

TEMPORAL CHANGES OF SOLAR ACTIVITY AND GLOBAL GEOPHYSICAL PARAMETERS OF THE EARTH ON DIFFERENT TIME SCALES

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This study is an attempt to find connection between temporal changes of solar activity and of fundamental parameters of the Earth as its global temperature (Tgl) and rotation velocity (f). We study temporal changes of oscillations with the same periods from the spectra of solar activity (sunspot numbers W), of Tgl and f to understand their connection in the past, present and close future. To solve the tasks we use own method of a non-linear spectral analysis named by the method of global minimum (MGM). We use Tgl for the last 1000 yrs and W from 1665. Spectra of W and Tgl (within error bars) show cycles with the same periods: T=200, T=130, T=48, T=30, T=24, T=22 and T=10 years. Trends in W and Tgl show increase from 1700. Amplitudes of the Tgl components near periods of solar cycle (10-12 yrs) have small power, compared with ones at T=200 and T=130 yrs. Connection of variations of W and Tgl has different character on different time scales pointing to different physical mechanisms. For instance, cycles with T=200 yrs in W and Tgl vary in phase; the 200-yr cycles in W and in the rotation rate vary almost in opposite phase. At present these cycles show increase of f accompanied by decrease of W and Tgl. The 130-yr nonstationary sinusoids in W and Tgl vary in phase for of 1700-1820 and in anti-phase later. The 10-yr and 30-yr cycles in W and Tgl vary in clear opposite phase from 1800. But magnetic solar cycle at T=22 yr in W and in Tgl described by non-stationary sinusoids vary in phase during all analyzed interval. We describe all power components of three spectra at close periods. Based on our results we discuss possible physical mechanisms of the solar activity influence on global temperature on different time scale.

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