Detrital Cr-spinels are mostly homogenous with the exception of some grains from the Myslejovice Formation that show typical features of spinels from metamorphic rocks. These spinels are partially replaced by Cr-chlorite and/or Cr-hornblende, have increased contents of ZnO (3–6 wt %), very low Mg# and high Cr#. These spinels are typically present in Moldanubian metamorphic rocks such as serpentinites.

TiO_2 content in conjuction with the Fe^{2+}/Fe^{3+} ratio (Lenaz and Kamenetsky, 2000) were used as criteria to distinguish between volcanic and peridotitic spinel. The population in the Protivanov Formation is dominated by high-TiO_2 and low-Fe^{2+}/Fe^{3+} volcanic spinel. The proportion of volcanic spinel decreases toward the younger part of Culm sediments. This trend corresponds very well to the decreasing amount of volcanic pebbles in conglomerates from older to younger Culm sediments. Three types of volcanic spinels were distinguished using the classification diagrams of Kepezhinskas et al. (1993) and Kamenetsky et al. (2001). High Al_2O_3 (> 25 wt %) with Mg# 0.5–0.7 and Cr# 0.3–0.5 compositions plot well within the field of MORB or MORB-type back-arc spinels. Spinels with 16–23 wt % Al_2O_3, <1 wt % TiO_2, Cr# 0.5–0.7 and Mg# 0.3–0.7 may be derived from subduction-related back-arc basalts or continental tholeiites. One spinel grain with high TiO_2 (1.5 wt %) fitted well into the field of spinels from ocean island basalts.

The proportion of peridotite spinel with low TiO_2 and high Fe^{2+}/Fe^{3+} ratio increases toward the younger part of Culm sediments. A large portion of grains of peridotitic Cr-spinel yielded Cr# of 0.4–0.55 and Mg# 0.5–0.62. A comparison with the data on spinels from ultramafic rocks (Barnes and Roeder, 2001) indicates that the compositional range of the detrital spinels closely matches that of spinels from ocean-floor peridotites with affinity to Al-poorer harzburgites.

Tomášková and Přichystal (1995) suggested that the source region for volcanic and magmatic pebbles was an island arc, denuded in the Lower Carboniferous. Our study of detrital spinels and their tectonic settings does not confirm that the material came from an island arc.

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Fluid Inclusion Planes vs. Fracturing in PTP-3 Borehole at Podlesí Granite Stock (Krušné hory Mts., Czech Republic)

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Czech Geological Survey in cooperation with other organizations dealed with the project of geochemical interaction between fluids and fractured rock environment in period from 2000 to 2002 (VaV/630/3/00). For this purpose two drillholes, PTP-3 and PTP-4A, were drilled in close vicinity of 10 m to a depth of 300 m in the granitic body of the Podlesí granite stock. This contribution shortly comprises the results of core scanning with microscopic observation of fluid inclusion planes.

The Podlesí granite stock is located in the western part of the Krušné hory Mts. in western Bohemia and represents the most fractionated part of the late Variscan Nejdek-Eibenstock pluton (Breiter 2002). The stock was emplaced into Ordovician phyllite and biotite granite of "younger intrusive complex". The Podlesí granite body consists mainly of albite-protolithionite-topaz granite (stock granite). In the uppermost part, the stock granite is penetrated with several flat-lying dykes of albite-zinnwaldite-topaz granite (dyke granite). Biotite granite was found only in boreholes. The stock is crosscut by steep quartz-rich veinlets accompanied by greisenisation and tourmalinisation of the surrounding rocks.

Táborská and Breiter (1998) measured magnetic anisotropy of stock and dyke granite from outcrops. The magnetic fabric reflected a primary fabric produced during magmatic emplacement. The rocks were not affected by later deformations. Steep foliation and very steep lineation probably indicate fabric formed during the ascent of magma.

The borehole PTP-3 was measured with acoustic borehole televiewer and the core was scanned with the ImaGeo mobile corescanner (Maros et al. 2002). Combining these two methods offered the oriented distribution of the different geological

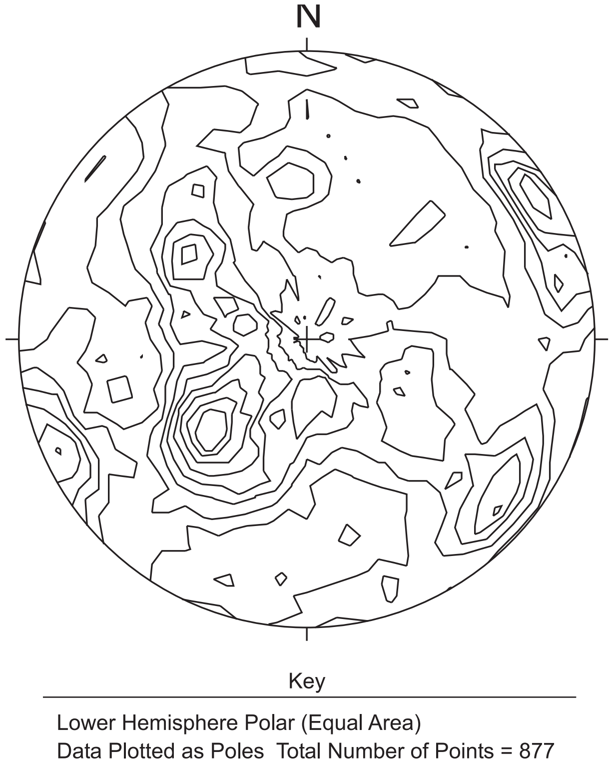

Fig. 1a. Contour diagram of poles of the fractures from the PTP-3 borehole from depth 20–348 m.

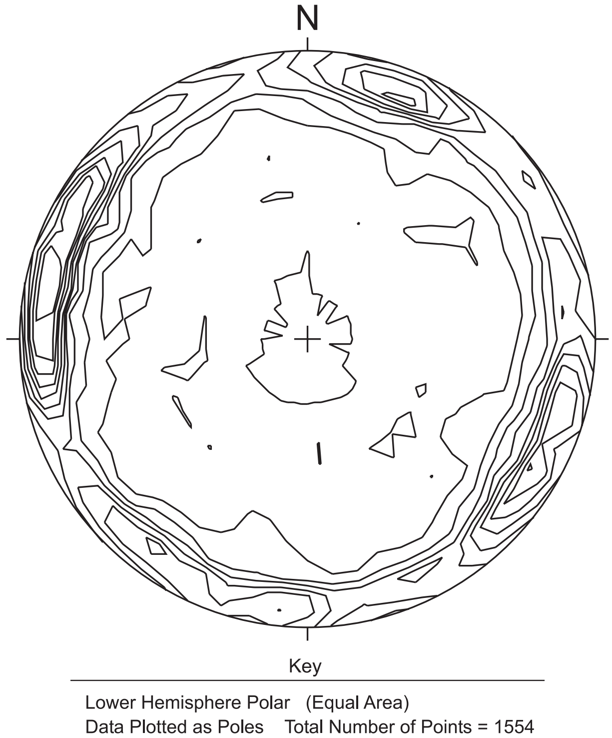

Fig. 1b. Contour diagram of poles of the FIP from the PTP-3 borehole.

phenomena, especially the fractures cutting the core (Fig. 1a). The fracture frequency was very low, 3,04 fractures per metre. The granite body cannot be termed as a fractured one, despite of this remarkable fracture zones could be distinguished. Oblique to subhorizontal fractures of NW-SE direction with dip to NE and of NNE-SSW direction with dip both to NW and SE predominate. Steep fractures are mainly of NW-SE and NE-SW direction.

Fluid inclusion planes (FIP) result from the healing of former opened cracks and therefore appear to be fossilized fluid pathways (Cathelineau et al. 1994). FIP are non penetrative cracks interpreted as extensional cracks. Length, dip and dip direction of FIP was measured in quartz and topaz of the oriented samples from the PTP-3 borehole using standard microscopic table. The length of measured FIP is from 0,1 mm to 3,2 mm. The density of FIP in quartz is estimated to be 30 to 75 FIP/cm^2. Two orthogonal directions of the steep FIP are predominate: NNE-SSW and WNW-ESE (Fig. 1). Subhorizontal FIP seem to be less frequent.

Three generations of water-rich fluid inclusions occur along the FIP: 1) Fluid inclusions with homogenization temperatures (Th) from 300 to 430 ^{o}C, 2) FIP with Th between 200 and 250 ^{o}C and, 3) FIP with Th from 140 to 230 ^{o}C. Salinity of fluids is relatively low in all the samples and does not exceed 10 wt% NaCl equiv. Fluid inclusions of the generations 1 and 3 occur in all the directions of the FIP, inclusions of the second generation are not frequent and occur only in NE-SW direction.

The directions of FIP do not correspond to the directions of the scanned fractures. The FIP are interpreted as a result of an early postmagmatic process connected with the origin of quartz-rich veins accompanied by greisenization at high temperature and pressure up to 1 kbar (Ďurišová, 1984). FIP with lower homogenization temperatures were trapped during repeated opening of fractures connected with late stage of granite evolution.

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