International Geology Review

ISSN: 0020-6814 (Print) 1938-2839 (Online) Journal homepage: http://www.tandfonline.com/loi/tigr20

Short note of field workshop on Neoproterozoic ophiolites, ophiolitic mélanges and other rock units in the Eastern Desert of Egypt and comparison with the Central Asian Orogenic Belt of Central Asia (18–24 February 2016)

Mohamed Abu Anbar, Alfred Kröner & Kamal Ali

To cite this article: Mohamed Abu Anbar, Alfred Kröner & Kamal Ali (2016) Short note of field workshop on Neoproterozoic ophiolites, ophiolitic mélanges and other rock units in the Eastern Desert of Egypt and comparison with the Central Asian Orogenic Belt of Central Asia (18–24 February 2016), International Geology Review, 58:9, 1127-1129

To link to this article: http://dx.doi.org/10.1080/00206814.2016.1166462

Published online: 06 Apr 2016.

INTERNATIONAL GEOLOGY REVIEW, 2016
VOL. 58, NO. 9, 1127–1129
http://dx.doi.org/10.1080/00206814.2016.1166462

Taylor & Francis
Taylor & Francis Group

FIELD WORKSHOP REPORT

Short note of field workshop on Neoproterozoic ophiolites, ophiolitic mélanges and other rock units in the Eastern Desert of Egypt and comparison with the Central Asian Orogenic Belt of Central Asia (18–24 February 2016)

Mohamed Abu Anbar[a], Alfred Kröner[b,c] and Kamal Ali[d]

[a]Geology Department, Tanta University, Tanta, Egypt; [b]Department of Geosciences, University of Mainz, Mainz, Germany; [c]Beijing SHRIMP Centre, Beijing, China; [d]Department of Mineral Resources and Rocks, King Abdulaziz University, Jeddah, Saudi Arabia

ARTICLE HISTORY Received 12 March 2016; Accepted 12 March 2016

The Neoproterozoic Arabian–Nubian Shield (ANS) and the latest Mesoproterozoic to late Palaeozoic Central Asian Orogenic Belt (CAOB) are two large and long-lived accretionary orogens. Both are mostly well exposed and consist of island arcs, ophiolites and older continental fragments. There are significant similarities between the rock types and evolution of these belts since both developed largely through accretion and ended by collision. However, there are also significant differences, particularly in their tectonic evolution. For example, the CAOB contains many well-defined ophiolite-decorated suture zones with high- and ultra-high pressure assemblages that reflect subduction and collision processes during the Neoproterozoic to Palaeozoic. Ophiolite-decorated sutures are common in the ANS, but blueschists, eclogites and other UHP metamorphic rocks have not been found. In the western ANS, known as the Nubian Shield, the tectonic evolution is dominated by large-scale obduction and extensive mélange development. We held a 5-day field workshop to compare and contrast the evolution of the ANS and CAOB, and compared the evolution of these terranes with convergent plate margins of the present circum-Pacific region. The workshop was based out of a seaside resort 60 km north of Marsa Alam, and for each of 5 days went into the Eastern Desert of Egypt to study exceptionally well-preserved ophiolites or their tectonically dismembered components and mélanges between latitudes 26° 00′ and 25° 00′ N, and longitudes 33° 00′ and 35° 00 ′E.

We opened the workshop in the evening of 18 February 2016, with three presentations about the ANS. Prof. Alfred Kröner presented an overview on the tectonics of the ANS. Dr Kamal Ali presented his research on the evolution of the ANS by highlighting the controversy resulting from discrepancies between mafic volcanic rock whole-rock Nd isotopic data (which indicated derivation of these melts from depleted mantle) and Hf isotopic signature of zircons (which indicated involvement of pre-Neoproterozoic zircons). Prof. Abu Anbar presented a general overview of the field workshop programme and an overview of the Precambrian in Egypt (Pan-African and Archaean) and the Pan-African tectonic episode.

The field excursions mostly examined Cryogenian rocks of the Central Eastern Desert. It started on 19 February by visiting the Esel dismembered ophiolite sequence in Wadi Esel, the Wadi El-Dabbah banded iron formation and the G. Sebai alkali granite (Figure 1).

The participants visited the complete Wadi Ghadir ophiolite as one of the best preserved Precambrian ophiolites on the Earth and ophiolitic mélange on the second day (20 February 2016) (Figure 1). The ophiolite sequence consists of serpenitinized peridotites, layered gabbro, isotropic gabbro, sheeted diabase dikes and pillow basalts. In the evening, Prof. Alexander Kuzmichev presented a talk about ophiolites in southern Siberia of Russia.

The Mubarak dismembered ophiolite, including components such as pillow lavas and serpentinites and mélange, was targeted on the third day (Figure 1). The mélange is dominated by serpentinites with subordinate metagabbros, metavolcanic and amphibolites. The research group examined diamictite in the mélange which include clasts suggested to be a glacial in origin, and visited Al-Umrah granodiorite pluton and Kadaburah El Hamara pluton.

On the fourth day, the participants (Figure 2) visited the Sefen chromites and Um Khariga serpentines along the Idfu-Marsa Alam road and the Atud diamictite at the type locality of Jabal Atud (Figure 1). The Atud diamictite is composed mainly of conglomerates and minor graywackes and mudstones.

CONTACT Kamal Ali alik6588@yahoo.com

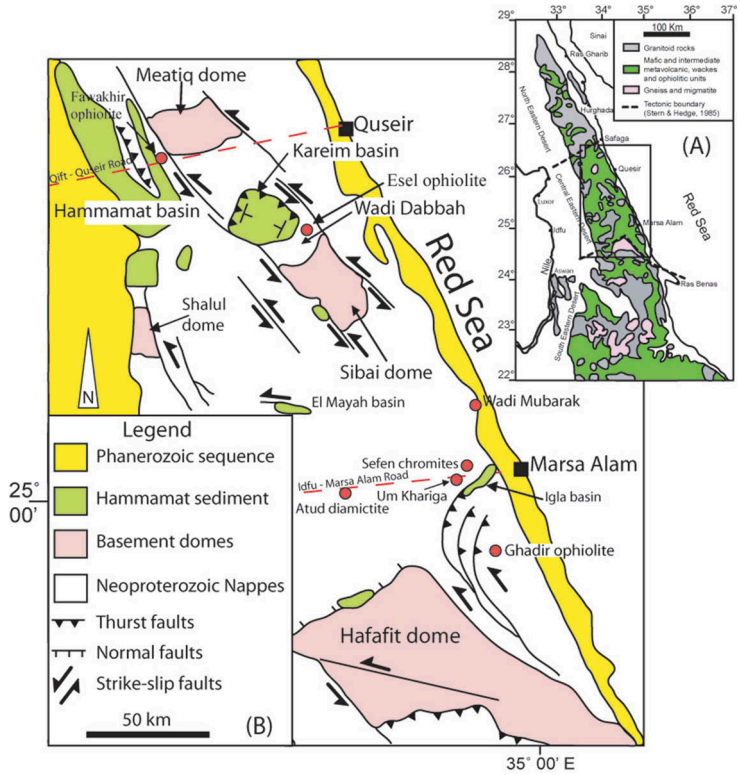

Figure 1. (A) Location of the Neoproterozoic rocks in the Eastern Desert of Egypt (modified from Stern and Hedge 1985). (B) Structural map of Eastern Desert of Egypt showing the distribution of basins and core complexes (modified from Fritz and Messner 1999; Shalaby *et al*. 2005), showing locations of the visited areas as discussed in the text.

Figure 2. Photograph shows the participants in the workshop from right to left: Prof. Xiaolei Wang (School of Earth Sciences and Engineering, Nanjing University, China); Prof. Wang Liangshu (School of Earth Sciences and Engineering, Nanjing University, China); Prof. Peng Peng (Institute of Geology and Geophysics, Chinese Academy of Sciences, China); Prof. Zhaojie Guo (School of Earth and Space Sciences, Peking University, China); Prof. Liangshu Shu (School of Earth Sciences and Engineering, Nanjing University, China); Prof. Jiansheng Qiu (School of Earth Sciences and Engineering, Nanjing University, China); Prof. Jinhai Yu (School of Earth Sciences and Engineering, Nanjing University, China); Prof. Guochun Zhao (Department of Earth Sciences, University of Hong Kong, Hong Kong); Assistant Prof. Ahmed ElSaed (Geology Department; Tanta University, Egypt); Police Guard; Prof. Afred Kröner (Department of Geosciences; University of Mainz, Germany); Police Guard; Prof. Arild Andresen (Department of Geosciences, Oslo University, Norway); Prof. Mohamed M. Abu Anar (Geology Department; Tanta University, Egypt); Associate Prof. Kamal A. Ali (Faculty of Earth Sciences, King Abdulaziz University, Saudi Arabia); Assistant Prof. Rami A. Bakhsh (Faculty of Earth Sciences, King Abdulaziz University, Saudi Arabia); Dr Maria Danukalova (Geological Institute of RAS, Moscow, Russia); Prof. Xianhua Li (Institute of Geology and Geophysics, Chinese Academy of Sciences, China); Prof. Ao Songjian (Institute of Geology and Geophysics, Chinese Academy of Sciences, China); Dr Bo Wang (School of Earth Sciences and Engineering, Nanjing University, China); Prof. Baofu Han (School of Earth and Space Sciences, Peking University, China); Prof. Ghaleb H. Jarrar (Geology Department, University of Jordan, Jordan).

On the last day, the research group visited the Qift-Quseir ophiolite (Fawakhir) and one of the most important stops was the Meatiq gneiss dome (Figure 1). Finally, the group examined Hammamat molasse sediments at the type locality of Wadi Hammamat. After we completed the workshop and field trip, the participants have recommended to do another field trip next year and will work together for future publications. Many of the participants collected rocks and showed great interest to analyse them to solve the problems highlighted during discussions.

Disclosure statement

No potential conflict of interest was reported by the authors.

References

Fritz, H., and Messner, M., 1999, Intramontane basin formation during oblique convergence in the Eastern Desert of Egypt: Magmatically versus tectonically induced subsidence: Tectonophysics, v. 315, p. 145–162. doi:10.1016/S0040-1951(99)00284-X

Shalaby, A., Stuwe, K., Makroum, F., Fritz, H., Kebede, T., and Klotzli, U., 2005, The Wadi Mubarak belt, Eastern Desert of Egypt: A Neoproterozoic conjugate shear system in the Arabian-Nubian Shield: Precambrian Research, v. 136, p. 27–50. doi:10.1016/j.precamres.2004.09.005

Stern, R.J., and Hedge, C.E., 1985, Geochronologic and isotopic constraints on late Precambrian crustal evolution in the Eastern Desert of Egypt: American Journal of Science, v. 285, p. 97–127. doi:10.2475/ajs.285.2.97