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Global and regional sea level change since 1900

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Sea level variations prior to the launch of satellite altimeters are estimated by analysing historic tide gauge records. Recently, a number of groups have reconstructed sea level by applying EOF techniques to gappy data. We complement this study with alternative methods. In a first step gaps in 178 records of sea level change are filled using the pattern recognition capabilities of artificial neural networks. Afterwards satellite altimetry is used to extrapolate local sea level change to global fields. Contrary to conventional methods we fit EOF amplitudes in time domain rather than space domain. Comparison of reconstructed sea level with the extended multivariate ENSO index (MEI.ext) since 1900 shows high correlations.
Global mean sea level change since 1900 is found to be 1.65 ± 0.26 mm per year on average while local trends range from -4 mm per year to +8 mm per year . These extrema both are found in the tropical Indian Ocean. Although no significant acceleration or deceleration is found for the global mean, local values range from -0.08 mm year**-2 in the tropical Indian ocean south of the equator to +0.10 mm year**-2 in the western tropical Pacific. These extrema are associated with patterns of sea level change that differ significantly from the first half of the analysed period (i.e. 1900 to 1954) to the second half (1955 to 2009). We take this as an indication that long period processes are superimposed on general sea level change.