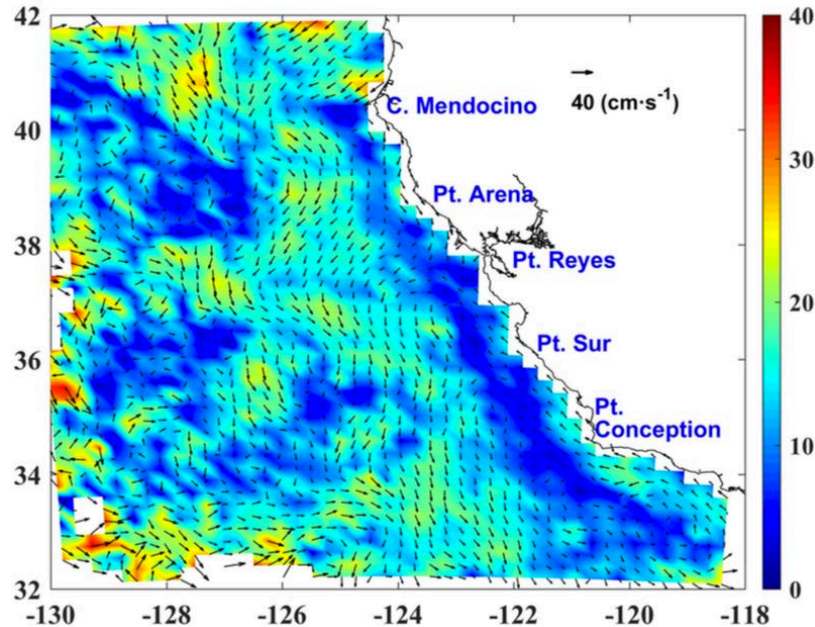


MS Thesis at SEE: Estimation of Ocean Currents from Optical and Thermal IR Satellite Data



Ocean surface currents are an important physical parameter for shipping, navigation, search and rescue, and the analysis / prediction of the spread of pollutants such as oil spills in the ocean. The Maximum Cross Correlation (MCC) method for ocean surface current estimation from thermal IR (infrared) remote sensing satellite is already implemented in the Dept. of Space, Earth, and Environment (SEE) at Chalmers. For this MS thesis, we require the student(s) to further enhance this method, and add more capabilities to it. We foresee the following tracks for method improvement:

- The existing MCC method at SEE only works with satellite thermal IR imagery. The algorithm can be enhanced to include satellite optical ocean color (OC) observations as well. The merged thermal IR and OC currents product will give better spatial coverage and more frequent observations in time. After implementation of the merged thermal IR + OC algorithm, the thesis would also involve evaluating the results and comparing with other ocean current measurements.
- Develop the MCC method towards an automated and near-real-time framework, to prepare it for operational use. The system should take near-real-time satellite data from different sources and process it automatically to generate ocean currents. The major scope of work will involve using programming to connect multiple components of the overall algorithm and make it perform with minimal human input. The output will be a largely self-sustained processing chain, which will produce ocean current maps at defined time intervals, e.g. daily outputs.

Each track can be an MS thesis in itself, so we are ready to take 1-2 students, one for each track. These MS thesis tracks are perfect for students looking for gaining expertise and entry into the earth observation and image / data analysis fields. This thesis will be conducted with the support of industry partner Offshore Monitoring Ltd (www.offshoremonitoring.com).

Pre-requisites: Basic to good coding skills in MATLAB / Python.

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