



## **SAETTA: fine-scale observation of the total lightning activity in the framework of the CORSiCA atmospheric observatory**

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Located in the West Mediterranean basin, Corsica is strategically positioned for atmospheric studies referred by MISTRALS/HyMeX and MISTRALS/CHARMEX programs. The implementation of the project of atmospheric observatory CORSiCA (supported by the Collectivité Territoriale de Corse via CPER/FEDER funds) was an opportunity to strengthen the potential observation of convective events causing heavy rainfall and flash floods, by acquiring a total lightning activity detection system adapted to storm tracking at a regional scale.

This detection system called SAETTA (Suivi de l'Activité Electrique Tridimensionnelle Totale de l'Atmosphère) is a network of 12 LMA stations (Lightning Mapping Array). Developed by New Mexico Tech (USA), the instrument allows observing lightning flashes in 3D and real time, at high temporal and spatial resolutions. It detects the radiations emitted by cloud discharges in the 60-66 MHz band, in a radius of about 300 km from the centre of the network, in passive mode and standalone (solar panel and battery). Each LMA station samples the signal at high rate (80 microseconds), records data on internal hard disk, and transmits a decimated signal in real-time via the 3G phone network. The decimated data are received on a server that calculates the position of the detected sources by the time-of-arrival method and manages a quasi real-time display on a website. The non decimated data intended for research applications are recovered later on the field.

Deployed in May and June 2014, SAETTA operated nominally from July 13 to October 20, 2014. It is to be definitively re-installed in spring 2015 after a hardware updating. The operation of SAETTA is contractually scheduled until the end of 2019, but it is planned to continue well beyond to obtain longer-term observations for addressing issues related to climatic trends.

SAETTA has great scientific potential in a broad range of topics: physics of discharge; monitoring and simulation of storm systems; climatology of convection in the western Mediterranean; production of nitrogen oxides by lightning; influence of pollution and aerosols on the electrical activity; synergy with operational lightning networks (EUCLID, ATDnet, Linet, ZEUS) and radar observations (ARAMIS). SAETTA should also become a validation tool for space observation of lightning (e.g. TARANIS mission and optical flash sensor on Meteosat Third Generation), but also for field campaigns.

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