Geophysical Research Abstracts
Vol. 12, EGU2010-2619-1, 2010
EGU General Assembly 2010

Landscape evolution in Lower Austria: Geodynamic processes comprised in time based on luminescence dating of loess

Christine Thiel (1,2), Birgit Terhorst (3), Iva Jaburova (4), Jan-Pieter Buylaert (2), Andrew S. Murray (2), and Manfred Frechen (1)

(1) Leibniz Institute for Applied Geophysics, Geochronology and Isotope Hydrology, Hannover, Germany (christine.thiel@liag-hannover.de), (2) Nordic Laboratory for Luminescence Dating, Department of Earth Sciences, University of Aarhus, Risø DTU, Denmark, (3) Institute of Geography, Chair of Physical Geography, University of Würzburg, Germany, (4) Institute of Geography and Regional Research, University of Vienna, Austria

Numerous geodynamic processes have formed the present-day landscape. To understand regional landscape dynamics, it is very important to investigate sedimentary outcrops that reflect these different processes. But it is equally important to constrain these processes in time.

Loess and loess-like deposits contain considerable information on palaeoenvironmental changes and landscape evolution. Moreover loess is potentially very suitable for luminescence dating because of the long distance atmospheric transport; this allows full resetting of the prior luminescence signal in the mineral grains. The technique also covers a wide time span (from a few years to several hundred thousand years) and it is very suitable for bracketing most landscape evolutionary processes in time, because it directly measures the last exposure to daylight of the mineral grains.

At Langenlois, Lower Austria, Pliocene fluvial sediments and Pleistocence loess and loess-like deposits are exposed; the latter are of interest for our study. We present sedimentological data and luminescence ages for several profiles exposed in an abandoned brickyard in Langenlois.

Luminescence ages were derived using polymineral silt-sized grains and a SAR-protocol (Murray and Wintle, 2000) with a preheat of 250°C (60 s), IR stimulation at 50°C (100 s) and a subsequent IR stimulation at 225°C for 100 s (referred to as elevated temperature post-IR IRSL protocol; Buylaert et al., 2009). The luminescence (mainly from feldspars) was detected in the blue-violet region through a Schott BG39/Corning 7-59 filter combination.

Our data suggest that distinct landscape evolutionary processes have taken place, represented by a gradual shift from fluvial to terrestrial-aeolian deposition. Two different depositional phases could be distinguished by luminescence dating, one of which lies in the Middle Pleistocene ($\sim$ 250 ka), whereas the other phase is dated to 35-45 ka.

Buylaert, J. P., Murray, A. S., Thomsen, K. J., Jain, M., 2009. Testing the potential of an elevated temperature IRSL signal from K-feldspar. Radiation Measurements, 44, 560-565.

Murray, A. S., Wintle, A. G., 2000. Luminescence dating of quartz using an improved single-aliquot regenerative-dose protocol. Radiation Measurements, 32, 57-73.