



H I O M A S

High-resolution Ice Ocean Modeling and Assimilation System

The HIOMAS project provides the U.S. Coast Guard (USCG) with a high-resolution model capable of predicting Arctic sea ice and ocean currents. Accurate highresolution modeling of ocean currents and sea ice conditions supports the USCG in conducting search and rescue missions quickly, safely, and reliably. It also enhances the USCG's ability to prepare for, and respond to, oil spills in an Arctic maritime environment. In addition, the predictive data modeled from this software assists other Arctic stakeholders in planning and managing various economic activities.

The project team has developed 3 different versions of HIOMAS with 3 different horizontal resolutions: 6 km, 4 km, and 2 km resolutions for the Arctic Ocean. Recently, the team has developed a new version of HIOMAS that produces a finer 1 km resolution with a small model domain for Alaska waters. This model development is inspired by a need for even higher resolution simulation and prediction of sea ice and ocean currents in the U.S. Arctic Exclusive Economic Zones (EEZ).

The HIOMAS platform has already been used in real world applications. HIOMAS sea ice thickness data from 2016-2017 modeled at 2 km resolution helped assess the feasibility of exporting liquid natural gas (LNG) directly off the North Slope of Alaska using DAS Icebreaking Tankers. HIOMAS has also demonstrated the capability to rapidly respond to search and rescue situations by helping a team in Utqiagvik, Alaska find a boat that was unable to reach shore due to engine complications.

The project team will continue to refine HIOMAS via improvement in model physics and numeric as well as model calibration and validation using observations. The research team is transitioning HIOMAS to the Alaskan Ocean Observation System (AOOS) - a NOAA affiliate, for routine and sustained forecast.

