

Studies of the diurnal anisotropy using polar neutron monitors

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A small local anisotropy of galactic cosmic rays (GCR) due to geometrical and orbital parameters is observed as a diurnal variability by the ground-based neutron monitor (NM) count rates. The capability of observing the GCR diurnal anisotropy is different for various NMs because of their different asymptotic directions. Here, we present the results of an analysis of the diurnal variability of polar NM count rates that varies from 0.16% to 0.4%. The only exception is the Dome C (DOMC) NM, which does not depict significant diurnal variation, it is only at the level of 0.03%. We interpret this fact to the polar, viz. off the equatorial plane, the asymptotic cone of DOMC NM restricted nearly to the South pole, with geographic latitude above 75 degrees. This determines the uniqueness of the DOMC NM station, which accepts cosmic ray particles originating from the off-equatorial region that is essential for a detailed study of near-Earth cosmic ray transport, in particular for the anisotropic solar energetic particle events.

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