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Report from visit to Khartoum, 05. – 17.02.2007

Cooperation in Geology
Structural Geology and Thermochronology

By

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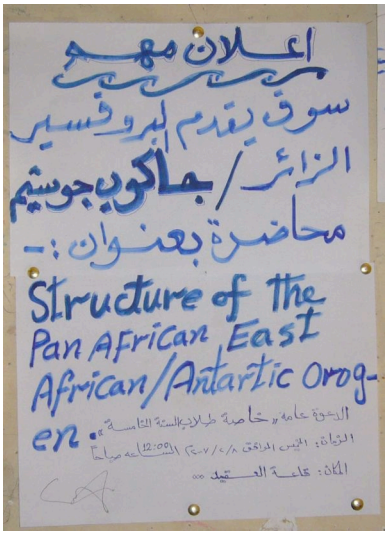
Visit of the Geology Department, University of Khartoum and fieldtrip across the Arabian-Nubian Shield

The Geology Department of the University of Khartoum was visited between 5.-17.02.2007. The visit included a one-week fieldtrip across the Arabian-Nubian Shield, which allowed sampling especially for fission track analyses. During the stay in Khartoum, Jacobs was accommodated in the delightful Khartoum University Guest House. The University provided daily transport from the guesthouse to the Geology Department.

Joachim Jacobs visited the Geology Department of Khartoum in order to make contacts with staff members and to inspect the facilities that are available at the department. The visit allowed discussions about how the department could be helped from the outside by upgrading some of the laboratory as well as the teaching facilities. Staff members outlined needs both in laboratories and for teaching. The main issues that were discussed are:

- Although the department has a large number of student microscopes, many of them are at a poor condition and need maintenance and upgrading. A technician should possibly be send to Bergen in order to learn how to maintain and repair microscopes. New cupboards need to be made in order to keep microscopes as good as possible dust free.
- The thin section laboratory needs upgrading. A new thin section saw is needed and a thin section automat would be desirable.
- Facilities for crushing rocks and mineral separation are not existing at the department but are highly desirable in order to conduct research projects.

Jacobs presented his areas of research and gave a talk on the "Structure of the Pan-African East African-Antarctic Orogen". The talk was attended by staff members and 4th and 5th-year students and was followed by a lively discussion. During the first days, staff members organised travel permits for the following field trip.



The visit at the Department of Geology was followed by a one-week geological fieldtrip across the Arabian-Nubian Shield. The trip was organised by Dr. El-Nadi. The University of Khartoum provided a 4x4 vehicle, a driver and petrol for the ca. 2500 km traverse. The Arabian-Nubian Shield of eastern Sudan forms part of one of Earths largest orogens, the East African-Antarctic Orogen. In Sudan it consists of a number of juvenile islands arc terranes that accreted along the eastern margin of W-Gondwana during Late Neoproterozoic times. The exhumation history of the Arabian-Nubian Shield is thus far not very well known, but possibly relatively important for some of the large North African and Arabian oil deposits. Possibly, the source rocks in North Africa and Arabia represent the eroded products of the East African-Antarctic Orogen. It is therefore relevant and highly interesting to understand the fundamental processes of the exhumation history of the Arabian-Nubian Shield. In order to test this hypothesis, we took a first suite of samples along two rough E-W profiles across the

Arabian-Nubian Shield. First, our trip took us from Khartoum E-wards towards the Eritrean border near Kassala. Thereafter we drove northeast to Port Sudan, where we were accommodated in the University of Red Sea Hills Guest House. Samples for fission-track analyses were taken at regular distances. From Port Sudan a day trip across the impressive western Red Sea rift shoulder was carried out and a number of samples were taken from various fault blocks. On the way back a more northerly route back to Khartoum via Haya and Atbara was taken, that allowed a second roughly E-W profile across the Arabian-Nubian Shield along a newly built road. Altogether, this trip offered a great impression of the various lithologies of the Arabian-Nubian Shield, including massive sequences of andesites, serpentinite bodies, various meta-sedimentary successions, igneous intrusions and also little known basement blocks within the Arabian-Nubian Shield near Kassala.

Altogether ca. 35 rock samples were taken. The samples arrived in Bergen in early April and will now be processed for fission-track analyses. Dr. El-Nadi took another few samples for geochemical analyses. Those samples were also sent to Bergen.

Outlook

Further field-work would be desirable along a more northerly traverse (E-W) in order to enlarge the present sample set. It was discussed to promote the exchange of master students within the Quota program of UiB as well as the exchange of staff members. Master students could be trained in fission-track analyses and other techniques at UiB.

Fig. 2: Impressive basement outcrops near the town of Kassala, close to the Eritrean border. These rocks probably formed microcontinents of the Mozambique Ocean, that accreted along the eastern margin of W-Gondwana.

Fig. 3: Succession of massive andesites, that formed along island arc terranes of the Mozambique Ocean.

Fig. 4: View across the western rift margin of the Red Sea Rift with mountain ranges representing single fault blocks.

Fig. 5: Mode of transport: a pickup with three beds and a barrel of diesel, sponsored by the University of Khartoum.