Lu-Hf geochronology of eclogites from the Dabie-Sulu terrain: Constraints on the timing of eclogite-facies metamorphism

A. SCHMIDT[1], S. WEYER[1], Y. XIAO[2], J. HOEFS[2] AND G.P. BREY[1]

[1]Institut für Geowissenschaften, JWG Universität Frankfurt, (alexander.schmidt@em.uni-frankfurt.de)
[2]2 Geowissenschaftliches Zentrum Göttingen

The Qinling-Tongbai-Dabie-Sulu belt was formed by the collision of the Yangtze and the Sino-Korean cratons, and is one of the largest ultrahigh-pressure metamorphic belts worldwide. Micro-diamond and coesite was found in eclogites and country rocks of this area, indicating a deep subduction of continental material at mantle depth. The eastern UHP part of the belt is subdivided in the Dabie and the Sulu terrain. The latter was offset 500km to the North by the Tan-Lu fault. Various geochronometers (U-Pb, Sm-Nd, Rb-Sr, Ar-Ar) have been applied to date the metamorphic events in this collision zone. However, UHP and eclogite facies metamorphism are controversely constrained to a Triassic age between 210 Ma and 245 Ma.

Here we present a new approach using the Lu-Hf isotope system to date garnet+clinopyroxene mineral assemblages in three eclogites from the Dabie terrain (sample localities are Bixiling, Shima and Lidu) and three eclogites from the Chinese Continental Scientific Drilling Program (CCSD) in the Sulu terrain. Garnets of our samples are very homogeneous and virtually non-zoned.

The Lu-Hf isochrons yield tightly grouped ages between 219.6 Ma and 223.4 Ma for both terranes (Dabie Shan and Sulu), yielding a mean age of 222.0 Ma for all six samples. This age is in good agreement with earlier estimates on the timing of UHP metamorphism. However, in contrast to previous studies our results indicate a tight age range for eclogites of the entire Dabie complex. Based on U-Pb zircon ages, Liu *et al*. (2006) and Hacker *et al*. (2006) recently proposed three metamorphic events within age ranges of 244-236 Ma, 230-220 Ma and 220-205 Ma, respectively. Liu *et al*. (2006) interpreted their ages as distinct eclogite facies events. In contrast, our Lu-Hf results show no evidence of multiple or long lasting eclogite facies conditions. Alternatively, Hacker *et al*. (2006) proposed a “precursor” UHP, a “main” UHP and an amphibolites facies metamorphic event for the Dabie-Sulu area. Our Lu-Hf ages fall into their proposed UHP event (220-230 Ma), however, define a much smaller range. This implies a very rapid UHP event on a large regional scale. Alternatively, not UHP, but the transformation of pre-curser rocks into eclogite or closure of the Lu-Hf system in garnet in the Dabie and Sulu terrain occurred within a very limited timescale.

References

Hacker, B.R. *et al*.; *Tectonics* **25** (2006); TC5006, doi:5010.1029/2005TC001937

Liu, D. *et al*.; *EPSL* **250** (2006); pp650-666

Using ^{222}Rn as environmental tracer for assessing groundwater/surface water interaction

AXEL SCHMIDT AND MICHAEL SCHUBERT

Helmholtz Centre for Environmental Research – UFZ, Leipzig, Germany (axel.schmidt@ufz.de; michael.schubert@ufz.de)

The exchange of water between lakes or rivers and hydraulically connected aquifers provides a major pathway for chemical transfer between the respective water bodies. For instance, the migration of dissolved carbon, oxygen, and/or nutrients coupled to such exchange processes has to be considered a main driver for biogeochemical processes on both sides of the surface water/groundwater interface. Furthermore, dissolved contaminants, such as dissolved NAPL, pharmaceuticals, or heavy metals, are not only influential on the aquatic life or the biological properties of the affected water body, but also on its overall water quality. Generally speaking, if the status of a surface water or groundwater resource is to be assessed or its fate to be predicted it must not be looked at as a separate aquatic system but interactions at the surface water/groundwater interface have to be taken into account.

The groundwater flux into a meromictic lignite mining lake (Lusatia Mining District, Germany) was quantitatively assessed by means of a geochemical tracer technique using the naturally occurring radio isotope ^{222}Rn. The noble gas radon makes an ideal environmental tracer because of its chemically inert behaviour and its ubiquitous presence in groundwater, where it appears in concentrations well above the concentrations found in surface waters (Nazaroff and Nero, 1988). In a long-term project radon concentrations in the water of the studied mining lake and in the groundwater sampled from surrounding monitoring wells were determined monthly over a two-year period. Evaluation and interpretation of the data sets allowed for assessing the dynamics of the local groundwater/surface water exchange processes. It could be shown that there is a high variability in the groundwater/surface water interaction rate, depending on changes of the (seasonal) precipitation rate, even within very short time scales.

The radon technique used has a high potential to improve the quality of the investigation of limnic environments. As a additional advantage the possibility of *on-site* determination of radon concentration in water samples (Schubert *et al*., 2006) allows for straight forward decisions concerning the further strategy of ongoing sampling campaigns.

References

Nazaroff W.W., Nero A.V. jr., (1988), *Radon and its Decay Products in Indoor Air*. John Wiley & Sons, New York/NY/USA.

Schubert M., Bürkin W., Peña P., Lopez A., Balcázar M., (2006), *Rad. Meas.* **41**. 492-497.