Integrating marine mammal presence into ASGARD: Arctic Shelf Growth, Advection, Respiration and Deposition Rate Experiments

Principal Investigator:

1. Dr. Kathleen Stafford, University of Washington

Summary of Proposed Work: The goal of the proposed project "Integrating marine mammal presence into ASGARD: Arctic Shelf Growth, Advection, Respiration and Deposition Rate Experiments" is to provide data on the occurrence of vocal marine mammals as upper trophic level consumers at the top of a complex Arctic ecosystem. To do so, we will add hydrophone packages into three proposed oceanographic moorings as part of the ASGARD program to improve our understanding of the northern Bering and Chukchi Sea ecosystem and its constituent parts, structure and functioning by examining productivity drivers, energy pathways and turnover rates, migratory and distribution patterns, and human dimensions. From the hydrophone data we aim to 1) document the inter-seasonal and inter-annual presence of vocal marine mammals (Arctic and sub-Arctic) in the Bering Strait; 2) Integrate presence with co-located oceanographic data to better understand how the physical environment influences the biological inhabitants of that environment; 3) Provide data on ambient noise levels in the region to assess the impact of commercial shipping; 4) Report to local communities on the health of the ecosystem including information on new species, and residency times of Arctic species. The combination of passive acoustic and physical and biological oceanographic data sets will provide urgently required information on how species presence varies seasonally with changes in benthic and water column prey, sea ice, currents, ocean water temperatures and freshwater flow. The proposed effort in collaboration with other ASGARD PIs will provide data on interannual variability and the bio-physical drivers of this variability. Co-located ecosystem measurements from "wind to whales" will allow for the testing of scientific hypotheses such as: how do oceanographic conditions dictate the residency of different marine mammal species? Are temperate species "invading" the Arctic and what will their influence be on Arctic species and Arctic food security?