Air quality in Buenos Aires : synergy between modelling, satellite data and in situ measurements.

Tutors:

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Duration : 4-6 months

Description:

Buenos Aires is one of the most populous cities in South-America, with more than 14M inhabitants in its urban area. Surrounded by large plains, and located on the shores of the La Plata estuary and not far from the Atlantic ocean, air quality in Buenos Aires is less degraded than in other cities of the subcontinent. However, past studies have identified a significant health effet of atmospheric pollution on mortality[1].

Air quality monitoring in the Buenos Aires megacity is very limited, with only three in situ surface stations with standard air pollutant routine measurements. In this context, **there is a clear need for improving the caracterisation of air quality over this urban area, with robust chemistry-transport modelling and alternative observations of air pollutants such as those derived from satellite sensors**.

For this purpose, air quality simulations for the city of Buenos Aires have been set up with the CHIMERE chemistry-transport model by CONAE in collaboration with LMD. These simulations will be performed before the beginning of the internship, if possible at kilometric scale.

The internship work proposed here will consist on analyzing these first simulations and compare them with the available in situ measurements and new satellite observations of the 3D distribution of ozone and aerosols developed by LISA. The methodology of this comparison is illustrated by Cuesta et al., 2022[2]. The intern will analyze both local urban pollution in Buenos Aires and also the influence of natural sources of air pollutants, such as wildfire plumes linked to the agricultural activities, which is known to influence serious pollution peaks in the megacity.

This internship fits in the context of the ChimSur International Research Network, a CNRS project funded for 2024-2028 to enhance interaction between French, Argentinian and Chilean researchers to study air quality in South-America. Depending on the needs and priorities of the project, the successful applicant could work in Argentina during part of the internship[3].

Added value for the COMPOSAIR community:

The proposed internship will strengthen the collaboration between LISA, LMD and CONAE to investigate air quality in the Buenos Aires megacity. This federative action will tackle a key societal need which is the better understanding of air pollution in a large megacity of the southern hemisphere, in which air quality problems need to be highlighted so as to alert populations of their major importance.

This intern scholarship will also provide a valuable support to the collaborative network ChimSur, which only provides financial funding for travelling (but no funding is available for personnel). It will allow the implication of a Master student, whose work will bridge the expertises of LMD, CONAE and LISA in chemistry-transport modelling and remote sensing of the major air pollutants.

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[1] Abrutsky et al., 2012, doi: 10.4236/jep.2012.33033

[2] Cuesta et al., 2022, doi: 10.5194/acp-22-4471-2022

[3] https://www.lmd.polytechnique.fr/~menut/projet_CHIMSUR.php