



Global Electric Circuit as a medium for inter-geospheres coupling

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For a long period of time the Global Electric Circuit (GEC) was considered as isolated machine for producing the atmospheric electricity. Stormy regions of atmosphere served as generator of the electric potential difference between ionosphere and ground, and fair weather regions were areas of steady current flow down to close the circuit.

Nevertheless, the recent years demonstrated that GEC is the area of communication and coupling between different geospheres, and not only geospheres but also galactic sources. It is established now that main material for atmosphere electricity production – clouds are in great extent result of action of galactic cosmic rays (GCR). Space Weather contributes in the form of GCR fluxes modulation in the form of the Forbush decreases, what, except the modulation of cloud production, contributes in our climate variability stimulating formation of tropical cyclones and hurricanes.

Ionospheric potential V_i as one of the main characteristic parameters of GEC is a sensitive indicator of the local large scale events such as dust storms, volcanoes eruption, nuclear explosions and emergencies at atomic power plants, and seismically active regions. Main moderator of V_i variations is the lower atmosphere electric conductivity which can be drastically changed due to the processes of air ionization by ionization sources of different origin and consequent ion induced nucleation, or simply by injection of aerosols and dust in atmosphere, or air pollution in Megapolices.

Due to electromagnetic coupling the information on near ground (and even underground) processes immediately is transmitted into the ionosphere what provides possibility of operative monitoring of these processes onboard artificial satellites by measuring variations in ionospheric plasma. Formation of field-aligned irregularities modifies the content of magnetospheric tubes and due to VLF emission scattering on these irregularities stimulates the particle precipitation.

The proposed approach opens the way of using the GEC parameters variations as diagnostic tool for inter-geospheres interaction studies.