Title: Current retrieval from remote sensing images of ocean waves

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Abstract:

The project deals with the retrieval of currents in the ocean. The interaction of currents with waves occurs in the water column. On the surface, currents are detectable because they alter the speed of the waves. The influence of the currents on the waves depends on the wavelength. Longer waves induce orbital motion in deeper layers than shorter waves. Therefore, the information on the current profile at various depths is included in wave observations.

Methods for the inversion of the current depth profile are available and have been tested on simulated data. The task of the student will be to apply algorithms to radar images from the Mediterranean and the North Sea. The student will learn to work with measurement of geophysical processes and get an in-depth understanding for working in the spectral domain. The core of the algorithm is a minimization method. The student will experience how imperfection in the input data leads to errors in the results and how the effect of data noise on the output can be reduced.

This is an example of a radar image at a single time. For the analysis a stack of images will be used so that the evolution of the waves is tracked in time.