The Barometric Coefficient Dependence with the Geomagnetic Cutoff Rigidity for Different Neutron Monitors.

Eduardo Tirado-Bueno[1]

[1]*Instituto Nacional de Astrofísica Óptica y Electrónica.*

Abstract:

In this work, we compare how the barometric coefficient, which quantifies the pressure effect on the cosmic ray intensity, changes with the geomagnetic cutoff rigidity, which quantifies the minimal rigidity/energy that a primary particle needs to reach a given location in a chosen direction. To do that, we used data recorded between January 2008 to December 2016 by several neutron monitors around the globe with R_C from 0.1 to 8.3 GV. We experimentally obtained β in two ways: (I) the typical one, which does not explicitly consider isotropic variations unrelated to the pressure effect; and (II) one that considers such variations by using coupling coefficients and a reference neutron monitor station. We found that the pressure effect seems to present a logarithmic relation with the cutoff rigidity when we estimate β through the typical method used. On the other hand, we found that the pressure effect linearly decreases with the cutoff rigidity when considering an adjustment in this typical method to eliminate external isotropic variations. These results enhance our knowledge of how the pressure effect globally acts on the cosmic ray intensity observed at ground level.

Acknowledgment:

We thank the support of the research team of the Neutron Monitor Database project for the provision of high-resolution neutron monitor data.

References:

E. Tirado-Bueno, J. E. Mendoza-Torres and R. R. S. de Mendonça, Barometric Coefficient Dependence on the Geomagnetic Cutoff Rigidity of Neutron Monitors, Advances in Space Research, DOI: 10.1016/j.asr.2021.04.034.

Session: Solar Physics, Heliosphere, Cosmic Rays.

Oral or Poster: Poster.