SEARCH: Study of Environmental Arctic Change

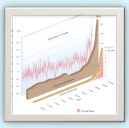
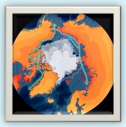
A System-Scale, Cross-Disciplinary, Long-term Arctic Research Program

Peter Schlosser, Lamont-Doherty Earth Observatory and Helen V. Wiggins, ARCUS; for the SEARCH Science Steering Committee

Goal of SEARCH

SEARCH is a U.S. multi-agency program to understand the nature, extent, and future development of arctic change

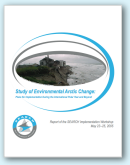
- **Interrelated arctic changes** are occurring across terrestrial, oceanic, atmospheric, and human systems
- Observed physical changes have **large impacts** on ecosystems and society
- **Anthropogenic activities** are a major cause of the observed changes


Development of SEARCH

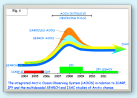
- **Science Plan** published in 2001 and initial implementation strategy published in 2003.
- **Multi-agency sponsorship:** 8 U.S. agencies - National Science Foundation (NSF), National Oceanic and Atmospheric Administration (NOAA), National Aeronautics and Space Administration (NASA), Department of Defense (DOD), Department of Energy (DOE), Department of the Interior (DOI), Smithsonian Institution, U.S. Department of Agriculture (USDA). The U.S. Arctic Research Commission participates as an observer.
- **Open Science Meeting 2003** assessed the state of arctic change science and research priorities.
- SEARCH Implementation Workshop held in 2005 - plan for SEARCH **implementation during IPY and beyond.**





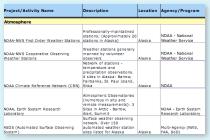
SEARCH Strategy

- Examine if such **changes have happened before** (paleo studies)
- Follow the **evolution of the changes** (integrated arctic observing system)
- Understand the **mechanisms and feedbacks** that control the changes and **interactions** interactions between changes (synthesis and modeling)
- Guide **responses to changes** in the physical, biological, and human domains
- SEARCH is guided by a Science Steering Committee (SSC); a Interagency Program Management Committee (IPMC); and "Observing Change," "Understanding Change," and "Responding to Change" Panels



SEARCH Activities and Implementation

- **Over 150 projects and activities** addressing arctic environmental change, funded through multiple agencies
- **Observing Change:** Integrated international observing networks—Atmosphere, Ocean and Sea Ice, Hydrology and Cryosphere, Terrestrial Ecosystems, Human Dimensions, Paleoclimate
- **Understanding Change:** Modeling and analysis
- **Responding to Change:** Stakeholder-driven research and applications addressing social and economic concerns
- **International connections:** SEARCH is a national program under the International Study of Arctic Change (ISAC), with expanding connections to international efforts



Project/Activity Name	Description	Location	Agency/Program
Atmosphere			
NOAA NWS Fred Dolder Weather Stations	Professionally-maintained stations, (Approximately 20 stations in Alaska)	Alaska	NOAA - National Weather Service
NOAA NWS Cooperative Observing Weather Stations	Weather stations generally manned by volunteer observers	Alaska	NOAA - National Weather Service
NOAA Climate Reference Network (CRN)	Network of stations – temperature and precipitation, 4 sites in Alaska: Barrow, Fairbanks, St. Paul (Bering Sea)	Alaska	NOAA
NOAA, Earth System Research Laboratory	Atmospheric Observatories (Barrow and Mauna Loa, include measurements); 2 Ships in ARCTIC: Barrow, Mauna Loa, Alaska		NOAA - Earth System Research Laboratory
NWS (Multi-Hybrid Surface Observing System)	Surface weather observing network. Over 150 stations, 2 sites in Alaska (also listed for Alaska)	Alaska	Multi-Agency (NWS, FAA, DOD)


www.arcus.org/search

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STUDY OF ENVIRONMENTAL ARCTIC CHANGE