

# Update on SEARCH from the Agency Perspective

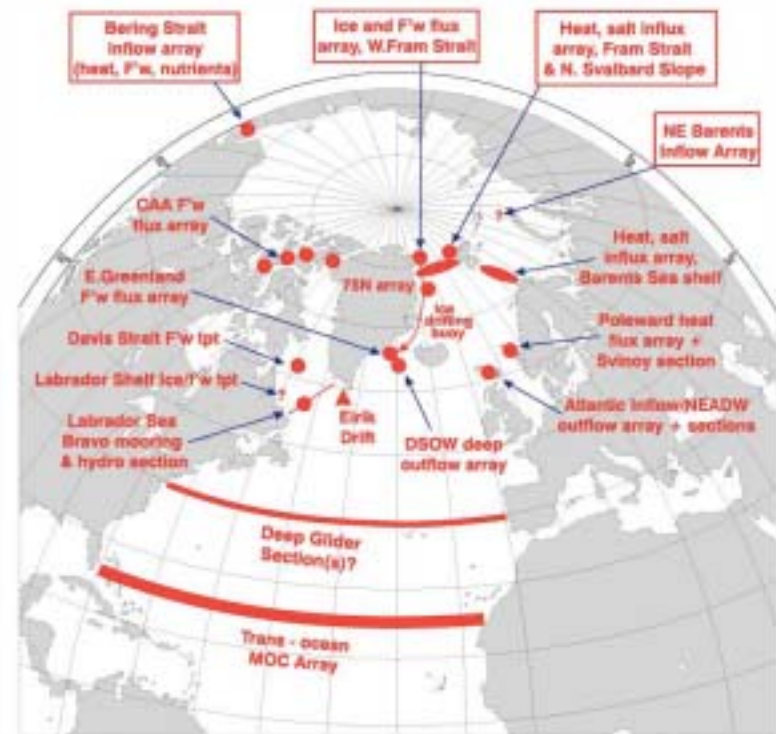


Figure 1. Configuration of prototype ASOF Array.



# Rationale for SEARCH

- observed multi-decadal trend of interrelated changes in the Arctic (atmosphere, ice, ocean, land) – termed “Unaami” by SEARCH
- perhaps driven by rising trend in Arctic Oscillation index
- AO perhaps strengthened by greenhouse warming
- serious impacts being felt in high latitudes now
- evidence growing for connections to mid-latitudes
- relation to abrupt changes possible (see new NAS report)
- economic implications huge, regardless of reasons for change



# UNAAMI IMPACTS

- Impacts of Unaami on ecosystem & society are already apparent in the north:
  - Changes in marine ecosystems
  - More terrestrial plant growth
  - Increases in forest fires
- Broad societal impact – changes in fisheries, hunting/gathering/herding, shipping, tourism



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# Potential Polar Feedbacks on AO and Climate

- ➡ Change in albedo (land and sea ice)
- ➡ Enhanced ocean heat and moisture flux
- ➡ Fresh water export cut down deep water convection
- ➡ Release of carbon from permafrost/methane hydrates



# Arctic Change = Hemispheric Issues

- Change in arctic atmosphere strongly influences mid-latitude weather
- Feedback processes could alter hemispheric climate
- Sustainable development will be affected
- Risks and opportunities in transportation, natural resource use, agriculture, energy, health, infrastructure, etc
- US environmental security may be affected



# The Future Arctic

- IPCC Greenhouse warming scenario
  - Long-term gradual warming
- Extrapolation from observed “oscillations”
  - Recent warming trend replaced by cooling trend
- Abrupt Change
  - Rapid surprising change – severe cooling?

Detecting change and distinguishing the causes will be an important activity over the next few decades.



# SEARCH STRATEGY

- **Enhanced Long-term Observations**
  - Atmosphere, Ocean, and Land
- **Retrospective Analysis**
- **Process Studies**
- **Modeling**
  - For data assimilation, expand on limited observations to track key variables - Arctic System Reanalysis (ASR)
  - To understand and predict Unami
- **Application**
  - Assessment and prediction of impacts on ecosystems and society



# SEARCH - An Opportunity for Success

- Recent NAS report cites need for new Federal leadership mechanisms to:
  - Support critical activities that do not fall within a single agency's mission
  - Remove barriers to sustained, integrated, multi-disciplinary observations
  - Support integrated, multi-disciplinary modeling and information systems
  - Conduct regionally focused research and assessment to complement global scale efforts



# Agency Roles in SEARCH

- NSF – processes, observatories, social science
- NOAA – ocean/atm. obs., forecasts, services
- NASA – satellite applications, research
- DOE – atm. obs. via ARM in Alaska
- DOD – research, application to military
- DOI – terrestrial obs., services
- DOA – ag.-related research, services
- EPA – synthesis, assessment, policy
- SI – outreach, education



# Response of agencies to SEARCH science plan

- Agencies are supportive of SEARCH, and have identified roles that each can play
- Agencies are working through their internal processes to build their capabilities for SEARCH
- Success requires processes for:
  - Capturing results of past and on-going efforts that can address the SEARCH science questions

Organizing future efforts to address SEARCH, while still meeting agency missions and operating principles



# Planned Agency Actions in FY2003 to Initiate SEARCH

- NSF – Arctic freshwater cycle using existing and new funds
- NOAA – sustained observations using ocean flux moorings/gliders and atmospheric observatories with new funds; synthesis and public education using existing funds
- DOD/ONR – continue Bering St. moorings (ASOF)
- NASA, DOI/NPS, DOE – relate on-going efforts to SEARCH goals
- All – inventory current SEARCH-related activities, evaluate future requirements



# SEARCH Development

- SEARCH Science Plan
- ACCA Workshop and report
- ASOF Implementation Plan
- SEARCH Implementation Strategy
- Marine/Terrestrial Ecology Focus Group
- Bering Sea Science Planning Workshop



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# Transition to Implementation

- SEARCH IWG may become the SEARCH Interagency Program Management Committee
- Need IARPC to approve a “terms of reference” for the IPMC
- SSC and subprogram steering groups must continue and increase their efforts



# SEARCH Issues

- Science coordination – relies on good will and extra effort – these have been displayed in IWG.
- Budget development – many individual decision makers, diverse missions, competing priorities
- Policy decisions – IARPC, Agency Heads, OMB, Congress
- FY2003 Congressional decisions will be critical

