

# Diurnal variation of the cosmic ray influx observed by the ground neutron monitors

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The ground-based neutron monitors detect portion of the primary galactic cosmic ray (GCR) spectrum in approximately 500 MeV to 20 GeV. GCR particles enter the atmosphere and collide with the air molecules. The new secondary cosmic ray particles, produced in a process called a cosmic ray shower, can be measured by the neutron monitors on the Earth's surface. The diurnal variation is a change of GCR intensity with the amplitude of 1~2 %. We investigate variations of the diurnal anisotropy of GCR using the observation data of two ground stations from 1975 to 2003. Oulu station is located at 65 degree north in latitude and Haleakala station at 20 degree north. We examine the dependency of the diurnal variations on the neutron monitor station latitude, the dependency on the solar cycle phase and the 29 year average diurnal variation. The results show the distinct directional anisotropy over two solar cycles. The constant diurnal anisotropy feature can be interpreted as the evidence of invariable interaction mode between the heliospheric magnetic fields and the Earth's magnetosphere in both solar minimum and maximum periods.