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Relative dispersion in the Nordic Seas - new insights ten years later

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The POLEWARD experiment in the Nordic Seas (2007-2009) involved deployment of 150 drifters in the eastern Nordic Seas and has been the first large drifter pair experiment in the ocean (and one of the very few conducted up to date). The experiment yielded nearly 100 drifter pairs with initial separations 2km or less, which allowed us to elucidate several aspects of the relative dispersion (a proxy for tracer spreading and transport) at a basin scale, to quantify the role of mesoscale eddies in surface transport, and to further develop the relevant theoretical and analytical methods through a series of publications. Ten years ago however there were no modeling tools available to carry out a similar numerical Lagrangian study in this region resolving relevant scales of variability.

In this presentation, we will present an update on the relative dispersion of surface drifter pairs in the Nordic Seas, with over 400 pairs available. We will then compare the observed statistics to these derived from Lagrangian simulations (OpenDrift scheme) forced by output from a very high resolution regional ocean model (Regional Ocean Modeling System). The comparison is very favorable pointing to the ability of the ocean model to represent surface eddy stirring processes. We will also show analysis of the regional dispersion regimes using both drifter observations and model simulations, and consider the effect of including vertical motion in the Lagrangian simulations, which impacts their horizontal dispersion. We will also present statistics of the temperature differences on drifters pairs. These are underestimated by the model on daily time scales and deformation scales, which has implications for the model ability to simulate tracer processes on these scales.