Geophysical Research Abstracts
Vol. 19, EGU2017-3854, 2017
EGU General Assembly 2017

Lagrangian Timescales in the Gulf of Finland

Bert Viikmäe (1) and Tomas Torsvik (1,2)

(1) Tallinn University of Technology, School of Science, Department of Cybernetics, Laboratory of Wave Engineering, Estonia (bert@ioc.ee), (2) Norwegian Polar Institute, Tromsø, Norway

Many applications, such as environmental monitoring, offshore commercial operations and safety of shipping, rely on accurate prediction of currents in the ocean surface layer. Although numerical models can be used for such predictions, observational data of currents is still scarce for many sea areas.

In this study we use observational data from field experiments carried out in the Gulf of Finland, in the Baltic Sea in order to determine Lagrangian timescales for our study area. We carried out several field experiments during 2014, involving passive surface drifters. We used a total of 20 passive drifters with 5 different deployments in spring, summer and autumn months.

The idea is to look at the ratio between the acceleration and velocity time scales y = Ta / Tv to separate Lagrangian trajectories in homogeneous classes in order to determine if motion can be represented as a typical advection-diffusion problem (the classical approach) or if there is an evolution of the gflow on intermediate scale that should be accounted for. It has been observed in the surface drifters data in the world's ocean basins, that trajectories having different values of y are characterized by different shapes, correlation, and dispersal properties. If the trajectories have similar values of Ta and Tv, this is an indication of the influence of eddies.

The results indicate the underlying surface current fields are extremely complex in the Gulf of Finland and give us indication what scales must be resolved in numerical models for parameterisation of eddy diffusivity in order to obtain reliable current predictions.