SEARCH Workshop on Understanding Change

How can “Understanding” be given traction within SEARCH?

• Ultimate aim is to galvanize the research community’s efforts toward high-impact advances in understanding Arctic change

• More immediate aim is to interface “Understanding” with “Observing” and “Responding to” Arctic change
  -- guide observing strategies as well as planning (adaptation, mitigation)
In addition, the workshop’s outcome should:

• Marry readiness and impact in identifying key research thrusts

• Point to approaches and partnerships that will lead to advances in Understanding
SEARCH Understanding Change Panel (UCP)


Identified gaps and needs in Arctic observations based on examination of SEARCH-related science driving questions, and other recently emerging activities in Arctic change:

-- SEARCH Implementation Plan (2005)
-- ISAC Science Plan (2009)
-- input from various members of research community
Organization of UCP assessment:

Marine changes
Atmospheric change
Terrestrial changes
Arctic-global connections
Integration of information/knowledge networks
Marine changes

• Are changes in Arctic marine mammal and fish distributions outside the range of natural variability?

• What is happening with Arctic sea ice?
  -- relative importance of various drivers (ocean, atmosphere) of recent changes has not been firmly established

• Are carbon pathways in the Arctic marine system undergoing changes that are consequential locally and/or globally?
Atmospheric changes

• Are changes in aerosols, particularly black carbon, playing a role in Arctic change?

  -- Simulated Arctic trends are generally smaller than observed

  -- Are the discrepancies partially attributable to decreasing aerosol concentrations (“solar brightening”) or black carbon?
Terrestrial changes

• What are the drivers of recent Arctic terrestrial changes (increases of river discharge, wildfires, changes in “greenness”)?

  -- changes in evapotranspiration are not known

  -- changes in snow (seasonality, water equivalent, vegetative masking) have major implications for soil temperature, vegetation, air temperature

⇒ areally integrated changes of ET and snow need to be monitored and evaluated in context of Arctic system changes
Arctic – global connections

• How is the Arctic contributing to global sea level rise?
  -- relative roles of Greenland and smaller glaciers/ice caps
  -- mass balance of glaciers is poorly sampled

• How are mid-latitude climate and the global heat budget influenced by the loss of Arctic sea ice?

Integration of community/industry networks and/or ecological knowledge cooperatives

-- integration of diverse local information is a long-recognized need
Recent activities/reports relevant to “Understanding”

AOSB/IPY Synthesis Report (2010, Bob Dickson)
-- key science questions in Arctic marine science

DOE Atmospheric System Research Science Plan (2010)
-- atmospheric priorities for reducing uncertainty:
  clouds, aerosols and radiative interactions
  (measurements to modeling)
What’s new in the present activity?

• Understanding in a cross-disciplinary context (“intersections”)
• Interface with “Responding to Change”
• Approaches, partnerships to achieve advances
• Broader community input

⇒ Questions and objectives that will galvanize the research community (and sponsors, users)