

# **ATMOSPHERE IONIZATION AS A FACTOR UNITING ALL AREAS OF IMCP PROJECT STUDIES**

**Sergey Pulinets**

*Space Research Institute of RAS, Moscow, Russia,*  
pulse@cosmos.ru

Atmosphere ionization is one of the key factors in the geospheres coupling processes. It facilitates the processes of energy transformation, modifies the vertical structure of atmosphere, forms new chemical components, modifies the Global Electric Circuit, creates conditions for formation of mesoscale critical processes such as hurricanes/typhoons, intensive precipitation, forest fires, etc. We will present effects from different sources of air ionization, including:

1. Effects of galactic cosmic rays on formation of the cloud cover of our planet;
2. Space weather effects on the formation and intensification of the tropical cyclones, hurricanes/typhoons;
3. Generation of the large-scale thermal anomalies by the earthquake preparation processes due to air ionization produced by radon emanating from the earth's crust;
4. Generation of the large-scale ionospheric and magnetospheric anomalies by the earthquake preparation processes due to the local modification of the Global Electric Circuit by air ionization produced by radon emanating from the earth's crust;
5. Effect of the global seismicity on the Global Electric Circuit and lightning activity;
6. Forest fires self-ignition due to the Space Weather effects;
7. Particles precipitation from the radiative belts stimulated by the earthquake preparation process and Distortion of the VLF waves sub-ionosphere propagation.

The air ionization by any source (solar proton fluxes of galactic cosmic rays, energetic electromagnetic emission, natural ground radioactivity, radioactive pollution) is the main driver for initiating the chain of physics-chemical processes responsible for the generation of many consequent effects in atmosphere and ionosphere. It changes the air conductivity in the vertical column between the ground and the ionosphere, producing the local modification of the Global Electric Circuit and, consequently, generating large-scale anomalies in the ionosphere. Simultaneously, the charge separation of the new formed ions creates an anomalous electric field and facilitates the cloud electrification. Ion's hydration releases the latent heat stored in the atmosphere by the water vapor and generates the thermal and meteorological anomalies.

The examples of effects from different sources of air ionization at different levels of altitude will be presented.