

PhD position (oct. 2020 – sept. 2023)

Impact of turbulent structures on the small-scale variability of pollutants' concentrations

Keywords	Atmospheric dynamics; Turbulence; Air pollution; Remote sensing; Doppler (wind) lidar
Project summary	Experimental studies investigating the impact of atmospheric dynamics on air quality often limit to a one-dimensional approach (dilution of pollutants into an atmospheric boundary layer of varying depth). In parallel, the numerous experimental studies bearing upon the three dimensional structuration of atmospheric turbulence (e.g. convective rolls) rarely show interest for the impact of those structures on the vertical and horizontal dispersion of pollutants. This PhD will make use of the rich experimental means owned by the LPCA in the field of active remote-sensing (scanning wind lidar, aerosol lidar...) and exploit the algorithmic developments performed in the framework of an another ongoing PhD, in order the characterize the turbulent structures and dynamic phenomena, and determine their influence upon the small-scale variability (a few 100 m to a few km) of pollutants' concentrations. These concentrations will be measured at several points of the surface or in altitude using micro-sensors previously calibrated in the lab. A particular attention will be paid to phenomena occurring in coastal areas (breezes, coastal jets...), to phenomena responsible for winter pollution peaks (strong thermal inversion, atmospheric stratification in stable atmospheres...) and to nocturnal phenomena (nocturnal jets, nocturnal turbulence...).
Qualifications	The candidate should have a Master's degree in physics with a major in environment or a Master's degree in climate sciences or meteorology. Skills in data analysis and computer programming (Matlab or equivalent) are absolutely necessary, as well as a good level in English. <i>NB. Applications with a Master specialty having nothing to do with the subject (e.g. quantum physics or nanomaterials) will not be considered, it is useless to apply in this case.</i>
Application	Candidates are invited to send their application by email <i>before March 27 2020</i> , including a CV, a description of their research activities during lab training periods, a cover letter and the name and email of two referees (teachers, training tutors) that could write a recommendation letter. The scholarship will be granted after validation of the candidate's record by the university post-graduate school and by the funding organism.
Salary	1437 € monthly net wages. If the level in French is sufficient, a teacher's assistant position is possible in 3 rd year (64h teaching in the year, +200 € net / month) or casual teaching in 1 st and 2 nd year.
Dates	From October 1 st 2020 to September 30 th 2023.
Lab location	Laboratory for Physico-Chemistry of the Atmosphere (LPCA) Université du Littoral-Côte d'Opale (ULCO) 189A, avenue Maurice Schumann, 59140 Dunkerque, France
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