

IAF EARTH OBSERVATION SYMPOSIUM (B1)
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MEASUREMENT OF AEROSOLS FORMED BY COSMIC RAYS AND ITS EFFECTS ON CLOUD
FORMATION

Abstract

Primary Cosmic rays are high energy protons and atomic nuclei which move through space at nearly the speed of light. They originate from sun or outside the solar system. Cosmic rays affect terrestrial processes such as cloud formation which has direct effect on the weather. Primary cosmic rays convert to secondary cosmic rays (SCC) upon collision with the atoms in the atmosphere. SCC mainly consists of x-rays, electrons and protons. Because of the interaction of the cosmic rays with atmosphere, ions are created which upon recombination form aerosol. Aerosols on subsequent growth can act as cloud condensation nuclei (CCN) which result in formation of clouds. Detection of aerosols formed by cosmic rays can result in better understanding of the effects of cosmic rays on cloud formation and hence weather. To detect the aerosols formed by cosmic rays we can use the following mechanism – Two satellites revolving around the earth, with same time period, with both covering same parts of the earth will be used. But the second satellite will be following the first satellite at a delay of x minutes (x- Time to form stable aerosols from the ions which will be forming CCN). First satellite will be equipped with cosmic ray detector and

aerosol detector and second satellite with only aerosol detector. First satellite will detect the incoming cosmic rays and existing aerosols concentration which are formed from ground radiation. Second satellite after x minutes will detect the total aerosols (formed by cosmic rays which were detected by first satellite + ground radiation). From this data we can calculate the aerosols' concentration formed by the cosmic rays only. This experiment can help us measure the effects of cosmic rays on cloud formation from which we can predict the local weather with more precision. All the parameters, design specifications and technology requirement will be presented with supporting calculation and data.