



## **Impact of the new GRACE geoid estimate on ocean data assimilation.**

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Today, two satellite gravimetric missions (CHAMP, GRACE) are dedicated to the improvement of our knowledge of the geoid, and one (GOCE) is planned in the near future. This will allow the original altimeter ocean height measurements to be exploited, instead of only sea level variations. Here, we address the impact of the GRACE mission on ocean data assimilation.

First, we analyse the response of an eddy-permitting North Atlantic ocean model to changes imposed by the use of different (and commonly used) mean dynamic topography (MDT) estimates in a multivariate assimilation context. The objective of assimilation is to improve the representation of the 3D ocean state. However, the imperfect representation of a MDT appears to be an important limiting factor with regard to the degree of realism obtained. .

We then present a new approach that directly assimilates the full altimetric signal relative to a geoid calculated with the first GRACE data. The response of the ocean model to the assimilation of this altimetric signal is analysed. Different ocean estimates are compared to that obtained if we use the common approach, i.e. the assimilation of altimetric sea level anomalies added to a MDT estimate. Even if the GRACE mission resolution is not yet compatible with oceanographic studies at mid latitude, the corresponding simulated flow is shown to reach a good degree of accuracy.