Geophysical Research Abstracts
Vol. 14, EGU2012-9283-2, 2012
EGU General Assembly 2012

Relation between the height and size of sprites and the parameters of the triggering lightning flash - preliminary results

J. Bór (1), J. Tóth (2), K. Yamashita (3), Y. Hobara (4), G. Sátori (1), M. Hayakawa (5), and H.D. Betz (6)

(1) Geodetic and Geophysical Institute, Research Centre for Astronomy and Earth Sciences, Hungarian Academy of Sciences, (2) Department of Astronomy, Physics of the Earth and Meteorology, Faculty of Mathematics, Physics and Informatics, Comenius University in Bratislava, Slovakia, (3) Salesian Polytechnic, Tokyo, Japan, (4) Department of Communication engineering and Informatics, The University of Electro-Communications, Tokyo, Japan, (5) The University of Electro-Communications, Tokyo, Japan, (6) Physics Department, University of Munich, D-85748 Garching, and nowcast GmbH, Munich, Germany

Sprites are brief luminous structures lasting for at most a few hundred milliseconds in the 50-90 km height range. This phenomenon is an optical emission accompanying electric air discharges which occur in the quasi-static electric field above active thunderstorms after tropospheric lightning discharges with extraordinary charge moment changes (CMC). 23 sprite events appearing in Central Europe during the summer of 2007 were observed simultaneously from Sopron [16.58˚E, 46.68˚N], Hungary and from Modra Observatory [17.27˚E, 48.37˚N], Slovakia. The location and height range of 64 individual sprites were determined by triangulation. Lightning activity in thunderstorms in Central Europe has been monitored by sensors of the LINET lightning detection network which operates in the VLF-LF (5-200 kHz) frequency range. Sprite producing lightning flashes were identified in the LINET database by their detection times coincident both with the time point of the corresponding optical observation and with the detection time of their characteristically high amplitude extremely low frequency electromagnetic radiation recorded in the 5-30 Hz frequency range at Nagycenk Observatory (NCK; [16.72˚E, 47.63˚N]) in Hungary. Polarity, peak current, and type (CG/IC) of the identified sprite producing lightning flashes was reported by LINET. The CMC in these discharges was deduced from the corresponding Schumann-resonance transients recorded at Moshiri station [142.3˚E, 44.4˚N], Japan. The correspondences among these properties of the sprite causing lightning flashes and the morphological type, size, and height of the sprites are examined and the preliminary results of this investigation are presented.