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Preliminary investigations on microplastic and microfiber pollution in NW Italian Alps glaciers

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Abstract

Microplastics (MPs) and microfibers (MFs) are a global problem, contaminating even remote regions. Atmospheric transport is one of the factors that most contributes to bring these micropollutants even to non-urbanized areas, such as glaciers; therefore, monitoring in extreme environments is useful to understand the severity of the problem in high-altitude environments. Within the project Glacier Lab of the DIATI, Politecnico di Torino, preliminary investigations in Mont Gelé, Indren, Whimper, and Rutor Glaciers, NW Italian Alps, were done to understand MP and MF pollution. Samples were collected at different depths to understand pollutant deposition in time. Collected samples were pre-treated with HO and filtered. Particles on filters were counted and characterized with microscopy techniques and image analysis using LibreCAD. Preliminary results indicated that MPs and MFs were present in all examined samples. Micropollutants abundances increased considering smaller size, and micropollutant abundances seem not to be related with the sampled depth. However, these data could be affected by several factors such as seasonal variations, weather, and snow fusion, therefore, other detailed analyses will be needed. These preliminary analyses allowed to find different problematics, useful to the improvement of the methodologies for future sampling, such as how to standardize volumes of samples and stratigraphic intervals, make a correct pretreatment of samples for organic matter removal, and optimize image analysis. In future, targeted sampling of different glaciers and spectroscopic analyses for material composition identification will be done, together with a monitoring of micropollutants transported by atmospheric currents.

Keywords: Italian Alps, Glaciers, Atmospheric transportation, Environmental monitoring, Sampling methodologies, Microscopy techniques

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