



Glacial retreat between the Late-Glacial and Early Holocene sequences in the Southern French Alps : definition of an accurate pattern by new Cosmic Ray Exposure ages.

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The Southern French Alps, characterized by many climatic influences (oceanic, continental and mediterranean), remain a scientific problem for palaeo-environmental studies. Indeed, the lack of chronological benchmarks hitherto hampered the definition of sequences of glacier variations since the Last Glacial Maximum (LGM), even if a scenario was based upon an extensive fieldwork realized in the Ubaye valley. This scenario was then considered as a regional model by many geomorphologists, but this valley is not necessarily representative of the entire region. Firstly, this valley is the driest area within the Southern French Alps due the sheltering effect of relief against humid fluxes. Secondly, topography (altitudes, slopes and shapes) of the upper part of watersheds are not particularly prone to snow accumulation into the cirques. The established scenario is as follows. Glaciers shrank and decayed between the LGM and the Late-Glacial periods and glaciers were restricted in cirques areas during the Late-Glacial and Holocene glaciations. We try to discuss this model thanks to geomorphic investigations and new chronological benchmarks acquired in Briançonnais area, in the upper part of Durance watershed.

The upper part of the Durance watershed was chosen because it corresponds to the accumulation zone of the main glacier of the Southern French Alps during the LGM. Thanks to extensive fieldwork and geomorphic mapping of remnants of past glaciations, and thanks to new chronological data (about 35 cosmic ray exposure –CRE– ages, acquired in 2004 and 2009) we propose here the first absolute scenario established in the very upper part of the catchment. To assess CRE ages, we sampled glacially-polished surfaces, along both longitudinal and transverse valley cross-sections, in order to assess both the retreat of the front and the thinning rate of the glacial tongue. We also paid attention to knobs located at the outlet of glacial cirques, and some morainic ridges.

The results show that cirque glaciation began only at the beginning of the Holocene, and that thick valley glaciers still occupied the upper valleys during the Late-Glacial period. The disappearance of the tongue occurred rapidly, between Younger Dryas and Preboreal sequences.

This scenario, well in accordance with new data obtained in Switzerland, implies many adjustments to the chronology of rockglaciers genesis and paraglacial periods in Briançonnais area.