

THE DECADE FLUCTUATIONS OF THE EARTH ROTATION VELOCITY AND OF THE SECULAR POLAR MOTION

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The decade fluctuations of the Earth rotation velocity and the secular polar motion (DFER) are usually explained by the interactions of the Earth's core and mantle. This hypothesis well explains a close correlation between DFER and the variations in the rate of the westward drift of the geomagnetic eccentric dipole; it corresponds quite reasonably to the possible redistribution of the angular momentum between the fluid core and the mantle of the Earth. However, the hypothesis cannot explain the close correlations of DFER with the observable variations in the masses of the Antarctic and Greenland ice sheets, with the decade oscillations of the types of synoptic processes (the epochs of the atmospheric circulation), with the global anomalies of the atmospheric pressure and temperature, regional anomalies of the cloudiness, precipitation, and other climatic characteristics.

A new hypothesis is proposed. It supposes that DFER are the fluctuations of the velocity of the lithosphere drift along the asthenosphere. These fluctuations are due to the lithosphere moments of the inertia variations owing to the redistribution of the water masses between the World Ocean and the Antarctic and Greenland ice sheets. The atmospheric and oceanic circulations are responsible for the redistribution of water on the Earth's surface and govern the global climate. The initial cause of the decade oscillations of the atmospheric and oceanic circulations are, probably, the gravitational interaction between the Earth's non-spherical and eccentric envelopes and the Moon, Sun, and planets (J.V.Barkin, 2002). The astrometrical consequences following from this hypothesis are discussed. See Figures and References below.

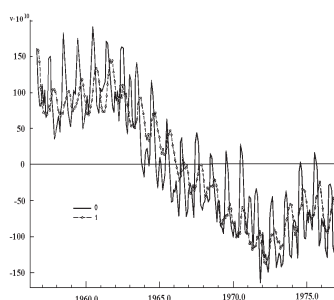


Figure 1: Monthly mean of the Earth angular velocity in 1957-1977:
0 - by the astronomical data; 1 - theoretical value (Sidorenkov, 1979, 2002).

Acknowledgements. This work was supported by the Russian Foundation for Basic Research (project code 02-02-16178) and the Local Organizing Committee of the “Journées Systèmes de Référence Spatio-temporels 2004”.

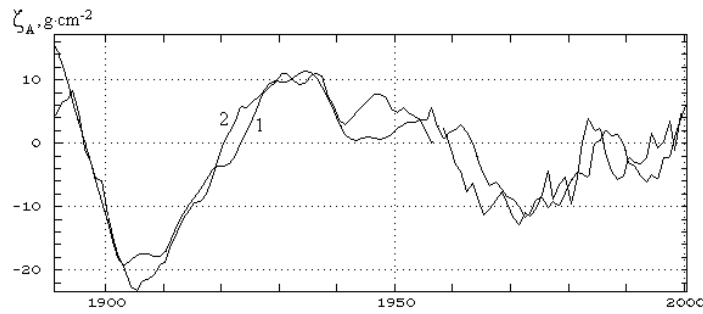


Figure 2: Temporal variations of the specific mass of ice ζ_A in Antarctica, gcm^{-2} .
 1 - the theoretical value ζ_A ; 2 - the empirial value ζ'_A (Petrov, 1975; Bryazgin, 1990).

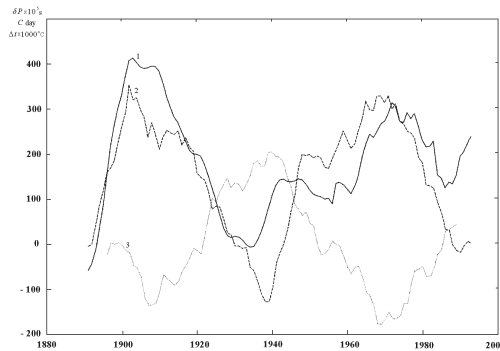


Figure 3: Synchronous changes in the length of day δP (1), the cumulative sums of anomalies of the circulation form C (2), and of the ten year running anomalies of the Northern Hemisphere air temperature Δt (after elimination of a trend and a thousandfold magnification (3)).

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