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Model CRAC:PPII for atmospheric ionization due to precipitating protons

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A new model of the family of CRAC models, CRAC:PPII (Cosmic Ray Atmospheric Cascade: Proton Precipitation Induced Ionization), is presented.

The model calculates atmospheric ionization induced by precipitating protons. The CRAC:PPII is based on Monte Carlo simulation. The simulations were performed using GEANT 4 simulation tool PLANETOCOSMICS with NRLMSISE 00 atmospheric model. It explicitly considers various physical processes. The results from the simulations are given as look-up table representing the ionization yield function. The CRAC:PPII model is applicable to the entire atmosphere (up to 100 km) considering a given proton's spectrum. The ionization yields is compared with a parametrization models, older models based on Monte Carlo and analytic models for various energies of incident precipitating proton.

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