

ULYSSES OBSERVATIONS OF SOLAR ENERGETIC PARTICLES TO HIGH HELIOGRAPHIC LATITUDES

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We present new results from Ulysses observations and theoretic modeling of the propagation solar energetic particles to high heliographic latitudes. During the second Ulysses encounter with the south polar region of the sun in 2000 when the solar activity was at its maximum level, there are several large X-class solar flare events and numerous smaller solar flare events. Although almost all these flare occurred near the equatorial plane on the solar surface, Ulysses recorded large increases of energetic particles (~ 1 MeV to $> \sim 100$ MeV) from these events even at the highest heliographic latitude of 80° . Within a few days of onset of the events fluxes of > 30 MeV protons observed at Ulysses and IMP-8 often became comparable and remained so throughout the decay phase of the events. Since no CMEs associated with these events were seen by Ulysses at high latitudes, the observations suggest that solar energetic particles can transport across latitude fairly easily from equatorial CME shocks to highest heliographic latitudes. It is consistent with the conclusion reached from Ulysses observations of cosmic rays and CIR-accelerated energetic particles during its first solar polar pass in the last solar minimum.

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