CR-SA HYSTERESIS PHENOMENON ON THE BASIS OF NM DATA, 2. RESULTS FOR ODD SOLAR CYCLES 19 AND 21.

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We analyzed monthly and 11 months smoothed data of cosmic ray (CR) intensity observed by neutron monitors with different cut-off rigidities for odd solar cycles 19 and 21. We use a special model described the connection between solar activity (characterized by monthly sunspot numbers) and CR convection-diffusion global modulation with taking into account time-lag of processes in the Heliosphere relative to the active processes on the Sun (Dorman et al., 1999). For taking into account drifts we use models described in literature (e.g. Burger and Potgieter, 1999). We approximate the expected drift modulation dependence from tilt angle (what changed the sign in periods of solar polar magnetic field reversal near maximums of solar activity) by parabola with 0-points at tilt angles 15 and 90 degrees. We suppose that final drift modulation is described by production of two functions: the first is the described above parabola approximated theoretical results of drifts calculations, and the second function can be present by two parallel lines +1 and –1 (in dependence of sign of solar polar magnetic field) connected linear during reversal periods. In the first we correct observed long-term CR modulation on drifts with different amplitudes from 0 (no drifts), then 0.15%, 0.25%,… up to 4%. For each expected amplitude of drifts we determine the correlation coefficient between expected CR variations and observed by neutron monitors with different cut-off rigidities for different times of solar wind transportation from the Sun to the boundary of the modulation region from 1 to 60 average months (it corresponds approximately to dimension of modulation region from about 6 to 360 AU). We found that the main global modulation is produced by convection-diffusion mechanism, but for odd solar cycles drifts produced the additional decreasing of CR global modulation in period from minimum to maximum of SA, and additional increasing of CR modulation from maximum to minimum of SA. This gives sufficient increasing of observed time-lag between CR and SA in odd solar cycles. We compare observed results for odd cycles 19 and 21.

REFERENCES:

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