

The Arctic RUSALCA project: Joint Russian, American observations from the region of extreme sea-ice loss.

Vitaly Keondjian[†]; Nikolay Laverov; John Calder; Kathleen Crane; Aleksey Ostrovskiy

[†] Alliance Group, Russia

Leading author: keondjian@alliance-gr.com; all@alliance-gr.com

The RUSALCA project is facilitated by Group Alliance LLC under a cooperative agreement with NOAA (USA National Oceanic and Atmospheric Administration) with financial support of the Russian Academy of Sciences (RAS), NOAA and NSF in the USA and within the framework of the 2003 Memorandum of Understanding on World Ocean and Polar Region Studies between the RAS and NOAA. The project is also supported by the Federal Service for Hydrometeorology and Monitoring of the Environment of Russia (ROSHYDROMET) under the Memorandum of Understanding between ROSHYDROMET and NOAA signed in 2005. The project name, RUSALCA (means "mermaid" in the Russian language) is an abbreviation of its English name and stands for the Russian-American Long-term Census of the Arctic. The goal of the project is to carry out long-term observations for the understanding of the causes and effects of the reduction of the sea ice cover in Pacific Arctic including the Bering Strait, Chukchi Sea, the East Siberian Sea and as far north as the summer sea ice edge in the Arctic Ocean. Observations of the flux of heat, salt and nutrients through the Bering Strait indicate that the amount of heat entering the Arctic from the Pacific has increased significantly accounting for more than 30% of the sea ice thinning in the Pacific Arctic region during the last 5 years. Numerical modeling projects that ongoing changes of the sea ice cover will lead also to enhanced changes in the albedo adding to the heating of the newly exposed Arctic Ocean. Heating is thought to lead to considerable changes in the structure of Arctic Ocean water masses as well as in the corresponding ecosystems. Thus, the monitoring of the parameters and the dynamics of the Arctic Ocean and its ecosystems in this region is very important. The first expedition of RUSALCA was carried out in the summer of 2004. It was multidisciplinary in scope ranging from physical oceanography, via moorings, and CTD observations, biogeochemistry of the water and both seafloor and air-sea exchange, nutrient fluxes, pelagic and benthic biology, seafloor methane fluxes and Arctic atmospheric chemistry. Oceanographic mooring stations were deployed for the first time in a decade in the western part of Bering Strait in 2004 along a line connecting formerly existing Russian and U.S. moorings. These stations have been recovered and redeployed annually from 2005 to 2010. The number of moorings along the Bering Strait transect have increased to eight. A number of CTD-stations (Conductivity, Temperature and Depth), as well as several benthic biological, plankton stations and marine mammal observations have been carried out during the annual mooring expeditions from the years of 2005-2010. Approximately every four years RUSALCA undertakes its longer multidisciplinary expedition. To date these have occurred in 2004-2009 and were carried out in the Chukchi, East Siberian and Beaufort seas into the Arctic Ocean as far north as 77 N. More detailed information about the RUSALCA project can be found on the following web sites: www.arctic.noaa.gov and www.rusalcaproject.com. Annual expeditions to service the Bering Strait moorings will be carried out in 2011-2016 with a large biophysical expedition arranged for 2012. Many of the RUSALCA stations have been selected by the USA and Russian Federation as sentinel biodiversity and climate sites by the Arctic Council's Arctic Marine Biodiversity Monitoring Program which engages six of the Arctic Nations in pan-Arctic long-term monitoring. Key observational results about the Bering Strait role in triggering ice retreat in the Pacific Arctic and evidence for species migration in the region will be presented.