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# A first outlook of GOCE contribution to the determination of the dynamic ocean topography and ocean circulation in the Mediterranean Sea

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The exploitation of altimetric data sets from past and current satellite missions is crucial to both oceanographic and geodetic applications, since it allows the determination of sea level anomalies as deviations from a static mean sea level, while it is also fundamental for marine geoid determination. In this work, altimetric data sets from the satellite missions of JASON1 and ENVISAT have been used towards the determination of Mean Sea Surface (MSS) models in the Mediterranean Sea. The raw data used are Sea Level Anomaly (SLA) values and their total inverse barometer corrections from the respective altimetric missions. Along-track records of the SLA have been first used to derive linear trends of the SLA variation in the area under study and then determine empirical covariance functions to estimate single and multi-satellite models of the mean sea surface through least squares collocation. The latter is then employed along with the GOCE/GRACE GOCO02s GGM in order to estimate the dynamic ocean topography (DOT) in the Mediterranean Sea and consequently the steady-state circulation in the area. The resulting initial DOT estimates are treated through various filters in order to remove high-frequency information that results from computing the residuals between the high-resolution MSS and the lower resolution GOCE geoid heights (degree and order 250 corresponding to $\sim$80 km). To this respect three types of filters are used, namely boxcar, Gaussian and Wiener ones employing various spatial wavelengths for the filter width to accommodate their cut-off frequency. The finally derived solutions presented refer to filters with spatial wavelengths set to 150 km and 200 km (75 km and 100 half-wavelength, respectively), which are used to determine the steady-state circulation in the Mediterranean Sea. The results are validated against the RioMed model for the DOT, the DTU2010 DOT and a solution based on the DTU2010 MSS and GOCO02s.