er and it is difficult to link individual tectonic events with metamorphism. Later fabric F_2 corresponds to mid crustal deformation event that affect whole Běstvina unit together with Varied group in the Moldanubian domain.

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Neotectonic Investigations of the Érmellék Region (NE Pannonian Basin, NW Transylvania)

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Neotectonic investigation has been carried out along the Ér-river valley, and between the Ér- and Berettyó-river valleys (Érmellék region). This ENE-WSW striking hilly region is situated on the northeastern part of the Pannonian Basin and NW of the Transylvanian (Apuseni) Mountains. The aim of the study was to find evidences for the hypothetised neotectonic control on river network development of the Körös Basin. The Émellék region represents a natural link between the uplifting Apuseni Mountains and Körös Basin which is the deepest sub-basin of the subsiding Great Plain. The Érmellék region is famous for its presumed neotectonic activity is shown by two larger historical earthquakes occurred in 1829 (M = 4,9; I_{max} = VII) and 1834. (M = 6,3; I_{max} = IX) (Réthly 1952).

The hilly part of the region is mainly covered by loess and "red clays" (Sümeghy 1944). The latter is a brown forest type paleosoil complex of the loess sequence which is resistant to erosion and dominantly covers the top of the ridges. The age of the loess sequence was not dated till this time, but was preliminary correlated to paleosoil horizons and may represent loess up to Middle Pleistocene (Upper sequence of the Old Loess series of the Paks Loess Formation, Marsi et al. 2004). In the Ér-river valley Late Pleistocene – Holocene alluvial sand and aleurolite can be found at different topographic height which are probably the remnants of terraces of the palaeo-Tisza, which was flowing along the northeast-southwest striking Érmellék depression (Ér-river valley) during the Late Pleniglacial (Gábris and Nádor in press).

We investigated the outcrops of the above mentioned Quaternary sediments of the region by structural, tectono-morphological and sedimentological methods to quantify the main fault directions in the field, and analysed the morphology and river network to determine the style of neotectonic deformation. We found two phases of deformations, based on microtectonic investigation of the area. The older is reflected by NE-SW trending normal faults, joints and dykes in the loess, filled with reddish, brown aleuritic clay. This is a redeposited material of the brow forest paleosoil complex. The younger/second phase is mainly reflected by rejuvenated shear faults of the first phase and Riedel-faults. These are usually filled by greyish-brown aleuritic clay wich are probably originated from chernozem-brown paleosoil of the eroded Upper Pleistocene paleosoil complex or recent zonal soil. Apart from small scale faulting, the most characteristic neotectonic feature is surface undulation. This phenomenon is probably related to folding, based on the en-echelon arrangement of the ridges of elongated undulations.

Combination of microtectonical datas with the morphotectonical observations and river network analysis, we concluded that the Érmellék region was a left lateral ENE-WSW striking fault zone with NE-SW compression and perpendicular extension up to the Middle Pleistoce. The second phase was a reactivation of the „first" phase, generated by WNW-ESE compression, and caused right lateral transpressions. This seems to be active till this time. Active deformation is also supported by the presence of historical earthquakes, too. This zone is in the norteastern continuitation of those tectonical lines which were analysed from seismic sections of the Körös Basin and caused main tectonic control on river network developement during the Late Pleistoce (Nádor et al., in press).

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REE Accessory Minerals as Regional Metamorphic Processes Indicators: An Example from Wedel Jarlsberg Land, Svalbard

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Accessory minerals are commonly used in reconstructions of metamorphic evolutions and geotectonic interpretations – from thin section scale to large regions. Significant role in that play REE- and REE-bearing minerals, such as monazite, xenotime, allanite and apatite. These minerals were previously used as indicators of metamorphic processes and their P-T conditions by numerous authors (e.g. Finger et al. 1998, Spear and Pyle 2003, Wing et al. 2003). In this paper we present use of interpretations based on reactions involving monazite, xenotime, apatite and allanite compiled with geochronological data in reconstructions of metamorphic evolution of the Isbjørnhamna Group rocks (see also Majka and Budzyń 2006).

Polimetamorphic tectonic block, composed of the metasedimentary Isbjørnhamna Group, conformably covered by metavolcanosedimentary Eimfjellet Group, is distinguished in SW part of Wedel Jarlsberg Land in Svalbard (Czerny et al. 1993). This complex was affected by metamorphism two times: firstly under amphibolite facies conditions (Barrovian type), and secondly under greenschist facies conditions (Majka et al. 2004).

Fine-grained mica schists from the Isbjørnhamna Group were studied. Quartz, biotite, muscovite, garnet, chlorite (progressive) and plagioclase are present as main minerals. Kyanite, staurolite, chloritoid occur in some samples. Moreover accessory tourmaline, zircon, sphene, apatite, monazite, xenotime, allanite, unidentified Th-phases, ilmenite, hematite and magnetite are common. Partial or complete replacement of garnet and biotite by chlorite, disintegration of muscovite, sericitization of plagioclase and kyanite indicate changes related to the low temperature metamorphism.

Euhedral monazite grains generally without zonation occur in the Isbjørnhamna Group metapelites. Chemical U-Th-total Pb method performed on monazite grains (some of them enclosed in garnets) provided uniform Cadomian (643 Ma) ages. Basing on the fact that monazites enclosed in garnets yield the same age, it is unquestionable that first metamorphic event took place during that time and also indicate, that this event was a result of orogenic movements in large scale. Previous geochronological results of Ar-Ar dating performed on micas and hornblende, reported by Manecki et al. (1997) indicate similar Cadomian ages (616 Ma for Hbl, 584–575 Ma for micas).

Investigated region was affected by later changes of P-T conditions resulting in breakdown of primary monazite and formation of apatite and/or allanite coronas. It is important to notice, that these secondary minerals are stable in lower P-T conditions than monazite, characteristic for low and middle greenshist facies (lower than Bt-in isograd). These changes are probably connected with younger Calledonian metamorphic event indicated by Ar/Ar dating (459 Ma; Manecki et al. 1998), or could be connected with cooling during the exhumation of orogen after Cadomian metamorphic event.

Compilation of the geochronological data and closing temperatures of investigated monazites – as well as hornblende and micas analyzed by Manecki et al. (1998) – provides the cooling ratio of the whole orogen equal to ca. 100 °C / 20 Ma. These data indicate maximum of metamorphism at ca. 643 Ma followed by slow exhumation of the orogen and erosion without significant uplift what took place till early Cambrian (ca. 575 Ma). Connecting of such geological history of this part of Wedel Jarlsberg Land with tectonic and litostratigraphical knowledge provides description of evolution of unique exotic terrain in Svalbard Archiepalgo.

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