

## TRIANGULATION OF SPRITES OBSERVED IN CENTRAL EUROPE IN 2007

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Sprites are one type of transient luminous events (TLEs) occurring in the 50-90 km height range above active thunderstorms. Altogether 23 sprite events were captured simultaneously in Central Europe (above Germany, the Czech Republic, Hungary and Slovenia) from Sopron [16.58E, 46.68N], Hungary and from Modra Observatory [17.27E, 48.37N], Slovakia during July and August in 2007. In Sopron, a Watec 902H2 Ultimate camera was used with Computar 8mm F08 aspheric lens having 45°×34° field of view. The resolution of the captured images is 720×576 pixels. In Modra Observatory, a Watec 120N camera was utilized with Canon 15mm fisheye lens covering the visible part of the open sky. Images at Modra Observatory have the resolution of 720×540 pixels. Videos and peak-hold images of the sprites were captured with GPS (Sopron) and internet (Modra) time stamps using the UFO Capture event detection software. The observation time of the events is known with the accuracy of 10 ms in most cases. Lightning flashes in sprite producing thundercloud cells were detected by the LINET lightning detection network which operates in the VLF-LF (5-200 kHz) range. Parent lightning flashes of sprites were identified and verified by their extremely low frequency radiation detected at Nagycenk Observatory (NCK; [16.72E, 47.63N]), some 16 km from Sopron. Additional information about the lightning activity (e.g. horizontal orientation of the discharge channels for intra-cloud (IC) flashes) was acquired from SAFIR 3000 V1 and V3 sensors in the very high frequency (VHF, 30-300 MHz) band in case of the events observed above Hungary.

Location of the simultaneously captured sprites was determined by triangulation. The uncertainty of deduced locations is not more than 10-12 km. Displacements of individual sprites from their parent lightning flash have been calculated and the statistics of the results are presented. The role of intra cloud lightning flashes as well as the role of the electrical environment in the thundercloud regarding sprite production is also examined by means of VLF-LF and VHF lightning data.

lightning, sprite, triangulation

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