



## **Detecting surface changes of glaciofluvial deposits in an alpine proglacial area using terrestrial laser scanning**

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Alpine regions are strongly affected by the global climate change. Since the end of the Little Ice Age (LIA) alpine glaciers have a negative net balance. Due to the retreat of glaciers proglacial areas with freshly exposed subglacial sediments are expanding. These sediments (moraines, tills, glaciofluvial deposits, etc.) are unconsolidated, unvegetated and therefore unstable. These sediments are highly vulnerable to surface changes. Especially during heavy rainfall events glacial and fluvioglacial deposits are remobilized and transported via the fluvial system.

This study is focused on rapidly changing surfaces in the proglacial area of the glacier Gepatschferner. The Gepatschferner is one of the biggest glaciers in Austria and is located in the Kaunertal/Ötztal Alps. The field site covers an area from the snout of the glacier (2150 m a.s.l.) to the outlet of the river Fagge into Gepatsch reservoir at (1750 m a.s.l.).

The goals of this study are to measure surface changes and quantify mass balances of important sediment sources (alluvial plains, bars) in the proglacial area, which are directly connected to the fluvial system. For this purpose multiple terrestrial and airborne laser scans are used. During the 2012 field season several sediment sources were scanned at least twice with an Optech ILRIS 36D laser scanner. Additionally, in July 2012, an ALS survey was carried out.

Significant surface changes occurred during the investigation period. The river Fagge changed from a braided channel pattern to a singular channel system and backwards on the distal outwash plain "Fernergrries".

On August 26, 2012, an extreme flood event occurred after heavy rain. Large amounts of sediment were remobilized, especially in the upper part of the proglacial area during this event.

First results show that most of the sediment was accumulated in the upper and middle part of the valley.