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FORECAST OF RADIATION ENVIRONMENT OUT SIDE OF THE MAGNETOSPHERE

Abstract

For carrying out and planning space activities, it is necessary to know expected radiation conditions. In particular, it is desirable to be able to predict solar proton events (SPE) — the onset time, evolution of time profiles, time of maximum, and the duration of the decline of the flux of protons with various energies, as well as their total fluences. Note that the real radiation hazard is posed by SPEs, whose maximum intensity exceeds the depth of galactic cosmic ray (GCR) modulation in the solar activity cycle, since spacecraft must be adapted to flights within the limits of possible GCR variations. There are still gaps in the understanding of the SPE physics and of the GCR modulation. Empirical forecasting models based on statistical analysis of solar activity and associated phenomena in the heliosphere are mainly used. In this report we will present a physical approach to the problem. Secondary hard X-rays (EHXR¿60 keV) from galactic and solar cosmic rays (CR) are undesirable background for astrophysical instruments design for registration of primary X-rays from far and weak sources. We will illustrate the problem by using observations of the radiation environment aboard astrophysical satellites SPECTR RG and INTEGRAL during the current 25th solar cycle.