U.S.A's Pacific Arctic Oceanographic Research Programs

Kathleen Crane November, 2011



RUSALCA 2004-2012

RUSALCA Goals:

- Observations where Arctic sea ice is reducing rapidly
- Bering St. fresh water, nutrient fluxes
- Regional physics and ecosystem response to change.
- Improve international Arctic science collaboration
- Explore the unknown Arctic
- Link with PAG vessels and programs



Russian American Longterm Census of the Arctic

A RUSALCA Goal: Gateway Fluxes Via Long-term Moorings in Bering Strait



NOAA, NSF, RAS, AARI service 8 Moorings Across the Bering Strait in 2007-2009 Bering Strait properties from 1990 to present

> warmer and fresher water



Meltback in area of Pacific Water influence

Bering Strait heat

- triggers the melt (then ice-albedo feedback)
- gives freshwater stratification to keep solar heat shallow
- winter source of subsurface heat

Woodgate 2010

Bering Strait ~ 2-6 x 10²⁰ J/Y

could melt o.6- 2 million square km of 1m thick ice (1/3 of the USA in Size)

Minimum (Sept) Sea-ice Extent



TRACKING ECOSYSTEM CHANGES IN THE ARCTIC

Lycodes adolfi Adolf's Eelpout

Nielsen & Fosså 1993

Found north of Spitsbergen on east side of Yermak Plateau in 2007– 2009 (Byrkjedal In press), indicating distribution probably extends eastward along the upper slope of Nansen Basin (and thence to the Pacific-Arctic, where we caught it)

RUSALCA 2009 Chukchi Cap

Loss of Sea Ice and Ecosystem Changes (RUSALCA)

Linking Ice Cover to Ecosystem Structure the 'Conceptual Model'



RUSALCA 2011

Confluence of permission issues, border guard requirements:





Chukchi Edges 2011 P.I. B. Coakley

Strategy

9

- Chukchi Edges Project Geophysical constraints on the history of the Amerasia Basin
- Purpose: collect Multi-Channel Seismic Reflection (MCS) data across the transition from the Chukchi Shelf to the Chukchi Borderland. These data will serve two purposes;
- 1) constrain the tectonic history and timing of relative motion between them.
- 2) establish the time stratigraphy along the profiles and other profiles we cross.
- This project was supported by the NSF with funding granted to the Geophysical Institute of UAF. Cruise participants are from Korea, Germany, Turkey, USA and the UK, representing seven different universities and research organizations.





Alaska Monitoring and Assessment Program (AKMAP) Chukchi Sea 2011 Coastal Impact Assistance Program Assessment September 04 – September 17, 2011 R/V Norseman

The Alaska Department of Environmental Conservation (DEC) with its University of Alaska partner established an Alaska Monitoring and Assessment Program (AKMAP) focused on conducting aquatic resource surveys of Alaska's waters. Research cruises were held in 2010 and 2011 to survey the Chukchi Sea coastal environment. In 2011, (NOAA) National Status and Trends Program joined this effort.



Proposed RUSALCA 2012 Leg 1 & 2







FUTURE ARCTIC RESEARCH GOALS: Role of Atlantic Water and Pacific Water on the Transport of Heat and Biota into the Pacific Arctic (RUSALCA Region)



Future RUSALCA observing 2012-2020

POSSIBLE RUSSIA - USA COOPERATION IN 2012



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NOAA's Arctic Vision and Strategy (V&S)