tent. If these ages are excluded then individual samples yield the following age ranges: TL-9 from 28 to 63 Ma, TT-5b/97 from 28 to 65 Ma, TT-5a/97 from 36 to 65 Ma and TT-6a/97 from 24 to 42 Ma. Since the host-rock did not experience post-crystallization argon loss due to regional reheating (including Neo-Alpine period) we suppose that similarly, the pseudotachylites did not suffer argon loss. The age of pseudotachylite formation is most likely connected with Late Paleogene – Oligocene (36–24 Ma) seismic events.

Hence the age of the Tatra Mts. pseudotachylite formation was unknown, there were only "scientific guess" for its time of origin. Commonly its generation is connected with Tatra Mts. uplift and/or propagation of Sub-Tatra fault e.g. Janák et al. (2001). Authors suggested Miocene age of its origin on the base of existing apatite fission-track data from the Tatra Mts granitic rocks yielding age between 20–10 Ma (Burchart, 1972; Kráľ, 1977). Accordingly, the studied pseudotachylites were probably generated by seismic slip along subsidiary tear faults that accompanied foundation and early stages of development of this large-scale Sub-Tatra detachment fault in the proximity of the ductile/brittle transition. Propagation of the Sub-Tatra fault is connected with origin and subsidence of Central-Carpathian Paleogene Basin in area eastern from the Tatra Mts. We suppose that our dating of the Tatra Mts. pseudotachylite veins enabled identified early stages of the Tatra Mts uplift and/or formation Sub-Tatra fault.

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Neoproterozoic High-Grade Transpression in the Kaoko Belt (NW Namibia)

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The Kaoko orogenic belt represents a NNW-SSE trending branch of the Damara orogenic belt system, which probably developed as a result of Neoproterozoic (Pan-African) collision between the Congo and Kalahari cratons of the present Africa, and the Rio de la Plata craton of the present South America. The most prominent structure of the Kaoko belt is represented by the ~400 km long Purros shear zone (PSZ), which can be traced from southern Angola up to the Atlantic coast in central Namibia.

In the Purros area, the PSZ separates two distinct tectonic units differing in both structural and metamorphic evolution. East of the PSZ, the lithology is represented mostly by metasedimentary rocks with subordinate orthogneisses and migmatites. Mineral assemblages of metasediments show typical medium-pressure Barrovian succession with decreasing metamorphic grade towards the east (Gruner, 2000). The structural style is characterized by westward-dipping metamorphic foliation, later refolded by km-scale open folds. The orientation of the stretching lineation is WNW-ESE (Dürr and Dingeldey, 1996). West of the PSZ, the lithology is represented by ortho- and metasedimentary migmatites, and associated intrusive body of Amspoort-type porphyritic granite. The determination of protolith ages of orthomigmatites and orthogneisses provided Mesoproterozoic ages of about 1640, and 1514 ±0.7 Ma, respectively (Pb-Pb zircon evaporation method). The intrusion age of the Amspoort-type intrusion is Pan-African (550 ±1 Ma).

Structural and petrological investigations West of the PSZ in the Purros area have revealed three phases of deformation. The D1 phase is associated with the development of the westward-dipping S1 foliation, and the L1 stretching lineation plunging in the same direction. The S1 foliation is later refolded into km-scale, open to close F2 folds with axes moderately plunging to the NW and subvertical axial planes. In most of the studied area, the S1 foliation is completely reworked into NW-SE trending, subvertical S2 foliation with ubiquitous closed to recumbent F2 folds with subhorizontal axes. The L2 stretching lineation is mostly subhorizontal, suggesting transpressional regime of deformation. PT conditions during the D2 are characterized by the Grt±Crd±Bt+Sill+Kf+melt assemblages in metasediments, and by partial melting in meta-igneous lithologies. Intrusion of the Amspoort-type granite seems to be coeval with the D2 deformation. Solid-state deformation of the Amspoort-type granite indicates that deformation continued during decreasing temperature. Its D3 origin is manifested by occasional brittle-ductile D3 structures overprinting D2 ductile fabric. However, the stress orientation during the D3 is the same as that during the D2. The difference is only in the temperature conditions of deformation, and the D2 and D3 structures are often indistinguishable in the field.

The orientation of the D1 structures West of the PSZ coincides with that of the main metamorphic foliation in medium-pressure metasediments East of the PSZ. During the D2, the PSZ has developed on the boundary between a westerly migmatitic unit, and an easterly unit of medium-pressure metasediments. The D2 deformation was most intense in the rheologically weak migmatitic unit where it almost completely reworked the older D1 fabric. On the other hand, the medium-pressure metasediments were only re-folded into large-scale open folds. The D2 deformation was associated with extensive melting, resulting in widespread migmatitization and intrusion of the Amspoort-type granitoid body. Continuous deformation and decreasing temperature conditions caused brittle-ductile D3 deformation of migmatitic lithologies. Stress concentration into rheologically weak, biotite-rich Amspoort-type intrusion and surrounding metasediments resulted in the appearance of a secondary transpressional shear-zone parallel to the PSZ.

The observed succession of structures suggests that the orientation of main compression remains the same during the whole tectonic history of the studied area. Major switch from D1 oblique thrusting into D2–D3 transpression is attributed to substantial weakening of the western unit by its low-pressure melting. This process allowed the development of a crustal-scale shear zone at the contact with rheologically more competent medium-pressure metasediments of the eastern unit.

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Crystalline Rock Clasts from the Visean Conglomerates – the Missing Link in the Evolution of the Moldanubian Zone?

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Crystalline rock clasts in the Luleč conglomerates (Upper Visean) of the Drahany culm have been studied in order to shed light on the lithological character and tectonic structure of their source area as well as to constrain the rate at which the potential lower crustal rocks were exhumed to the surface. Based on the presence of migmatitic gneisses, durbachites (dated at 343±7 Ma), cordierite and tourmaline-bearing granites, granulites and graphitic quartzites with V-bearing muscovite it can be concluded, that the Moldanubian Zone (Gföhl unit ± Drosendorf unit) represented a major source for the clastic material. However, this idea is modified by our new data. First, we found exotic rock types not known from the present erosion level. These are calc-alkaline volcanic rocks (dacite-andesite-rhyolite, including volcanic equivalents of durbachites) with geochemical characteristics suggesting a volcanic arc environment, biotite granites which are untypical for Moldanubian pluton and strongly peraluminous garnet-cordierite-sillimanite-bearing granulites. Second, presently outcropping rocks at the surface do not have proper equivalents among the studied clasts: no mafic durbachite types were found, tourmaline granites have slightly different geochemistry. Felsic granulites lack alumosilicate or contain just rare sillimanite, and both acid and intermediate granulite types reflect extensive medium-pressure (re)-equilibration. Moreover, graphitic quartzite is the only representative of the Variegated (Drosendorf) unit. Some of the crystalline rocks have a lower-grade character compared to the Moldanubian – these are abundant muscovite-bearing gneisses and migmatites. Lower-grade rock fragments are present also in the associated greywackes (mica-schists, marbles, volcanites and older sediments in addition to quartz and other mineral fragments).

U-Pb zircon data from granulite clasts (~ 338–339 Ma, Kotková and Parrish, 2000) are consistent with a Neo-Variscan high-temperature event, as typical for granulites from the present erosional level. We suppose that the zircon data record our peak P-T conditions (> 820 °C). The upper limit of the monazite U-Pb ages (337–332) overlap within the error with the zircon data, and the lower one with those from rutile (332±1–3, 329±5 Ma). P-T data indicate isothermal decompression over at least 15 km from depths corresponding to ~ 12 kbar (at min. 820 °C) to about 6.5 kbar and 820 °C, i.e. a region of a perturbed geotherm (> 90 mW/m^2). This lower-pressure event is possibly dated by crystallization of the latest monazite. These data are consistent with a two-stage evolution of the granulites, with the initial rapid exhumation (isothermal decompression) to mid-crustal depths of ~ 20 km, followed by an isobaric cooling stage.

Based on our data we assume, that the clasts were derived from a shallower structural level than represented by present-day surface (e.g. characterized by the presence of volcanic arc rocks). High-pressure rocks (kyanite-bearing granulites, peridotites) occurring now at the highest structural level of the Gföhl unit are absent in the Upper Visean sediments but occur in the Permian sediments of the Boskovice furrow. This can be taken as an evidence for sequential Carboniferous nappe