Influence of the Jupiter Position on Cosmic Ray Intensity in the Vicinity of the Earth

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Galactic cosmic ray (GCR) diffusion in interplanetary space depends in a certain way on a degree of regularity of the interplanetary magnetic field (IMF). The sector IMF structure is manifested in inhomogeneous GCR distribution in the heliosphere. In parallel with the usual sectors associated with solar activity, one should take account of the sectors, which are caused by the Jupiter activity. It is known that the Jupiter is the powerful regular source of high-energy electrons (0.2 – 40 MeV), the density of which, on the average, is many times higher than that of solar cosmic ray. The high-energy electrons are systematically registered with the 399-day period in near-Earth space. According to estimations of the particle energy density their flux is sufficient to decrease the magnetic field in the Jovian sector and can due to corresponding large-scale inhomogeneity in the GKL distribution.

Here we present the evidences that the GCR diffusion is noticeably stronger in the sector where there are Jovian electrons. By data on periodic passage of those sectors near the Earth, we have treated neutron monitor data using the superposed epoch technique. The day of the Earth and Jupiter opposition is taken as a zero epoch. At large statistical data (9925 days) it is found that the GCR intensity in that period increases with an amplitude near 1%. The ground effect is manifested with period of 399 days and its maximum time is in a certain way shifted relative to the planet opposite moment.