

Non linear oscillations of mean annual sea level data in Genoa

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Abstract

In this paper we examined the tide gauge records of Genoa ($44^{\circ}25'$ N, $08^{\circ}54'$ E) from 1928 to 2016 to investigate long period oscillations of mean annual sea level data. We found a significant oscillation with a period of 18.6 years associated with the period of the retrograde orbital motion of the Moon's nodes through a complete cycle (Schureman, 1941). At the Thomson gauge of Genoa a permanent sea land reference mark is used to measure sea level changes (Lusetti, 1977). A statistical analysis on the mean annual data from 1928 to 2006 has produced a linear positive trend of about 1.1 mm per year (Demarte et al., 2007). In the present investigation the mean sea level from 2006 to 2016 has shown a positive rate of 10.2 cm compared to the 1937 to 1946 average value which is the standard reference mark for the Italian terrestrial topography. Although the tide gauge data of Genoa are limited the mean annual sea level rise can hypothetically be described in terms of harmonic and subharmonic oscillations of the 18.6 year tidal wave (Mandelstam and Papalexi, 1932). The harmonic and subharmonic oscillations of the 18.6 year tidal wave could be a powerful technique to predict sea level changes in Genoa over coming decades.

References

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