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Study of ground level electric field response to Forbush decreases

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Energetic charged particles of galactic cosmic rays (GCR) and in a extent stronger energetic solar particles penetrate more or less deep into lower atmosphere ionizing the air and affect onto the value and distribution of electric conductivity, the electric field and other atmospheric electric parameters. The response of the atmospheric electric field (AEF) at ground level to the GCR changes and the solar particle events (SPEs) is difficult to distinguish due to large amount of factors affecting the measured vertical component of AEF Ez. In spite of such situation, the effects of Forbush decreases (FEs) in GCR and SPEs in the AEF and air-earth current density in short time scale (hours and days) have been examined and reported in numerous papers. Recently, the interest in such results has increased in a view of the possible physical links between the effects of solar wind on the atmospheric electricity and the changes of weather and climate. A selection of data using a bit larger statistics (March, 1997) enabled a lowering of the Ez values during and after the Forbush decreases. In the present report a preliminary examination of the energetic particle flux changes on the Ez at Swider Observatory is presented using a part of atmospheric electricity recordings continued there since 1954. Only the geomagnetically quiet days with the fair weather condition have been taken into account in our analysis. The preliminary results show the near the ground level potential gradient increase during a 2-4 days after FE.

Collaboration

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