

Key Science Mission for MMS

- Obtain Quality Information For Environmental Impact Assessment To Support Leasing
 - Sales and On-lease Activities
- Monitor Environmental Changes
 - Natural and Anthropogenic

Arctic Physical Oceanography Topic Areas

by Ronald Lai

1. Physical Oceanography
2. Meteorology
3. Sea Ice
4. Modeling

Physical Oceanography of the Northeast Chukchi Sea

Rachel Potter, Seth Danielson, Hank Statscewich, Tom Weingartner, and Peter Winsor
School of Fisheries and Ocean Sciences; University of Alaska Fairbanks

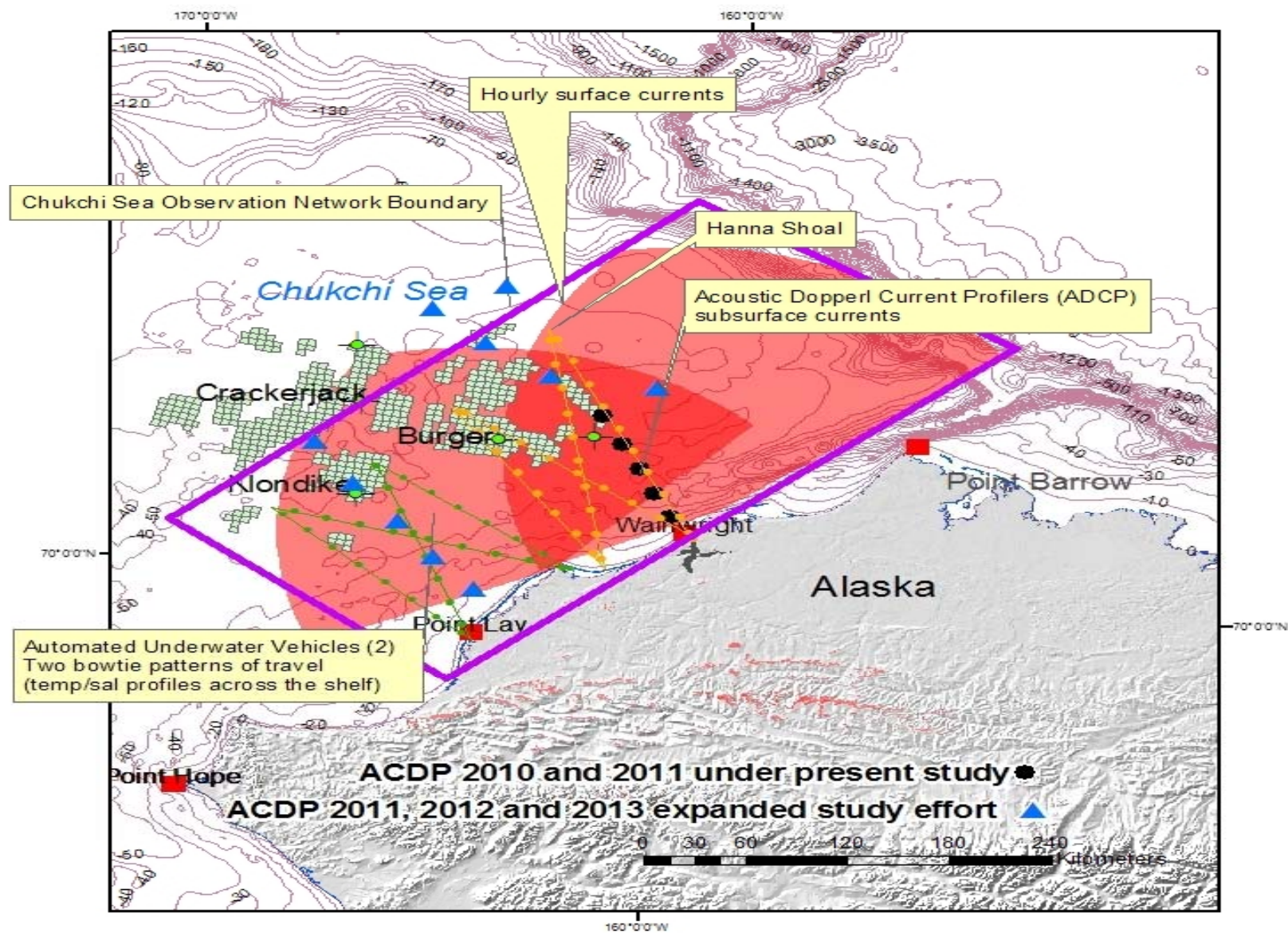


Funding provided by: **ConocoPhillips**



Physical Oceanography of the Chukchi Sea OCS

Surface and subsurface current measurements

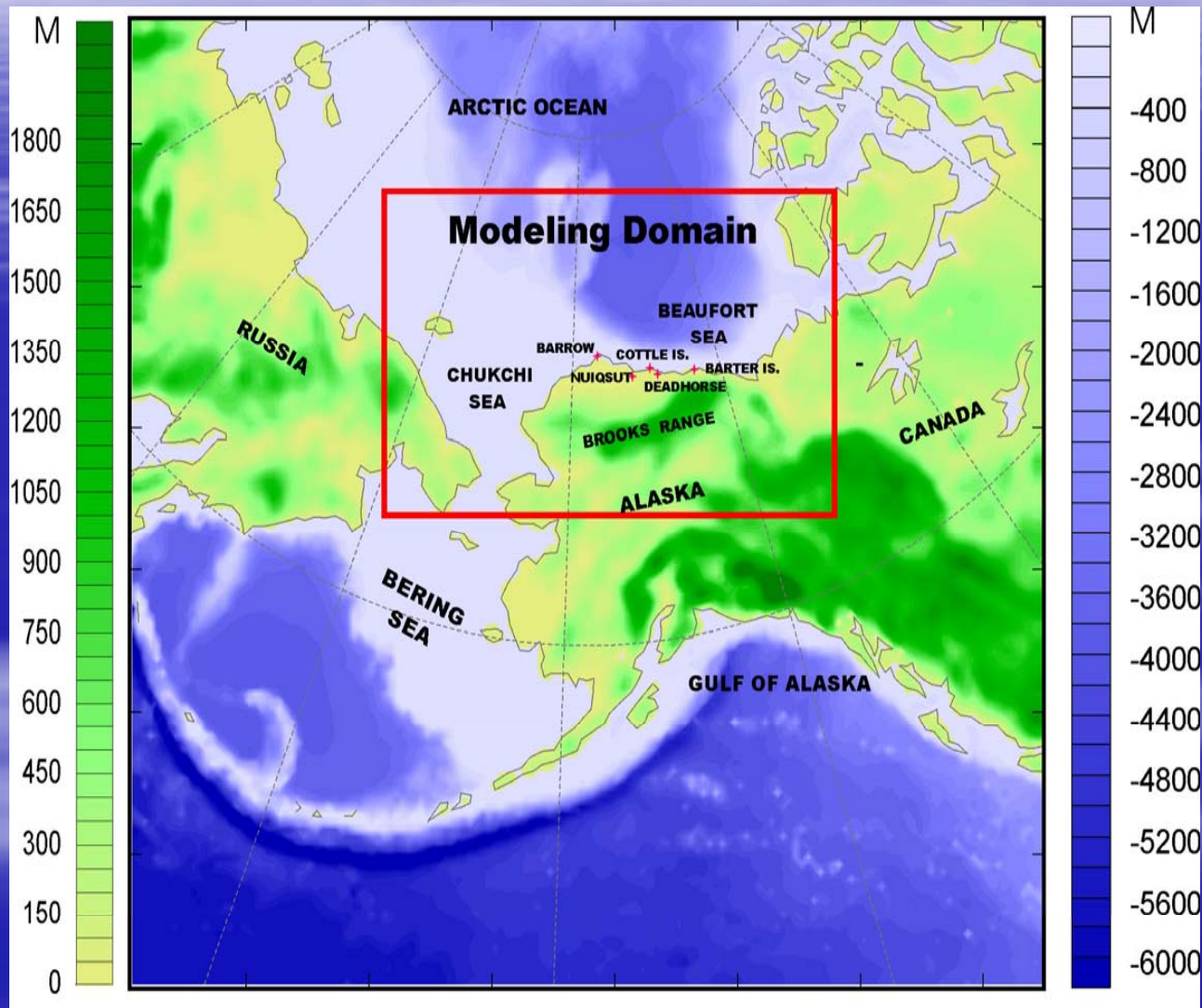


Chukchi and Beaufort Seas Meteorology Study from Mesoscale and Climatology Aspects



Jing Zhang, Jeremy Krieger, Martha Shulski, Fuhong Liu*, and Steve Stegall*

Effort 2: Model Simulation



- Model setup
- Seaice improvement
- Mesoscale modeling

Final Product of Model Simulations

- **Establish a well-tuned Chukchi/Beaufort Seas mesoscale meteorology modeling system**
- **Conduct 30-year production simulation (1979-2009)**
 - temporal resolution: 1 hour
 - spatial resolution: 10 km

Mapping and Characterization of Recurring Spring Leads and Landfast ice in the Beaufort and Chukchi Seas



Hajo Eicken (PI)
Geophysical Institute
University of Alaska Fairbanks,
hajo.eicken@gi.alaska.edu

Co-Is:

Lew Shapiro, Tom Heinrichs,
Rudi Gens, Franz Meyer
(UAF)

Allison Gaylord (Nunatech)

Matching funds:

Shell & Conoco-Phillips

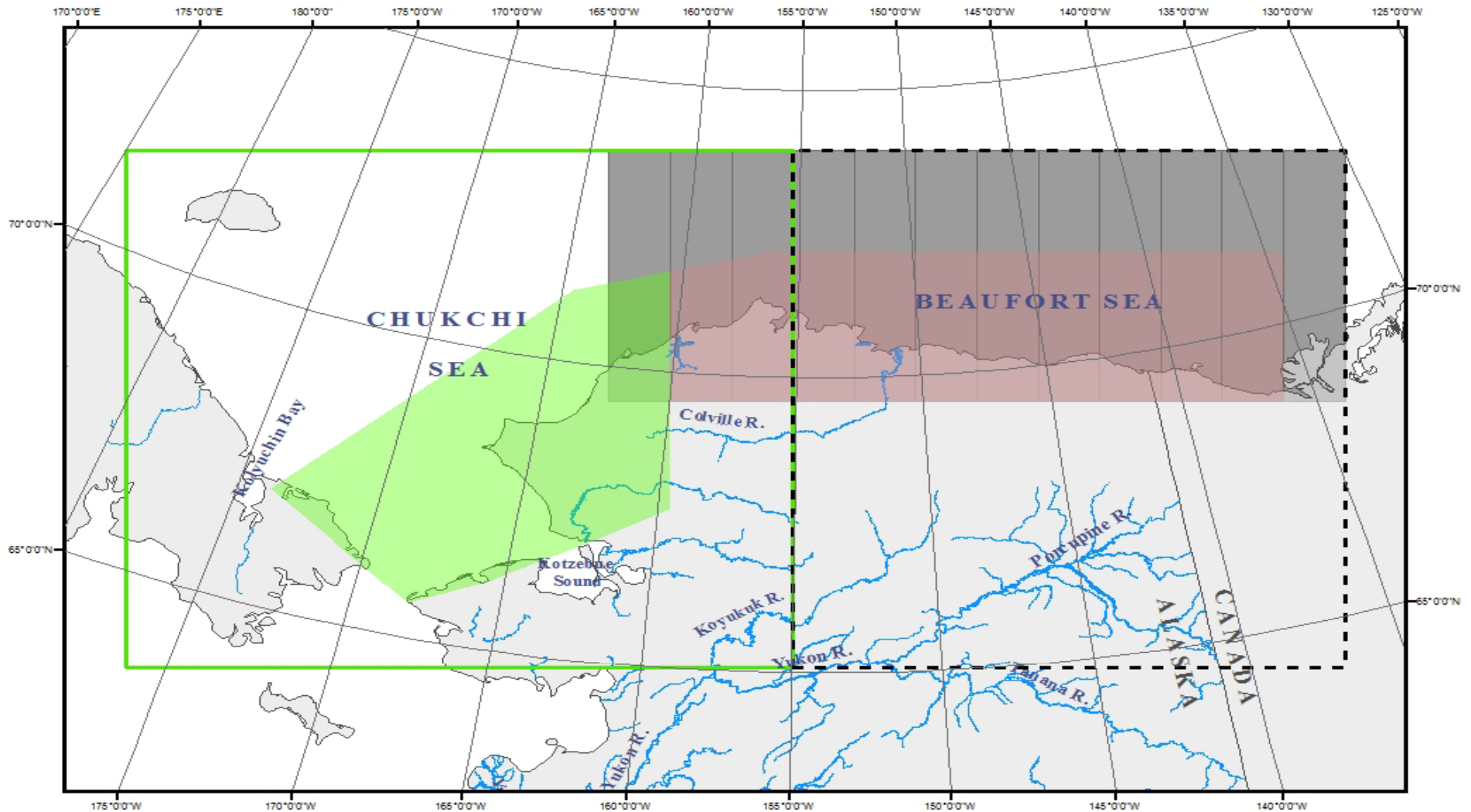
Duration:

June 2009 – May 2012

Mapping and Characterization of Recurring Spring Leads and Landfast ice in the Beaufort and Chukchi Seas

Study Area

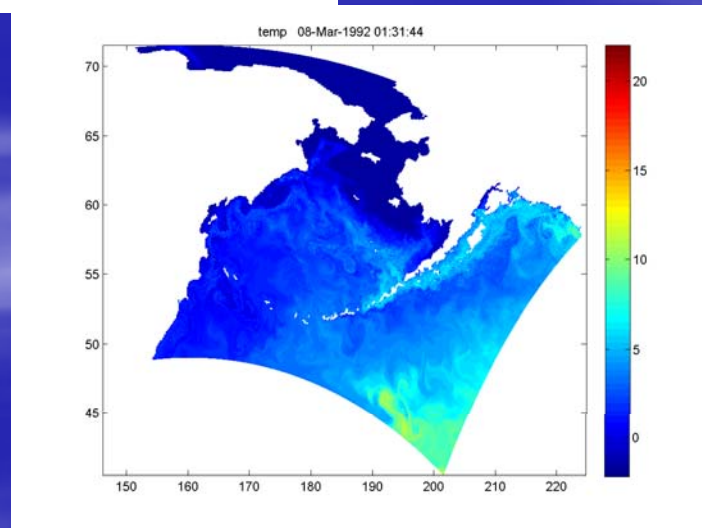
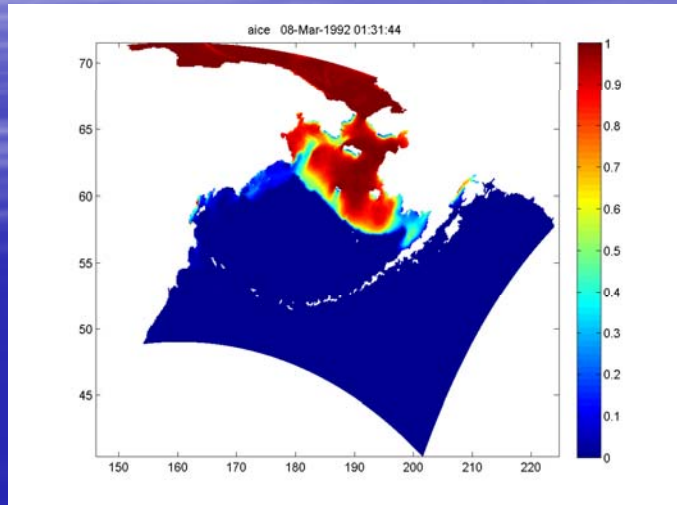
- 2003 AVHRR Study Area Subregions
- 2009 AVHRR Chukchi Study Area
- 2009 AVHRR Beaufort Study Area
- 2009 RADARSAT Chukchi Study Area
- 2009 RADARSAT Beaufort Study Area



■ Ice-Ocean Modeling

- Numerical Simulation of Atmosphere/Ocean/Sea Ice Interaction in the Arctic Ocean: 1982-1996
- Comprehensive Modeling Approach Towards Understanding and Prediction of the Alaskan Coastal System Response to Changes in an Ice-diminished Arctic (with extension)
- Modeling Circulation of the North Aleutian Basin

Modeling of Circulation in the North Aleutian Basin



- Rutgers University and University of Alaska Fairbanks
- Nested Ice/Ocean Model for 1985-2005

Future Chukchi Sea Studies of Biological Oceanography

Studies Development Plan 2011

- Hanna Shoal Ecosystem Study
 - Highest industry interest is in the Burger prospect
 - Biological Hot Spot
 - Physical oceanography and productivity
- Distribution of Fish, Crab and Lower Trophic Communities in the Chukchi Sea Lease Area
 - Many species are shifting their distributions northward
 - Variations from historic collections
 - Comparable to surveys conducted by RUSALCA, Conoco/Shell, and CMI surveys
- NSF/MMS Vulnerability to Climate Change CMI/Mathis
 - Moving into Chukchi 2011