AOOS
The Eye on Alaska's Coasts and Oceans
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Update
Summer 2019

New Ecosystem Mooring

AOOS' long-term buildout plan calls for deploying ecosystem moorings in each of the four Large Marine Ecosystems in Alaska oceans: Chukchi, Beaufort and Bering Seas, and the Gulf of Alaska, to provide sustained, year-round observations and track changes over time. The Chukchi Ecosystem Observatory (CEO) is now fully built out and operating. The Gulf of Alaska Ecosystem Observatory (GEO) began collecting data July 11 with three moorings deployed off the R/V *Sikuliaq*. Here's the report from the field:

By Seth Danielson

Mooring technician Pete Shipton and project lead Seth Danielson, UAF, had been preparing for this day for many months, but the last two days prior to deployment were some of the most critical: multi-beam bathymetric surveys, final programming of the instruments, attaching zinc anodes for corrosion protection, removing sensor caps, and all of the other things that can impact deployment success. Two of the moorings have surface floats that relay data back to shore in real-time, so while the ship was slowly steaming toward the deployment site, they were deployed by lowering the surface float into the water, paying out line and attaching floats and instruments at their prescribed locations, and finally, attaching the 4,300 lb anchor.

When *Sikuliaq's* stern passed over the drop location, a release command was relayed from the bridge that sent the heavy anchor toward the seafloor. As the anchor rocketed downwards, the mooring line was pulled with it, and the surface floats got a "Nantucket sleighride," at first skimming across the water before eventually being pulled below the surface. For a few very drawn out seconds, everyone waited to see if all lines had been cut long enough, and soon enough the surface float popped up to begin life in its new home. The mooring's surface expression was designed to be submerged in the largest of Gulf of Alaska swells, so this initial "dunk test" was an excellent verification.

Data from the real-time surface instrumentation is now available through the AOOS data portal at https://tinyurl.com/AKGEO1 and https://tinyurl.com/AKGEO03. ■

Seth Danielson

The uppermost subsurface instrument package of the GEO mooring is lowered into the water.

Seth Danielson

Buoys for the GEO mooring await deployment as R/V *Sikuliaq* steams to the deployment site. The surface buoy is equipped with a large radar reflector, flashing light, meteorological sensors, and a housing that contains telemetry equipment for transmitting data back to shore via the Iridium satellite network.

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New Modeling Efforts Underway in Central Beaufort Sea Region

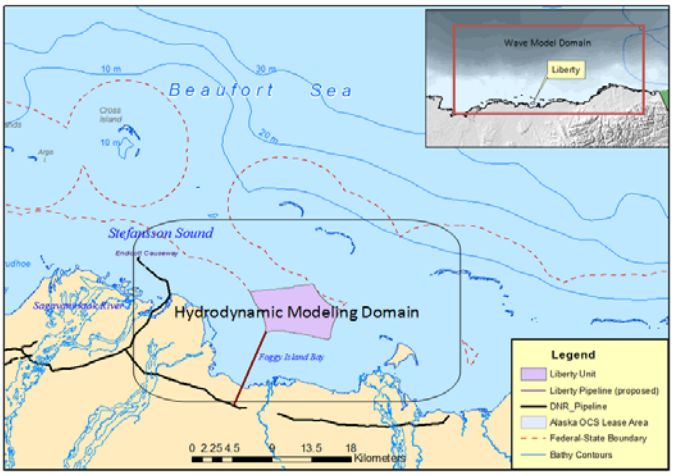
Renewed interest in nearshore oil exploration and production in the central Beaufort Sea has created a need by federal agencies in understanding wind, wave, current, storm, and sediment dynamics conditions in Stefansson Sound and Foggy Island Bay and how conditions might change over time. The Central Beaufort Sea Wave and Hydrodynamic Modeling Study (CBSWHMS), funded by the Bureau of Ocean Energy Management (BOEM), is designed to develop, test, and validate numerical models that can simulate waves, hydrodynamics, and sediment transport in these regions. Modeling these conditions is difficult due to limited availability of wind and wave information, complex shallow bathymetry and coastal topography of the region.

AOOS and our data contractors at Axiom Data Science are providing data management and outreach support for this project, including a project website and data portal. The first task was to compile a comprehensive historical data record and annotated spatial database and bibliography for this region, which included addressing complicated data formats and missing metadata.

Other key components of the project include:

- New field observations for waves, currents and hydrography using seasonal wave buoys, shore-based meteorological stations, shipboard measurements, and bottom mounted oceanographic moorings to understand existing sediment transport conditions. Project leader Jeremy Kasper, UAF.
- Downscaled climate hindcast and forecast data spanning1979-2100 to help drive the new wave, storm surge and sediment transport models. Peter Bieniek, UAF.
- Coupled wave-hydrodynamic-sediment transport model to produce a 40-year hindcast (1979-2019) and projection (2020-2049) of waves, storm surge, and sediment transport potentials within Stefansson Sound region. Li Erikson, USGS, Santa Cruz, CA.
- Historic and contemporary shoreline position and environmental conditions data for developing and calibrating coastal erosion and sediment transport models for use in safely developing natural resources in local offshore islands, coastal roads and pipeline infrastructure. Tom Ravens, UAA.

All project data will eventually be made publicly available on the project data portal hosted by AOOS, as well as on the AOOS Ocean Data Explorer and the Arctic Data Portal. The resulting dataset from this project will include new real-time, moored and model data, and all 47 historical datasets including some synthesized visualizations. For more information and progress updates, see https://aoos.org/foggy/ ■



Courtesy of BOEM

Map showing the Foggy Island Bay and Stefansson Sound area where the Liberty Development Project is proposed and the study model domain.

Increasing Wave Observations in Alaska

AOOS is adding a new ocean wave and current buoy off Kodiak Island to provide real-time data to local mariners and fishermen. The buoy was originally owned and operated by the National Renewable Energy Laboratory (NREL) to support a tidal energy research project. AOOS will now "adopt" the buoy and take over its operations and maintenance. The data will continue to be streamed through the Coastal Data Information Program (CDIP) funded by the US Army Corps of Engineers, and made available through the AOOS Ocean Data Explorer. The US Coast Guard in Kodiak will assist with annual maintenance.

This will be the third CDIP buoy operated and maintained by AOOS since 2011 when AOOS partnered with the Kachemak Bay Research Reserve, Lake Clark National Park and Preserve, and the US Coast Guard to deploy the Cook Inlet wave buoy off Anchor Point. This buoy has been popular with local mariners providing important real-time information for boating safety.

Last year AOOS partnered with the Port of Nome, the Alaska Marine Exchange, and the USCG to deploy another CDIP wave and current buoy off the Port of Nome. This buoy has been providing important real-time information to the increasing marine traffic heading for the Bering Strait.

The addition of these three buoys in Alaska waters is an example of how AOOS leverages partnerships to fill gaps in ocean observing information throughout the region. ■

Adobe Stock

Bering Strait Algal Toxin Workshop

Bering Strait residents and health providers learned about algal toxins, their effect on humans and marine species, and what we know so far about their presence in western and Arctic Alaska at a July workshop in Nome, co-sponsored by AOOS and Alaska Sea Grant with funding support from the US Arctic Research Commission and NOAA.

Harmful algal blooms, or HABs, occur when small algae (also known as phytoplankton) grow rapidly to large numbers in the water (a "bloom"), while producing toxic or harmful effects on people, fish, shellfish, marine mammals, and birds. Certain environmental conditions may contribute to excessive growth of these organisms. Not all species are toxic, and most species that cause harmful effects grow slower at colder temperatures and faster in warmer temperatures. Compared to the southeast and southcentral regions of Alaska, little research has been done in the Bering Strait region concerning HABs; however, with sea surface temperatures reaching unprecedented highs in the Bering Strait over the last few years, more frequent appearances of HABs in the region are likely.

The two-day workshop covered identification of algal species, monitoring techniques, impacts to the ecosystem, and current HAB research results for the region. The workshop also included presentations on changing environmental conditions in the Bering Strait region and the State's role in public health responses to algal toxin poisoning. The first day of the workshop was targeted for local entities and the public. The second day was designed to inform local health care professionals in the region on the symptoms of algal toxin poisoning and how to effectively treat it.

A workshop report summarizing presentations and the resulting discussion is underway and will be made available on the Alaska Harmful Algal Bloom Network website (https://aoos.org/alaska-HAB-network/). ■

PRESENTERS:

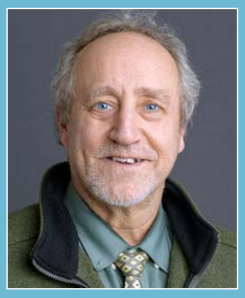
Gay Sheffield, MAP Agent, UAF Alaska Sea Grant
Dr. Vera Trainer, Manager of the Marine Biotoxin Program, NOAA
Rick Thoman, Alaska Climate Specialist, UAF ACCAP
Julie Matweyou, MAP Agent, UAF Alaska Sea Grant
Caroline Van Hemert, Research Wildlife Biologist, USGS
Matthew Smith, Geneticist, USGS
Kathi Lefebrve, Wildlife Algal Researcher, NOAA
Dr. Raphaela Stimmelmayr, Wildlife Veterinarian, North Slope Borough
Dr. Sara Schoen, Wildlife Biologist, USGS
Dr. Dean Stockwell, Research Associate Professor, UAF
Dr. Joe McLaughlin, State Epidemiologist, Atate of Alaska
Dr.Rachel Lee, Environmental Health Director, Norton Sound Health Corporation

Bering Strait Algal Toxin Workshop participants at the UAF Northwest Campus Education Center Grand Hall in Nome, Alaska.

Beverly Bradley

Board Update

AOOS welcomed three new board members this spring. Doug Vincent-Lang, Commissioner of the Alaska Department of Fish and Game; Jason Brune, Commissioner of the Alaska Department of Environmental Conservation; and Sara Longan, Deputy Commissioner of the Alaska Department of Natural Resources all joined the board as representatives of state agencies with the incoming new administration. ■



Data Management Highlights

- The Alaska Water Level Watch project is focused on making real-time and historical water level observations and predictions around Alaska more available. This includes finding, aggregating, and displaying data from the NOAA Center for Operational Oceanographic Products and Services (CO-OPS)and non-CO-OPS data sources in the AOOS portal. https://tinyurl.com/AWLWdata
- AOOS began managing the Data Assembly Center (DAC) of the U.S. Animal Telemetry Network (ATN) in 2018. The ATN DAC serves as a central platform to store, share, and visualize data related to GPS-tagged animals and products using IOOS data standards and services. https://portal.atn.ioos.us
- AOOS, Axiom Data Science, and the Marine Exchange of Alaska (MXAK) generated maps summarizing ship traffic to support the NOAA Office of Coast Survey (NOAA OCS) in prioritizing bathymetric surveys as part of a project funded by the Department of Homeland Security through the Arctic Domain Awareness Center at UAA. These data products also inform decision-making about vessel traffic and safety in a rapidly changing Arctic environment, and are made available through the AIS for Prioritizing Arctic Charting (PAC) data portal. https://tinyurl.com/shiptraffic ■

AOOS Executive Director Gives Congressional Testimony

Molly McCammon testified May 8 at a hearing of the House Water, Oceans and Wildlife Subcommittee of the House Natural Resources Committee on reauthorization of the Integrated Coastal Ocean Observing System (ICOOS) Act and the National Sea Grant College Program. Molly stressed the importance of programs like IOOS and Sea Grant for providing vital ocean and coastal data, creating jobs, improving environmental quality, and supporting the blue economy. She described the unique partnership between the Alaska Ocean Observing System (AOOS) — a regional component of IOOS — and the Alaska Sea Grant program. In Alaska, the Sea Grant office trains young fishers on the business of fishing with tools in marketing and business advice, while AOOS provides ocean data to the managers of those fisheries. ■

New Ocean Acidification Laboratory

Amanda Kelley

A new 'ocean-change' lab including the build-out of a permanent ocean acidification experimental system was installed at the Kasitsna Bay Laboratory in Kachemak Bay by Alaska Ocean Acidification Network researcher Amanda Kelley, Assistant Professor at the University of Alaska's College of Fisheries and Ocean Sciences. The experimental system can manipulate multiple environmental parameters to mimic future-ocean conditions, allowing researchers to characterize the response of important marine species to ocean change.

When asked about the impetus for writing the proposal to fund the lab, Assistant Professor Kelley replied, "The establishment of this lab in the Gulf of Alaska is a game-changer. While the need to study OA in Alaska is high, the cost of the equipment to carry out such experiments is prohibitively expensive. The goal of this project was to ensure that researchers from both Alaska and outside of the state had the necessary tools to conduct cutting-edge OA research."

With this lab now in place, scientists can increase the number of experiments that test the response of key Alaska species to future ocean change scenarios, drastically improving scientists' predictive capacity. Until now, the only other permanent ocean acidification experimental system was located at the Alaska Fisheries Science Center Kodiak Laboratory. Already, an experiment examining the impact ocean acidification and increased temperature on the black chiton has been carried out at the Kasitsna Bay Laboratory. ■