



Deglaciation pattern of the Upper Durance catchment (Southern French Alps) since the Late Glacial Maximum: new data from cosmic ray exposure dating.

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The deglaciation pattern of the Upper Durance catchment (southern French Alps) since the Late Glacial Maximum (LGM) is still not well chronologically constrained. Knowledge of this pattern is relevant because of the transitional position of the studied area between mediterranean and oceanic climatic influences. More specifically, it is interesting to know whether the Upper Durance glacier behaved like the northern and northwestern French Alpine glaciers, which lasted during the entire Late Glacial period until the Early Holocene, or like the southeastern French Alpine glaciers (Ubaye, Verdon), which disappeared just after the Last Glacial Maximum, i.e. between 20-15 ka. Knowledge of deglaciation chronology within the study area is thus critical to clarify the processes involved in this transition zone. Our methodology is based firstly upon a geomorphic mapping of post-LGM glacial remnants (erratics, fluvio-glacial terraces, moraines, roches-moutonnées) to reconstruct a relative chronology. Secondly, cosmic ray exposure dating has been applied (15 dates) to provide absolute age constrains. To maximise the accuracy of the results, we sampled well-preserved roches-moutonnées (polished surfaces with striations) where the exposure to cosmic rays began as soon as the glacier disappeared. The results are as follows. Geomorphic evidence indicates that glaciers recession was not synchronous all over the study area. The glacial tongues located within the southeastern valleys (Guil, Cerveyrette) first retreated just after the LGM, leaving a glaciation confined in the upper cirques, whereas in the northwestern valleys (Vallouise, Clarée), glacial landforms freshness attest the long lasting presence of glacier tongues in the valley bottom. Cosmic ray exposure

dating corroborates such pattern, implying that glacier tongues in northwestern valleys disappeared at the beginning of the Holocene (9,155 +/- 2,713 10Be), while the southeastern valleys became mainly free of ice as early as the Late Glacial. Such results are in good agreement with palynological and pedological data. They also reveal, at a regional scale, a W-E gradient of the Equilibrium Line Altitudes of glaciation during the Late-Glacial, thus providing an original database for further palaeo-climatological reconstructions.