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Influence of irregular phase variations in the Earth orientation parameters on their prediction errors

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The forced annual oscillation in polar motion and UT1-UTC is realated to the seasonal thermal cycle therefore its phase fluctuates around its well-defined expected value. The phases of the free Chandler oscillation in polar motion and Free Core Nutation in precession nutation residuals have not expected values, so their phases may show a drift. The wavelet transform and the combination of the Fourier transform filter with the Hilbert transform and complex demodulation were applied to compute phase variations of the most energetic oscillations in the Earth orientation parameters. It was shown that there is a good agreement between phase variations determined by different combination techniques. These phase variations are irregular which causes the increase of the prediction errors of the pole coordinates and UT1-UTC data. The pole coordinates and UT1-UTC data were forecast by the combination of the least-squares extrapolation and the autoregressive prediction. Due to the unmodeled effects in the phase variations the optimum length of data used for computation of the prediction model is discussed.