



Analysis of the most recent data of Cascais Tide Gauge

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In order to meet international standards and to integrate sea level changes and tsunami monitoring networks, Cascais tide gauge, one of the oldest in the world, has been upgraded in 2003 with new acoustic equipment with digital data acquisition, temperature and air-pressure sensors, and internet connection for real time data. The new tide gauge is located very close to the old analogical gauge, which is still working. Datum links between both gauges and the permanent GPS station of Cascais were made and height differences between gauges and the GPS station have been monitored to verify site stability and to estimate the absolute vertical velocity of the site, and therefore, the absolute sea level changes.

Tide gauge data from 2000 to 2009 has been analyzed and relative and absolute sea level rise rates have been estimated. The estimation of sea level rise rate with the short baseline of 10 years is made with the daily mean sea level data corrected from the inverse barometric effect. The relative sea level trend is obtained from a 60-day moving average run over the corrected daily mean sea level. The estimated rate has shown greater stability in contrast to the analysis of daily mean sea level raw data, which shows greater variability and uncertainty.

Our results show a sea level rise rate of 2.6 mm/year (± 0.3 mm/year), higher than previous rates (2.1 mm/year for 1990 decade and 1.6 mm/year from 1920 to 2000), which is compatible with a sea level rise acceleration scenario. From the analysis of Cascais GPS data, for the period 1990.0 to 2010.0 we obtain an uplift rate of 0.3 mm/year leading to an absolute sea level rise of 2.9 mm/year for Cascais, under the assumption, as predicted by the ICE-5G model, that Cascais has no vertical displacement caused by the post-glacial isostatic adjustment.