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Irregular variations of Sea Level Anomaly data and their impact on prediction errors of these data

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The movement of water around the oceans caused by density and a wind driven circulation plays a significant role in variation of sea surface heights which is now observed by satellite altimetry. Weekly SLA data thanks to courtesy of AVISO (Archiving, Validation and Interpretation of Satellite Oceanographic) service were analyzed to detect their irregular variations using the two time-frequency methods: Fourier Transform Band Pass Filter with Hilbert Transform (FTBPF+HT) and Complex demodulation with the Fourier Transform Low Pass Filter (CD+FTLPF). Using these two methods it is possible to compute time variable amplitudes and phases of oscillations as a function of geographic location. The global ocean maps of the standard deviations of amplitude differences and products of amplitude and phase differences for the annual oscillation and other shorter period oscillations with frequencies being an integer multiplicity of the annual frequency were computed to show the ocean areas with the greatest irregular variations. Such irregular amplitude and phase variations of the oscillations are the main causes of the SLA prediction errors. The predictions of the SLA time series were computed by a combination of the polynomial-harmonic model with the autoregressive prediction in the frame of PROGNOCEAN prediction service at the University of Wroclaw. The maps of these standard deviations are very similar to the maps of the mean prediction errors for a two weeks in the future of the SLA data. Thus, it's possible that the broadband annual oscillation is the main cause of the increase of the SLA data prediction errors.