

## **Upgrade of the Muon Detector at the Southern Space Observatory**

**Jesús Alberto Nuñez**, Alisson Dal Lago, Marlos Rockenbach, Adriano Petri, Wagner Sarjob Coura Borges, K. Munakata, Carlos Braga

Instituto Nacional de Pesquisas Espaciais (INPE)

The Brazilian muon detector, part of the Global Muon Detector Network (GMDN), was installed in 2001 at the Southern Space Observatory (SSO/INPE) in São Martinho da Serra. Since its installation, the detector has undergone several upgrades to enhanced sensitivity, stability, and data quality. The most recent upgrade, carried in collaboration with Shinshu University (Japan), involved the replacement of the old acquisition system with a new, high performance electronics system provided by our Japanese partners. This modernization significantly improved the detector directional resolution, and the counting rate stability, enabling more precise measurements of cosmic ray flux and solar modulation effects such as Forbush Decreases. Data produced are transmission to the GMDN ensures coordinated global observation, strengthening Brazil role international space weather monitoring and Sun-Earth connection studies.