



Project acronym: ASEOM

Project title: Atmosphere-Snow Exchange of Organic Matter

Project leader: Dusan Materic, Utrecht University, Netherlands

Discipline: Earth Sciences & Environment: Global change & Climate observation

Station(s): Sonnblick Observatory (Austria)

Our project will be conducted at Sonnblick Observatory, Austria. The idea of the project is to systematically analyse summer and winter concentrations of volatile organic compounds (VOCs), semi-volatiles (SVOCs) and organic aerosols (OA) in the air and to sample the surface snow for subsequent analysis and characterisation of the organics. Organic matter (OM) in the cryosphere originates from different continental and marine sources, undergoes complex processes, such as re-volatilisation, chemical and biological changes, and holds a potentially valuable historical record of past atmospheric conditions. However, our understanding of the processes involved is insufficient to translate the measurements of organics into the interpretation of the past atmosphere. We recently developed a quantitative, high-resolution method that uses Thermal Desorption – Proton Transfer Reaction – Mass Spectrometry (TD-PTR-MS) enabling the detection and quantification of bulk OM in aqueous samples with a mass window ranging from 28 to 500 amu. We recently applied this method to the analysis of soluble organics in surface snow, and we discovered that snow-atmosphere exchange of OM is dominated by gas phase semi-volatile organic compounds. However, direct, simultaneous measurements of VOCs, SVOCs and OA do not exist so far; and in this project, we will perform such analyses using real-time, online and off-line PTR-MS. As a result of our measurements and the meteorological data available from the station, for the first time, we will be able to obtain significant, holistic knowledge of OM snow-atmosphere interactions.