Pan-African Modification of the Contact between Middle and Upper Crust in the Western Zone of the Kaoko Belt (NW Namibia)

Jiří KONOPÁSEK[1] and Shawn L. KITT[2]

[1] *Institute of Petrology and Structural Geology, Faculty of Science, Charles University, Albertov 6, 128 43, Praha, Czech Republic*

[2] *Geological Survey of Namibia, 1 Aviation Road, P.O. Box 2168, Windhoek, Namibia*

Pan-African evolution of the Kaoko belt in NW Namibia is governed by a long period of transpressional deformation active from high- to low-temperature stages of the tectonic history. The Western Zone of the belt is characterized by almost complete exhumation of the Mesoproterozoic orthomigmatites and orthogneisses in its eastern part, whereas the western (coastal) part is built of metasedimentary rocks intruded by Pan-African granitoids ranging in age from ~700 to 550 Ma. Such a lithological and age contrasts suggest that the eastern and western parts of this zone represent different crustal levels reworked during Pan-African orogeny. The present-day boundary between these two units is represented by a large medium- to low-temperature transcurrent shear zone, and geochronological and structural data suggest a complex history of this contact between middle and upper crust.

In the Mesoproterozoic orthomigmatites, an early (D1) stage of structural evolution is characterized by oblique south-eastward thrusting of the basement over the easterly foreland. D1 structures were subsequently reworked by a penetrative D2 fabric as a result of high-temperature sinistral transpression. Despite distinctively different orientation of S_1 and S_2, NW-SE oriented stretching recorded as a strong aggregate lineation remains the same during both deformation events.

The pre-tectonic contact between the easterly Mesoproterozoic basement and coastal metasediments is masked by a large intrusional complex built of ~625 Ma and 550 Ma old granitoid rocks. Overlying metasedimentary complex contains at its base well developed unit characterized by periodic alternation of metamorphosed granitoids and amphibolites. This unit shows high-temperature metamorphism associated with partial melting of amphibolites. In contrast to the Mesoproterozoic orthomigmatites, metamorphic fabric is dipping to the south to southwest and bears strong southward oriented lineation. This lineation is missing in the hangingwall paragneisses and paramigmatites and these metasediments, as well as the granitoid complex show low-temperatrure refolding and development of localized transcurrent shear zones. The stress field of this low-temperature event is compatible with that of D2 in the basment orthomigmatites.

We interpret the southward dippping high-temperature fabric at the base of the metasedimentary complex to be contemporaneous with that in easterly Mesoproterozoic orthomigmatites. As the orientation of principal stretching (recorded as high-temperature lineation) is different in these two units, we suggest that the southward plunging lineation has developed as a result of normal ductile faulting along the boundary between middle and upper crust during active transpression in the basement. Although there are no macroscopic kinematic indicators associated with the development of this fault, an alternative thrusting scenario would not be compatible with sinistral movement observed in the Mesoproterozoic basement. Subsequently, several granitoid intrusions were emplaced along the whole middle-upper crustal boundary at ~550 Ma. Final stage of tectonic evolution of the metasedimentary (coastal) complex is the result of transfer of major transpressional deformation into the granitic complex and overlying paramigmatites and paragneisses during cooling. This process resulted in folding of the metasedimentary complex associated with the development of localized shear zones, the most prominent of which marks the boundary with the easterly Mesoproterozoic basement.

Metamorphic Zonation and Anomalously Hot Geothermal Gradient of the Silesian domain: an Interplay between Devonian Rifting and Carboniferous Collision

Monika KOŠULIČOVÁ[1] and Pavla ŠTÍPSKÁ[1]

[1] *Institute of Petrology and Structural Geology, Faculty of Science, Charles University, Albertov 6, 128 43 Praha, Czech Republic*

Investigations of metamorphic evolution in the Keprník dome and in the southern part of the Desná dome of the Silesian domain has shown an anomalously hot geothermal gradient compared to the rest of the Moravo-Silesian zone. The variations in T/P ratios along the collisional margin are discussed in terms of heterogeneously developed pre-collisional rifting within the Brunia microcontinent.

The Silesian domain was interpreted as a continental accretionary wedge developed in the marginal part of the Brunia microcontinent due to underthrusting under the Moldanubian/ Lugian domain during Variscan collision (Schulmann and Gayer, 2000). The Silesian domain was tectonically subdivided from the base upward into: 1) para-autochthonous Desná dome and its Devonian cover, 2) lower allochthonous Keprník dome