



Proglacial sediment supply and channel evolution of the Arveyron of the Mer de Glace since the early 20th c.

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Glacier retreat in the Alps, from the end of the Little Ice Age (LIA) to now, has released large sediment-covered areas. Those rock debris are potential massive sediment supply which could increase proglacial stream activity and worry river managers and authorities.

However, because of the ice shrinkage, proglacial hydrographic pattern in the headwater is evolving. The connexion between morainic sediments and proglacial streams is thus moving. The goal of our study is to understand the evolution of sediment sources and their level of connectivity with the proglacial streams located on the French side of the Mont-Blanc massif (Chamonix Valley).

We have used the Connectivity Index (IC) which is a geostatistic method based on lidar DEM for assessing the probability for the sediment-covered areas to be connected to a certain outlet. Then, we have kept only the IC which could be supplied by the potential glacial meltwater with the LIA and 2008 glacier extension. Unfortunately, available lidar DEM does not cover the entire study area. Nevertheless, it is sufficient to get partial or full results on different glacier types: valley glacier, cirque glacier, etc. Results are checked using the mapping of – active or not – gullies and through the analyse of the large historical picture collection available in which it is possible to identify the past active sediment sources.

Results show some explicit processes such as the contraction of the sediment sources inside morainic vallums whereas the outer moraine side was active during the LIA. Generally, results suggest a disconnection trend between sediment sources and the trunk valley. These results seem to be confirmed by a general tendency of decreasing activity of proglacial streams which is observed in the Chamonix valley.

Even if this method shows some bias, it represents an interesting semi-quantitative and geographic approach to assess past proglacial sediment sources thanks to glacier extensions. It is also possible to imagine other applications using this method such as isolated the IC from the lithology or the nature of sediment sources.