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From Sun to ground: Particle Acceleration and transport in the inner heliosphere

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The inner heliosphere, spanning from the solar corona to Earth's orbit, is a dynamic region where energetic particles are accelerated and transported. Understanding these processes is crucial for comprehending space weather phenomena and their impact on Earth. This abstract discusses the key mechanisms involved in particle acceleration near the Sun, primarily driven by solar flares and coronal mass ejections (CMEs), and the subsequent transport of these particles in the solar wind, focusing on the roles of large-scale magnetic fields and turbulence. Furthermore, we address the influence of Solar Energetic Particles (SEPs) and Galactic Cosmic Rays (GCRs) on the global electric circuit. SEPs, produced by solar flares and CMEs, and GCRs, originating from outside the solar system, both contribute to the ionization of the Earth's atmosphere. This ionization significantly impacts the conductivity of the atmosphere, particularly in the polar regions. Change of ionization due to SEPs and GCRs can alter the potential difference between the ionosphere and the ground, influencing the flow of current within the global electric circuit. These changes can lead to observable effects, such as variations in atmospheric conductivity and potential gradients, and may even influence weather patterns.

Collaboration(s)

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