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Improvements in the oceanic mean dynamic topography as determined using GOCE gravimetry

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Data from GOCE have pushed the accuracy of the satellite-derived geoid out to shorter length scales than have previously been accessible. This is clear particularly over land regions where the match with levelling is improved, especially in regions which are poor in situ gravity measurement coverage. In principle, this should mean that it is possible to improve the resolution of ocean currents from a combination of geoid and mean sea surface, but handling of omission errors over the ocean is a subtle matter which can make any gains difficult to see. Here, we show that the combination of a combined GOCE-GRACE-altimetry-in situ gravity geoid (TUM2013c) with a compatible mean sea surface, and an adaptive filtering algorithm, provides clear improvements in the mean dynamic topography, especially over the Southern Ocean. The improvement is verified by comparison with mean sea surface temperature fields.