

Do Changing Snow Levels Effect the Count Rate of the South Pole Neutron Monitors?

Monday, 21 May 2018 13:45 (15 minutes)

Neutron monitors are instruments that can be used to study low energy cosmic rays. In addition to providing information about the fundamental properties of cosmic rays, such as how they are produced and their composition, they may be helpful for forecasting space weather. This could provide an early warning against increased radiation levels for satellites or astronauts in space from solar storms for example. It is important to understand how environmental factors, especially those that can change, affect the neutron monitors. This project studied the impact of varying snow levels below a platform that held three single neutron monitor 64 sections in separate environmental enclosures at the South Pole. The platform is currently three meters above the ground. Snow can drift beneath the rack, potentially affecting the count rate recorded by the neutron monitors. If that is the case, then longer term studies would have to correct for these changes. The goal of this project was to produce a simulation of the South Pole configuration, and see if changing the snow level has a measurable impact on the count rate. The environment, neutron monitors and particle beams were modeled using FLUKA simulation software. Results of the counts per incident neutron beam luminosity as a function of energy and snow height below the neutron monitors will be reported.

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Session Classification: A7: Astronomy I

Track Classification: Astronomy, Astrophysics, and Cosmology