



Exhumation of Mid-Crustal Rocks in the Arabian-Nubian Shield. The Baladaya Complex of Saudi Arabia

Tamer Abu-Alam (1,2), Mahmoud Hassan (1), Kurt Stüwe (1), Sven Meyer (3), and Cees Passchier ()

(1) Graz Univ., Austria (tamer.abu-alam@uni-graz.at), (2) Tanta University, Egypt, Faculty of Science, Geology Department, Tanta, Egypt, (3) Institute of Earth Sciences, Johannes Gutenberg Universität Mainz, Mainz, Germany

Upper amphibolite facies rocks from mid-crustal levels are exhumed in the Arabian-Nubian Shield as metamorphic complexes surrounded by low-grade rocks. These middle crustal level rocks were exhumed during the East- and West-Gondwana collision (Pan-African event) in a time interval of ca. 630 to 590 Ma. One of these metamorphic complexes (i.e. Baladaya complex) shows a complicated exhumation history. Four major rock types are found in the study area. They are: a) metamorphic rocks of upper-amphibolite facies which represent the core of the Baladaya complex. Angular unconformity separates the upper-amphibolite facies rocks away from other rock types in the complex, b) metamorphic rocks of greenschist-amphibolite facies transition. These rocks lie directly above the upper-amphibolite facies rocks (type: a) and below Thalbah molasse sediments (type: c). The lower section of the Thalbah sediments shows metamorphism in lower-greenschist facies. The types (a) and (b) were exhumed underneath the Thalbah sediments (type c) as a flower structure. This flower structure can be confirmed in the field by presence of granitic rocks (rock type: d) bounded by thrust planes. The thrust planes surround the Baladaya complex and dip toward the inner part of the complex while the Thalbah molasse sediments as a footwall to the thrust planes.

This geological setting indicates that the complex was exhumed at least three times during the activity of the Pan-African event. The first exhumation was prior to the deposition of sediments, which metamorphosed later to be metamorphic rocks of greenschist-amphibolite facies transition (type: b). The second exhumation was prior the deposition of Thalbah molasse sediments. The third exhumation was by the formation of thrust planes and the regional flower structure of the Baladaya complex.