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Room:203

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Development of a GLE alarm system based upon neutron monitors for early warning of radiation hazard

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We have developed a system that watches for count rate increases recorded in real time by eight neutron monitors, which triggers an alarm if a ground level enhancement (GLE) is detected. In this work, we determine optimal strategies for detecting the GLE event at a very early stage, while still keeping the false alarm rate at a very low level. We study past events to optimize appropriate intensity threshold values and a baseline to determine the intensity increase. The highest-level alarm, which we term an ALERT, is generated when a 4% increase is recorded at three stations in 3 min averaged data. At this level, the false alarm rate obtained by back testing over the past 4.4 years is zero. Ten GLEs occurred in this period, and our system produced GLE alarms for nine events. Alarm times for these nine events are compared with satellite proton data. The GLE alert precedes the earliest alert from GOES (100 MeV or 10 MeV protons) by 10-30 min. Real-time GLE data may be viewed at <http://neutronm.bartol.udel.edu/spaceweather>. An automated e-mail alert system is now under beta testing at <http://www.bartol.udel.edu/~takao/neutronm/glealarm/index.html>.

Keywords: GLE, Neutron Monitor, Cosmic Ray