



Completing the Record of 20th Century Sea Level Rise in the Eastern Mediterranean

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Quantitative studies of sea-level rise in the Mediterranean are becoming more and more accurate thanks to detailed satellite monitoring campaigns. However, these studies cover several years to a couple of decades at best, while longer-term sea-level records for the area are rare. Long-term sea-level measurements are essential in order to derive accurate trends free of conspicuous oscillations in shorter records. We use an approach from data archaeology to meet this shortcoming, and to offer a more complete record of sea-level rise cross-checked among several tide gauges. Specifically, we investigate monthly mean sea-level data of the Antalya-I (1935-1977) tide gauge provided by the Turkish National Mapping Agency. We checked how accurately and reliably these monthly records were digitized, quality-controlled, and tied to a common datum. We then merged these data with the more recent records of the nearby Antalya-II (1985-2010) tide gauge, obtaining a composite time series of monthly and annual mean sea levels spanning approximately 75 years. We thus offer the hitherto longest record in the Eastern Mediterranean Basin as an essential tool for studying the region's sea-level trends. We estimate a relative mean sea-level rise of 2.46 ± 1.65 mm/yr between 1935 and 2010, with a sub-decadal variability ($\sigma_{\text{residuals}} = 49.47$ mm) that is higher than at nearby tide gauges (e.g. Thessaloniki, Greece, $\sigma_{\text{residuals}} = 28.71$ mm). Our study highlights the value of data archaeology for recovering and integrating early tide-gauge data for long-term sea-level and climate studies.