

INVESTIGATION AT GLOBAL AND MEDITERRANEAN SCALES OF MEAN SEA LEVEL HEIGHT VARIABILITY BY SINGULAR SPECTRUM ANALYSIS

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ABSTRACT

The spatial sampling offered by satellite altimetry and its continuity during the last years are major assets to provide an improved vision of the oceanic variability. In this paper, the seasonal and interannual variability of global and Mediterranean mean sea level height variability are studied through the maps of sea level anomalies (MSLAs) that extend back to 1993. The singular [spectrum analysis](#) (SSA) method is applied to the averaged MSLAs time series on global and Mediterranean scale separately. The SSA technique shows that the [global mean sea level](#) variability is dominated by an increasing trend, which represents 91.52% of the initial MSLAs time series. The rate of the global long-term trend as seen by SSA appears to be about 2.8 mm yr⁻¹. Also, the SSA shows that the global mean sea level is object of significant harmonic components: annual signal, semi-annual signal and 4 months signal. The amplitude of the grouped seasonal components varies between -0.83 and 1.04 cm. Likewise, the first harmonic components in the [Mediterranean sea](#) are: annual signal, semi-annual signal and 7 months signal, where the annual frequency signal is particularly strong. Its contribution represents 72.38 % of the initial averaged MSLAs and its amplitude is of 14.4 cm. The rate of mean sea level height variability over the Mediterranean sea is estimated of 1.72 mm yr⁻¹.

Keywords: [mean sea level](#) variability; global and [Mediterranean scales](#); maps of sea level anomalies.