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Regional Mean Sea Surface Model over the Eastern Mediterranean Sea

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The Mean Sea Level is not an equipotential surface because it is subject to several variations, e.g., the tides, currents, winds, etc. Mean Sea Level can be measured either by tide gauges near to coastlines relative to local datum or by satellite altimeter above the reference ellipsoid. From this observable quantity, one can derive a non-observable quantity at which the potential is constant called geoid and differs from mean sea surface by amount of ± 1 m. This separation is called Sea Surface Topography. In this research, the data of nine altimetric Exact Repeat Missions (Envisat, ERS_1 of 35 days (phase C and G), ERS_2, GFO, Jason_1, Jason_2, Jason_3, Topex/Poseidon and SARAL) were used for computing the regional mean sea surface model over the eastern Mediterranean Sea. The data of all missions together span approximately 25 years from September -1992 to January-2017 and referenced to Topex ellipsoid. Which is later transformed to WGS84 ellipsoid, as it is chosen to be a unified datum in this study. Prior to computing the altimetric MSS, altimetric sea surface height measurements were validated by comparing time series of altimetric-MSL with mean sea level time series calculated from three in-situ tide gauge measurements. The sea surface heights values of the derived MSS model is between 15.6 and 26.7 m. And the linear trend slope is between -3.02 to 6.53 mm/year.

Keywords: Mean Sea Level, Satellite Altimetry, Tide Gauge, Exact Repeat Missions