

#### Prince William Sound Field Experiment

#### **Key Questions**

 How do weather and currents influence Prince William Sound?



- How well do scientific models predict atmospheric and oceanic conditions?
- What are the costs and benefits of the Alaska Ocean Observing System modeling the trajectory of an oil spill?

# Applications

- Search & Rescue
- Oil Spill Response
- Fisheries
- Risk Management



### Collaborators

- AOOS
- Oil Spill Recovery Institute
- Prince William Sound Science Center
- NASA Jet Propulsion lab
- UAF School of Fisheries & Ocean Sciences
- UAA Experimental Forecast Facility
- Texas A&M University
- U. S. Coast Guard
- University of Maine
- UCLA
- Applied Science Associates
- California Polytechnic State University
- UC Santa Barbara

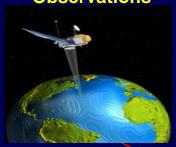






#### **Conceptual Model: 2004 - present**

#### Satellite Observations



**Winds** 



**Sea Surface Conditions** 



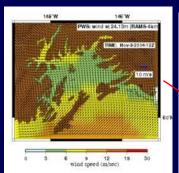
Water Quality



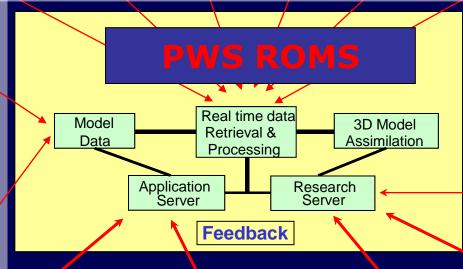
**Currents** 



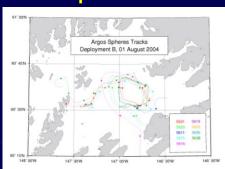
**PWS Weather** 



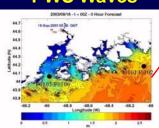
Data Assimilation



Field Validation Experiments



**PWS Waves** 



**Education** 



**Communities** 



**Fishery management** 



**Economic models** 



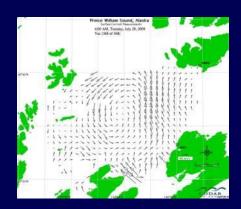
# Components: Observations

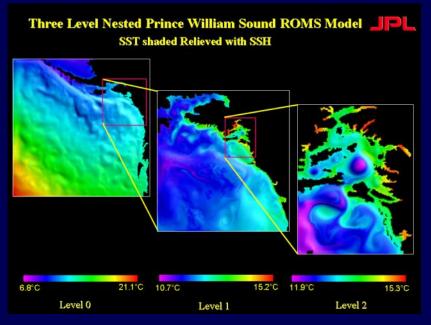
- Coordinated Science program
  - Fixed observing system instruments
  - Thermosalinograph surveys
  - Vessel-based measurements
    - Salinity, temp, chlorophyll, turbidity, nutrients
  - Glider measurements (temp, salinity)
  - Drifters



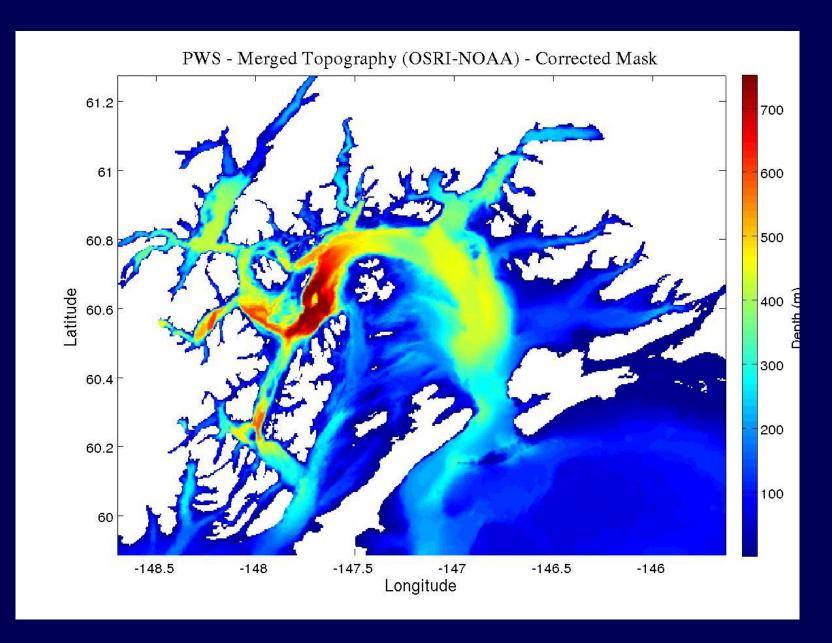
# Components: Models

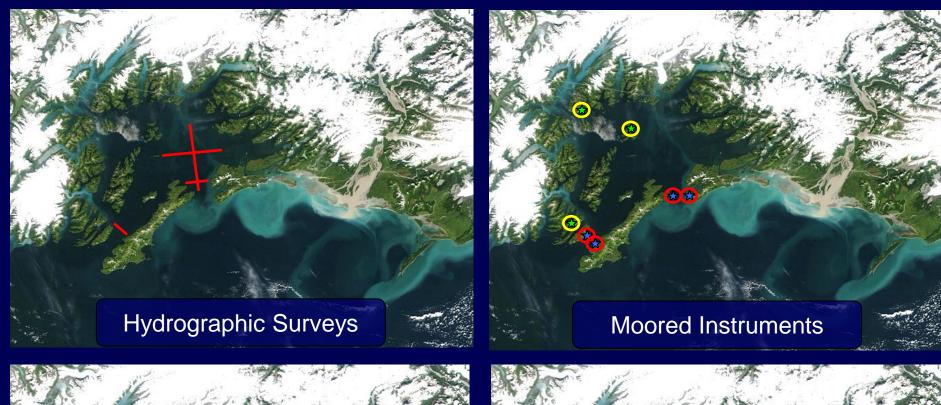
- ROMS
- WRF
- SWAN
- GNOME
- SAROPS
- ATOM
- NPZ

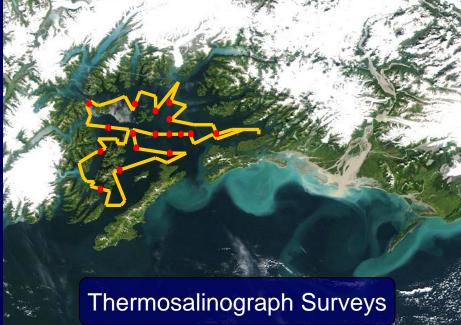


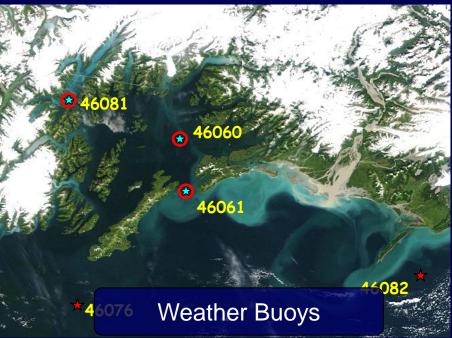


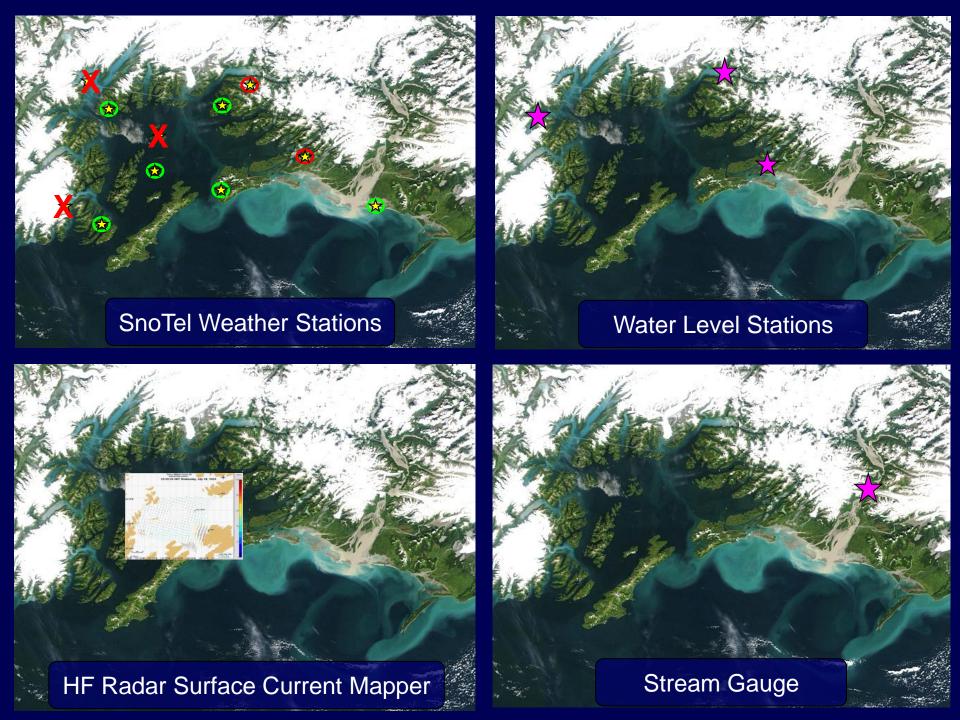
# **Standard Bathymetry Data** for wave and ocean models



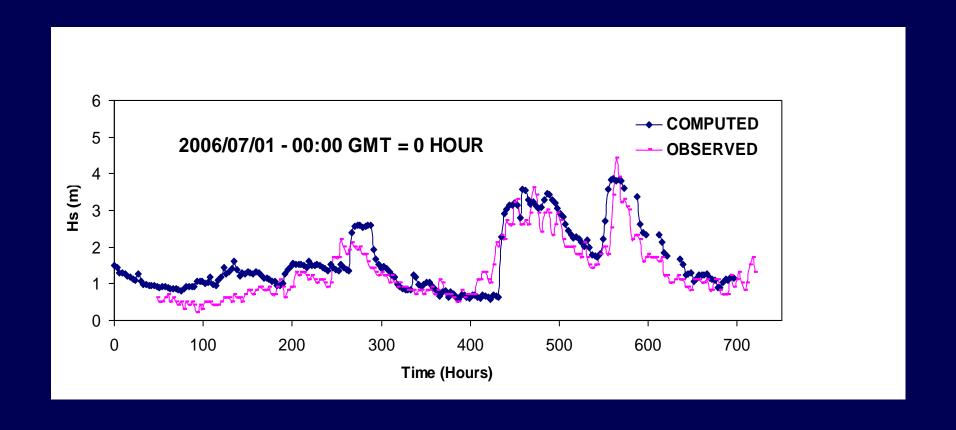








# Adding Real Time Data for Model Validation and Calibration



### Communications

- Twice daily phone calls
- 2 blogs
- 3 Outreach events







#### A Subset of Results

- Wind direction was very hard to predict in light and variable conditions
- SWAN wave height forecasts (in general) are over-predicted
- With data assimilation the ROMS model correctly predicted drifter trajectories and vertical structure of the water column.
- Quantifying fresh water input from local and regional watersheds is difficult but ultimately essential to resolve the buoyancy forcing.
- HF radar surface current mappers are an essential assimilation component of this observing system.

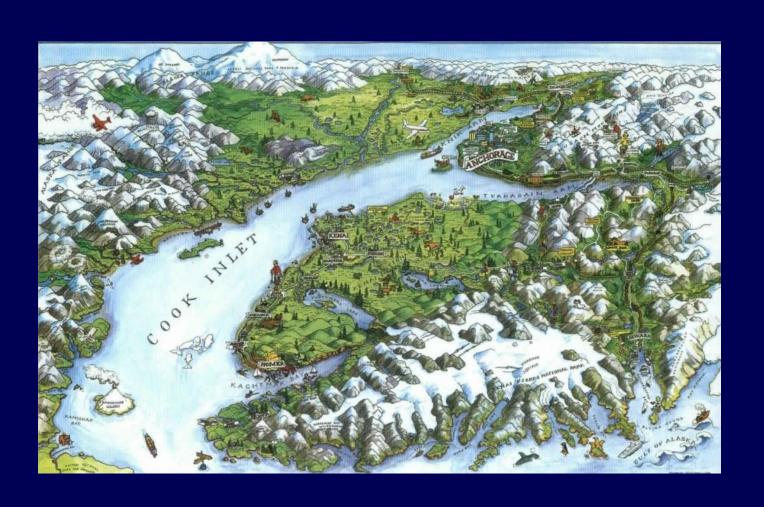
#### Conclusions

- Qualitative Success!
- Difficult conditions
- Real time data assimilation accomplished
- ROMS improved
- Still need hydrographic model
- Figuring out what to maintain...

\*Upcoming special edition of Eos journal\*



# Cook Inlet



### How to Approach Cook Inlet

- Multiple-use area
- Complex system
- Many modelers



→ Goal: Develop a conceptual framework for a circulation model system in Cook Inlet

### March Modelers Workshop

- Provide a forum for the modeling community to share information on existing numerical modeling
- Discuss strengths and weaknesses
- Assess the needs for existing and future numerical forecast models and the observations to support them











### **Participants**

- NOAA
- Chevron
- Resource Development Council
- NASA Jet Propulsion Lab
- U.S. Army Corps
- The Nature Conservancy
- Minerals Management Service
- University of Alaska Anchorage
- U.S. Army Corps
- Old Dominion University
- Anchorage Water and Wastewater Utility
- Coastline Engineering
- ConocoPhillips/City of Soldotna
- Cook Inlet Regional Citizens Advisory Council

- Kachemak Bay Research Reserve
- UC Santa Barbara
- Terrasond
- University of Alaska
- Oil Spill Recover Institute
- Cook Inlet Regional Citizens Advisory Council
- Kinnetic Labs
- Coastwise Services
- NOAA Hazmat
- Ocean Renewable Power Company
- University of MA
- Texas A&M University
- SW Pilots Association

### **Key Recommendations**

- Establish a Cook Inlet Working Group
- Establish a Cook Inlet Data Exchange
- Increase the Number of Observations
- Develop a Cook Inlet Publication



# Working Group

- Monthly calls
- 3 subgroups: wind, wave, circulation
- Ancillary Data Collection
  - Bathymetry
  - Climatology
  - Historical Database
  - Satellite Data
  - Ice
  - Sediment Transport

#### **Check AOOS website for updates...**

# AOOS Alaska Ocean Observing System The Eye on Alaska's Coasts and Oceans

AOOS Home

Regional Information

Cook Inlet

Prince William Sound

Background

Components of Ocean Observing

Acronyms

Home

Access Data

About AOOS

Web cams

#### Cook Inlet Modeling Workshop

Below are the presentations from the March 29-30th workshop, held in Anchorage. Click here for the Agenda and Participant List.

Also try clicking on the Chart of Existing Models (xls) showing what modeling efforts have taken place in Cook Inlet.

The Workshop Report, including summaries of presentations and discussions, is also available.

#### Presentations

#### Cook Inlet Background

- Background and General Physical Oceanography Steve Okkonen, UAA (1.1 MB)
- An Overview of the Current Observing System Carl Schoch, AOOS consultant (1.6 MB)

#### Wind Models

- Cook Inlet Marine Weather Forecasts Eddie Zingone, National Weather Service (2 MB)
- Atmospheric Modeling over Cook Inlet and Prince William Sound Peter Olsson, UAA (800 KB)

#### CALENDAR

 calendar events related to cook inlet here...