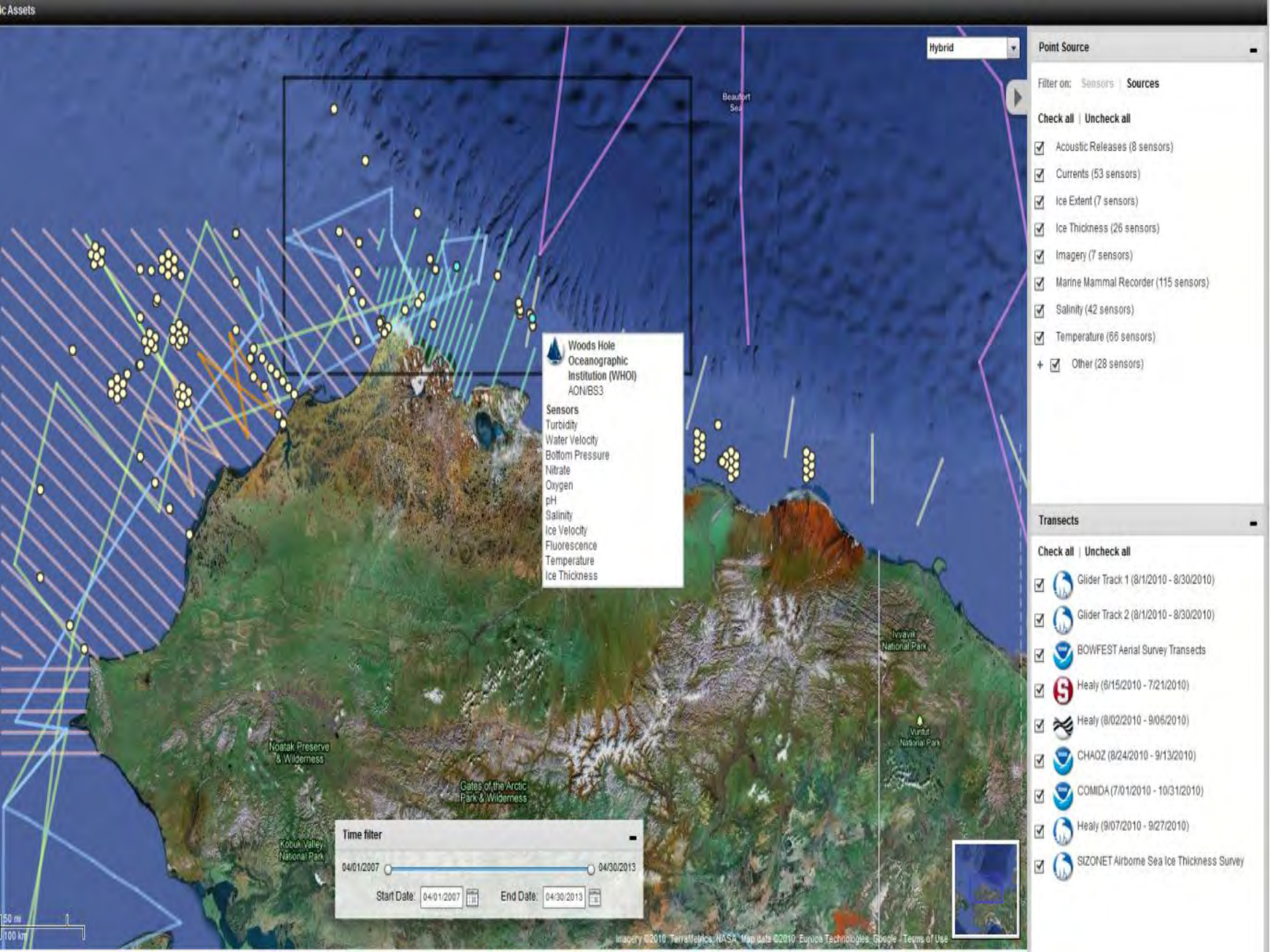
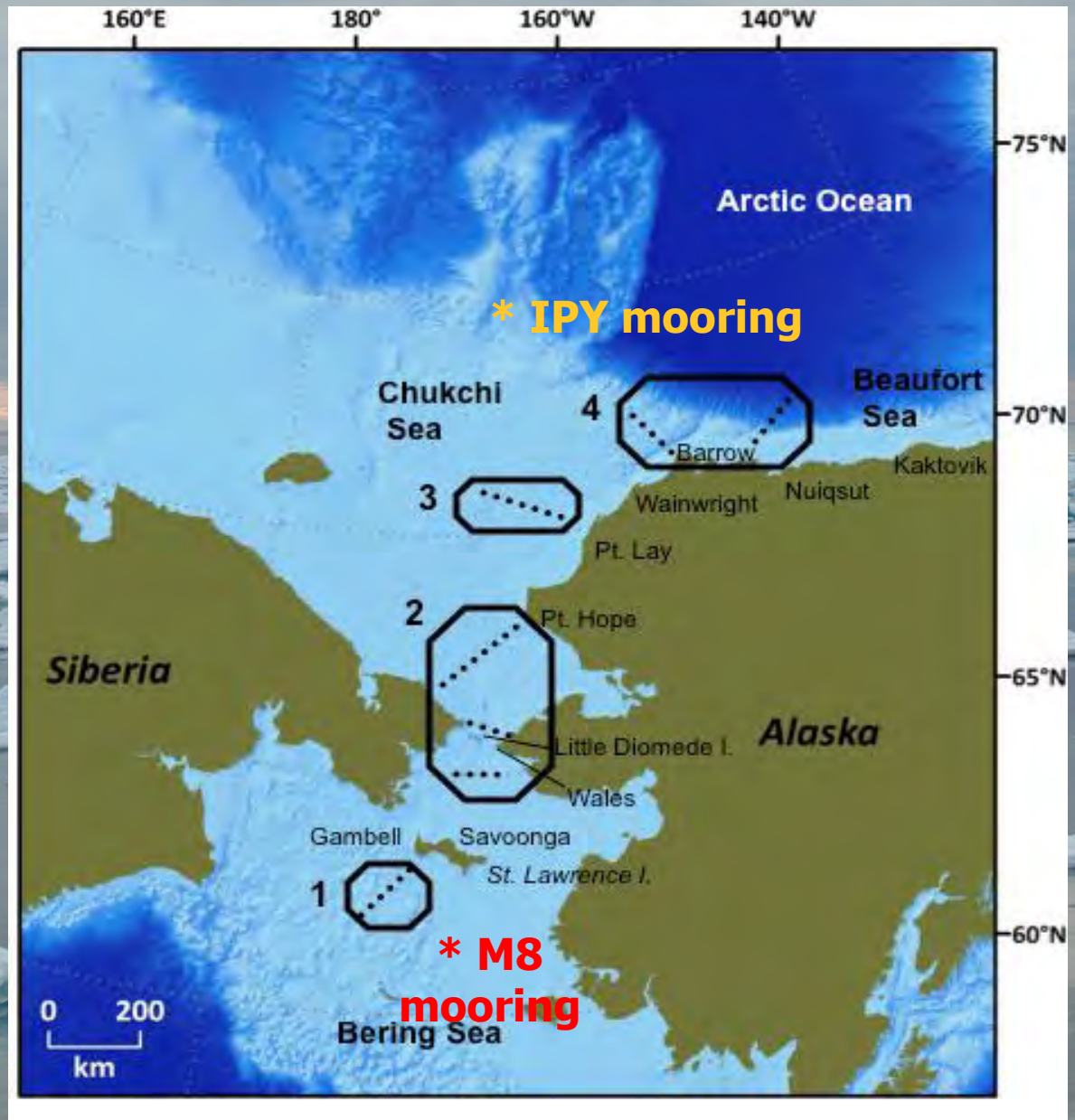
Planned Arctic Ocean Observing

- Improve sea ice models (better sea ice thickness measurements) with partners
- Take nearshore sea ice monitoring w/ice radar system at Barrow from research to operational; add new sites; develop local sea ice expert monitoring
- Develop nearshore climatology in ice and ice-free seasons: historical sea ice atlas, workshop & plan to add additional monitoring stations to monitor ocean conditions with real-time updates: ice, winds, temp, acidification, etc. & improve forecasts
- Map & predict erosion events; determine risk scenarios
- Contribute to planned Distributed Biological Observatory
- Develop robust HF radar


ic Assets
Hybrid
Beaufort Sea
Woods Hole Oceanographic Institution (WHOI)
AON/BS3
Sensors
Turbidity
Water Velocity
Bottom Pressure
Nitrate
Oxygen
pH
Salinity
Ice Velocity
Fluorescence
Temperature
Ice Thickness
Point Source
Filter on: Sensors | Sources
Check all | Uncheck all
Acoustic Releases (8 sensors)
Currents (53 sensors)
Ice Extent (7 sensors)
Ice Thickness (26 sensors)
Imagery (7 sensors)
Marine Mammal Recorder (115 sensors)
Salinity (42 sensors)
Temperature (66 sensors)
+ Other (28 sensors)
Transects
Check all | Uncheck all
Glider Track 1 (8/1/2010 - 8/30/2010)
Glider Track 2 (8/1/2010 - 8/30/2010)
BOWFEST Aerial Survey Transects
Healy (6/15/2010 - 7/21/2010)
Healy (8/02/2010 - 9/06/2010)
CHAOZ (8/24/2010 - 9/13/2010)
COMIDA (7/01/2010 - 10/31/2010)
Healy (9/07/2010 - 9/27/2010)
SIZONET Airborne Sea Ice Thickness Survey
Ivvavik National Park
Vuntut National Park
Noatak Preserve & Wilderness
Gates of the Arctic Park & Wilderness
Kobuk Valley National Park
Time filter
04/01/2007
04/30/2013
Start Date: 04/01/2007
End Date: 04/30/2013
150 mi
100 km
Imagery ©2010 TerraMetrics, NASA, Map data ©2010 Europa Technologies, Google / Terms of Use

DBO- Repeated Oceanographic Sampling with Links to Community-based "research partnerships"

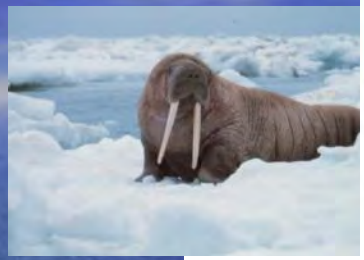


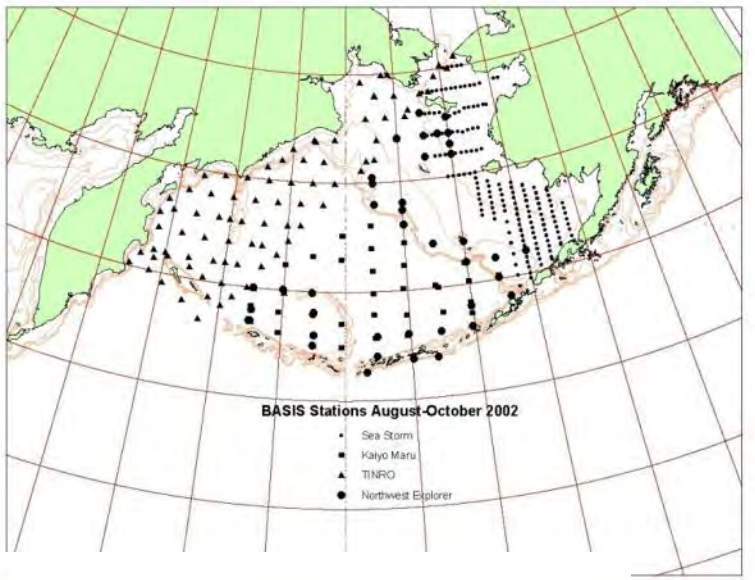
- Stations from prior & existing research programs: SBI, RUSALCA, SNACS, BOWFEST

Framework for integration of IPY * and many other research programs

Links to prior & existing Community-based Research: SLI/Diomede Pt. Lay, Barrow

AOOS VISION: Bering Sea/Aleutians



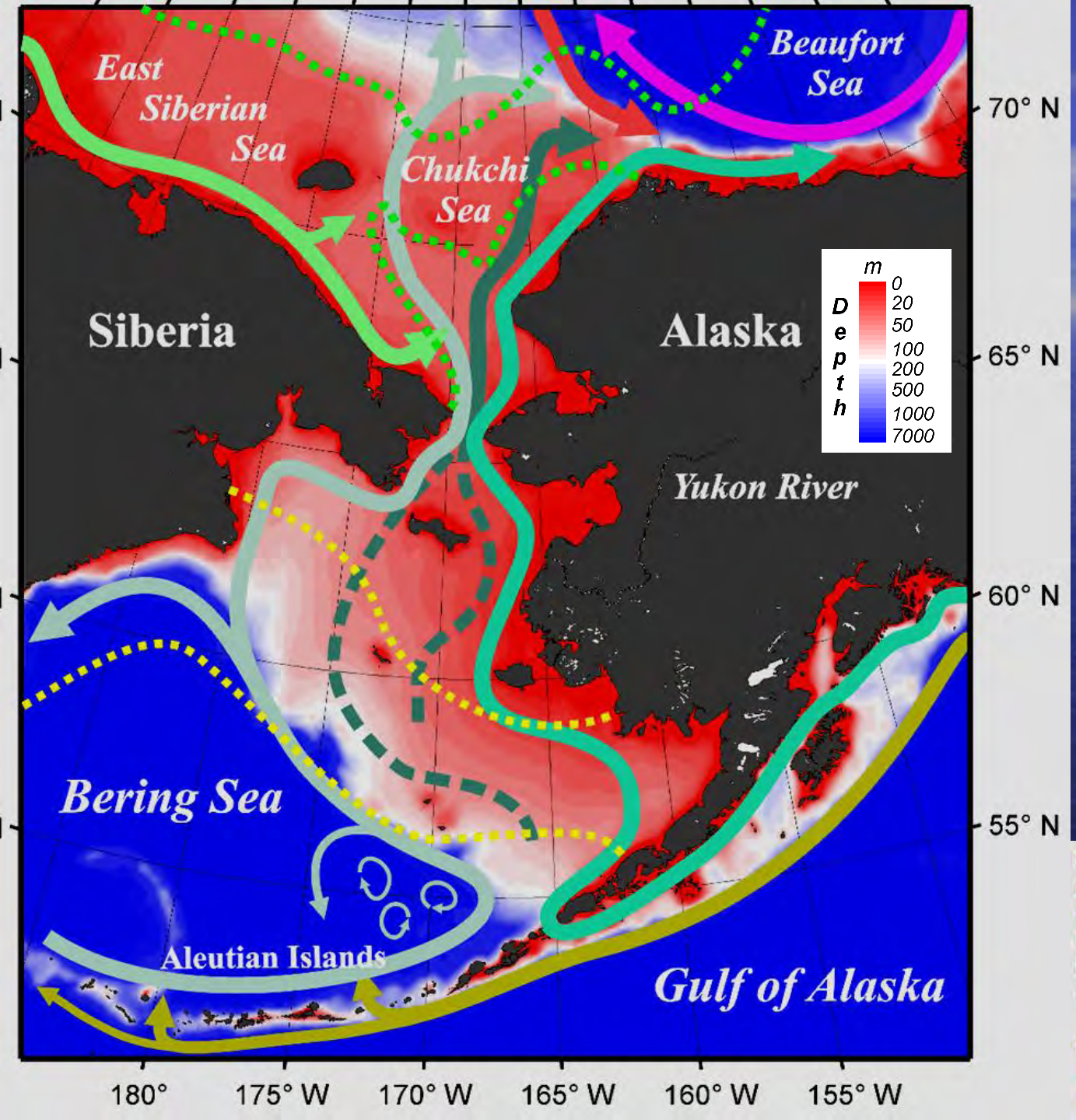


- Users
  - commercial fishing
  - subsistence; communities
  - climate change research
  - safe navigation: search & rescue & oil spill response
  - resource managers

- Information products
  - sea ice & vessel icing forecasts
  - coastal erosion predictions
  - fisheries/ecosystem productivity – climate change
  - wind and wave forecasts

Planned Bering Sea/Aleutians

- Increase precision of sea ice forecasts based on work done in Arctic - thickness & real-time conditions
- Develop BSAI ocean circulation model (Aleutian passes moorings, N-S mooring array & Bering Strait array)
- Assess establishing HF radar at Unimak Pass and Bering Strait
- Determine wind & wave info needed for coastal erosion forecasts
- Develop more intensive monitoring at Bering Strait, Norton Sound, Bristol Bay, other?



Pacific Gateway

Net flow is northward into the Arctic:

- Heat (summer)
- Cold (winter)
- Freshwater
- Pacific fauna

Beaufort Gyre
Atlantic Water
Siberian Coastal Current
Alaska Coastal Water
Bering Shelf Water
Aleutian North Slope - Bering Slope - Anadyr Waters
Alaskan Stream
September Ice Edge
March Ice Edge

Ocean Observing in Northwest Alaska: A Conceptual Design

Existing Observation Platforms

- NWS stations: real time met obs (wind, temp, humidity) used by National Weather Service forecasters
- Bering Sea moorings: Four moorings along the 70-m isobaths measuring temp, salinity, fluorescence, nutrients, currents. Spring and fall hydrographic transects measure temp, salinity, oxygen, fluorescence, nutrients, chlorophyll, zooplankton. Data recovered twice annually.
- Bering Strait moorings: temp, salinity, currents & flow through strait, ice draft, plus some fluorescence and nutrients on Russian and U.S. sides
- Diomede environmental observatory: shore-based biological and water sampling; marine mammal tissue samples from subsistence use
- Sea Ice observatory: Real-time radar measures ice motion and break-out events; local sea ice observers; web cam
- Hotspot sampling: benthic high-production zone sampled near annually since 1984
- Bering Strait ship sampling: samples water column across strait.
- Fish surveys (NOAA-BASIS): sample for groundfish and salmon; take ocean property measurements. Every 2-3 years depending on funding.
- Volunteer ship observing: ships voluntarily report met and ocean wave conditions to NWS. (usually barge traffic transiting strait)
- Bering Sea Sub-Network: indigenous community-based observations of environmental changes by Russian and U.S. villages, including Gambell.
- Ocean Tracking Network: sea-floor based acoustic sensors track migration of marine mammals and fish, and include sensors to monitor ocean conditions
- Tide gauges: real-time measurements of water levels, winds, air temp
- AIS System: provide ship Maritime Mobile Service Identify numbers to identify and track ships transiting Bering Strait. (Diomede and/or Wales)
- Satellites: measure ocean color, sea surface temp, sea surface height
- Wave buoys: used during ice-free season to measure waves and model coastal inundation

Proposed Observation Platforms

- Harbornet: met obs, web cam, plus soil temp profiler and wave, tide and water property sensors
- HF radar: real-time surface current mapper

AOOS
Alaska Ocean Observing System

AOOS VISION: Gulf of Alaska

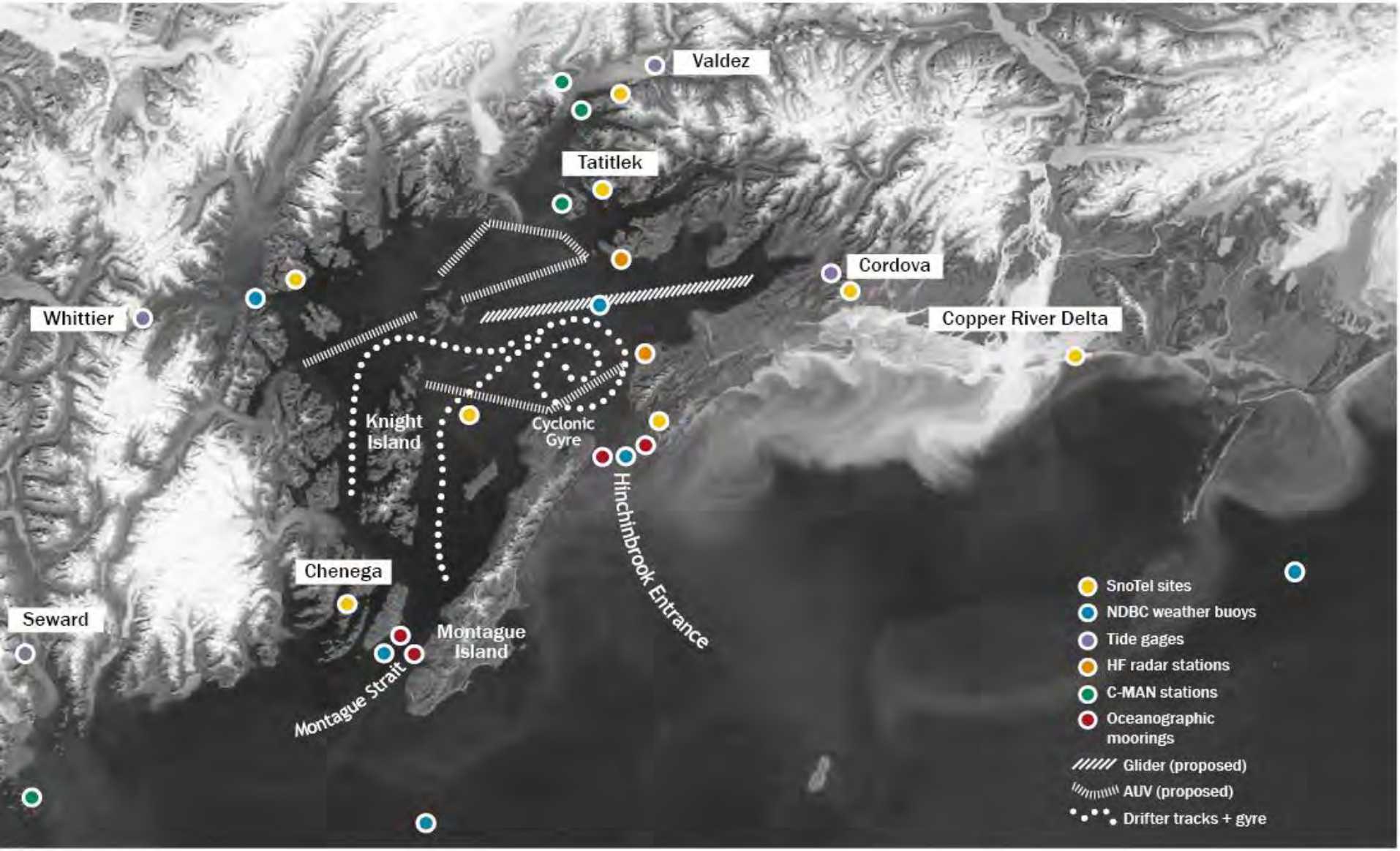
- Users
  - navigation services
  - commercial fishing
  - recreational boaters
  - oil & gas development
  - search & rescue
  - tourism
  - managers
  - aquaculture/mariculture

- Information products
  - marine sea state & icing conditions
  - ocean circulation patterns
  - coastal erosion predictions
  - nowcast/forecasts for search & rescue & oil spill response
  - fisheries/ecosystem productivity
  - HAB forecasts

Planned Gulf of Alaska Ocean Observing

- Use PWS demonstration to develop ocean circulation, wave, wind, weather forecasts for GOA: expand first to Cook Inlet/Kodiak, then add on Southeast
- Determine what are minimum observing platforms needed for better forecasts
- Identify where web cams can be most useful: e.g., Cook Inlet ice, other?
- Expansion of Harbor Observing Network
- Begin to develop Harmful Algal boom forecasting capacity
- Ocean Acidification monitoring
- Map & predict erosion events; determine risk scenarios

Prince William Sound Field Experiment 2009



Products, Services, & Tools

- **Cross-cutting**

  Data management

  Nested models from global to regional to local

  Education and outreach

- **Ecosystem Based Management**

- **Coastal and Marine Spatial Planning**

Data Management Group

- Data management & integration
- Web design
- Data mining & analysis
- Data & metadata discovery
- GIS dataset discovery & development
- Work with AK Data Integration Working Group

PWS Region

Maps
—Select Map—

Graphs
–Select Graph—

Data Tables
–HTML format–
–ASCII format–

Web Cameras

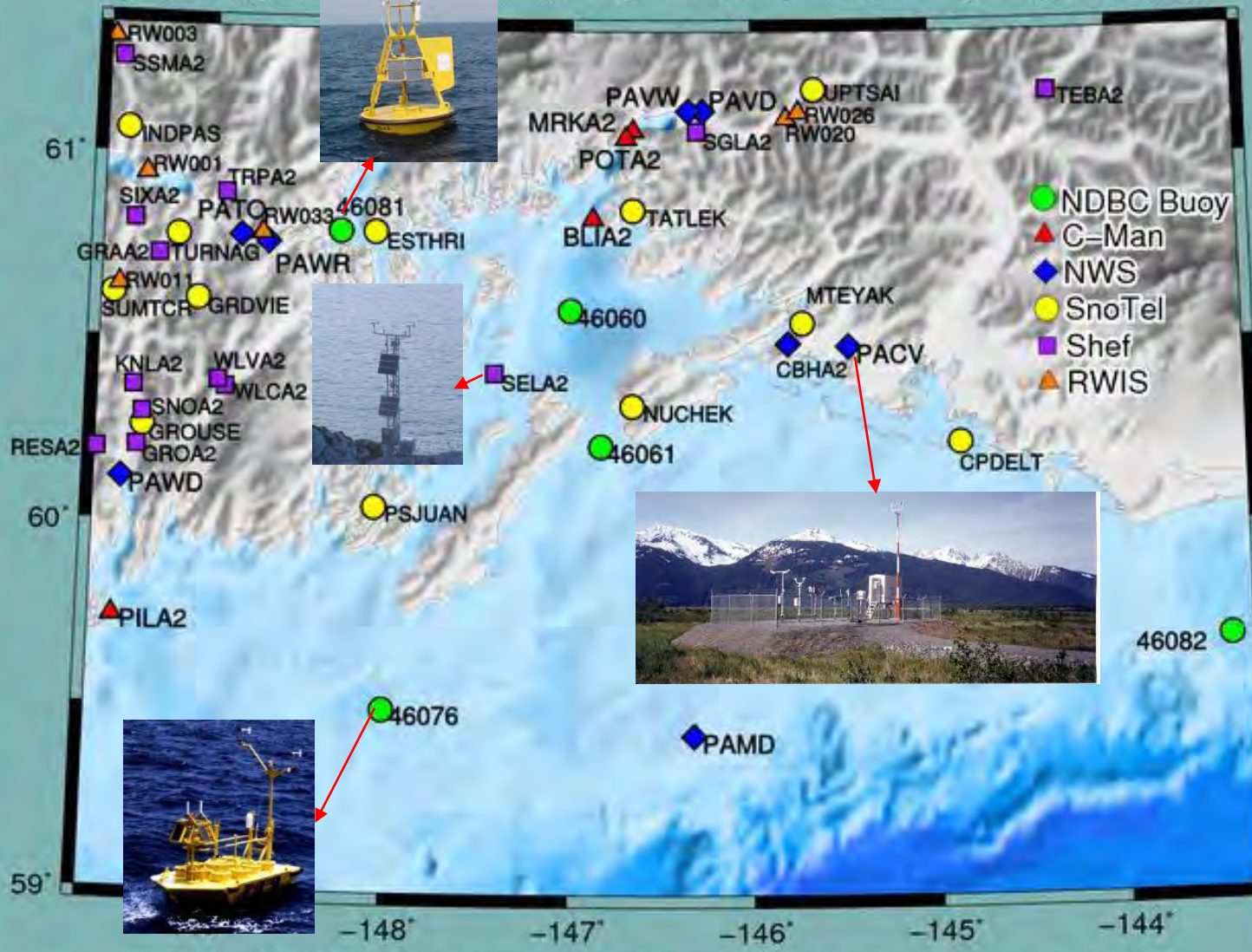
Interactive Station Data:
More station data
-Choose station-

Want more data?
Complete Recent Data Listing

Prince William Sound Stations - Recent data links

—Choose station—

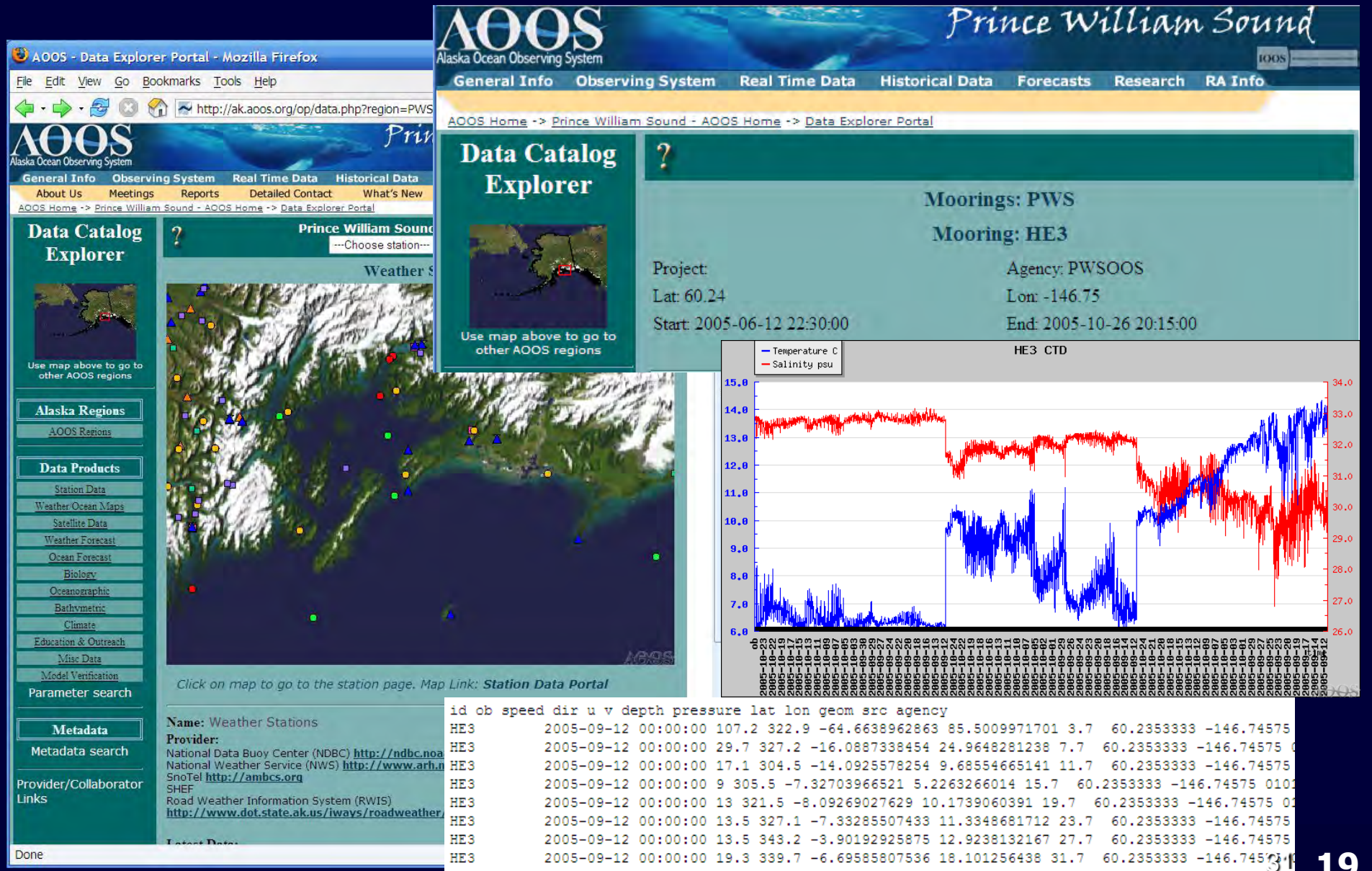
Click on map to v ation map - Or click on station to go to station page



*** Shef and RWIS stations do not have station pages but will appear in regional maps ***

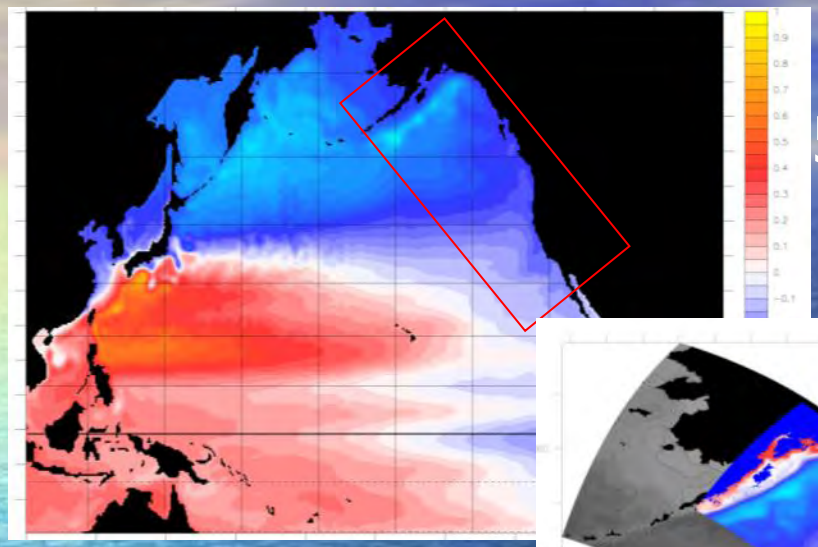
Want a bigger parameter map? —Larger Map— (WARNING: Large File)

Data Catalog Explorer: AK Marine Information System (AMIS)

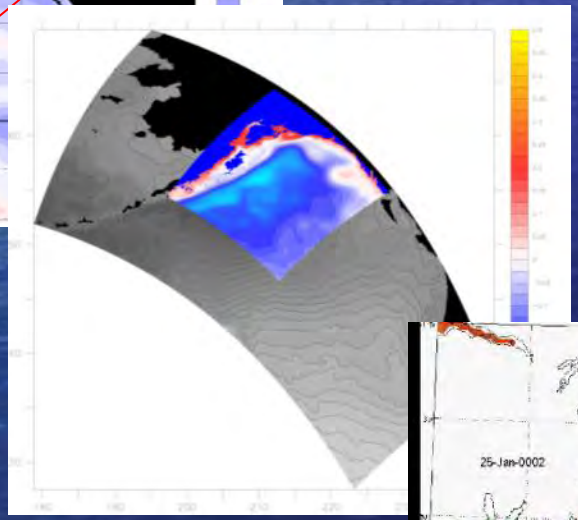


Modeling and Analysis Group

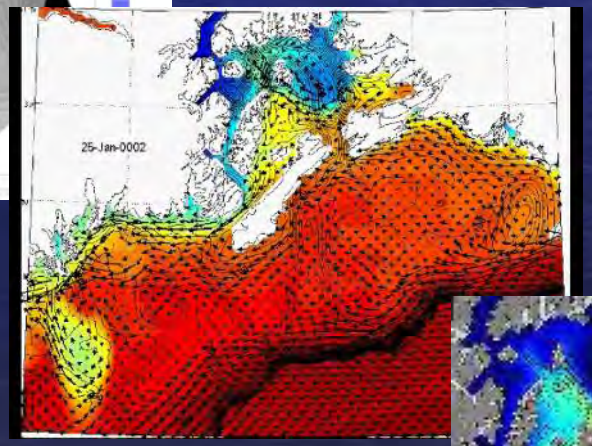
Regional Ocean Modeling System (ROMS)



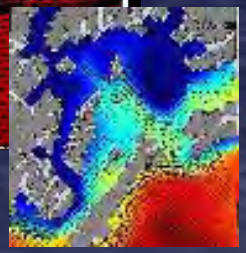
50 km grid



12 km grid



3 km grid



1 km grid

Nested domains

Questions to resource managers and other users of marine environment

- What are the main issues facing you?
- What decisions do you need to make?
- What information do you need to make those decisions?
- What information is missing?
- How do you want the information made available?

Arctic has huge potential for doing it right

Resources: IOOS RA (AOOS), RISA (ACCAP),
IARC, GINA, SNAP, ARSC, ASF, ACCER

1 region, 1 state

Need the vision and the leadership to make it happen

Opportunities for collaborations with Army Corps of Engineers

- Data sharing
- Observing assets (CDIP buoys)
  - esp. waves
- Hindcasts/forecasts
- Education/outreach to stakeholders