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Lead-free neutron monitor and short-term solar modulations

Abstract content

The IGY type neutron monitor operating at Gulmarg has been modified to a lead-free detector to detect neutron bursts produced in lightning discharge channels. The monitor also records continuously neutrons produced by the cosmic ray interactions with the atmospheric constituents. Apart from recording integrated low energy neutron count, the monitor is also set to record neutron bunches with multiplicities of 1 to 9 in short time intervals of several tens of milliseconds. We demonstrate the versatility of this lead-free neutron monitor in responding to solar modulation effects like Forbush decreases. We show that modulation effects are recorded with astonishingly larger amplitudes in higher neutron multiplicity rates. This feature makes the monitor a highly useful tool to record transient solar modulation effects in an effective manner. Several well-defined Forbush decrease events recorded during the periods of the smooth operation of the monitor are presented. The events are compared with the events recorded by other worldwide neutron monitors. The possible association of these decreases with solar events like solar mass ejections and solar flares will be discussed.

If this papers is presented for a collaboration, please specify the collaboration

Summary

Reference

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