Geophysical Research Abstracts, Vol. 8, 04705, 2006
SRef-ID: 1607-7962/gra/EGU06-A-04705

Excitation and ionisation of the atmosphere by streamers.

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To understand the influence of streamers on atmospheric chemistry, it is necessary to know the ionization rate, production rate of excited states of nitrogen and oxygen, and the electron temperature in the discharge. In this paper these parameters are estimated for a typical example of streamer propagation in the mesosphere at sprite altitudes.

The calculations are based on a 2D, axi-symmetrical, particle-in-cell code designed to simulate electrical breakdown of air. The method employs Monte Carlo treatment of collisions. The results are compared to observations and other results reported in the literature.