

Calculation of a World Grid of Geomagnetic Cutoff Rigidities for Epoch 2000 Using the 9th Generation IGRF Magnetic Field Model

D.F. SMART and M.A. SHEA

*Emeritus, Air Force Research Laboratory (VSBX), 29 Randolph Road, Hanscom AFB,
Bedford, MA 01731, USA*

The Earth's geomagnetic field is evolving rapidly (in geological time) and as a consequence, the amount of geomagnetic shielding at a specific location is also changing. Geomagnetic cutoff rigidities derived from the International Geomagnetic Reference Fields (IGRF) are a basic quantity necessary to compute the radiation dose due to cosmic radiation experienced along aircraft routes. Aircraft measurements of the radiation dose experienced along specific flight paths are sufficiently precise that the secular variation of the geomagnetic field is observable. The 9th generation of the IGRF describes the earth's magnetic field to previously unattainable precision. We are calculating an updated set of geomagnetic cutoff rigidities for Epoch 2000 utilizing these newly available high precision geomagnetic field coefficients with the goal of generating a more precise and updated world grid of geomagnetic cutoff rigidity values. We will describe the result of our computations, the accuracy of the vertical cutoff rigidity values and some of the computational artifacts that result in limitations in the applications of vertical geomagnetic cutoff rigidities.

Keywords: Geomagnetic Cutoff Rigidities, Geomagnetic Field Epoch 2000, Aircraft Radiation Dose Measurements