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Multidirectional Muon Detector for Solar-Terrestrial Physics

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One important topic within Heliophysics is the modulation of <100GeV cosmic rays due to solar activity. Since 2001, a prototype of a multidirectional muon detector is in operation at the Southern Space Observatory, in Sao Martinho da Serra (SMS), Brazil. It is part of the Global Muon Detector Network (GMDN), composed by detectors in Nagoya (Japan), Kingston (Australia), Sao Martinho da Serra (Brazil) and Kuwait City (Kuwait). The SMS detector went through an upgrade in 2025 and it now operates with a collecting area of 36 m2. Since then, the SMS instrument was able to observe a few Forbush Decreases (FD) resulting from solar Coronal Mass Ejections (CMEs) and their interplanetary counterparts (ICMEs). We will show some preliminary ground cosmic ray directional observations of these recent FDs/CMEs (atmospheric pressure and temperature corrected observations). The SMS detector was a donation from Shinshu University (Japan) to the National Institute for Space Research (Brazil), in 2001 and 2005. The recent upgrade was funded by the Japan Society for the Promotion of Science (JSPS-Japan), the National Institute for Space Research (Brazil), the Brazilian Space Agency, and the Brazilian CAPES funding agency. Additional funding for data analysis is being requested to FAPESP funding agency.

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