Assimilation of sea surface velocity and height data into a ocean model

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Orbiting of the JASON and TOPEX-POSEIDON (T/P) satellites in parallel during the TANDEM mission allowed for calculation of surface velocities from the sea surface height (SSH) data (Stammer and Dieterich 1999; Leeuwenburgh and Stammer 2002; Stammer and Theiss 2004). We assimilate such derived surface velocity data along their virtual tracks into the Finite Element Ocean Model (FEOM) of North Atlantic developed at the Alfred-Wegener Institut (AWI). This model uses continuous linear representation for the horizontal velocity, surface elevation, temperature and salinity, and solves the standard set of hydrostatic ocean dynamic primitive equations (Wang et al 2008). Assimilation is done using the Singular Evolutive Interpolated Kalman (SEIK) Filter(Pham 2001). For comparison, assimilation of only the altimetry data from the TANDEM mission is also performed. We investigate assimilation results depending on whether the observed field or its gradient is assimilated.