

# **The testing of the Earth's magnetosphere models by galactic cosmic rays, 1. Cutoff rigidities in the Earth's magnetosphere for various azimuth and zenith angles during minimum of solar activity (with application to the expedition route from Antarctica to Italy)**

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The interaction of galactic cosmic rays (CR) with the magnetic fields during their voyage through the Earth's magnetosphere may be used for testing magnetospheric models. Calculations of the CR trajectories, asymptotic directions and cutoff rigidities, and then comparison with observations give uniquely possibility to check magnetospheric models. In the 1996-1997 solar minimum a cosmic ray (CR) latitude survey onboard an Italian Antarctic Research ship has been performed by using a 3NM-64 detector. In this paper we report results of computation of cutoff rigidities of non-vertically incident CR particles, together with vertical cutoffs, in "real" geomagnetic field for the backward route from Antarctica to Italy. Computations have been performed by tracing particle trajectories through the summarized magnetic field of the International Geomagnetic Reference Field model (IGRF95, IAGA Division 5 Working Group 8, 1996) and the Tsyganenko (1989) magnetospheric magnetic field model for geographic points corresponding to the daily average coordinates of the expedition ship; for zenith angles 15°, 30°, 45° and 60°, and azimuth angles from 0° to 360° in steps of 45°. Obtained results will be used in [1] to estimate the impact of non-vertically incident particles in the effective cutoff rigidities, which may be used in studies of magnetospheric models by CR.

References:

[1]. L.I. Dorman, O.A. Danilova, N. Iucci, M. Parisi, N.G. Ptitsyna, M.I. Tyasto, and G. Villoresi "The testing of the Earth's magnetosphere models by galactic cosmic rays,

2. Apparent cutoff rigidities for latitude survey from Antarctica to Italy in minimum of solar activity”, Paper on COSPAR-2006, Session D3.2.