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Estimation of the cosmic ray ionization in the Earth's atmosphere during GLE71

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DYASTIMA is an application, based on Geant4, which simulates the cascades of particles that are generated due to the interactions of cosmic ray particles with the atmospheres of the planets. The first version of DYASTIMA has been successfully applied to the Earth's atmosphere, providing results that are in accordance with the publications of other models (Paschalis et al., *New Astronomy*, 2014). Since then, important improvements and extensions have been made to this application, including a graphical user interface environment that allows the more effective management of the configuration parameters. Also, the actual modeling of the atmosphere has been changed allowing the definition of more complex cases and at the same time providing, in a more efficient way (with respect to the program's previous version) enhanced outputs. In this work, we combine the new version of DYASTIMA with the NMBANGLE PPOLA model (Plainaki et al., *Solar Phys.*, 2010), that estimates the spectrum of SEPs during relativistic proton events using ground level neutron monitor data from the worldwide network. Such a joint model has as a primary scope the simulation of a SEP event and of its secondary products at different altitudes in the Earth's atmosphere, providing at the same time an estimation of the respective ionization rates and of their spatial and temporal dependence. We apply this joint model to GLE 71, on 17 May 2012, and we discuss the results.

Collaboration

– not specified –

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