In PSD there is significant effort directed towards observation-based “story-telling” science that usually can only be done with models.*



What You Will Hear

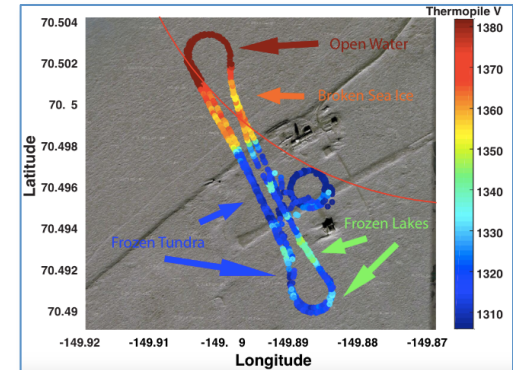
2-3. Gijs de Boer

Observational Prowess: *Innovative observational technologies are being developed to probe and better understand the complex polar regions.*



UPCOMING POSTER: Sandy Starkweather

Leading Synthesis Science: *Providing a framework for integrated Arctic observations, data and science to facilitate Arctic research collaboration.*



UPCOMING TALK: Amy Solomon

Modeling the Arctic System: *Modeling the Arctic to understand cloud and aerosol processes, atmospheric dynamics, and boundary layer structures on the formation and melt of sea ice.*

