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Analysis of lightning activity and electromagnetic radiations associated with large TLEs

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On the night of 01/02 September, 2009 and in a very unstable atmosphere (CAPE at about 2000 J kg-1), a storm developed North-Eastern Spain and moved over Gulf of Lion, Mediterranean Sea. Several TLEs were observed during a short period (one hour) above this storm characterized by very high cloud tops, around 15 km according to Meteosat observations, by a very circular shape and a size of about 250 km. Some TLEs were huge with a vertical extent of about 70 km and possible troll events. The cloud-to-ground (CG) lightning activity associated with this storm is analyzed. Different radiations produced during the luminous events are considered. So, a specific signature was observed for the electric field in ELF range in the cases of the very big sprites. The charge moment change (CMC) values are estimated from the ELF transients. Magnetic signals of large amplitude associated with the TLEs were detected by a Superconducting QUantum Interferometer Device magnetometer located inside a Shielding QUalified for Ionosphere Detection (SQUID2).