BOOK OF ABSTRACTS

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EUCOP6 PUIGCERDÀ
18-22 JUNE 2023

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DOI: 10.52381/EUCOP6.abstracts.1

The project "ROCK-ME: Geochemical response of Alpine Rock Glaciers to global warming: hydroecological consequences of trace element Export"

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Abstract

ROCK-ME is a 3-year project funded by the 4th Call of the EUREGIO Interregional Project Networks framework, including the Alpine regions North Tyrol (A), South Tyrol and Trentino (I). The project, started in April 2022, addresses the effects of climate warming on the degradation of mountain permafrost. Thawing rock glaciers (RG) are becoming key hydroecological drivers in numerous deglaciating Alpine catchments, as they export cold waters often enriched in trace elements (TE). However, both the hydrological dynamics and the ecological effects of TE enrichment on water quality and ecology of RG and the downstream river networks are almost entirely unknown. The research questions investigated by ROCK-ME are: 1) Do thawing RGs export higher loads of TE than glaciers, relict RGs and groundwater springs? 2) Do TE in RG-streams mainly originate from bedrock weathering, while only a smaller amount derives from past/present atmospheric deposition? 3) Do TE export and its ecological effects vary at multiple timescales in relation to seasonal and long-term dynamics of permafrost thawing; 4) Do TE bioaccumulate in the stream foodweb? 5) Do RG microbial communities modulate TE bioavailability? 6) Do thawing RGs release trace metal resistance genes? Three Alpine catchments with different proportions of glaciers and RG cover - Futschöl in Jamtal (North Tyrol, A), Lazaun in Schnalstal/Val Senales and Madritsch in Martelltal/Val Martello (South Tyrol, I) - have been investigated during the Alpine summer 2022 following an integrated approach combining geomorphological/geochemical analysis, hydrological monitoring and modelling, ecological and genomic characterization. Field activities are going to be completed within autumn 2023.