

Thesis in atmospheric chemistry
Laboratoire de Physico-Chimie de l'Atmosphère (LPCA)
Université du Littoral-Côte d'Opale (ULCO, Dunkerque, France)

**Study in the atmospheric simulation chamber CHARME of the reactivity of
the first-generation oxidation products of monoterpenes:
Implications on air quality and climate**

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Funding: ANR (50%) – ULCO (50%)

Context

Monoterpenes are massively emitted in the atmosphere by vegetation and undergo rapid gas phase oxidation by hydroxyl radical (OH), nitrate radical (NO₃) and ozone (O₃). These reactions generate semi-volatile oxygenated products and lead to the formation of Secondary Organic Aerosols (SOAs) thus affecting both air quality and climate.

Objectives

This objective of this thesis is to study the atmospheric reactivity of the first-generation oxidation products of monoterpenes.

The research works will be performed in the atmospheric simulation chamber CHARME which is an instrument of the regional platform IReNE. The targeted Volatile Organic Compounds (VOCs) are *pinonaldehyde*, *nopinone*, *caronaldehyde*, *ketolimone*, *camphelinone*... Reactional mixtures containing one VOC and one atmospheric oxidant (OH, NO₃ or O₃) will be generated and their chemical composition will be followed versus the time by dedicated analytical techniques (PTR-ToF-MS, GC-MS, SMPS...).

The expected results are:

- The determination of the rate coefficients to calculate the atmospheric lifetimes;
- The identification of the oxidation products formed in the gas- and particle- phases and the measurement of their yields;
- The elucidation of the chemical mechanisms;
- The investigation of the hygroscopicity and optical properties of the SOAs.

This thesis subject is supported by the ANR AF2OM (Atmospheric Fate of the First-generation Oxidation products of Monoterpene compounds: implication on photo-oxidants budget and aerosol properties) and fits into the scientific problematics studied in the frame of the Labex CaPPA¹ and the CPER ECRIN.

Candidate profile: A master in chemistry, physico-chemistry or atmospheric sciences is required. Knowledge in analytical chemistry (chromatography, mass spectrometry, spectroscopy...) are also desirable.

Application: Please send a detailed CV, a letter of application with research interest and contact details of the supervisor of the Master 2 internship to:

- Dr. Cécile COEUR ; cecile.coeur@univ-littoral.fr; <https://lpca.univ-littoral.fr/>.

¹ <https://www.labex-cappa.fr/>.