HIGHLIGHTS FROM RUSALCA 2004-2010

RUSSIAN-AMERICAN LONG-TERM CENSUS OF THE ARCTIC

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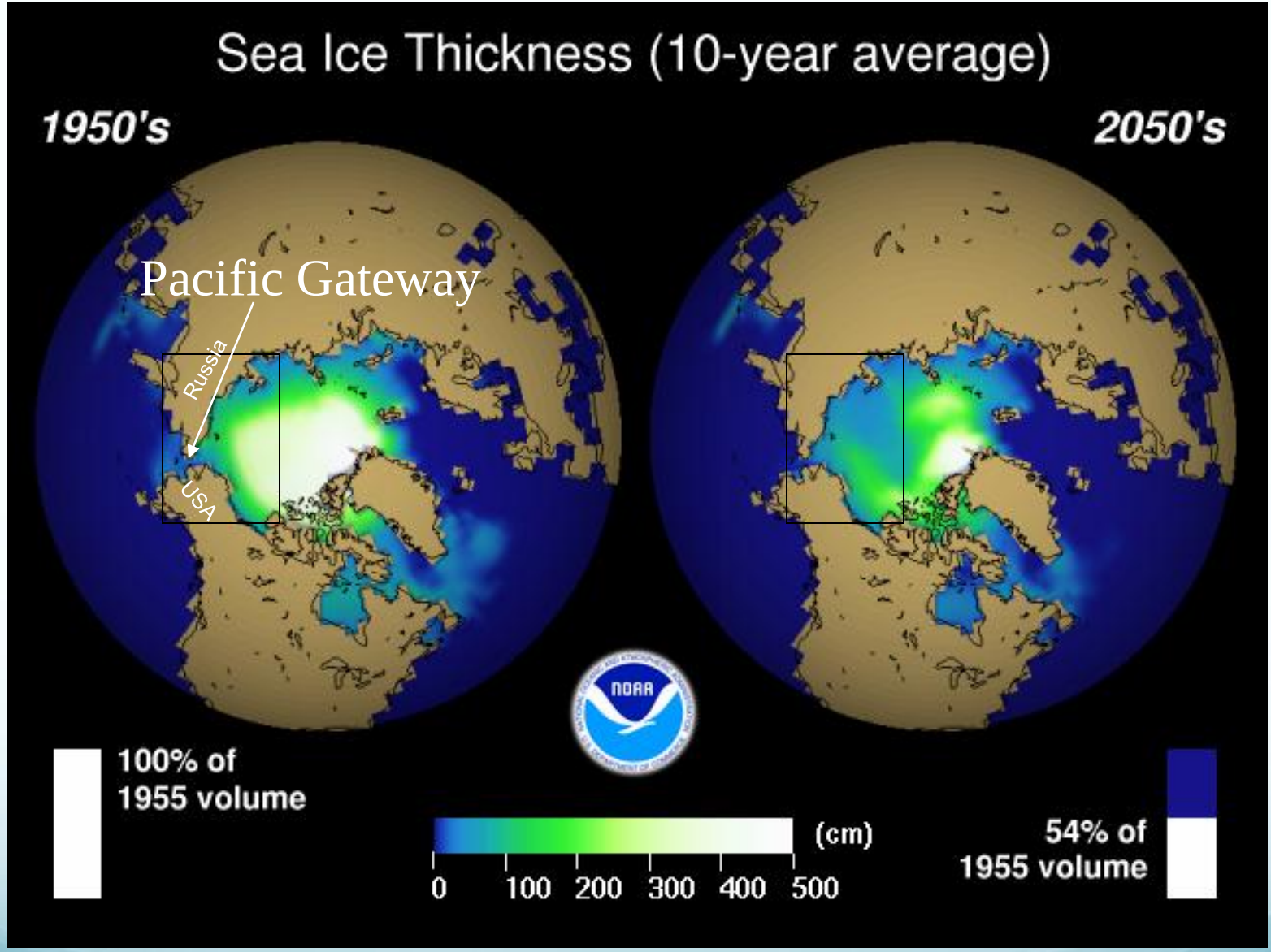
Aleksey Ostrovskiy, Group Alliance, Russia, Russian Federation Oversight for RUSALCA

ISSUE: How to Improve Russian - U.S. ocean and polar Region collaboration after a long period of distrust

Bringing overarching guidance back into Russian-U.S. scientific collaboration was and is a worthy goal.

Vice-Admiral Lautenbacher(NOAA) and Vice-President Laverov (RAS) sign the Memorandum of Understanding between NOAA and the Russian Academy of Sciences, December, 2003 (World Oceans and Polar Regions Studies).

*A major outgrowth of this MOU was the creation of the **Rus**sian, **A**merican **L**ong-term **C**ensus of the **A**rctic (RUSALCA)*



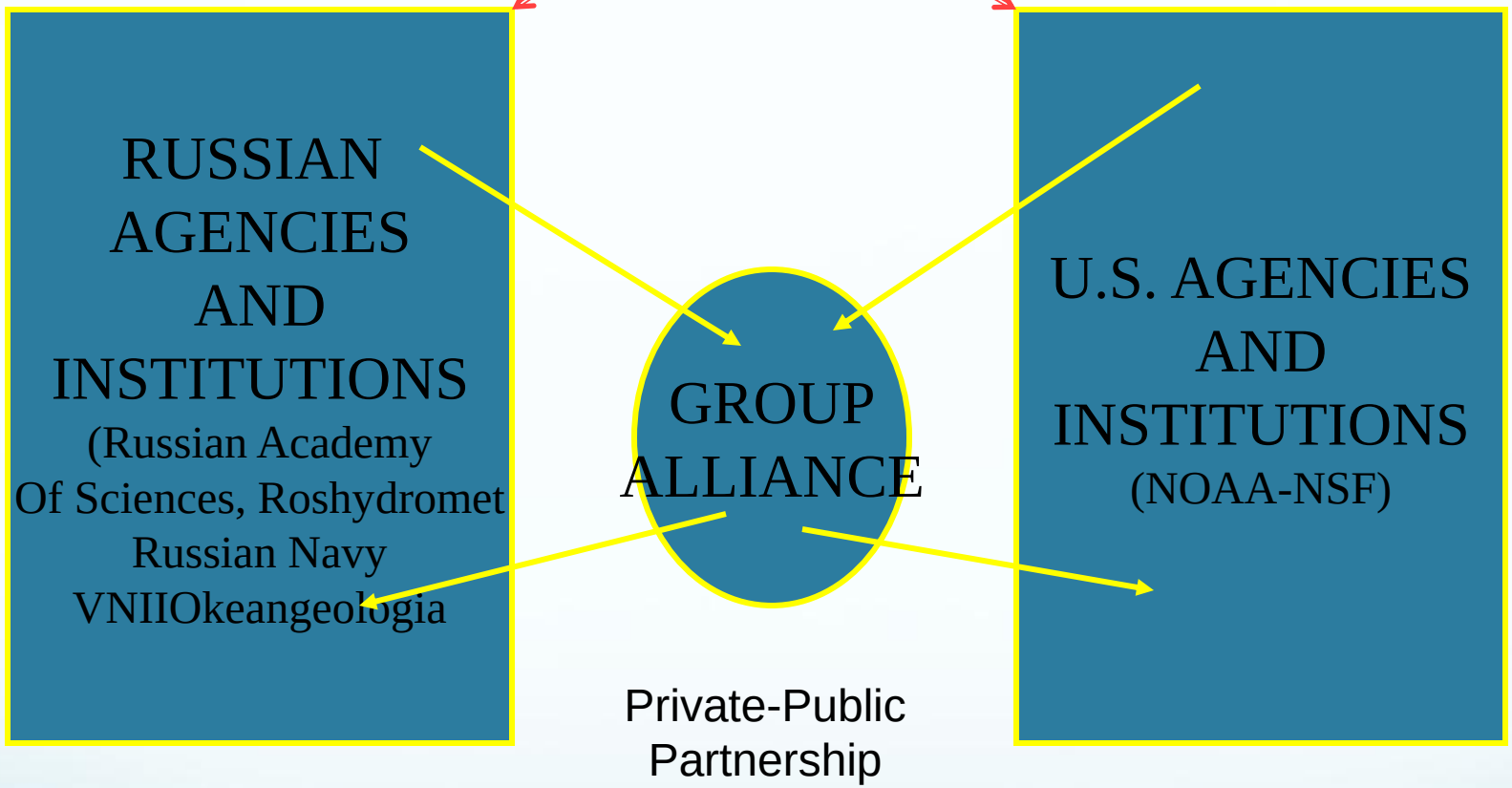
RUSALCA IS LOCATED IN THE PACIFIC ARCTIC

RUSALCA'S GOALS

1. Take observations Where Arctic sea ice reduction is a maximum
2. Monitor fresh water, heat, nutrient fluxes and transport pathways through the Pacific Gateway.
3. Monitor ecosystem indicators of climate change.
4. Model and forecast changes in ecosystems and Arctic wide physical systems that impact global climate and ecosystem stability.
5. Improve Russian-U.S. Arctic science relations
6. Explore the unknown Arctic

RUSSIAN FEDERATION AND US SCIENCE AND TECHNOLOGY AGREEMENT

MOU ON WORLD OCEANS AND POLAR REGION STUDIES



HOW RUSALCA IS ORGANIZED

RUSALCA Russian Government Partners

- Russian Academy of Sciences
  - Shirshov Institute of Oceanology
  - Zoological Institute
  - Institute of Microbiology
  - Pacific Oceanological Institute
- Roshydromet
  - AARI
  - FEHRI

- Ministry of Defense
  - Russian Federation Navy
- Ministry of Natural Resources
  - VNIIOkeangeologica
- Ministry of Sciences
- Foreign Ministry

RUSALCA U.S. PARTNERS

- NSF- Bering Strait Moorings
- NOAA funded (CPO, OER, NMFS)
  - CIFAR- University of Alaska
  - Smithsonian Institution
  - Pt. Stephens Research
  - University of Maryland
  - University of Washington
  - Woods Hole Oceanographic Institution
  - Bermuda Institution of Oceanography
  - Oregon State University

Additional Assistance by the Department of State and the U.S. Coast Guard

Structure of the Shipboard Operations

- ROSHYDROMET: Captain, Crew, Scientists
- Ship Operator: Heritage Expeditions, New Zealand
- RUSSIAN FEDERATION NAVY: Chief of Expedition
- RUSALCA MISSION COORDINATORS : K. Crane USA A. Ostrovskiy, Russia
- CHIEF SCIENTISTS: Terry Whitledge, UAF, Rebecca Woodgate,UW, AARI?

SCIENTIFIC PARTY

- > 50 Scientists have been funded by their own funding agencies
- Russians - to the Russian Academy of Sciences
- US - to NOAA's, Arctic Research Program , Ocean Exploration and Research or to NSF

- Most teams have both Russian and American partners **The teams are**:
  - Ocean Acidification,
  - Benthic and Epibenthic Census and Processes,
  - Census of Zooplankton
  - Biodiversity of Fish and Assessment
  - Nutrients and Productivity
  - Physical and Chemical Oceanography (Bering Strait Fluxes)
  - Paleooceanography, geology and seafloor-ocean fluxes
  - Seafloor permafrost stability
  - Methane
  - Census of Marine Mammals

RUSALCA TIME LINE

2003 Signed Memorandum of Understanding, Russian Academy and NOAA

2004 Khromov Expedition **Bering-Chukchi Seas**

- Census of Marine Life, Ecosystem changes in conditions of sea ice in the Chukchi Sea
- Began the Bering Strait monitoring of fluxes into the Arctic (heat, salt, nutrients and marine mammals)

2005-2008 retrieval of mooring data

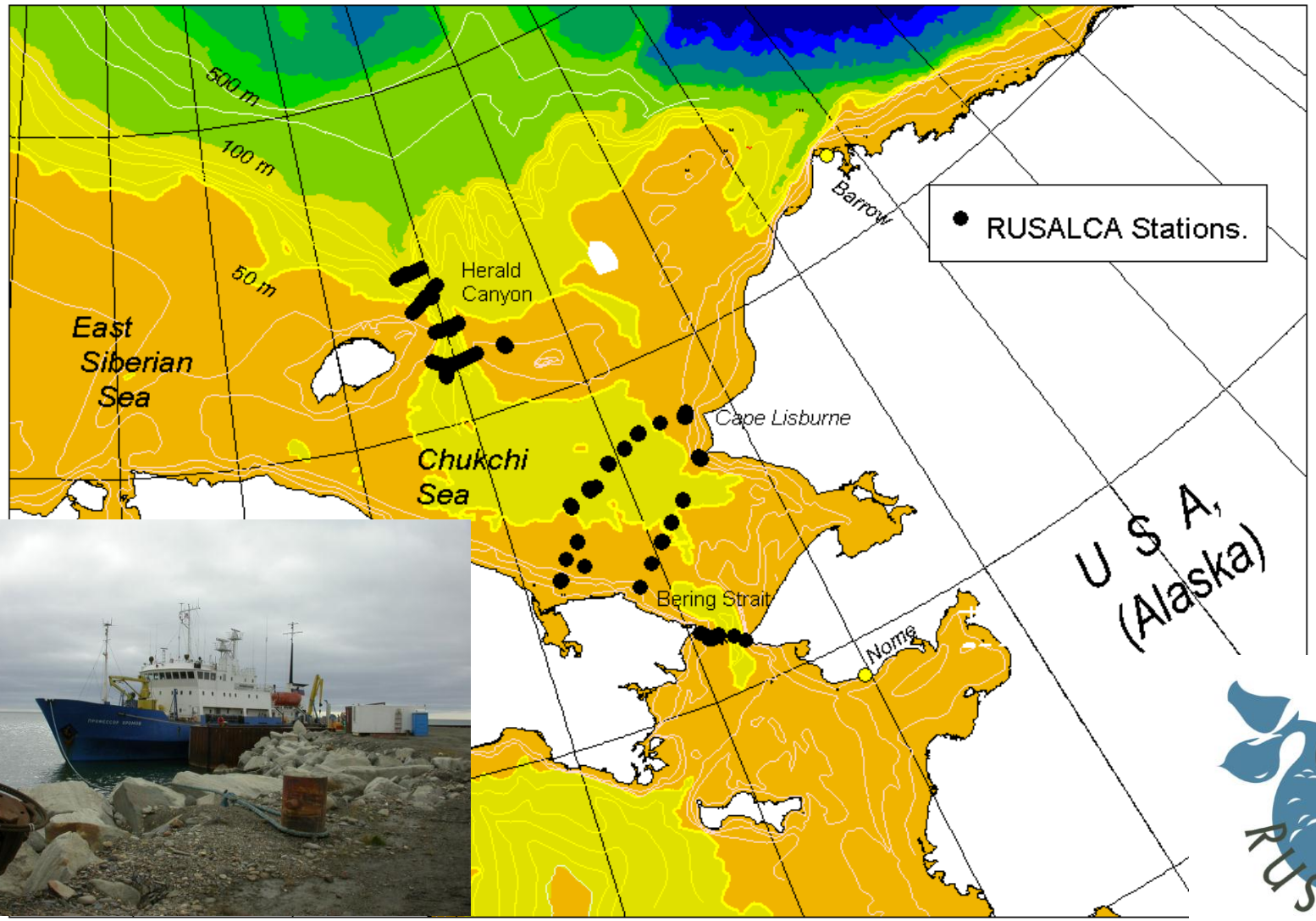
2009 Khromov Expedition**: Bering Strait to the Yermak Plateau** Climate and Ecosystem Changes from the loss of sea ice cover.

2010 Bering Strait Moorings and extensive mapping of the Siberian Current

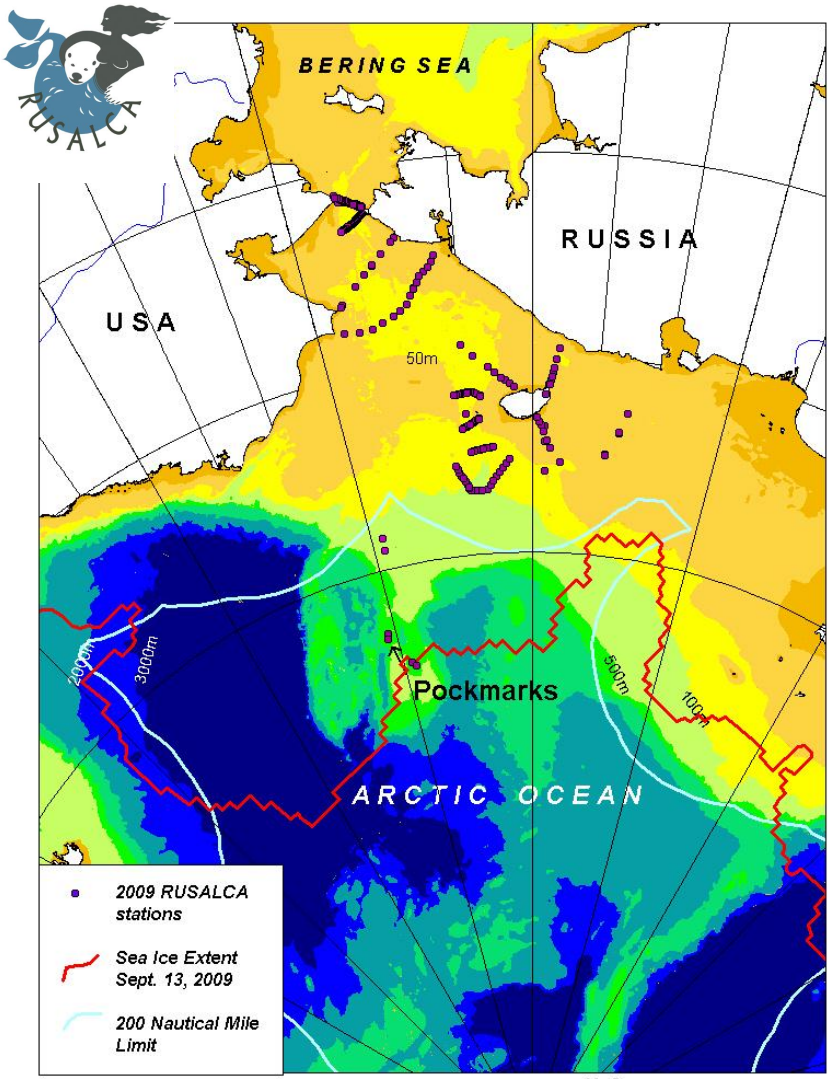
2011 Bering Strait Moorings

2012 Ecosystem Ocean Expedition (Bering Strait to the Ice Edge-East Siberian Sea)

2004 STATION LOCATIONS



2009 STATION LOCATIONS

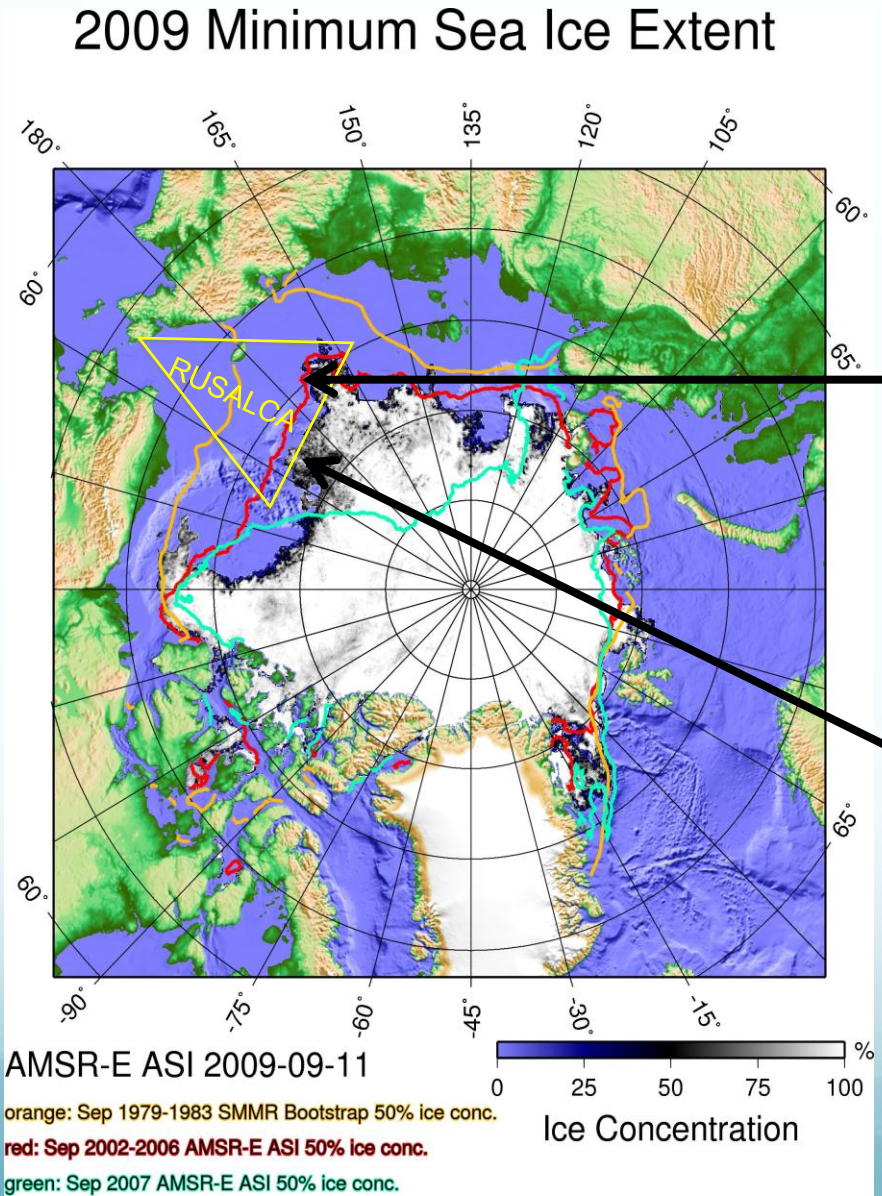


RUSALCA 2009 stations, bathymetry in meters

K. Crane
NOAA

Photos Courtesy of A. Ostrovskiy

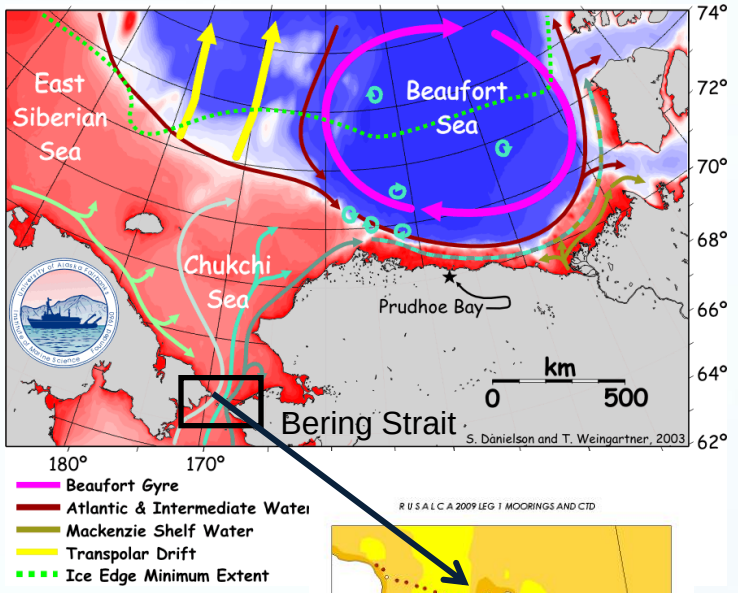
Recent Changes in the Arctic Ocean Sea Ice Cover, 2009: RUSALCA Region of Study

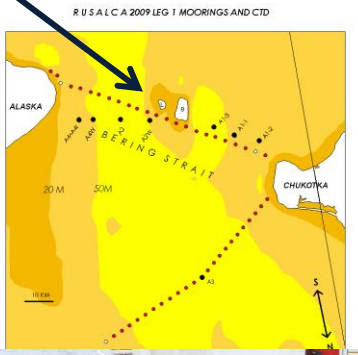


Fluxes Through the Bering Strait: Leg 1

Rebecca Woodgate, UW, Chief Scientist
Elena Bondareva, AARI mooring head

- moorings in Bering Strait show decreased salinity, increase of freshwater flux, and temperature
- Bering Strait influx is greater since 1989
- Bering Strait is the largest Arctic "river" (~40% of freshwater)
- 10% of earth's freshwater flows into the smallest ocean with the highest proportion of shelf
- currently 8 joint US-Russian moorings part of RUSALCA
- 2009 Eastern Strait fresher & cooler… waiting for Western data

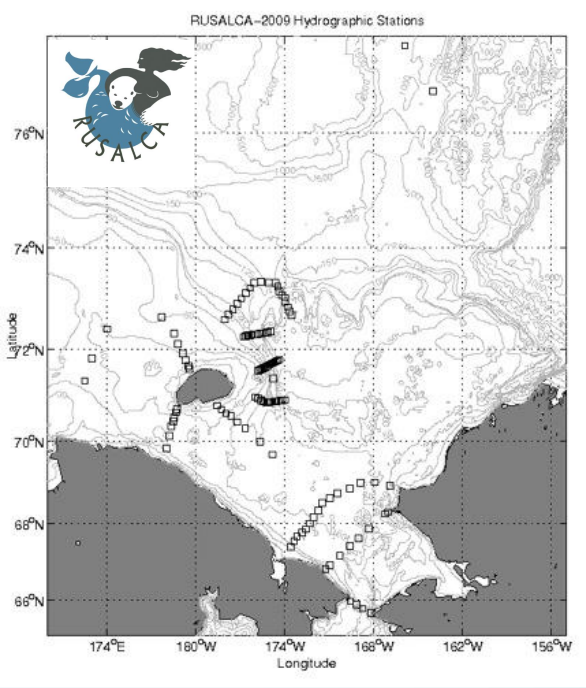




Photos courtesy of A. Ostrovskiy and K. Crane

Changes in Hydrography: Leg 2

R.S. Pickart, H.N. Swartz and D.J. Torres, Woods Hole Oceanographic Institution
E. Bondareva, Arctic and Antarctic Research Institute



- 134 CTD stations during Leg 2
- WHOI provided rosette mounted with 21 10-liter bottles, Sea-Bird model SBE 911 + CTD profiler, upward and downward looking RDI Workshorse300 kHz ADCP, and a SeaScan Video Plankton Recorder
- High speed survey of the Herald Canyon was carried out, with investigation of the area around Wrangel Island, in the East Siberian Sea and over the Chukchi Plateau.
- Hydrographic conditions were greatly different from 2004 (Maybe a seasonal effect).
- Water masses on the western side of Herald Canyon were warmer than in 2004. On the eastern side of the canyon, the summer water reached farther north than in 2004
- The Siberian Coastal Current extended more than 70 km offshore in 2009. It was not present during the 2004 expedition.

Photo courtesy of RAS-NOAA, RUSALCA 2009