

Verification of the Air Shower Simulation Induced by Solar Energetic Particles

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When solar energetic particles (SEP) are incident to the atmosphere, they can induce air showers by generating varieties of secondary particles. Such secondary particles can reach conventional flight altitudes (~12 km), and hence, aircrews are exposed to enhanced level of radiations. In order to precisely estimate the aircrew doses, the Monte Carlo simulation for air shower is indispensable. We therefore simulated air showers induced by mono-energetic protons, using a general-purpose Monte Carlo particle and heavy ion transport simulation code system PHITS [1], and developed a database of particle fluxes in the atmosphere. Combining the database with the proton fluxes measured by PAMELA during the GLE event occurred on Dec. 13th 2006, the count rates of the neutron monitor located at Thule were calculated. The calculated count rates agree with the measured data fairly well, verifying the accuracy of our simulation technique.

[1] <http://phits.jaea.go.jp/>

Keywords: SEP, radiation dose, airshower simulation, solar flare, GLE