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Mediterranean Circulation and Sea Level Using Satellite Altimetry and GRACE

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The Mediterranean Sea is a semi-enclosed "true" ocean bordering European nations from the Western Europe to the near- and middle-East and Africa and inhibited by some of the world's most ancient civilizations and its tremendous resources could be significantly influenced by global climate change which has considerable impact to the society and human well-beings in the region. Long-term sea level change has been quantified recently using a decadal data record from TOPEX/POSEIDON and ERS-1/ERS-2, and using long-term (several decades to 100 years) tide gauge records. The currently observed sea level change of 1.1-1.4 mm/yr from tide gauges [Tsimplis and Baker, 2000] and 2.2 mm/yr from satellite altimetry (1996-2000) [Cazenave et al., 2002; Fenoglio-Marc, 2002] indicate substantial regional variability (rise of sea level in the Eastern Mediterranean and a drop of sea level in the Western Mediterranean), and do not agree with the current estimated global sea level rise of 1.8 mm/yr [Church et al., 2004]. This paper is focused on the potential quantification of the processes governing Mediterranean circulation and long-term sea level change, including hydrological fluxes associated with refreshening, heat transport, salinity, oceanic mass variations, precipitation, and evaporation, using satellite altimetry and spaceborne gravimetry, and available in situ oceanic measurements.