Geophysical Research Abstracts
Vol. 16, EGU2014-500, 2014
EGU General Assembly 2014

Investigations on the size and shape of river bed material in a proglacial river (Kaunertal, Tyrol)

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Fluvial systems of proglacial areas are characterized by a high spatiotemporal variability of discharge and sediment transport and are therefore highly vulnerable to morphological changes.In glacier forefields, sediment (moraines andglaciofluvial deposits) is mainly unconsolidated and unvegetated. The discharge in proglacial areas is predominantly influenced by the glaciers. The anticipated climate change will cause an increase of glacial retreat and due to this, higher discharges and a higher rate of sediment transport areexpected in the near future.
The understanding of the effectsof climate changeon geomorphodynamicsin high mountainareasis important for regional planning and natural hazard management. Investigations on sediment fluxes, transport paths, sediment mobilization and related channel morphodynamics are part of the project “High-resolution measurements of morphodynamics in rapidlychanging Proglacial Systems of the Alps” (PROSA).
The field siteKaunertalis located in the Eastern European Alps.The valley is drained by theFagge River originating from the glacierGepatschferner. Field work was concentrated on a particular channel reach of the Fagge River in the proglacial area in 2012 and 2013.Within this reach 14 cross sections were defined.
Most parts of the Fagge River are strongly influenced by the adjacent slopes, moraines and glaciofluvialdeposits. Preliminary results of the grain size and clast shape analysis show very heterogeneous values for the investigation area. Downstream fining is not evident for the whole channel reach due to the high geomorphological activity by debris flows and active slope-channel coupling. For several parts of the river (sedimentary links) downstream fining could be detected. The Graichengries area (an alluvial channel reach)for example shows a downstream fining for the D90, D84 and the D50 value as well as the distal Fernergries area. Clast shape analyses illustrate the subglacial influence at the investigation sites proximal to the glacier. The cross sections show a high variability in width/depth ratios. Additionally, high resolution terrestrial laser scanning data are used to quantify subaerial surface changes (erosion/accumulation) along the river.