Model Estimated GCR Particle Flux Variation - Assessment with CRIS and MARIE Data

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We present model calculated particle flux as a function of time during the current solar cycle along with the comparisons from the ACE/CRIS data and the Mars/MARIE data. In our model calculations we make use of the NASA's HZETRN (High Z and Energy Transport) code along with the nuclear fragmentation cross sections that are described by the quantum multiple scattering (QMSFRG) model. The time dependant variation of the GCR environment is derived making use of the solar modulation potential, phi.

For nearly two years, the MARIE (Martian Radiation Environment Experiment) instrument, onboard the 2001 Mars Odyssey spacecraft provided radiation measurements from the Martian orbit. The preliminary radiation dose estimations that are made with only the proton flux measurements of the MARIE instrument are well within 10% of the model predicted dose-rate. We present the MARIE instrument anticipated variations in the particle flux distribution along with the model predicted calculations of the particle flux during the past two years.

For the past seven years, Advanced Composition Explorer (ACE) has been in orbit at the Sun-Earth libration point (L1). Data from the Cosmic Ray Isotope Spectrometer (CRIS) instrument onboard the ACE spacecraft has been available from 1998 through the present time. Our model calculated particle flux showed high degree of correlation in the lower Z region within 15% of the observed measurements for the ions from boron (Z=5) through silicon (Z=14). In the higher Z region, from chlorine (Z=17) through nickel (Z=28), model calculated particle flux is within 5% of the measured data.