

Modeling SEP Transport and Geomagnetic Cutoffs in Geospace from Magnetopause to LEO

A new modeling capability for quantifying Solar Energetic Particle transport, energy spectra, and geomagnetic cutoff rigidity throughout geospace — developed for community access via the NASA CCMC.

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Summary & Sample Outputs

AMPS GEOSPACE EXTENSION

A **Monte Carlo test-particle transport** capability that traces SEPs through the magnetosphere to evaluate fluxes, energy spectra, and cutoff rigidity from the **magnetopause** to LEO.

APPROACH

Backward tracing with Liouville phase-space mapping captures the cutoff penumbra

Hybrid integrator — full-orbit $\leftrightarrow$ guiding-center, with AMR

Fields: IGRF + Tsyganenko **T96 / T01 / TS05**

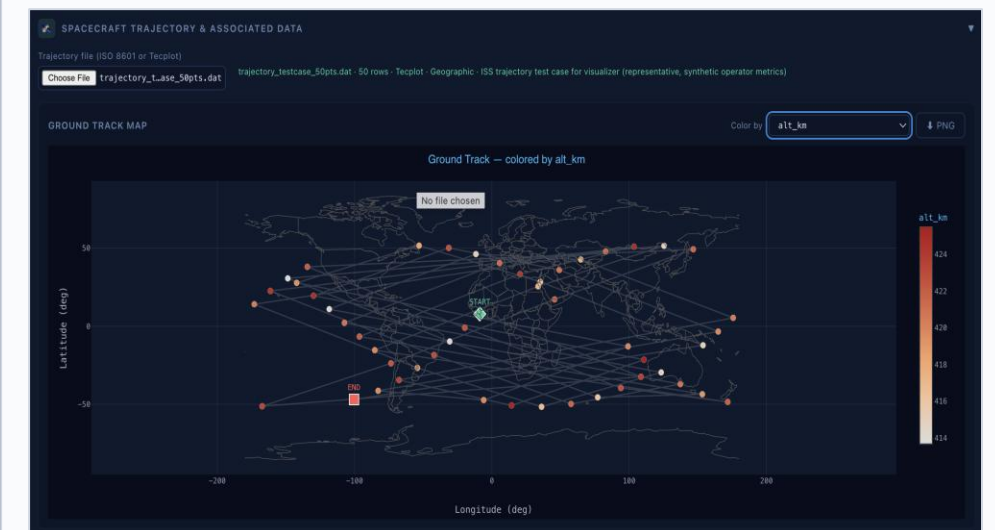
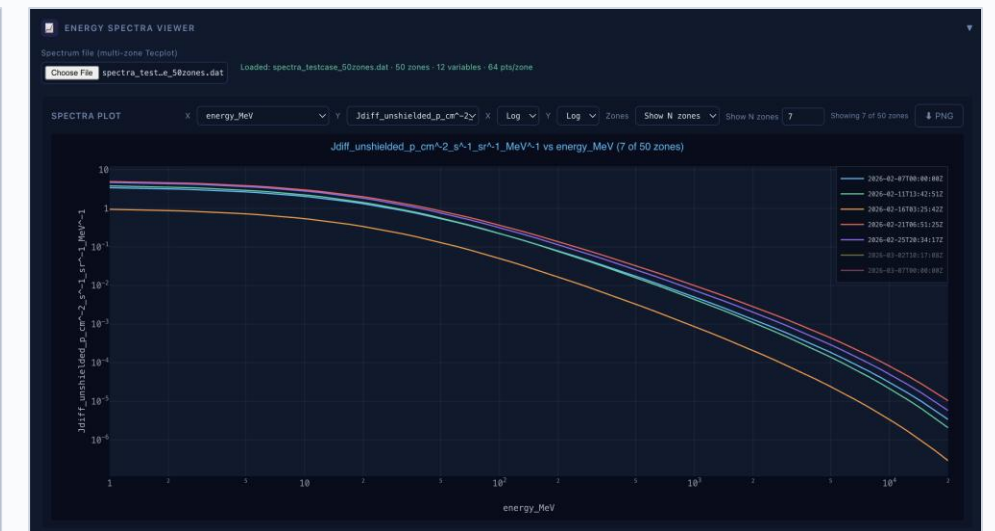
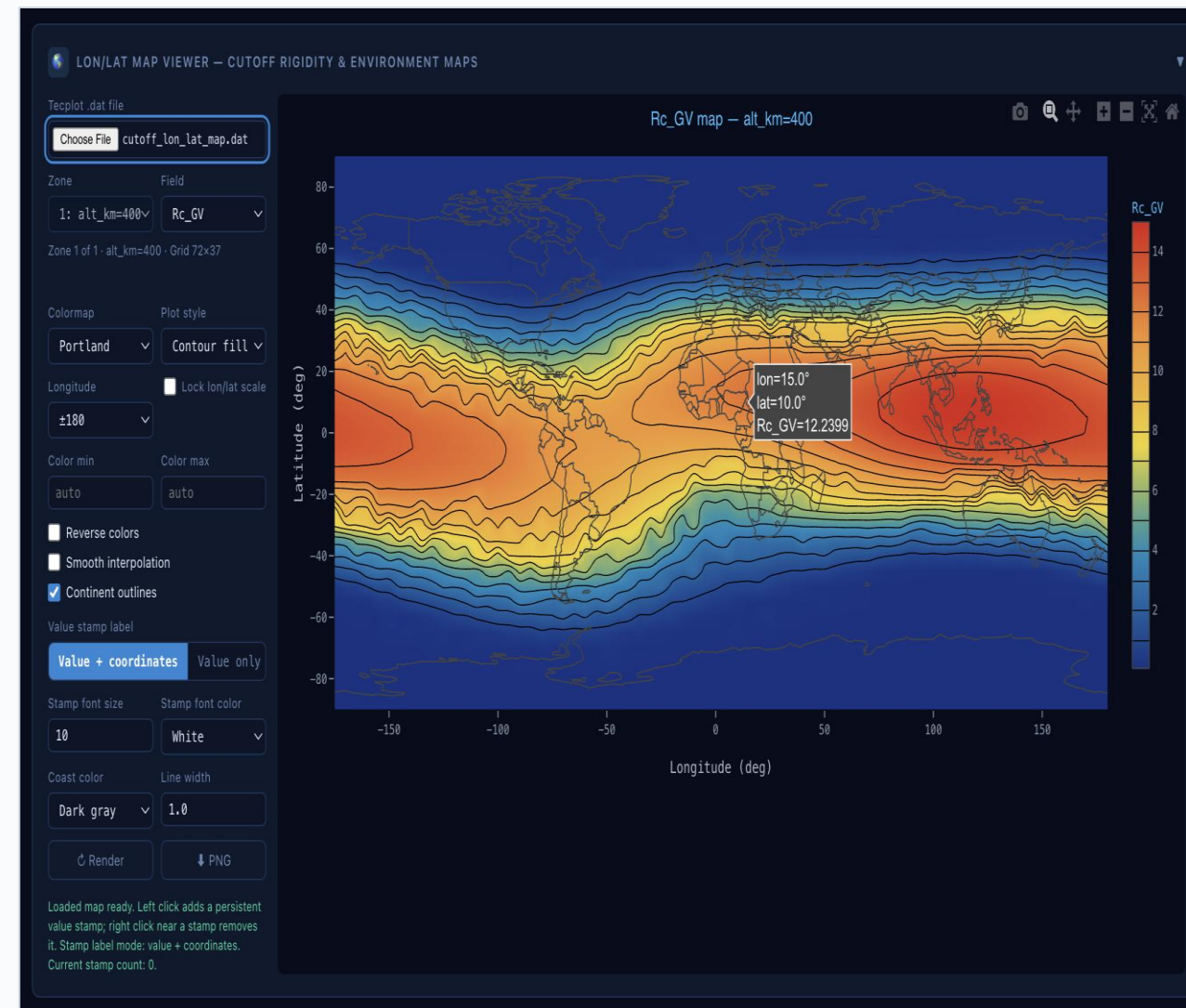
PRODUCTS

Cutoff rigidity maps — points, shells, directional

Differential spectra & directional flux

Geant4-based radiation exposure proxies

FIG. GLOBAL CUTOFF RIGIDITY MAP AT 400 KM — USER-SELECTABLE SHELL ALTITUDE



COMMUNITY ACCESS · CCMC RUNS-ON-REQUEST

Wizard-driven AMPS runs with user-defined sampling points, S/C trajectories, and boundary spectra.

ccmc.gsfc.nasa.gov/ror/requests/IM/AMPS/wizard/

