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Earth variable rotation and climate oscillations

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Abstract

Our epoch of precise observations of Earth systems is already giving us an evidence of interconnection between climate processes and Earth rotation changes. Amplitude of the Chandler wobble decreased sufficiently in the 2010s, as in the 1930s. 70-year modulation is observed in the Length of Day (LOD) changes. At the same time Earth temperature and sea level variations, well observed after removal of the global warming trend, have similar periodicity. The temperature extrema, usualy related to the Multidecadal Atlantic Oscillatons are observed in the 1930th and 2000 and, coinciding with the extrema of LOD. We analyze Chandler wobble phase and amplitude changes, its excitation sources, trying to bridge this traditional subject of geodesy with contemporary climatological observations over ocean, atmosphere, and land mass transport.

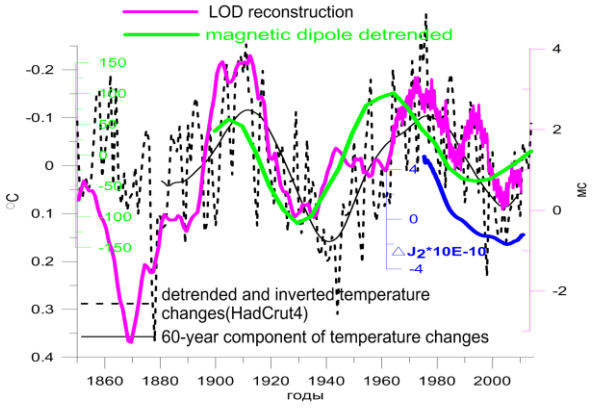

Fig. 1 Length of day changes, 60-year temperature changes (inverted), trend in the Earth gravity J_2 coefficient, and magnetic dipole strength detrended.

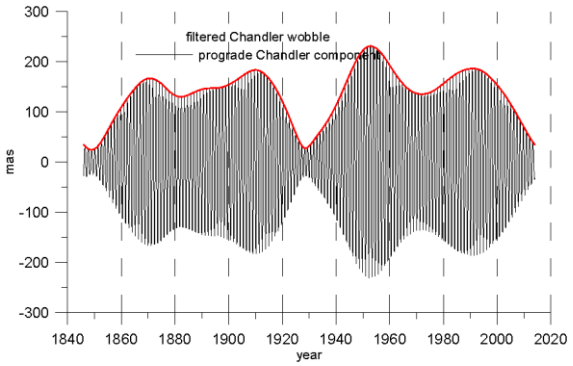

Fig. 2 Chandler wobble of the Earth pole (X-component) and its envelope.

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