



PhD position at LSCE

Title : High resolution characterization of (ultra)fine secondary pollution in the Paris region, France.

Summary :

Atmospheric pollution is associated with demonstrated health and climate issues. Our understanding of the sources and transformation processes are confronted with the chemical complexity of the particulate phase, and more particularly of its organic fraction. The metrological limits of the instruments commonly used in the various observatories therefore deprive us of a complete vision of the mechanisms involved. Indeed, it has been recently underlined that in Paris, for instance, around 80% of organic matter is secondary, without being able to link it to natural or anthropogenic sources. As part of the in-situ observations at the SIRTA station (located at LSCE) within the European ACTRIS infrastructure, the CAE team acquires a high-resolution aerosol mass spectrometer (ACSM-X, manufactured by Aerodyne) to better characterize, in real time, the primary and secondary chemical composition and its sources. Based on this new instrumentation, this thesis will focus on three different objectives :

- the thorough metrological evaluation of the instrument's performance towards its implementation for continuous measurements;
- the annual characterization of the sources of the organic fraction, with a dedicated interest in the role of wood burning (in a context of energetic upheaval),
- and the contribution of biogenic and marine biogenic sources; and the evaluation of the chemical composition of ultrafine particles (<200nm), as well as their representations in chemistry-transport models.

This thesis is complementary to the instrumentation deployed at SIRTA, within the framework of the European ACTRIS infrastructure, and also in the near real time source apportionment work of the EU-Greendal RI-URBANS project.

Candidate

Master degree in Atmospheric Sciences

Demonstrated skills on experimental set-up and data analysis

Programming skills (R / Python / Igor) are preferable

Working Environment

LSCE is a world-recognized laboratory studying climate change and environmental pollution. Located 20km SW of Paris, France, LSCE gathers around 300 people. The CAE team (Experimental Atmospheric Chemistry), led by Valérie Gros, explores the complexity of gaseous and particulate pollution in different environments (from polar to urban). In particular, CAE operates long-term in-situ measurements, which is part of the SIRTA observatory. In close collaboration with INERIS, CAE performs cutting-edge source apportionment studies in order to refine our understanding of the chemical composition of the atmosphere and its impact on air quality and health.

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