Parallel Sessions
Intro & Overview

Craig Nicolson, UMass-Amherst
Monday 27th October, 2003
The SEARCH Axiom

• “Recent decades have seen a complex suite of pan-arctic changes that are interrelated…”

**Widespread**
- Pan-Arctic
- Land, Sea, Atmosphere

**Interrelated**
- Covariance
- Arctic is a system
- Feedbacks, Drivers
Organizing committee decided:

– Not simply a “Plenary Talks Meeting”
– Exciting chance to see the state of the system from a ‘grassroots’ range of scientific perspectives

The heart of the OSM is these two blocks of open sessions
Changes, Feedbacks, Drivers

Today

Welcome
ACIA
Regional view
Pan-arctic view
Parallel Intro
Lunch

Changes on the Land
Changes in the Sea
Changes in the Atmosphere
Changes in the Coastal system

Posters
Posters
Posters
Posters

Dinner
Feedbacks, Drivers

Tomorrow

<table>
<thead>
<tr>
<th>The SEARCH Vision</th>
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<tbody>
<tr>
<td>Measuring Feedbacks</td>
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<td>Coupled models</td>
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<td>Human-Environment Relation</td>
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<td>Freshwater Cycle</td>
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<td>Sea Ice: 2 perspectives</td>
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Social Feedbacks

Biological Feedbacks

Physical Feedbacks

Drivers & Causes

Connections: Science Issues
Changes #1 (Monday)

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- What parts of the terrestrial system are the most sensitive to changes?
- Are we monitoring these changes closely enough?

Permafrost  
Veg/Tundra  
Glaciers  
Hydrology  
Humans
Changes #1 (Monday)

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‘Overview’ talks (6 x 15min)

1. Permafrost
2. Vegetation/Tundra
3. Glaciers
4. Hydrology
5. Humans

‘Rapid-fire’ talks (14 x 5min)

- Detailed observations
- Findings of change
- Goal:
  - “Catalog of changes”
  - As up-to-date as possible
## Changes #2 (Monday)

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- Which places in the Arctic marine system are the most sensitive to changes? What kinds of changes?
- Subpolar Oceans; Arctic Ocean and Seas

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*Geochemical*

*Physical*

*Ecosystem*
### Changes #2 (Monday)

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1. Bering Sea  
2. Barents Sea  
3. Arctic Ocean,  
4. Greenland Sea

- Coherent change and variability in the Arctic from physical, chemical to biological components and ecosystem  
- Linkages and feedbacks among the components
## Changes #3 (Monday)

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- What key changes are being observed in the atmospheric system?
  - Sea Level Pressure
  - Tropospheric Air Temperature and Circulation
  - Airborne contaminants and surface ozone
  - Humidity, Clouds, Aerosols, Radiation and Precipitation
  - Observing systems for the Arctic atmosphere
Changes #3 (Monday)

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Observations of change: Patterns, Spatial & Time Scales

- Sea Level Pressure
- Tropospheric Air Temperature
- Tropospheric Circulation
- Airborne contaminants & surface ozone
- Humidity, Clouds, Aerosols, Radiation and Precipitation
- Observing systems for the Arctic atmosphere

(4 x 20 min)

Modeling atmospheric change (3 x 20 min)

- Assimilation and reanalysis of atmospheric variables
- GCM response to century-scale forcing by anthropogenic GHG
- Spatial scaling of model variables
1. What is the role of coastal regions in the Arctic system?
2. What processes control Arctic coastal dynamics?
3. How will climatic changes and sea level change affect:
   • Coastal retreat?
   • Material flux?
   • Methane emission?
   • Permafrost development?
## Changes #4 (Monday)

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### Context & Programs

*(3 x 10 min)*

### Physical processes

*(3 x 10 min)*

### Material fluxes & biogeochemical cycles

*(4 x 10 min)*

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[Image of posters and related content]

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AD  
Arctic  
Coastal  
Dynamics

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[Image of coastal landscape]
Feedbacks & Drivers

Tomorrow

- The SEARCH Vision
- Measuring Feedbacks
- Coupled models
- Human-Environment Relation
- Freshwater Cycle
- Terrestrial Feedbacks
- Sea Ice: 2 perspectives
- Lunch

Social Feedbacks  Biological Feedbacks  Physical Feedbacks  Drivers & Causes

Connections: Science Issues
Introduction to Feedsback & Drivers #1 (Tue)

1. How might climate variation affect human activities in the Arctic (e.g., commercial fishing, subsistence harvest)?

2. How do political and economic forces for change (both historical and contemporary) complicate environment-human interactions?

3. How might human adaptations to ecosystem effects of climate shifts change ecosystems and communities?
## Feedbacks & Drivers #1 (Tue)

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**Human adaptation to climate variation**
(3 talks x 15 min)

**Programs researching social feedbacks**
(Panel discussion)
1. How do terrestrial ecosystem processes feedback to the Arctic climate system?

2. How are marine biological systems linked to the Arctic’s variable climate system?

- **Experimental manipulation**
- **Modeling**
- **Species case studies**

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# Feedbacks & Drivers #2 (Tue)

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- **Terrestrial linkages**
  - 2 talks x 20 min

- **Marine linkages**
  - 2 talks x 15 min

- **Case studies**
  - 3 talks x 15 min
1. What are the relative effects of
   • Cloud feedback processes
   • Atmospheric heat transport
   • Surface- and Ice-Albedo processes
   on the Arctic and global climate system?
What is the relative importance of

- mid latitude processes versus
- high latitude processes

in forcing changes to the Arctic’s atmospheric and oceanic circulation system?
Changes on the Land

Changes in the Sea

Changes in the Atmosphere

Coastal Processes