NSF and Arctic Oceans science

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Drivers

- Following NSF strategic plan format
  - Discovery
  - Learning
  - Research Infrastructure
  - Stewardship
Discovery

- Healthy foundational research in the social and natural sciences concerning elements of the Arctic system.

- Thematic (next slide)

- Arctic system and its global linkages
  - Modeling and synthesis
  - Global context and connections
Discovery (continued)

- Thematic
  - Bering Sea studies - strengthening the social science component
  - Abrupt climate change
  - Glacier & sea-level
  - Ocean acidification
  - A warming tundra/permafrost and the carbon cycle
  - Sustainability, adaptation & resilience
  - Black carbon
  - Sea-ice vulnerability
  - Human eco-dynamics
Discovery (continued)

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Learning

- Maintain the scope established during the International Polar Year (2007 – 2009)
  - Main vehicle will be climate change education in the next year or so.
    - K-12
    - Undergraduate – post-doc
    - Informal education, outreach & media

- Broadening participation
Research Infrastructure

- Arctic Observing Network
- Cyberinfrastructure
- Next generation instrumentation
- Logistics
  - Greenland enterprise modeling
  - Increase energy efficiency
Stewardship

- Conducting a dialogue with Arctic residents, priorities and participation
- Support for research community planning and dialogue
Fourth IPY Observatories

A Sense of Scale
Glaciers and Sea-level

The Polar Earth Observing Network is an Arctic and Antarctic network of GPS stations that measures crustal uplift and accumulation of the world’s major ice sheets.

Data complements satellite measurements of ice-sheet dynamics.
The AON Network measurement locations on a polar projection as of the end of 2009. Observation sites, moorings, and the general region of drifting buoys are assigned a symbol unique to each investigator.

A system of atmospheric, land- and ocean-based environmental measurements contributing to the interagency U.S. government initiative—the Study of Environmental Arctic Change (SEARCH).
The Bering Ecosystem Study (BEST), is a partnership between NSF and the North Pacific Research Board (NPRB) to support a comprehensive and vertically integrated investigation of the Bering Sea ecosystem during 2007-2012.
A project partly funded by NSF is published in this week's *Science*. The research indicates that a section of the Arctic Ocean seafloor that stores vast amounts of methane is showing signs of instability and increased venting of the powerful greenhouse gas.
Ocean Acidification

Research indicates that ocean acidification is likely more severe and is happening more rapidly in Alaska than in tropical waters.

NSF has issued a cross-directorate solicitation to help understand the processes and effects of ocean acidification, including acidification of the Arctic Ocean.

http://www.sfos.uaf.edu/newsletter/fall09/ocean_acidification.html
The Arctic as a contributor to Global Processes

NSF’s Freshwater Switchyard of the Arctic Ocean project studies outflows of Russian and U.S. Rivers and how an increasing southward flow of “light” arctic water might influence the sinking of North Atlantic waters that drive the global ocean circulation.
NSF is funding the construction of the Arctic Region Research Vessel, now named *Sikuliaq*, an Inupiaq word that means “young sea ice.” NSF will own the ship, the University of Alaska Fairbanks will operate it. Scheduled for completion in 2012, the 254-foot *Sikuliaq* will be one of the most advanced university research vessels in the world, capable of breaking ice up to 2.5 feet thick.
Emerging National Ocean Policy

- Ecosystem-based management
- Coastal and marine spatial planning
- Inform decisions and improve understanding
- Coordinate support
- Resiliency and adaption of climate change and ocean acidification
- Regional ecosystem protection and restoration
- Water quality and sustainable practices
- Changing conditions in the Arctic
- Ocean, Coastal and Great lakes observation, Mapping and infrastructure

From draft document released public comment
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