SOLAR CYCLE PHASE AND STREAMING OF ENERGETIC PARTICLES IN AND AROUND THE MAGNETOSPHERE

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Intensities and anisotropy patterns of energetic protons and other nuclei in local interplanetary space are usually considered to be governed by solar-heliospheric effects, while magnetospheric influences are mostly taken as negligible. Long-term IMP-8 JHU/APL CPME data are used to show that magnetospheric influences are, in fact, more important than expected, and their strength and nature depend on the phase of the solar cycle. Also, yearly median particle flux patterns in the magnetosheath and even inside the magnetosphere show a marked solar cycle dependence.
Simplified models of the magnetospheric geometry are invoked in order to classify the directional flux data according to their measurement site relative to the magnetosphere. Median directional fluxes are then calculated for equivalent site bins along the orbit. It is shown that median first harmonic amplitudes in the magnetosheath and in interplanetary space are much larger at solar minima than at maxima, and the outward streaming may distort IMP-8-based measurements of proton anisotropy at 1 AU.