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Poster
Solar energetic particles (SEPs) represent radiation hazards to spacecraft and human activities in space, with their penetration into near-Earth space controlled by the state of the geomagnetic field. This presentation describes new modeling capabilities for quantifying SEP transport in geospace, including particle energy spectra and geomagnetic cutoff rigidity, from the magnetopause to low-Earth orbit (LEO). The method applies Monte Carlo test-particle transport to trace the propagation of upstream SEP populations through the magnetosphere and to evaluate both the spatial variation of particle populations and the shielding provided by Earth's magnetic field.

The capability is being developed for community access through the NASA Community Coordinated Modeling Center (CCMC), where users will be able to define individual sampling points, virtual spacecraft trajectories and spherical shells for calculating particle fluxes, energy spectra, and cutoff rigidity throughout the region from the magnetopause to LEO. Planned outputs include global maps of cutoff rigidity as well as trajectory-based diagnostics that relate particle access at different geospace locations, supporting systematic analysis of regional variability in SEP penetration.

SEP transport is modeled using the geomagnetic field from both phenomenological and physics-based models, enabling event-focused investigations as well as sensitivity studies. The presentation will include a case study illustrating the modeled transport behavior in geospace together with examples of the cutoff and spectral products that will be made available to CCMC users.
Poster session day
Wednesday, April 29, 2026
Poster location
39
Meeting homepage
2026 Space Weather Workshop
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