### BOEMRE ESP: Focus on Arctic Science

Dr. Ronald Lai Program Coordinator for Physical Science Environmental Sciences Branch April 2011

### Key Science Mission for BOEMRE

 Obtain Quality Information For Environmental Impact Assessment To Support Leasing

 Sales and On-lease Activities

Monitor Environmental Changes– Natural and Anthropogenic



### BOEMRE Alaska OCS Region Oceanographic Research in 2011

#### Physical Oceanography:

- Surface Current Circulation HF Radar Mapping in the Chukchi Sea
- Satellite-Tracked Drifter Measurements in the Northeast Chukchi Sea
- Mapping and Characterization of Recurring Polynyas and Landfast Ice in the Chukchi Sea
- Chukchi and Beaufort Seas Meteorology Study from Mesoscale and Climatology Aspects
- Adaptation of an Arctic Circulation Model

#### Continue from previous page:

- Habitat and Ecology:
  - Shorebirds and Infaunal Abundance and Distribution on Delta Mudflats along the Beaufort Sea; Recovery in a High Arctic Kelp Community
  - Biogeochemical Assessment of the OCS Arctic Waters: Current Status & Vulnerability to Climate Change
  - Marine Fish Monitoring Survey in the Central Beaufort Sea
  - Epifaunal Communities in the Central Beaufort Sea
  - \*Hanna Shoal Ecosystem Study

#### Continue:

#### • Marine Mammals and Protected Species:

- Bowhead Feeding Variability in the Western Alaska Beaufort Sea
- COMIDA: Factors Affecting the Distribution and Relative Abundance of Endangered Whales: Passive Acoustic Detection and Monitoring and Biophysical Moorings

 The BOEMRE research vessel, the 36-foot Launch 1273, will also be underway supporting research in the Beaufort Sea.

#### 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



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# Satellite-tracked drifter measurements in the Northeast Chukchi Sea

- This is one of BOEMRE/UAF Coastal Marine Institute program,
- Total of 24 CODE type (left) and 24 WOCE type (right) drifters be deployed this coming summer by UAF and track by GPS



#### Chukchi and Beaufort Seas Meteorology Study from Mesoscale and Climatology Aspects

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

### **Effort 1: Data Collection and Analysis**

#### In-situ observational data collection



### **Effort 2: Model Simulation**

Model setup; Sea-ice improvement; and 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
- \* Deploy a Met buoy at NE Chukchi Sea this coming summer

### 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-ls: Lew Shapiro, Tom Heinrichs, Rudi Gens, Franz Meyer (UAF) Allison Gaylord (Nunatech) Matching funds: Shell & Conoco-Phillips Duration: June 2009 – May 2012

Lead & Landfast Ice Mapping

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



### Objectives of the study

- Map spatial distribution of lead systems in Beaufort & Chukchi Seas, 1993-2008
- Determine statistics of lead patterns and interpret in context of large-scale forcing and sea-ice change
- Map extent of stable landfast ice along Chukchi & Beaufort Sea coasts
- Determine statistics & seasonality of landfast ice extent and assess changes in relation to forcing & bathymetry

## Any Questions?

