

Meteorological Study of the First Observation of Red Sprites from Poland

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Abstract

The first red sprite events scientifically observed from Poland on 20/21 July 2007, during the two-week SPARTAN Sprite-Watch 2007 campaign, are analysed in the context of the meteorological conditions over Poland and the Czech Republic at that time. The phenomena were detected and recorded from the IMWM High-Mountain Meteorological Observatory at Mount Śnieżka using a low-light television CCD camera. Meteorological conditions over the south-west Poland were monitored on the basis of information from the Polish and Czech meteorological radar and lightning detection systems and also from satellite infra-red difference images, indicating the development of thunderstorm clouds over central Europe. Four sprite events detected in the night-time of 20/21 July indicate that in this region sprites are produced by massive storm cells built on warm fronts which are supplied by warm and humid tropical air masses during local summer thunderstorm season.

Key words: red sprites, transient luminous events, optical observations, sprite-producing thunderstorms, supercells, cloud-to-ground lightning discharges.