



Sprite and Lightning Infrasound Measurements during the 2005 Eurosprite Campaign

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Liszka [2004] first assumed that infrasound have a specific signature in their spectrogram (a chirp) when a sprite occurs. During the Eurosprite 2003 campaign, Farges et al. [2005] correlated such kind of infrasound with camera observation of sprite. They used the data of the Flers infrasound station located in the North-West of France. The correlation between the time of an infrasound due to sprite and the sprite time is done by calculating the propagation time with a ray-tracing model. A clear relation between the infrasound duration and the sprite size has been found.

For the Eurosprite 2005 campaign, in addition to the permanent infrasound station of Flers, a supplementary station has been set up in St Just at ~ 400 km south-westward away from Flers. The two main objectives for the infrasound campaign were: i) to measure the same sprite infrasound with two stations and to possibly locate it and ii) to evaluate the attenuation with distance of the infrasound produced by lightning. The expected result of this second objective was the confirmation that the chirp signature is due to the sprite alone and not to the sprite and its parent lightning.

On September 9th, 3 sprites were observed by camera from 20:30 to 21:30 UT over South-West of France. The storm moved North-Eastward from the Bay of Biscay, passing just over the St Just station at around 23:00 UT. In St Just, the overpressure reached peak-to-peak 20 Pa when the storm was just over the sensors whereas it never exceeded peak-to-peak 1 Pa in Flers data. The amplitude of infrasound produced by lightning is higher than the noise only when lightning are located at distances lower than 50 km from the station. These measurements show clearly that infrasound produced by lightning are measured at St Just and are not detected in Flers. The chirp signature is then only a property of sprite infrasound.

Furthermore, from the infrasound signals detected at St Just, we try to evaluate the

charge amount discharged during a lightning as it was theoretically assumed by Dessler [1973] and Few [1985].

At last, numerous infrasounds of sprites were detected during the campaign, particularly during the large September 26th storm. But the location of these sprite-producing storms (southward relatively to the two sensors and over the Mediterranean Sea) limited the capability to locate a sprite from joined infrasound measurements.