Multidisciplinary Simulation, Estimation, and Assimilation Systems
Seminar Series

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Dynamical ocean topography from satellite measurements and its impact on Southern Ocean circulation estimates

Abstract: With the focus on the Southern Ocean, results of the assimilation of multi-mission-altimeter data and the GRACE/GOCE gravity data into a finite element ocean model are investigated. We use the geodetic method to obtain the dynamical ocean topography from only the satellite measurements and an ensemble Kalman filter approach for assimilation of this data set into the finite element ocean model. The data assimilation scheme corrects all the ocean fields, although only the geodetic DOT is assimilated. Properties of the data assimilation algorithm, particularly with respect to the resolution of the data, are discussed in detail. By assimilating only absolute dynamical topography data, we were able to improve the model fields. The results of the assimilation agree better with observations which were not used for assimilation and lie outside the area covered by the altimetry in the Southern Ocean (e.g. temperature of surface drifters or deep temperatures in the Weddell Sea area at 800 m depth derived from Argo composite). In addition we show that the ocean model representation of the location of the fronts in the Southern Ocean is improved.

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