

The Role of Neutron Monitor Networks in Radiation Storm Warning and Specification

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About 15 times per solar cycle, the Sun emits cosmic rays with sufficient energy and intensity to increase radiation levels in Earth's atmosphere and on its surface, an event termed a "Ground Level Enhancement" (GLE). These radiation storms are of concern to passengers and air crews, especially those flying the heavily traveled and highly exposed north polar corridor. This talk describes a GLE alert system based upon realtime neutron monitor data. In a backtesting study covering 4.4 years, the system generated alerts for all 9 GLE that occurred with zero false alarms. The GLE alert preceded the earliest proton alert issued by NOAA's Space Environment Center by \sim 10-30 minutes, thus providing valuable additional minutes to prepare for a solar radiation storm. We also discuss future projects to specify in real time the particle energy spectrum, and to map the anisotropy of cosmic rays in space and in Earth's atmosphere. The capabilities of ground-based networks for radiation storm warning and specification would be greatly enhanced if the neutron monitor at South Pole (\sim 10, 000 feet) could be re-opened, and if a new monitoring station could be placed on the summit of Denali (Mt McKinley, \sim 20, 000 feet).