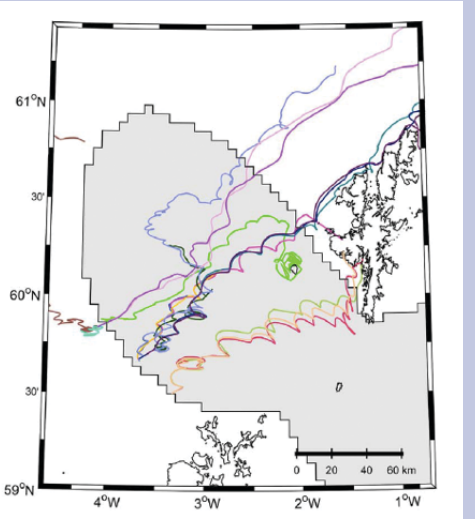
Recommended Reading

Notable publications from CODAR user community

Operational Oil Spill Trajectory Modeling Using HF Radar Currents



SeaSonde coverage area (grey) & drifter trajectories.

The broad spatial and temporal scale of SeaSonde surface current data represents an untapped resource for oil spill mitigation and is especially valuable when combined with oil spill detection solutions such as satellite imagery.Recognizing this potential, IH Cantabria and Marine Scotland approached the challenge strategically, addressing data gaps with Open Modal Analysis (OMA), assimilating a short term predictive system (STPS) for 12 hours of forecast currents, and implementing the TESEO oil spill transport and fate model. The resulting real-time oil spill trajectory system was integrated into the PORTUS Marine Information System, allowing web-based or private Internet access.

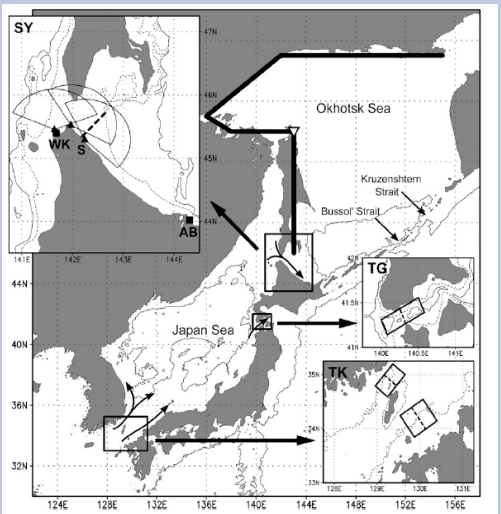
This publication details the multi-layered work effort and a successful test case in the Fair Isle Gap, a channel separated by two island chains in the northwest European shelf sea. The oil spill trajectory forecast model was validated with 18 drifter deployments. On average, OMA-enhanced, STPS currents reduced error in the simulated trajectory by approximately 40% compared to hydrodynamic model output.

SeaSonde currents prove useful in hindcast mode - for detection of the origin of pollution and debris in the sea - and in forecast mode, to inform real-time response efforts. PORTUS takes the operational system one step further with its integration of environmental data, cohesive visualization, and flexible data output options.

Abascal, A.J., Sanchez, J., Chiri, H., Ferrer, M.I., Cárdenas, M., Gallego, A., Castanedo, S., Medina, R., Alonso-Martirena, A., Berx, B., Turrell, W.R., Hughes, S.L. "Operational Oil Spill Trajectory Modelling Using HF Radar Currents: A Northwest European Continental Shelf Case Study." Marine Pollution Bulletin, Vol. 119, No. 1, 336–350 (2017).

Soya Strait SeaSonde Current Data Fills Japan Sea Throughway Knowledge Gap

Twelve years of SeaSonde current data served as a crucial long term dataset in Soya Strait, an outlet of the complex Japan Sea Throughflow, which provides passage for a portion of the Kuroshio Current. While transport through two of the three straits is well studied, Soya Strait has not been investigated with long term records until now. Fishing activity, the national border, and winter sea ice have hindered access, however, continuous monitoring from three standard range SeaSondes provided 95% coverage along the study transect line from August 2003 to August 2015.



Study area. SY, TG, TK represent Soya Strait, Tsugaru Strait, Tsushima-Korea Strait, respectively. Study transect is dashed line above S. Triangles represent SeaSondes.

The extensive record of surface currents provided a key component of volumetric flow rate, or flux, calculations through Soya Strait. Annual flux values were used to quantify the distribution of flow, heat, and salt through the Japan Sea Throughflow, closing these budgets for the first time. Monthly means reflected a seasonal peak in flux during summer/fall and a minimum in winter/spring. Wind stress along the east coast of Sakhalin was identified as a significant transport mechanism, setting up greater differences in sea level between the Japan Sea and and the Sea of Okhotsk during the summer/fall.

The discoveries in this article have implications for the role of the Japan Sea Throughflow in atmospheric cooling. In addition, potential sources of regional oceanic waters are identified. We recommend exploring the details.

Ohshima, K.I., D. Simizu, N. Ebuchi, S. Morishima, and H. Kashiwase. "Volume, Heat, and Salt Transports through the Soya Strait and Their Seasonal and Interannual Variations." Journal of Physical Oceanography, Vol. 47, No. 5, 999–1019 (2017).