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Combining a Global GOCE Derived MDT with In-situ Observation for Regional Enhancement of the Mean Dynamic Topography

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The Gravity and steady state Ocean Circulation Explorer (GOCE) satellite mission measures Earth's gravity field with an unprecedented accuracy at short spatial scales. Previous results have demonstrated a significant advance in our ability to determine the ocean's general circulation. The improved gravity models provided by the GOCE mission have enhanced the resolution and sharpened the boundaries of those features and the associated geostrophic surface currents reveal improvements for all of the ocean's major current systems. Furthermore, finer scale features, such as meanders and branches of the current system have become visible.
In this study, a global mean dynamic topography (MDT) derived using a gravity models from GOCE combined with the DTU13MSS mean sea surface is used as a reference model. Then regional analyses are carried out using in-situ observations of the gravity field as well as of the geostrophic surface currents. The aim of those analyses is to evaluate the GOCE derived MDT in detail at regional scales. Subsequently, the in-situ observations are used in a regional enhancement of the estimated MDT and its associated currents. The data are combined using an optimal estimation technique such as least squares collocation, that is based on the functional relationship between the gravity field and the MDT as well as their a-priori statistical characteristics. The methodology and preliminary results will be presented.