

## Submitted Abstract

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<b>Country</b>	Austria
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<b>Title</b>	Geotextiles Used On Glacial Skiing Resorts To Reduce Ablation Are Emission Sources Of Microplastics.
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>> SYNTHESIZE MOUNTAINS OF KNOWLEDGE <<

## Abstract

Climate change is exerting an enormous pressure on winter tourism and in particular on skiing areas. All Tyrolean glacial skiing operators use geotextile covers made of polypropylene (PP) which are exposed in May until the end of summer to increase albedo. The overall covered area is now by more than 50ha. The mechanical benefit is obvious: More than 1,70 m in height can be preserved during one season which is crucial to maintain glacial skiing slopes as well as neuralgic spots and infrastructure over the year which must be secured. However, this previously promising and undoubtedly necessary measurement has turned out to be more of a spell after identification as a substantial source of microplastics (MP). Fibers are released from the matrix in the course of time and are distributed in the near vicinity as well as to more distant downstream habitats such as glacial rivers by atmospheric transport and meltwaters, respectively. In the summer season of 2021 we exposed geotextiles (PP) from May to September which resembles the current measures by the operators. After removing the fleece, on average 961 m of fibers total length have been detected in the weathering crust with a maximum cumulative length of 3.157 m. Control fields without coverage reveal ca. 6 m of cumulative fiber length. From a total number of 40 sampled cryoconite holes the presence of PP fibers could be verified for the entire sample set. Downstream sampling revealed fibers in running water, sediments and in association with invertebrates, e.g. Simulidae sp. PP filaments could affect invertebrates by blocking their gills or serving as useless nutrient particles in case of incorporation.

PP fibers are non-degradable but will be broken down to microplastics eventually. MP is known to be harmful not only for invertebrates but to all living organisms including humans. Microbial communities are prone to express increased numbers of antibiotic resistance genes when growing on MP as biofilm. Additionally, MP serves as vectors for potentially pathogen organisms, hence, there is a clear need to change strategies for glacial covering.

Just by 2022 the National Environment Agency of Austria released an Action Plan for microplastics stressing the need to search for alternatives which are ecologically friendly and sustainable. So far, this is a clear chance for science and tourism to cooperate in the quest for climate friendly solutions.