

Detrital apatite thermochronology from the Chambaran basin in the foreland of the Western Alps

Christoph Glotzbach¹, Matthias Bernet¹ & Peter van der Beek¹

¹Laboratoire de Géodynamique des Chaînes Alpines, BP 53, F-38400 Grenoble (France)
(christoph.glotzbach@bvra.ujf-grenoble.fr).

Sediment budget and in-situ thermochronological data suggest independently an increase at ~5 Ma of both the sediment flux out of the orogen and the exhumation rates in the Alps (Cederboom et al. 2004; Kuhlemann 2000; Vernon et al. 2008). At approximately the same time an intensification of the Atlantic Gulf Stream happened (Haug and Tiedemann 1998), which was used to argue for a climatic control on the '5 Ma event' (Cederboom et al. 2004; Willet et al. 2006) triggered by an increase in atmospheric moisture.

Here we present detrital thermochronological data from Miocene-Pliocene Molasse sediments of the Chambaran basin, located in the foreland of the Western Alps. Sedimentation in the basin started at ~17 Ma and lasted up to ~ 1.8 Ma. The youngest sediments form an abandonment surface, which was subsequently uplifted and tilted to ~250m in the West and up to ~800 m in the East. Preliminary detrital apatite fission track data of Miocene, Pliocene and a recent river sample (Isère) reveals no clear increase in exhumation rates, as predicted by other studies. Possible reasons for this discrepancy includes: (i) poor temporal resolution of the data and (ii) reworking of older sediments. The latter is indicated by the presence of very old ages (Cretaceous and older) in some samples, including the recent river sample.

References:

- Cederboom, C. E., H. D. Sinclair, F. Schlunegger, and M. K. Rahn (2004). Climate-induced rebound and exhumation of the European Alps. *Geology*, 32, 709-712.
- Haug, G. H., and R. Tiedemann (1998). Effect of the formation of the Isthmus of Panama on Atlantic Ocean thermohaline circulation. *Nature*, 393, 673-676.
- Kuhlemann, J. (2000). Post-collisional sediment budget of circum-Alpine basins (Central Europe). *Mem. Ist. Geol. Mineral. Univ. Padova*, 52, 1-91.
- Vernon, A., P. van der Beek, H. Sinclair, and M. K. Rahn (2008). Increase in late Neogene denudation of the European Alps confirmed by isoage analysis of a fission-track database. *Earth Planet. Sci. Lett.*, 270, 316-329.
- Willet, S. D., F. Schlunegger, and V. Picotti (2006). Messinian climate change and erosional destruction of the central European Alps. *Geology*, 34, 613-616.