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Investigation of Forbush decrease events during solar cycle 25 using observations from the Belgrade muon station

This work investigates several strong Forbush decreases occurring during the 25th solar cycle. A Forbush decrease is a rapid drop in cosmic ray flux intensity, typically associated with coronal mass ejections. The study utilizes data from scintillating detectors at the Belgrade muon station, Serbia. Two instruments, one at ground level (75 m above sea level) and another at a shallow underground level (25 mwe depth), simultaneously and continuously record secondary cosmic ray muon flux with different median rigidity. We analyzed variations in cosmic ray flux detected by these ground-based instruments during recent extreme solar events. Additionally, we compare in-situ near-Earth interplanetary conditions, solar wind proton flux at Lagrange Point 1, and the characteristics of the detected Forbush decreases to assess their implications for solar-terrestrial coupling processes. Recently, the Belgrade muon station became a node in the expanding global gLOWCOST network of compact, portable muon detectors, allowing these findings to be integrated into worldwide muon monitoring.

Collaboration(s)

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