



Temporal and spatial evolution of the solar energetic particle event on January 20th, 2005 and resulting ion pair production in the atmosphere

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The solar energetic particle event on January 20th, 2005 was one of the largest ground level events ever observed. Neutron Monitor stations in the Antarctic recorded energetic particle increases of several thousand percent and it took more than 36 h to return to background level. Such huge increases in high energetic solar cosmic radiation on ground obviously is accompanied by considerable changes in the radiation environment at aviation altitudes. Measurements of 28 Neutron Monitor stations were used in this work to numerically approximate the primary solar proton spectra during the first 12 h of the event by minimizing the differences between measurements and the results of Monte-Carlo calculated count rate increases. The primary spectrum of solar energetic protons was approximated by a power law in rigidity and a linear angular distribution. The incoming direction of the solar energetic particles was determined and compared to the interplanetary magnetic field direction during the event. The resulting effects on the ion pair production during that time will be presented.