

The modeling of the cosmic ray particles interaction with the Earth's atmosphere during the GLE events

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The work presents the results of calculations of the cosmic ray protons propagation through the Earth's atmosphere using the Monte Carlo method. We developed the model for this modeling with the GEANT4 software development toolkit. It uses the standard QGSP_BERT_HP class to describe the physics of the particle interactions with matter. The general results are a quantitative estimated secondary particle fluxes (neutrons, muons, electrons, positrons and photons in the wide energy region), as well as the ionization count rate in comparison only with the galactic cosmic rays. In this work we have considered three GLE events (№ 65, № 69 and № 70). Moreover, it is taken into account that there are two components in the spectrum of primary cosmic rays, prompt and delayed (in accordance with the work on assessing the features of the spectrum of relativistic solar protons using the GLE modeling technique).

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