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## Quasi-periodic changes in the galactic cosmic rays intensity related to the $\alpha$ - $\omega$ effect on the Sun

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We established that the amplitudes of the 27-day variations of the galactic cosmic rays intensity and several parameters of solar activity (SA) and solar wind (SW) manifest quasi-recurrent changes with various periodicities. Among those periodicities is a clearly seen cyclicity consisting of 3 to 4 Carrington rotations period (3-4 CRP). We ascribe this phenomenon to the existence of a spatial topological structure (STS) of the magnetic field lines. The STS is created by  $\alpha$ - $\omega$  transformation with some peculiarities for each individual rotation of the Sun in the inner solar atmosphere, from the photosphere to the lower corona. STS according to our assumption exists owing to the asymmetry of turbulent solar dynamo and solar differential rotation transforming the Sun's poloidal magnetic field to the toroidal ( $\alpha$ - $\omega$  effect), and vice versa. Studying this phenomenon using wavelet and spectral analysis methods we found an existence of the quasi-periodicities with periods shorter than, and longer than the 3-4 CRP. This quasi-periodicity, 3-4 CRP, corresponds to the extreme interval  $t$  of differential rotation periods,  $t = 35$  days -25 days (from poles to equator, respectively) of the Sun. However, we also assume that the  $\alpha$ - $\omega$  process appears in time intervals corresponding to the intermediate differential rotation periods, as well, e.g.  $t_1 = 26$  days -25 days,  $t_2 = 27$  days - 25 days,  $t_3 = 28$  days - 25 days, and so on, up to  $t = 35$  days -25 days. This finding led us to assume that, in general, broad quasi- periodicities in changes of the GCR intensity, solar wind and solar activity parameters can be related to the joint effect of the turbulent solar dynamo and differential rotation of the Sun being a cause of creation of the STS. Hence, the STS should be very complex pattern containing a broad modes of fluctuations responsible for various types of quasi-periodicities in changes of the GCR intensity, SW and SA parameters (among them in changes of the amplitudes of the 27-day variations).

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