



Vertical profiles of ion production measured in the lower troposphere

R.Giles Harrison, Keri Nicoll, and Karen Aplin
University of Oxford, Physics

The electrical resistance of a unit area column of atmosphere is strongly influenced by the generation of cluster ions within the column, for example from natural radioactivity and galactic cosmic rays. This “columnar resistance” determines the vertical current flow in the global circuit. An underexploited measurement platform is the conventional weather balloon (radiosonde), thousands of which are launched daily by meteorological services. Using specially-designed and inexpensive ionization sensing technology, we present profiles of ion production in the troposphere. These show characteristic features of ionization profiles, such as variations due to changes in geomagnetic latitude and the Pfoetzer maximum between 15 and 25km. The use of meteorological radiosondes for such measurements of particle fluxes at a wide range of altitude and latitudes offers a cost-effective method of long term measurements of these quantities.