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Recent developments in understanding sea level rise at the Adriatic coasts

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Sea level observations from tide-gauge records located at the Adriatic coasts are analysed. The estimated sea level trends show variability in time and space. Spatial variability is assessed by estimating the differential trends by reference to Trieste. For many of the stations the differential trends become smaller than the corresponding error bars. This indicates that the land, atmospheric and oceanic contributors to sea level change are, at long scales, uniform in the basin.

Observed trends in the longer records differ significantly for the periods before 1960 and after 1960. Atmospheric forcing has been a significant contribution in sea level variability for the period 1960 onwards. The atmospheric trends account for -0.8 mm/yr for the period 1960-2000. No significant atmospheric trends appear to be present at the period 1900-1960. Changes in the atmospheric forcing alone are not capable of explaining fully the difference in the sea level trends for the periods before and after 1960.

Steric trends for the period 1960-2000 have also been identified. Their magnitude depends on the depth used for their estimation. Steric trends range between -0.4 mm/yr for the upper 100 m to -2.4 mm/yr for the whole water column. The residual sea level after the removal of atmospheric and steric effects ranges between 2 to 3.4 mm/yr at various stations with an associated error bar of 1 mm/yr. This residual must be accounted for by land movements and incoming signals through the strait of Otranto.

The coherence of high frequency sea level signals in the north part of the Adriatic Sea is also analysed for the period 2002-2005 using eight tide gauges. The first empirical orthogonal function contains 71% of the variability indicating that the known coherency at interannual and interdecadal scales extends partly to the higher frequency too.