Radiation hazard from galactic cosmic rays: integral multiplicity and coupling function for radiation dose, monitoring and forecasting, 2. For satellites in dependence of their orbits in the Earth's magnetosphere

Lev I. Dorman (1,2)

(1) Israel Cosmic Ray and Space Weather Center and Emilio Segre' Observatory affiliated to Tel Aviv University, Technion and Israel Space Agency, Israel,

(2) Cosmic Ray Department of IZMIRAN, Russian Academy of Science, Troitsk, Russia (lid@physics.technion.ac.il / Fax: +972-4-6964952)

Here we use results obtained in paper [1] on the parameters of convection-diffusion and drift modulations of galactic cosmic rays (CR) in the Heliosphere in dependence of particles energy. Then by using published regularly elsewhere predictions of expected solar activity variation we may make prediction of expected in near future long-term CR intensity variation. From other hand, we introduce new nominations: integral multiplicity and coupling function for radiation dose inside satellite caused by galactic CR in dependence of shielding. By the method of coupling functions we estimate the connection between CR intensity long-term variation and radiation hazard for satellites in dependence of their orbits (cutoff rigidity changing along the orbit). We show that by this way we may made monitoring and prediction of expected differential (per unit of time) and integral radiation doze (per some interval of time) for astronauts (e.g., on ISS) and electronic systems. We take into account also expected long-term changes in the planetary distribution of cutoff rigidities which also influenced on galactic CR intensity, and through CR – influenced on radiation hazard inside satellite. In this paper we do not consider radiation hazard for satellites from trapped radiation.

Reference:

[1]. Lev I. Dorman, 'Radiation hazard from galactic cosmic rays: integral multiplicity and coupling function for radiation dose, monitoring and forecasting, 1. For aircrafts in dependence of shielding and airline parameters'. Abstract for COSPAR-2006 on Session PSW1.