IMF sector dependent anisotropy of cosmic ray intensity observed with the global muon detector network

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It has been well established that the north-south anisotropy (NSA) of galactic cosmic ray (GCR) intensity arises from the drift streaming expressed as a vector product between the radial gradient of GCR density (G) and the IMF vector (B). Since G points outward from the Sun when averaged over a solar rotation period, the NSA observed at the Earth is expected to reverse its direction when the Earth crosses the IMF sector boundary. Such an IMF sector dependent NSA has been actually observed in a directional channel called "GG component", which is the difference between GCR intensities recorded in the north-pointing and south-pointing directional channels of a multi-directional muon detector at Nagoya (Mori and Nagashima, PSS, 27, 39, 1979). It has been reported that "GG component" can be used to infer the IMF sector polarity at the Earth’s location (Laurenza et al., JGR, 108, 1069, 2003). In the present paper, we examine the NSA observed with the global muon detector network and compare it with the "GG component". This also makes a crucial test of our best-fitting analysis method from which we have been deriving the 3-dimensional GCR anisotropy on the real-time basis.