



Contribution ID: 101

Type: **Contributed**

Atmospheric Effects of High Energy Cosmic Rays

Tuesday, 29 June 2010 12:05 (15 minutes)

It has been suggested that events such as supernovae, gamma ray bursts (GRBs) and motion of the Sun perpendicular to the galactic plane may expose the Earth to an enhanced flux of high energy Cosmic Rays (HECRs). The electromagnetic component of the resulting air showers leads to an increase in ionization and dissociation in the atmosphere which results in a series of chemical reactions. These reactions occurring in the stratosphere deplete the ozone, resulting in an increase in the solar UVB flux at the ground level. This could be harmful to a variety of organisms such as phytoplanktons which form the base of the food chain. Enhanced ionization could also result in an increase in the low altitude cloud cover, thereby increasing the albedo and cooling the planet. Magnitude of these effects depend on the flux of cosmic rays hitting the atmosphere. Using CORSIKA and NASA GSFC 2D photochemical code, we perform detailed computer simulations of 10 GeV – 1 PeV range primaries interacting with the Earth's atmosphere and construct a model to quantify these effects for an arbitrary astrophysical source. Data up to PeV primaries is freely available and is being extended for EeV primaries.

If this is a contributed presentation, please indicate preference for Oral (O) or Poster (P):

O

Primary author: Mr ATRI, Dimitra (University of Kansas)

Co-authors: Prof. MELOTT, Adrian (University of Kansas); Prof. THOMAS, Brian (Washburn University)

Presenter: Mr ATRI, Dimitra (University of Kansas)

Session Classification: Balloon and Satellite Experiments

Track Classification: Balloon and satellite experiments