Geophysical Research Abstracts,
Vol. 10, EGU2008-A-11217, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-11217
EGU General Assembly 2008

Amino acid geochronology as an independent test of numerical dating methods applied to Central Asian loess deposits

Björn Machalett (1,2,3), Eric A. Oches (3), Manfred Frechen (2), Ludwig Zöller (1)

(1) Chair of Geomorphology, University of Bayreuth, D-95440 Bayreuth, Germany, (2) Leibniz Institute for Applied Geosciences (GGA-Institut), S3 Geochronology and Isotope Hydrology, Stilleweg 2, D-30655 Hannover, Germany, (3) Department of Geology, University of South Florida, 4202 E. Fowler Ave. - SCA 528, Tampa FL 33620, USA

Palaeoclimatic investigations of loess-palaeosol sequences depend on the application of numerical dating techniques, such as radiocarbon and luminescence methods, in order to develop reliable time series for the proxies being studied. Commonly, the utility of luminescence and radiocarbon dating is limited by their applicable dating range or, in the case of many European and Central Asian loess sites, results show a significant age underestimation for samples taken from the last glacial cycle. Relative dating approaches, such as amino acid geochronology, offer an independent assessment of numerical age estimates and assist in the chronostratigraphic evaluation of loess units beyond the range of useful numerical dating methods. Amino acid geochronology has been successfully applied to fossil gastropod shells from calcareous loess deposits from loess-palaeosol sequences in North America, Europe and China. In this study we present the first aminostratigraphic results from a Central Asian loess site: the Remisowka loess sequence in southeastern Kazakhstan, near the former capital Almaty.

We measured D/L ratios of glutamic acid, aspartic acid, phenylalanine, valine, and alloIsoleucine/Isoleucine in fossil shells of the terrestrial gastropod *Pseudonapaeus retrodens* (Martens, 1879) using reverse-phase liquid chromatography. The results of amino acid geochronology provide an independent age model for the loess series, and

their combination with numerical dating techniques allows us to confidently determine the position of the last and penultimate interglacial periods in the Remisowka sequence, casting new light on the chronostratigraphy of the last three glacial cycles in Central Asian loess.

We aim to highlight the vast potential of highly resolved multi-proxy investigations, $e.g.$, particle size studies, of the aeolian dust record of terrestrial sediments in combination with different geochronological techniques and chronostratigraphic tools, including luminescence and radiocarbon methods, plus amino acid geochronology. As loess sediments are widespread on the continents and offer paleoclimatic reconstructions on regional and inter-hemispheric scales, we anticipate that the implementation of new methods will lead to a renaissance in the study of terrestrial climate archives.