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Investigating Periodical Variations in Muon Rates: A Study Using EEE Detectors in Ny-Ålesund

Since 2019, a set of three compact, scintillator-based muon telescopes from the Extreme Energy Events (EEE) Project has been successfully deployed and operated at the high-latitude site of Ny-Ålesund (79° N) in the Svalbard archipelago. These detectors have been used for various analyses, including the observation of Forbush decrease events in regions with a low geomagnetic cutoff. With distances ranging from 700 m to approximately 1100 m between the detectors, they also facilitate the detection of coincidence events from extensive air showers.

Muon rate measurements from all three detectors have been continuously recorded alongside environmental parameters. The collected data were initially stored locally before being transferred to the CNAF computing center in Italy, enabling remote monitoring and analysis. A recent study analyzing the dataset from the past six years focused on identifying periodic components in the measured muon rates. Various time-series analysis techniques, including the Lomb-Scargle periodogram, were applied to examine these periodicities. The results of this study will be presented and discussed in this contribution.

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