

Master 2: Research Training 2023-2024

Laboratory: LASIRE

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Eventually CaPPA Work Package: WP2

Atmospheric fate of aerosols containing first-generation oxidation products of monoterpenes: study at the single particle scale

Terpenes are complex organic compounds emitted in large quantities from vegetation.[1] Terpenes react with atmospheric oxidizing species such as O_3 , HO^\bullet and NO_3^\bullet forming oxygenated first-generation terpene oxidation products (FGTOP). These compounds are semi-volatile and can produce Secondary Organic Aerosols (SOA) or condense on pre-existing particles.[2,3] It is known that FGTOP react with atmospheric oxidants in the gas phase.[4-6] However, reactions of FGTOP in condensed phases are lacking in the literature. Thus, through their reactivity, FGTOP can affect air quality, climate change and cloud formation.

During this Master project, the student will study the behavior of FGTOP when deposited on inorganic surfaces or contained in aerosols and exposed to oxidants (e.g O_3 , HO^\bullet and NO_3^\bullet), water and UV-Visible light. This **laboratory study** deals with the understanding physicochemical processes at the surface scale and at the single particle scale.

To undertake such a study, the student will have access to state-of-art approaches combining non-contact techniques (optical and acoustic levitation) coupled with optical and spectroscopic characterization. Levitation systems are equipped with environmental cells that permits environment and humidity control.[7,8] Composition and morphology of single droplets will be studied in-situ as a function of the reaction time.

Depending on student performance and motivation, this study could be continued as part of a **doctoral thesis** starting in October 2024.

Key words: Atmospheric chemistry, reactivity, single particles, levitation, organic aerosols

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