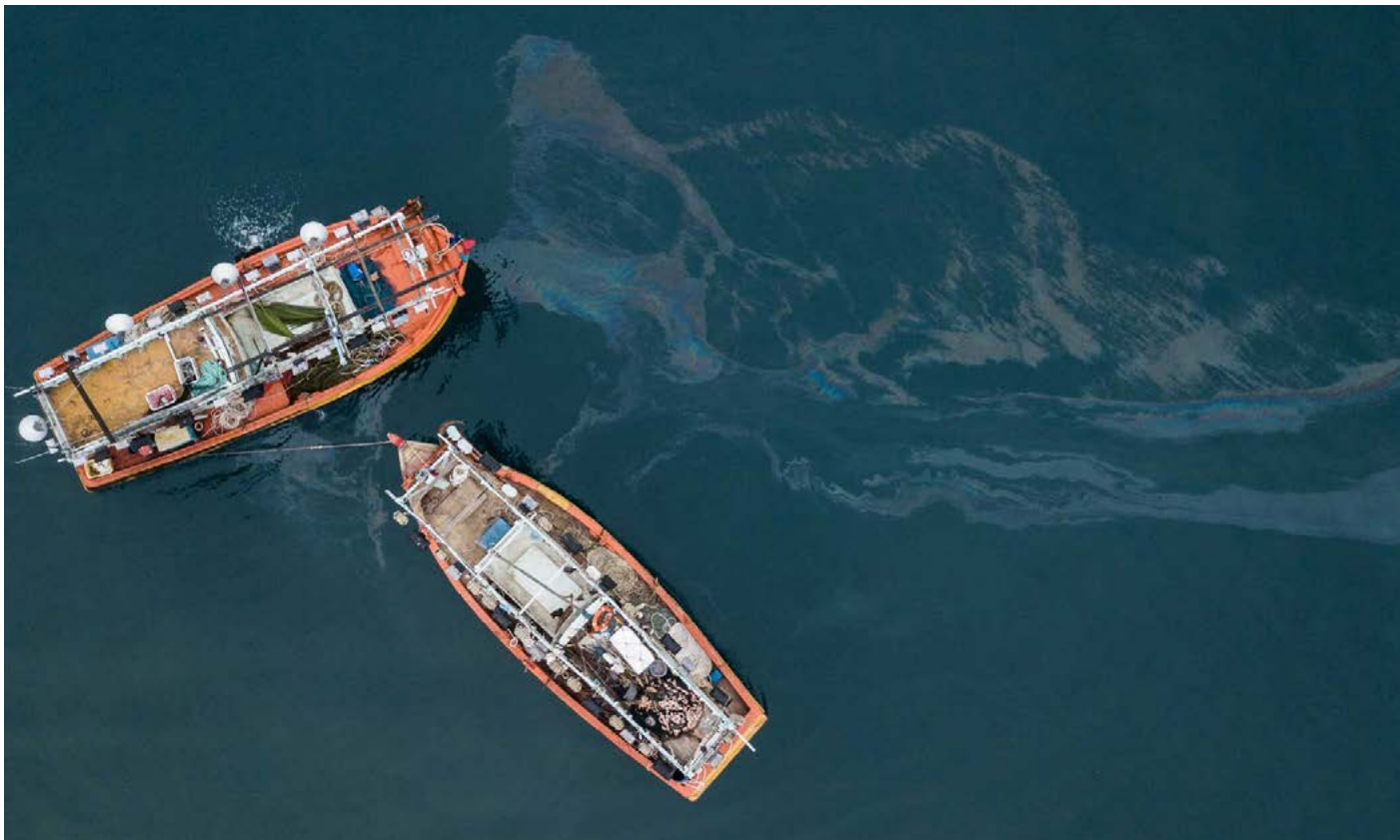


Oil Leakage Modeling

During the industrial activities associated with the extraction, transportation, and processing of petroleum products in coastal waters, seas, and oceans, contamination of the seas and oceans with petroleum products may occur in emergency cases, which poses a threat to the safety of the ecological system.



In order to minimize the consequences of extraordinary events associated with oil or oil product spills into water bodies, the OpenDrift software package is used, the prognostic capabilities of which allow effective online management decision-making in order to eliminate adverse effects on the marine environment.

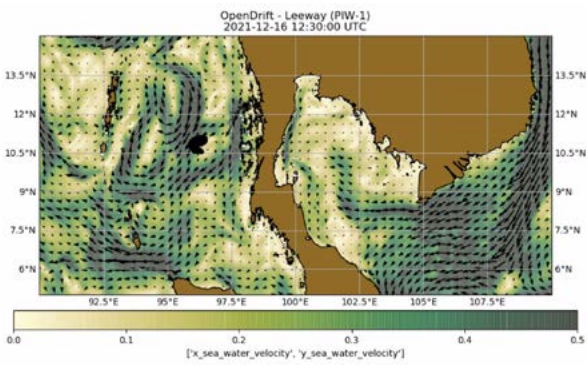
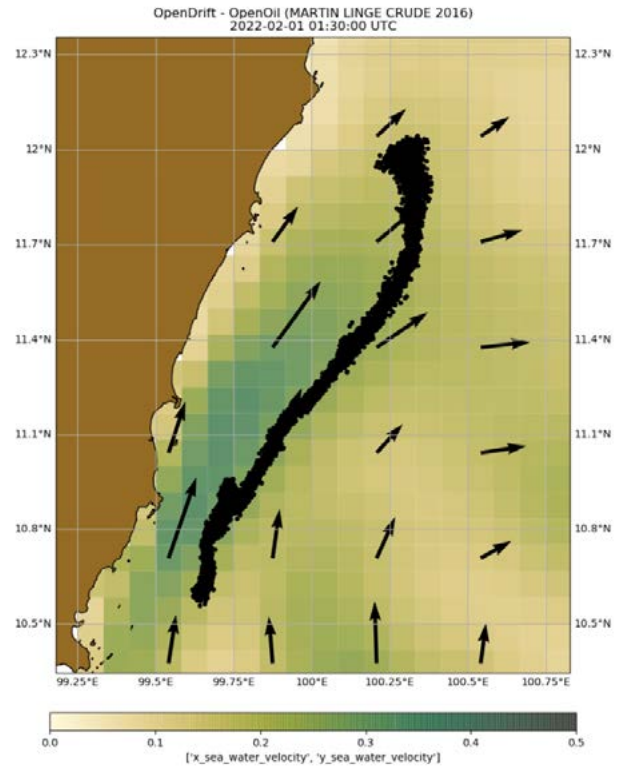
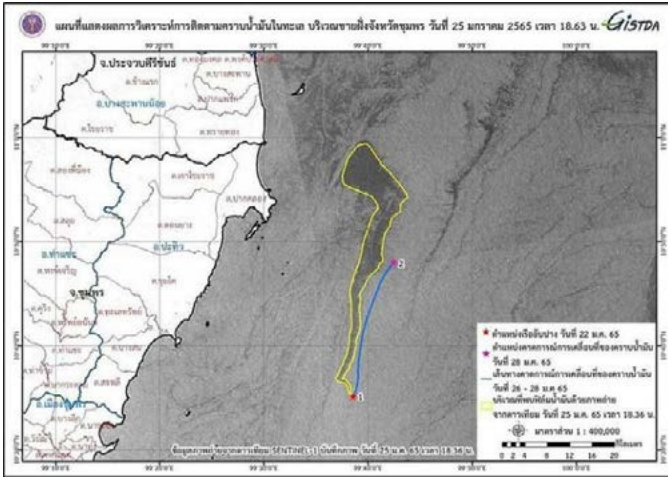
The OpenDrift algorithm is based on modern numerical methods that take into account all the necessary factors for a reliable forecast of the drift of oil products. The location of the pollution source can be set both at the depth and at the surface. The transfer of petroleum products is carried out in the vertical and horizontal directions, taking into account many factors:

- hydrometeorological conditions in the region which are ocean currents, waves and atmospheric wind at the surface, ocean stratification, water viscosity and density,
- physical and chemical processes such as evaporation, emulsification and dispersion of petroleum products.

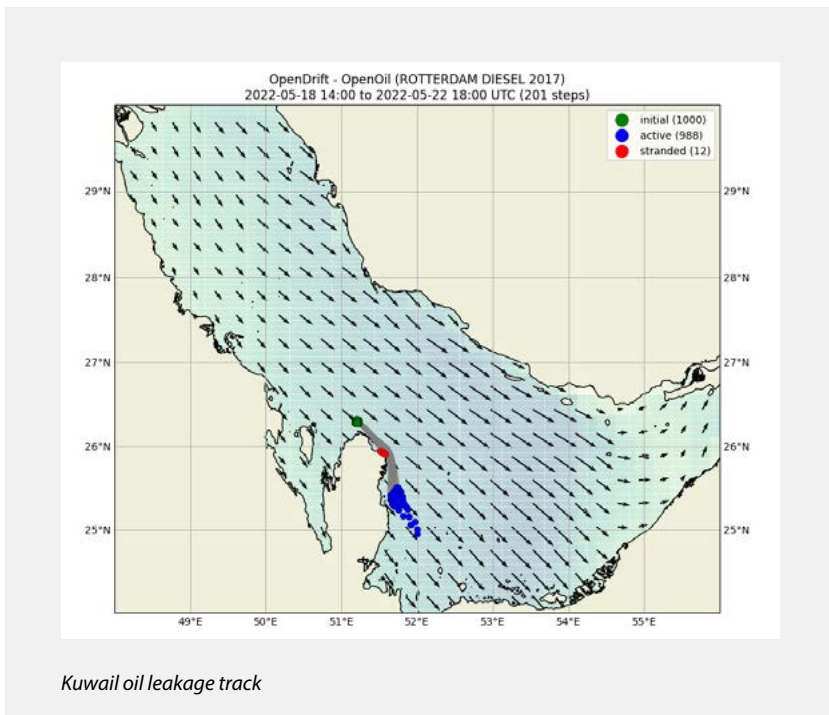
The flexible architecture of OpenDrift allows it to quickly build a forecast (including a probabilistic one) of the spread of various oil spills in the region on any spatio-temporal scales. The built-in database of characteristics of oil products contains more than 1000 items, which makes it possible to apply an individual approach to each extraordinary event and to predict the development of the drift of oil pollution of a specific type.

The modular system of OpenDrift allows to predict the drift of ships larger than 30 meters, while the calculation is carried out taking into account the influence of wave actions. In addition, it is possible to track the trajectories of various ocean drifting buoys and other passive tracers.

The model is able to assimilate local observational data and can be interfaced with other marine and atmospheric models through deep integration with the products of the IMS4 family. Model data can be stored and processed using the IMS4 CLDB module, as well as displayed in the IMS4 Maps module with an individual set of necessary information visualization.



Thailand oil leakage: Satellite track (upper left), leakage scenario (bottom left), leakage forecast track (right)



Kuwait oil leakage track