Valeriy
Tenishev
Marshall Space Flight Center
Poster
Solar energetic particles (SEPs) penetrate deep into the geospace and the Earth's atmosphere, initiating nuclear and chemical reactions. These reactions produce secondary hadrons, leptons,
and photons, posing radiation hazards at commercial aviation altitudes, particularly during high-latitude flights. During solar particle events, protons with energies above 10 MeV can reach below 100 km altitude, causing ionization that disrupts HF communication and navigation in polar regions.

Galactic Cosmic Rays (GCRs) and Solar Energetic Particles (SEPs) pose radiation risks to satellites, astronauts, and ground infrastructure. High-energy particles can lead to single-event effects in spacecraft electronics, such as upsets, latch-ups, and burnouts. These particles also interact with the Earth's atmosphere, generating ionization and secondary particles like hadrons, leptons, and photons, creating hazards for astronauts, especially during extravehicular activities.

The work presented in the paper is focused on characterizing the SEP population in geospace in the altitude range starting from that of LEO through MEO and GEO, and up to the magnetopause accounting for the realistic geomagnetic field. The dynamics of SEPs are studied during quiet and geomagnetically active times using Monte Carlo simulations. The paper discusses the variability of the SEP population in geospace in response to geomagnetic activity.

The former manifests in the temporal trapping of SEPs in geospace and the suppression of rigidity cutoff during geomagnetic storms.

Poster category:

Poster category
Geospace/Magnetosphere Research and Applications
Poster session day
Thursday, April 18, 2024
Poster location
20
Meeting homepage
Space Weather Workshop 2024
Download to PDF