

First geochemical and isotope characteristics of amphibolites of the Huab Metamorphic Complex (NW-Namibia)

NICOLE NOLTE¹, ILKA C. KLEINHANNS²,
BENT T. HANSEN¹ AND THOMAS FÜLLGRAF³

¹Geoscience Center Göttingen, Goldschmidtstr. 3, 37077 Göttingen, Germany

²Department of Earth Science, University of Bergen, Allégaten 41, 5007 Bergen, Norway

³BRGM, 3, avenue C. Guillemin, 45060 Orléans, France

The Huab Metamorphic Complex builds together with the metavolcanosedimentary Khoabendus formation and the Fransfontein granitoid Suite the Kamanjab Inlier in NW-Namibia. It is located at the SW-border of the Congo Craton. Only few geochronological constraints exist, but these point towards protolith ages of 1800Ma [1]. Rb-Sr WR isochron calculations give ages from 1260 to 1560Ma [2] and presumably indicate a metamorphic overprint. These ages indicate a shared evolution with the Epupa Complex that shows protolith ages of 1800Ma. Further, an amphibolite-facies event at 1320-1340Ma and a granulite-facies overprint at 1490-1450Ma (i.e. [3,4]) were determined. Thus, it seems to evidence an event of Paleoproterozoic crustal growth at the SW border of the Congo Craton with intracrustal recycling processes operating until the Mesoproterozoic. First results of amphibolites of the Huab metamorphic complex show a subalkaline geochemistry with a tholeiitic fractionation trend and a prominent relative depletion of the HFSE (Nb, Ta, Zr, Hf). Both observations indicate an origin in an active continental margin, i.e. a subduction regime. Initial (1800Ma) Nd isotope compositions discriminate two different groups that are separated by the present location of the Huab valley. The northern group shows initial Nd isotope compositions from 0,510297 to 0,510357. In contrast to that, the southern group is characterised by values that range from 0,510438 to 0,510461. This is also reflected in older TDM (Nd) ages for the northern group. This could indicate an increasing influence of crustal contamination to the north and coincides with the proposed geological setting with subduction to the present NW direction beneath the Congo craton.

[1] Tegtmeier & Kröner (1985), *Precam. Res.* **28**, 311-326.

[2] Clifford *et al.* (1962), *J. Petrol.*, **3**, 244-279. [3] Seth *et al.* (2003), *Precam. Res.* **126**, 147-168. [4] Seth *et al.* (2005), *Earth planet. Sci. Lett.* **230**, 355-378.

Variations of the ²³⁸U/²³⁵U isotope composition in rivers

JANINE NOORDMANN¹, STEFAN WEYER¹,
MUKUL SHARMA² AND R. BASTIAN GEORG³

¹Institute of Geosciences, University of Frankfurt, Germany
(*correspondence: j.noordmann@em.uni-frankfurt.de)

²Department of Earth Sciences, Dartmouth College, New Hampshire, USA

³Department of Earth Sciences, University of Oxford, UK

Recent studies observed ²³⁸U/²³⁵U isotope fractionation between oxic and anoxic oceanic environments, which may be used to constrain the oceanic U mass balance. However, U isotope fractionation during continental weathering and transport to the oceans, as well as during hydrothermal alteration (the second most important sink for U) is yet unknown [1]. Previous considerations were based on the assumption that there is no U isotope fractionation between the continental crust and rivers (the major U source to the ocean).

In this study, we have been analyzing water samples from rivers of different climatic conditions, e.g. Venezuela (Rio Portuguesa, Rio Orinoco), India (Alaknanda, Bhagirathi, Ganges, Brahmaputra), Pakistan (Indus), Germany (Main and Nidda) and four different rivers from Switzerland (Ticino, Birs, Saane, Verzasca) to constrain the range of U isotope compositions of rivers. The Swiss Rivers were sampled at four different times in the year to investigate seasonal U isotope variations. Preliminary results from these river samples display a narrow range in U isotope compositions between $\delta^{238}\text{U} = -0.17$ and -0.38‰ compared to a crustal value of $\delta^{238}\text{U} \sim -0.3\text{‰}$ [1], indicating that only minor U isotope fractionation occurs during weathering and transport. This limited fractionation may be explained by an essentially quantitative transfer of the well soluble Uranyl complex during oxidative weathering from the eroded continental crust to the rivers.

[1] Weyer *et al.* (2008), *Geochim. Cosmochim. Acta* **72** 345-359