

# Specific call for Trans-National Access to the SIRTA Atmospheric Observatory

## Precipitation Field Campaign Fall 2016

Objectives: A field experiment will be carried out at the SIRTA observatory (<http://www.sirta.fr>) to study microphysics and dynamics in precipitation, based on in-situ measurements and radar measurements at multiple frequencies (including Doppler and polarimetric measurements). Spatial and temporal variability will be studied using a comprehensive sampling measurement systems deployed at multiple locations.

Current French laboratories involved are: IPSL, LATMOS, LaMP, ENPC, Meteo-France, LTHE.

Routine measurement at SIRTA: Continuous measurements are performed of radiation (radiometers at multiple locations), wind and turbulence profiles (UHF radar, sodar, Doppler lidar, sonic anemometer, ...), aerosol profiles (backscatter lidar), water content profiles (cloud radar), as well as in-situ dry aerosol size distribution, number and mass concentration and optical properties (SMPS, CPC, CCNC, TEOM, nephelometer, aethalometer), and ambient aerosol and fog droplets (PVM, FM100, Welas), and particle chemistry (ACSM).

Instrumental set-up dedicated for this field experiment: This campaign will take place from **September to December 2016** at SIRTA and will see the deployment of a number of instruments meant to measure rain at various space-time scales:

- up to **3 spectro-pluviometers** and **3 disdrometers** (from ENPC, LATMOS and LaMP) will ensure continuous measurement of the DSD and rain intensities at the ground around the central location of SIRTA;
  - on the central location a **video sonde** (LTHE) will also provide PSD/DSD description;
  - on the same central location, two **vertically-pointing W-Band Doppler radars** to measure vertical profiles of microphysical characteristics of the DSD/PSD, the water content and the vertical wind;
  - on the central location also, a **vertically-pointing X-Band Doppler radar** to complement the W-Band (multi-frequency retrieval).
  - close to the central location but slightly shifted (20 m), a **Micro Rain Radar (MRR)** at 24 GHz to measure spatial and vertical variability of the precipitation field at small scale;
  - about 400 m from the central location, an **X-band rain radar** will perform volumetric sampling of the rain field (PPI at different elevations from 0 to 90°) with additional RHI sampling above the central location. This radar will provide a high-resolution description of the rain field. The spatial variability of the rain will be compared to the differences in rain estimates obtained from the various spectropluviometers at and around the central location.
  - about 16 km from the central facility, we will also use the data from the **C-band polarimetric Doppler radar of Meteo-France**. This radar will provide us with polarimetric measurements suitable to classify the types of hydrometeors and precipitation measurements

at a coarser resolution than the above-mentioned X-Band (and at a higher altitude above the central facility). Assessment of the spatial resolution on the rain product error will be performed in parallel with Z-R relationship tests;

- about 30 km from the central facility, an **X-band polarimetric Doppler radar** (Ecole Nationale des Ponts et Chaussées) will also perform a third set of radar measurements. They will be used to assess the attenuation effects by comparing these data with both the Trappes and the local X-band radar. Tests of stereoradar attenuation correction will be performed over Paris area;

- similarly, a third **X-band polarimetric Doppler radar** (Météo-France) at about 40 km from the central facility will give us a third measurement, with yet another spatial resolution. In addition this third radar will allow us to perform triple-Doppler measurement over the Paris urban area to retrieve 3D wind field in a box enclosing the SIRTA site. The set of polarimetric data will also allow us to test particle classifications from 4 different perspectives to check consistency and improve the microphysical description of the rain system that will be observed.

- An optional **X-band polarimetric Doppler radar** (from Novimet) might be set-up about 14 km (and 4km from Trappes) from the central facility in order to complement the network. This radar will also serve as a bench test for various sampling strategies configurations.

Principal scientific investigators are Joël Van Baelen (from LaMP) and Yvon Lemaître, Laurent Barthès and Nicolas Viltard (from LATMOS).

**We would like to invite you to participate in this field campaign.** In the framework of the European ACTRIS program, Trans National Access funds are available to host European researchers and help deploy their equipments at SIRTA. 1000€ grants per researchers are available to cover your travel and subsistence costs for a minimum 8-day stay.

Please let us know if participating in this field experiment could be of interest to you, and what would be your specific research interests.

Please contact us with any questions or feedback you may have. We look forward to hearing from you soon.

Martial Haeffelin ([martial.haeffelin@ipsl.polytechnique.fr](mailto:martial.haeffelin@ipsl.polytechnique.fr)),  
Jean-Charles Dupont ([jean-charles.dupont@ipsl.polytechnique.fr](mailto:jean-charles.dupont@ipsl.polytechnique.fr))