Université de Lille 1 SCIENCES ET TECHNOLOGIES — UFR de Physique

Master Physique du fondamental au professionnel
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International Master 2 Atmospheric Environment: Research Training 2018-2019

Laboratory: LOA

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CaPPA Work Package: WP 2,3 (Aerosol microphysical, chemical and optical properties from fundamental heterogeneous processes to remote sensing) / WP 3 (Aerosol observations: Instrumentation and intensive field campaigns Monitoring from networks and satellite)

Validation of a mobile photometer coupled to a LiDAR for aerosols characterization in oceanic regions

Abstract

Ground-based characterization and monitoring of aerosols properties mainly rely on automatic instruments organized into networks. LOA is one of the key laboratory in charge of a the worldwide AERONET network (https://aeronet.gsfc.nasa.gov/). This network is composed of automatic sun/sky/moon photometers mostly covering continental areas and very few are operated over Islands which makes the ocean poorly covered by such observations.

On going developments performed at LOA, in cooperation with CIMEL company (Paris), are aiming to design and build a mobile version of this automatic sun/moon photometer. Mobile capability photometer means the instrument is performing measurements when it is moving onboard various vectors (i.e. airplane, boat, car). A first prototype has been built in the framework of a project funded by the European Space Agency (ESA).

This prototype has been involved in 2 field campaigns. The first one, AQABA (Air Quality and climate change in the Arabian Basin), took place during Summer 2017 and covered a long cruize starting from Toulon (south of France) to Kuwait City. Additional aerosols observations were performed using ceilometer (profiling aerosol) and in situ optical measurements. Similarly, a second campaign has been organized with this prototype onboard the german oceanic research vessel PolarStern from the South of Argentina to Hambourg, however sampling different types of aerosols.

The proposed internship will consist in (i) validating the observation technique and (2) providing a first scientific analysis of the data obtained during this 2 campaigns.

Keywords: aerosols, variability, mobile photometer, LiDAR/Ceilometer, oceanic area, synergy