# Chemical Analysis of Organic Aerosol Particles and Nanoplastics Deposited on Alpine Glaciers

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Organic aerosols (OAs) have a significant effect on Earth's climate due to their radiation scattering properties and potential to be cloud condensation nuclei. OAs occur naturally from biological processes and biomass burning, but anthropogenic sources such as fossil fuel burning, residential biomass burning and pollution add to the presence of organic compounds in the atmosphere.

In this work we present data from a sampling campaign aimed at investigating the concentrations of nanoplastics and organics on the snow surface in remote Alpine areas. Surface snow samples from 13 locations in the Swiss and French Alps were collected in August 2021 during reconnaissance for an expedition in June 2022. The samples were taken from glaciers at altitudes between 1880 and 3550 m and as far as possible away from areas trafficked by mountaineers. The sampling was performed by mountaineers acting as citizen scientists, and analysis of blank purity proved that well-trained citizens can be a good recourse for high-quality sample access, especially in difficult-to-access mountain locations.

Upon arrival at Utrecht University, the snow samples were filtered through a 1 µm PTFE filter before being analyzed using Thermal Desorption - Proton Transfer Reaction - Mass Spectrometry (TD-PTR-MS). This method analyzes semi- and non-volatile organic compounds in the snow samples, which includes unique tracers for biomass burning (e.g. vanillic acid and levoglucosan), biogenic organic aerosols (e.g. pinonic acid) and nanoplastic pollution (e.g. polypropylene, polyethylene terephthalate, polyethylene, polystyrene, polypropylene carbonate, and polyvinyl chloride). Further processing will reveal the total organic carbon content, presence of nanoplastics of different polymer types, and the oxidative state of the carbon in the samples.