Sample F8 from the Paleogene Podhale flysch yielded 7.6 ± 1.2 Ma age. Two million years difference between AFT ages for the High Tatra and for the Podhale basin is probably related to the difference in elevation (c. 1500 m) and/or due to possible difference in geothermal gradient between the two areas. Similarity of obtained ages suggests contemporaneous uplift and exhumation of the Podhale basin and the Tatra Mountains.

In the OC, sample Ta 00/1 represents the Oligocene sandstone of the Dukla nappe (exposed in the Mszana tectonic window, Fig. 2), which is the structurally deepest unit in the investigated region (Fig. 2). Apatite grain age distribution from this sample shows two distinct populations: 154.0 ± 8.6 and 20.7 ± 3.0 Ma (Fig. 2). Track length distribution determined for the older population (Fig. 2) indicates lack of significant annealing since c. 150 Ma. The age of the younger population overlaps with the stratigraphic age of the sequence within its analytical error. Thus, we interpret the obtained ages as reflecting the cooling history of the source area(s). The second analysed sandstone sample (Sn 00/1) comes from the flysch deposits of the Magura Nappe, whose stratigraphic age is determined as Eocene (Fig. 2). It shows a wide scatter of individual grain ages from c. 100.3 to 6.7 Ma, which, together with the bimodal track length distribution (Fig. 2), indicate the presence of different source rocks and a partial resetting after the deposition.

Conclusions

The Internal Carpathians together with the Podhale basin underwent Miocene uplift at moderate rates. However, the High Tatra seem to have undergone slightly larger amount of uplift relatively to the Western Tatra. Taking into consideration that biotite Ar-Ar ages from the same area gave Variscan ages (Janak, 1994), the maximum amount of Tertiary exhumation can be determined as c. 8–10 km.

The present erosional level in the OC has only reached the top of the AFT partial annealing zone, which points to less than c. 3–5 km of exhumation. The presence of partial fission track annealing in the structurally higher Magura Nappe and lack of significant annealing in structurally deeper unit of the Dukla Nappe indicates, that the most of partial AFT resetting in the Magura Nappe occurred in the Eocene sedimentary basin prior to Miocene nappe stacking.

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Preliminary Results of Detailed Seismological Monitoring in Hrubý Jeseník Mts.

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In the year 2001 a temporary local seismological network was put into operation in order to monitor natural and induced seismicity in the broad environment of the Dlouhé Stráně Pumped-Storage Power Plant (Hrubý Jeseník Mts.). The network consists of four stations (SVYC, ALFC, KAMC, ANAC), each instrumented by Guralp equipment including three-component seismometer 40T-1 with eigenfrequency of 1 Hz, DM24 digitizer, SAM acquisition unit and GPS receiver of time information. The stations work in continual mode with sampling frequency of 100 Hz. The geographic situation of the seismic stations is outlined in Fig. 1. Seismological data are recorded on removable SCSI discs with the storage capacity of 4.5 GB. Offline data processing is performed at the Institute of the Physics of the Earth, Brno. After data complementation with the records from permanent broad-band station MORC (the village of Červená by Libava) and short-period mobile station MUTC (the village of Mutkov) the phase identification and arrival time picking is performed. The hypocentres of tectonic events are computed using the HYPO3D programme and simple 3D velocity model.

During the period April-December 2001 a total number of 70 local tectonic events with local magnitudes up to 1.4 was registered and 36 of them were localized. It is clear from their spatial distribution that the events occur repeatedly in close positions forming the clusters of epicentres (Fig. 1). In the following paragraphs we discuss possible relations of these clusters to the tectonic structures of the Nízký and Hrubý Jeseník Mts. combining the available data on geological situation, gravity field and reflection seismics.

Cluster 1

The most pronounced group of microearthquakes (13 events during the acquisition period) is situated in a linear zone going to the NW from Šternberk which fits approximately the boundary between the Cenozoic Hornomoravský úval basin and the Culmian of the Nízký Jeseník Mts. The depths of foci range between 10 and 13 km. This group of events seems to be linked to the NNE striking boundary fault of the Cenozoic basin which is well reflected in gravimetric map. The possible connection of the north-eastern sub-cluster with the Temenice fault and Andělská hora thrust cannot be excluded.

Clusters 2 and 3

The group of three epicentres lying ca. 6 km NE from Bruntál together with one epicentre to the SE (cluster 2) is situated on the Bělá fault which is geologically well defined and represents a major tectonic structure (e.g. Buday et al.1995). Surprisingly, this important fault is not well reflected in gravity maps. Only in derived gravity maps we can detect NW-SE trending zone representing the continuation of the Lugian boundary fault into the Keprník Dome and Culmian sediments. The hypocentres are at the depths of 9–12 km. The importance and significant depth extent of the Bělá fault is corroborated by the occurrence of the largest neovolcanic centre of the region in a close surrounding of its surficial trace. A similar coincidence of volcanic rocks occurrence and microearthquakes can be found near the village of Odry (cluster 3) where the foci of 2 events were localized in the depth of 13–14 km. In spite of this marked fact, making any direct connection between Plio-/Pleistocene volcanism and microearthquakes in this area would be rather prematu-

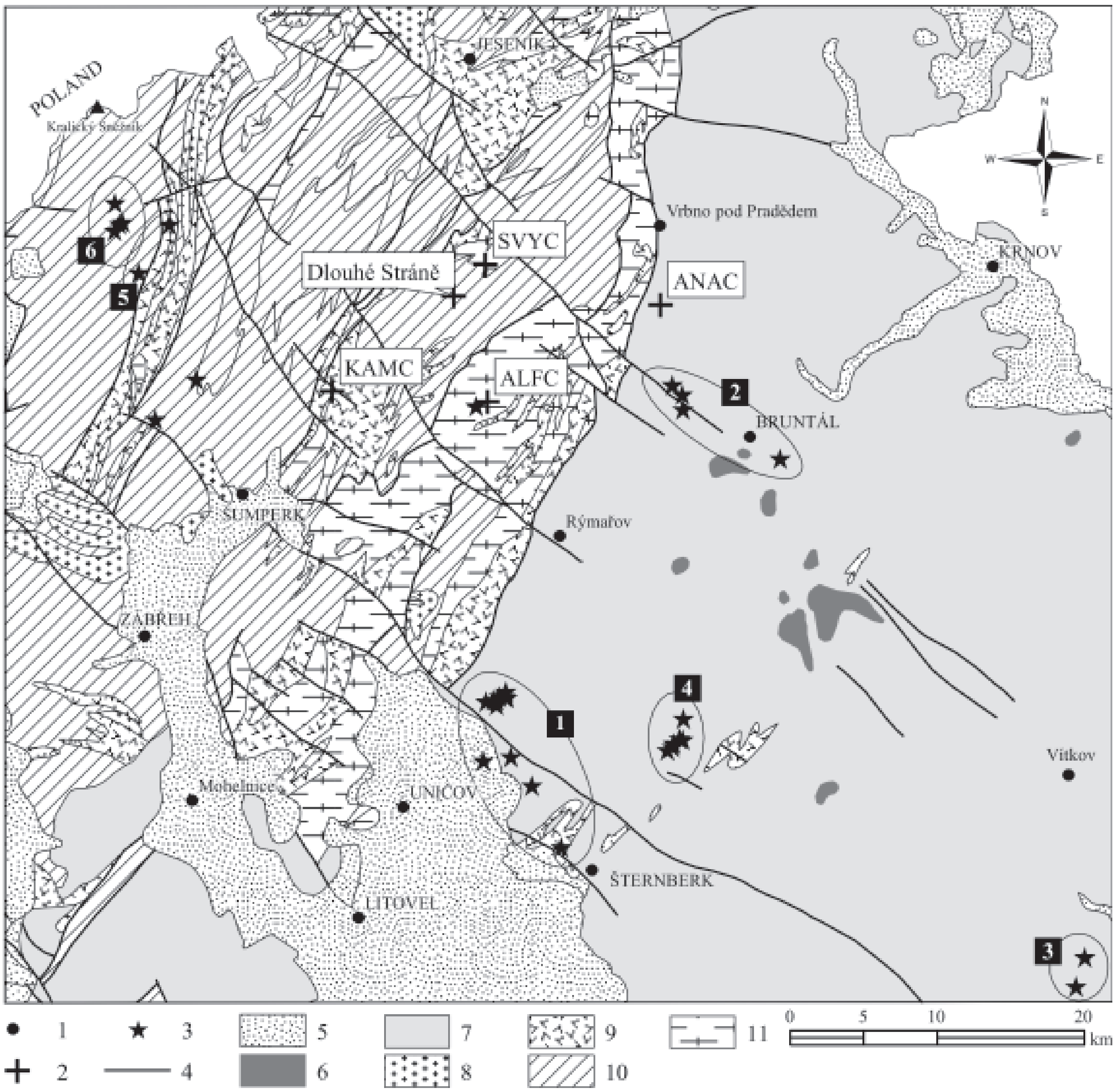

Fig.1. Simplified geological map showing epicentres of microearthquakes registered during April-December 2001 and the stations of newly established seismological network. 1 – cities, 2 – seismological stations, 3 – epicentres of microearthquakes, 4 – important faults, 5 – post-Palaeozoic sediments, 6 – Cenozoic volcanic rocks, 7 – Culmian sediments, 8 - Variscan granites, 9 – metamorphosed volcanic rocks, 10 and 11 – metapelites, orthogneisses and migmatites.

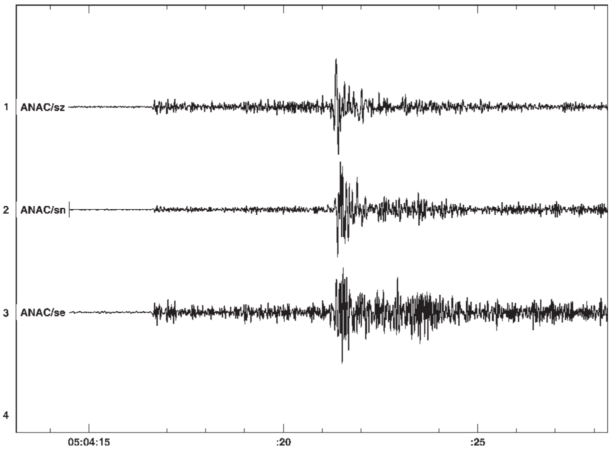

Fig. 2. Seismic signal of a tectonic microearthquake near Kralický Sně•ník (October 16th 2001, 05:04 UTC, ML = 1.0) registered at ANAC station (see Fig. 1).

re. For the time being it can be simply stated that some seismic events correlate well with the continuance of NW-SE trending sudetic faults. Concerning the interpretation of the events in cluster 3 we can utilize a reflection seismic profile 5/83 running in NNW-SSE direction 5 km to the east of the epicentres. In this profile, a 3 km long, sub-horizontal reflections occur in the proximity of the hypocentres at the two-way times of 3.9–4.0 s, which corresponds to the depths of 11–12 km. This high-amplitude reflection zone can be explained with the existence of significant shear zone within the crystalline complex, whose roof is interpreted to be in the depth of 5 km.

Cluster 4

Another group of epicentres occurs approximately 10 km SE of Šternberk, in the area where several seismic events have been already registered before this local seismic network was installed (Skácelová et al., 1998). The depth of foci ranges between 4 and 7 km. As far as the assignment of this seismically active area to its tectonic source is concerned three significant structures should be mentioned. The Šternberk-Horní Benešov zone, representing a major tectonic structure which is manifested both by an array of the outcrops of Devonian volcanic and pre-flysch sedimentary rocks and by distinct and abrupt step in a gravimetric map. Linsser indications document associated density contrast at least down to the depth of 8 km. Another structure which is well defined in the map of Linsser indications can be seen between the towns of Horní Město and Moravský Beroun, striking NW-SE. Third prominent structure of the area figures as a remarkable line in gravimetric and relief maps, running in a NNW-SSE direction between Rý•oviště and Karlova Studánka and hosting a part of Moravice river watercourse.

Cluster 5

Epicentres of two events lying SSW from Staré Město roughly correspond with the western boundary of the Staré Město Belt (Lugian domain). The dense rocks of this tectonic unit (amphibolites, serpentinites) are manifested by positive gravity anomalies. Linsser indications document sub-vertical direction of the density contrast boundary down to a depth of 2 km. Near the eastern boundary of the Staré Město Belt another event was registered with focus at a depth of 10 km. Linsser indications document steep SE dipping density contrast boundary down to 2 km at the eastern margin of the Lugian domain.

Cluster 6

The westernmost group of seismic events registered so far is situated approximately 7–8 km southwards from the peak of Kralický Sně•ník mountain. The depth of foci is 10–12 km and the epicentres lie within the negative gravity anomaly that is possibly connected with large volume of relatively light orthogneisses and metagranites of Orlice-Snieznik Complex. Skácelová et al. (1998) assumes that the recent tectonic activity in the area of Kralický Sně•ník can be explained by Kletna fault movement.

Currently, the installation of seismological station is being accomplished in a tunnel beneath the lower reservoir of the Dlouhé Stráně Pumped-Storage Power Plant. This station will play a decisive role in the study of reservoir-induced seismicity.

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Preliminary Data on P-T Metamorphic Conditions in the Metapelites from the Bystrzyckie Mts. (Orlica-Śnieżnik Dome, W Sudetes)

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Introduction

The Orlica-Śnieżnik dome is situated in the easternmost part of the West Sudetes. The western limb of the dome comprises a large orthogneiss body (Śnieżnik orthogneiss) enveloped by rocks of the Stronie formation mainly including mica schists, paragneisses, basic and acid metavolcanics and marbles. Metapelites from the eastern part of the Orlica-Śnieżnik dome are metamorphosed under the P-T range of the amphibolite facies (Józefiak 1998; Szczepański and Anczkiewicz, 2000; Białek, 2001; Romanová and Štípská, 2001). Nevertheless, there is no P-T data for the rocks from the western part of the dome. The aim of this study is to provide preliminary geothermobarometric data on metamorphic conditions in the metapelites from the Bystrzyckie Mts.