



Molecular characterization of gaseous and particulate oxygenated compounds using offline gas chromatography mass spectrometry (GC/MS) techniques

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Polyfunctional oxygenated volatile organic compounds (OVOCs) are key species for the understanding of chemical processes in the atmosphere. It has been shown that these species can play a major role in secondary organic aerosol (SOA) formation (due to their low volatility) and in the ageing of SOA (due to their ability to react between themselves to form oligomers). Analysis at the molecular level, in the gas and aerosol phases, is an inescapable necessity both to develop their transformation mechanisms in the environment, and to identify source and process tracers. Improving our understanding of these processes is essential for a better assessment of the health and environmental impact of atmospheric particles.

In this context, a field campaign, called LANDEX (The Landes Experiment), took place in the Landes Forest 30km south west of Bordeaux (France) during the summer of 2017. It is a unique project with an interest in the formation and fate of Secondary Organic Aerosols (SOAs). This campaign aims at investigating the main parameters describing in summer the variation of VOC concentrations, the main precursors and the favourable conditions for the formation of SOAs in an expanse forest of maritime pines. As part of this project, this study aims at characterizing the molecular composition of organic carbon in both gaseous and aerosol phase using offline GC/MS techniques, in particular to study the processes involved in the transfer of biogenic organic carbon from the gas phase to the particulate phase. In this context, the aerosol chemical composition was analyzed using SFE-GC/MS technique, a method based on a supercritical fluid extraction followed by gas chromatography and mass spectrometry; and the gaseous phase chemical composition was analyzed using ATD-GC/MS technique, a method based on thermal-desorption (TD) of derivatized gaseous samples, coupled with gas chromatography and mass spectrometry. Furthermore, this last technique was also involved in a recent intercomparison campaign dedicated to small OVOCs which took place in EUPHORE chamber in Valencia (Spain) during May and June 2018.

In this presentation, we first describe the two methods used for the characterization of molecular composition of organic carbon in both gas and aerosol phase. Then, we present the results obtained during the Landex field and for the intercomparison campaign. Finally, we conclude and give some perspectives concerning this study.