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Sea level changes and vertical land movements in the Mediterranean from paleo-historical indicators, modern instrumental data and model predictions.

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The Mediterranean basin is a natural laboratory for the reconstruction of the sea level variations since paleo-historical times. During the Holocene, sea level variations in this region have been mainly determined by the response of the geoid and of the solid Earth to the melting of remote ice aggregates, which has produced spatially variable signals mostly governed by the effect of ocean loading. An analysis of past and recent sea level variations is possible from various indicators, which provide data on relative sea level and crustal vertical movements on different time scales. Since the Mediterranean

shows a significant seismic and volcanic activity, the interpretation of sea level variations in this region must be accompanied by the evaluation of vertical land movements associated with seismic and volcanic activity. This can be tentatively carried out through seismic strain analysis based on data pertaining the last 2 millennia as well as from the study of maritime archaeological structures in volcanic areas. Predictive models can then be used for sites located in tectonically stable areas or where the magnitude of tectonic uplift or subsidence is known from geological or archaeological indicators. A comparison between observed deformations and predictions of glacio- and hydro-isostatic signals may provide constraints on the earth rheological profiles and ice sheets chronologies. Recent results indicate for the central Mediterranean significant variations of relative sea level in the last $\sim$2000 years, suggesting that the observed signal can be accounted for by eustatism and isostatic adjustment as well as by land movements in active zones. The average modern eustatic sea level rise recorder by tide-gauges, close to 1 mm/year, has not been constant since the Roman epoch, but it is likely to be representative of the last 100-150 years. Here we show new results on the reconstruction and modeling of sea level changes in the Mediterranean during the Holocene from a combined data set and competing models of glacial isostatic adjustment.