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Geomorphological mapping and system analysis of two glacier forefields (Pasterze & Obersulzbachkees, Hohe Tauern, Austria)

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Glacial retreat in high mountain areas exposes landscapes with partly unconsolidated, loose and potentially unstable landforms causing a geomorphological disequilibrium that leads to a series of adjustments affecting various geomorphological components. Thus, glacier forefields
are susceptible to rapid topographic modification. Paraglacial landform adjustment within glacier forefields, accelerated by current temperature changes in mountains, can be investigated in sediment budget studies on relative short time scales.
This is concerned by an individual project of the University of Salzburg within the collaborative research project SedyMONT (Timescales of Sediment Dynamics, Climate and Topographic Change in Mountain Environments, ESF Topo Europe programme). In order to establish
sediment budgets, proper knowledge of the geomorphological situation is needed. Detailed geomorphological field mapping campaigns were carried out in the summer 2009 at the Pasterze and Obersulzbachkees catchments identifying sediment sources and storages, surface material and (sub)recent sediment transfer processes In addition enhanced multitemporal orthophoto-interpretation was applied to assess the temporal variability of sediment dynamics.
This paper presents the results of the geomorphological mappings including i) the geomorphological maps at catchment scale created using GIS techniques, ii) a qualitative description of the geomorphological system of each study site, and iii) the development of a qualitative sediment cascade model for each glacier forefield. Both study sites represent a specific composition of glacial, glacifluvial, periglacial and gravitational landforms. Considerable distinctions are observed concerning available sediments, storage distribution, vegetation cover and process activity. Erosional and depositional landforms are identified to examine where debris has been eroded, transferred and deposited. By comparing the present day system configurations with former states of activity and glacial extents, a first qualitative
discussion of the degree of paraglacial landscape adjustment is possible. We are convinced that geomorphological mapping represents a key tool for synoptic landscape analysis and serves as a basis for the further development of sediment budget models for each of the two
glacier forefields.
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