

Estimation of Electron Energy in Sprites

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The energy dissipation processes of sprites are important for the energy balance in the middle and upper atmosphere as well as their mechanisms. To investigate these processes, we carried out two-color observation of sprites with two multi-anode array photometers (MAPs) with high time resolution in the SPRITES'98 and '99 observation campaign in Colorado.

The temperature of electrons producing sprites attains its peak prior to the maximum enhancement of luminous intensity. For carrot-like sprites the electron temperature reaches up to 10 to 20 eV in their bright (head) region at the initial phase of sprites. The vertical profile of the electron temperature has a peak at an altitude of about 80 km where the intensity of sprite emissions is reduced.