



## Burial dating of sediments by cosmogenic nuclides

**A. Dehnert** (1), N. Akçar (1), M. Fiebig (2), P. Häuselmann (2), H. U. Kasper (3), P. Kubik (4), F. Preusser (1) and C. Schlüchter (1)

(1) Institute of Geological Sciences, Universität Bern, Switzerland (2) Institute of Applied Geology, Universität für Bodenkultur, Vienna, Austria (3) Institute of Geology and Mineralogy, Universität zu Köln, Germany (4) Institute for Particle Physics, ETH Zürich, Switzerland (andreas.dehnert@geo.unibe.ch)

Sedimentary records provide important information on the climatic and environmental history, as well as on the tectonic development of a given area. To evaluate the information reliable dating is necessary. There are enormous problems however associated with dating, especially Quaternary sediment sequences. Burial dating of sediments using in-situ produced cosmogenic nuclides could provide absolute ages for these sediments.

Burial dating utilises the fact that minerals were exposed to cosmic radiation prior to burial and that individual cosmogenically-produced nuclides decay at a constant rate once sediment has been buried. In this case, the decay ratio of the cosmogenic nuclides  $^{26}\text{Al}$  and  $^{10}\text{Be}$ , which are abundant in quartz minerals, can be used to calculate the time when sediment was shielded from cosmic rays. The upper dating limit is around 5 Ma due to technical evolution of accelerator mass spectrometry (Granger and Muzikar, 2001). Burial dating with  $^{26}\text{Al}$  and  $^{10}\text{Be}$  is quite well developed in the field of cave sediments and only a few studies have attempted the dating of fluvial terraces. Further more, no published studies in dating of sedimentary basin fillings are available so far.

Successful burial dating of fluvial terraces in the Lower Rhine Embayment, Germany, shows ages up to 2.7 Ma, which correlate well with the local stratigraphy. Bavarian "Deckenschotter" deposits were dated by burial dating to 0.68 Ma and 2.35 Ma (Häuselmann et al., subm.). At present, we are working on sedimentary fillings of over deepened valleys in the Swiss Midlands. This, and a status report of our ongoing work, will be presented at the conference.

References:

**Granger, D.E. and Muzikar, P.F.** 2001. Dating sediment burial with in situ-produced cosmogenic nuclides: theory, techniques, and limitations. *Earth and Planetary Science Letters*, **188**: 269-281.

**Häuselmann, P., Fiebig, M., Kubik, P.W. and Adrian, H.** subm. A first attempt to date the original "Deckenschotter" of Penk & Brückner with cosmogenic nuclides. *Quaternary International*.