

International Master 2 Atmospheric Sciences: Research Training 2020-2021

Laboratory: SAGE

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Collaborator:

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CaPPA Work Package: WP 1 (From gas-phase to aerosols)

Investigation of the atmospheric radical budget in Cap Corsica

The SAGE department from IMT Lille Douai is involved in the ChArMEx program whose main objective is to understand how the Mediterranean basin will change in a context of strong regional anthropogenic and climatic pressures. This region is characterized by anthropogenic (urban, industrial) and natural (oceanic, biogenic) emission sources of both trace gases and aerosols, and usually experiences intense events of photochemical pollution. IMT Lille Douai participated to an intensive field campaign in Cap Corsica to study the chemistry leading to the oxidation of trace gases and the formation of secondary pollutants such as secondary organic aerosols.

The oxidation of trace gases during daytime is mainly driven by an efficient propagation chemistry between RO_x radicals, including the hydroxyl (OH), hydroperoxyl (HO_2) and organic peroxy (RO_2) radicals. This work will focus on the analysis of field measurements of RO_x radicals from the ChArMEx field campaign and will involve zero-dimensional modeling using state-of-the-art chemical mechanisms.

The main objectives will be to:

- investigate whether atmospheric models are capable of reproducing observed levels of RO_x radicals
- assess the nature and strength of radical sources and sinks
- evaluate our understanding of the radical chemistry at a remote location

This work will ultimately improve our knowledge on key factors that drive the oxidation of trace gases at remote locations impacted by biogenic emissions of volatile organic compounds and long range transport of anthropogenic emissions. The recruited student will be trained on zero-dimensional box modelling and will become well-versed in atmospheric chemistry. The preparation of a publication is expected from this internship.

Key words: Atmospheric chemistry, free radicals, field measurements, 0-D modeling