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Strategies for the monitoring of rapid changes in paraglacial systems

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Glaciers are retreating at an historically unprecedented pace. Climate-determined processes are changing markedly. As a result, proglacial areas are expanding. Paraglacial dynamics are expected to further increase in significance, controlling sediment supply and landscape change in mid- to high latitudes for the next few hundred years. Paraglacial adjustment in proglacial areas has not been fully explored to date and there is an urgent need to monitor and understand these systems in more detail.

We present first insights into a planned project called glacier2go aiming to investigate changes in the paraglacial system in the highly variable and sensitive areas determined by rapid glacier retreat at two Austrian glaciers. The project aims at the development of a new holistic monitoring system, where remote sensing and field work data are combined and integrated to achieve a deeper understanding of the different stages of evolution of the paraglacial system, and to detect changes through classification approaches. The project glacier2go will fill a research gap by developing an automatic land cover classification model with very high spatial and temporal resolution for monitoring geomorphic changes. glacier2go will capture surface changes through contrasting geomorphic-classification maps.

The proposed survey will be conducted on selected glacier forefields in the Austrian Alps with Jamtalferner (Tyrol, Silvretta) and Pasterze (Carinthia, Glockner range) as the main study sites. glacier2go will be executed as a dissertation project hosted at the Interdisciplinary Institute of Mountain Research (IGF) in Innsbruck, Austria. International cooperation partners in the field of geomorphology, photogrammetry and geoinformation are on board to realize this project.

At the current stage first data comparisons are shown, emphasising the needed research on the interlinkage of geomorphology and the methodical development of new monitoring systems. Setting these first insights into the framework of paraglacial geomorphology leads to the emergence of new research questions. The associated challenges and first approaches for their solution are presented at the conference.

