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A mini neutron monitor in Central Antarctica (Dome Concordia)

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A new cosmic ray detector has been installed in the inner Antarctic Plateau, at Concordia station (75°06'S 123°23'E, 3233 meters a.s.l.). The detector consists of two fully independent measuring units: FIN1 - a standard mini neutron monitor, and FIN2 - a bare (lead-free) neutron monitor. The detector was built by the North-West University (Potchefstroom, South Africa), are owned and operated by the University of Oulu (Finland), and hosted by the French-Italian Concordia station. The detector is placed in a thermo-stabilized "Physics" shelter, fully maintained all year-round. The Concordia station is an optimal for the detection of solar energetic particles and low energy galactic cosmic rays. The detector's asymptotic acceptance cone is nearly perpendicular to the equatorial plane, pointing to the geographical southern latitudes $>80^\circ$ for cosmic rays with energies above a few GeV, which is much more in the polar direction than that for the South Pole cosmic ray station.

The measurements started in mid-January 2015, and the instruments work properly. The average count rate is about 15 counts/sec and 4 counts/sec for FIN1 and FIN2 units, respectively. Every single hit is recorded by a DAS with a time stamp allowing for an off-line analysis. The reference atmospheric pressure level is set to 650 mb. The very preliminary barometric correction coefficients are -0.7 ± 0.02 and -0.73 ± 0.02 %/mb, for FIN1 and FIN2 units, respectively, but they will be defined more precisely by the Conference time, when more statistics are collected. We are fully prepared for a solar energetic particle event once it appears. Meanwhile, time variability of cosmic rays is recorded on the routine basis.

The data are still preliminary but will be publicly available, after verification, at the databases cosmicrays.oulu.fi and www.nmdb.eu.

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Collaboration

– not specified –

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