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Rockglacier speed-up throughout European Alps - possible controls and implications

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Active rockglaciers represent typical indicators for the present occurrence of permafrost in high mountain geosystems. Due to their characteristics, the kinematics of these landforms implies important information on their sensitivity to climate-induced changes within the geosystem.

In our presentation, we compile monitoring data on rockglacier kinematics from different sites distributed over the whole alpine arc, realised by the application of diverse ground-based and remote sensing techniques. The single locations indicate great differences in geological and geomorphological settings as well as in their glacial history. In spite of these varieties, all investigated rockglaciers show a distinct increase in horizontal movement rates since the 1990s.

In order to interpret the observed speed-up of rockglaciers in the European Alps several geomorphic and climatic parameters are investigated for their individual influence on rockglacier movement. According to the current knowledge of rockglacier rheology, parameters such as differences in ice content and thickness, ice temperature, changes in slope as well as the flow law or a combination thereof, control their kinematics. These parameters are influenced by the input of water (precipitation, meltwater), debris supply, snowcover characteristics (duration, thickness, etc.),

and temperature variations. Obviously, the rather simple correlations will not allow for a well-defined deduction of ongoing processes or dynamics within this complex system, but they will improve the knowledge on major controls. Hence, future objectives in monitoring rockglacier kinematics - in order to understand their dynamics - will be defined. In addition, possible consequences like destabilisations of periglacial slopes will be considered.