



Time frequency analysis of sea level anomaly data corrected for centre of Earth mass variations model

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The accuracy of the Earth centre of mass coordinates has a significant influence on altimetric measurements accuracy because altimetric satellites orbit around temporary Earth centre of mass meanwhile orbits of these satellites are determined in the terrestrial reference frame with fixed origin (currently ITRF2008). The systematic errors in sea level variations are caused by systematic errors of altimetric satellites orbits and station coordinates determined in the ITRF. The investigations have shown that the determination of the centre of mass of the Earth estimated from SLR and GNSS measurements is so accurate that it is possible to model it with a precision of 1 mm. The common signal in the centre of mass time series has been found using the wavelet based semblance filtering. The highest amplitude of the annual retrograde oscillation in this signal is of the order of 5mm in the equatorial plane. The wavelet based semblance filtering model, can be then used to correct the global sea level anomalies (SLA) data available from AVISO for systematic errors due to centre of mass variations. The time-frequency analysis of the SLA data and corrected SLA for centre of mass variations were carried out. The amplitudes and phases of oscillations in the SLA data as a function of geographic latitude and longitude with periods ranging from about 30 to 400 days were computed using the Fourier transform band pass filter and other spectro-temporal analyzes based on the wavelet transform. It was shown that in the equatorial region the amplitudes of the annual oscillation in the SLA data were slightly changed after applying the Earth centre of mass correction.