

Radial and latitudinal intensity gradients of galactic and anomalous cosmic rays in the outer heliosphere

Z. Fujii (1,2), F.B. McDonald (2)

(1) Solar-Terrestrial Environment Laboratory, Nagoya University, (2)

Institute for Physical Science and Technology, University of Maryland

Fujii@stelab.nagoya-u.ac.jp/Fax:+81-52-789-4313

The basic one-dimensional transport model gives the equation, $g_r = CV_{sw}/K_r$ where C is the Compton-Getting factor, V_{sw} is the solar wind velocity and K_r is the radial diffusion coefficient. In the inner heliosphere near the ecliptic plane K_r is dominated by the parallel diffusion with transition to perpendicular diffusion at near 10 AU in the outer heliosphere. In an accompanying paper we measure in detail the gradients in the inner heliosphere. In this paper we focus on the radial and latitudinal intensity gradients near the ecliptic plane in the outer heliosphere, where the perpendicular diffusion dominates, to study in more detail the gradients throughout the inner and outer heliosphere together. We assumed the radial gradients to be dependent on heliocentric radial distance r with a functional form of $g_r = dJ/Jdr = G_0 r^\alpha$ and the latitudinal gradients G_λ constant in heliolatitude, and measured the gradients in detail, using the combined data set observed in the solar activity minima of 1977/1997 ($qA > 0$). The obtained gradients are discussed in comparison with those of the 1987 solar minimum ($qA < 0$) and of 1980-81 and 1990 solar maxima.