



Multi-Instrumental Observations of a Gigantic Jet Produced by a Winter Thunderstorm in Europe

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At 23:36:56 UTC on 12 December 2009, a Gigantic Jet (GJ) was recorded by a member of the Italian Meteor and TLE Network. 51 additional transient luminous events including sprites, elves, halos and two cases of upward lightning were observed that night. Analysis of the imagery and detected lightning near the time of the GJ revealed its most likely location to be near 41.99°N and 7.61°E, 93 km west of Ajaccio, Corsica, leading to a top altitude near 92 km and a “trailing jet” phenomenon between 37-59 km, matching with earlier reported GJs. A sprite with halo occurred during the trailing jet phase of the GJ, which was triggered by a detected positive cloud-to-ground lightning (+CG) flash of 198 kA. The sprite initiated at lower than typical altitudes, with a hole at the location of the GJ. At the same time, the trailing jet and beads were re-illuminated. Four minutes after the event, an extraordinary 406 kA +CG producing a bright elve and sprite was detected near the same location.

The location of the GJ corresponded exactly to a distinct cloud top (-34°C). This is the first documented GJ which emerged from a winter thunderstorm of only 6 km tall, which shows that high cloud tops are not required for initiation of GJs. With strong vertical wind shear, the meteorological situation was different from typical outbreaks of fall and winter thunderstorms in the Mediterranean.

Electromagnetic waveforms from Hungary, Poland, and Durham (North Carolina, USA), reveal unusually large ELF/VLF signals (in contrast to several previous GJ events) and Schumann resonances persisting for 3.5 seconds. A synthesis of this and any additional data will be presented in detail at the conference.