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Wavelet variance analysis of global satellite altimetry data

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Satellite altimetry yields huge datasets of measurements of the height of the sea surface on a nearly global and spatially uniform scale. Continuous records spanning more than 15 years are now available for the study of the temporal variability of global sea-level. The specific features of altimetry data (e.g. along-track rather than image data, spatial and temporal resolution) require appropriate methods for summarising the information contained in these valuable records. Wavelet variance analysis based on the discrete wavelet transform is particularly suitable for assessing sea-level variability on a scale-by-scale basis, summarising the energy in the different signals contained in the satellite altimetry series. In this work the procedure is applied for the analysis of global sea-level data from along-track gridded Topex/Poseidon and Jason-1 data. First the wavelet variance analysis is applied for the complete period, implicitly assuming stationarity, then the analysis is carried out in a running window version for assessing non-stationary behavior of global sea-level at different scales.