Fig. 2. Time sequence of 2000 swarm.

Sedimentology of Redeposited Conglomerates: Sections at large Quarries of the Drahany Culm Basin

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Sections in the Luleč and Olšany quarries were studied during the work on the project: "Exhumation of the Variscan lower crust – constraints from the Viséan siliciclastics (Eastern Bohemian Massif)". This study has been materialised as a part of basin analysis supporting numerous special studies on comparison of pebble material, greywacke matrix and supposed crystalline source rocks (various methods of comparative petrology and mineralogy, dating, special geochemistry, etc.)

The quarries in operation are situated close to the villages of Luleč and Olšany in brachystructures of identical names. From the viewpoint of local lithostratigraphy both quarries belong to the upper member of the Myslejovice Formation, i.e., to the Luleč Conglomerates.

The conglomerates are biostratigraphically dated on the basis of goniatite fauna identified in from the intercalations of mudstones. Goniatite fauna of all Upper Viséan zones (Go α, β and χ) has been determined in the Myslejovice Formation.

The conglomerate at the Luleč quarry is composed of 78% metamorphic rocks (gneisses, granulites, mica-schists and quartzites), 19.5% magmatic rocks (granites, effusive rocks, durbachites) and 2.5% sediments (greywackes, shales). The above-mentioned analysis differs from average composition of the Luleč Member in the entire Drahany Culm by higher amount of magmatites and lesser share of sediments (Štelcl 1960).

The study was focused on definition of the depositional environment of conglomerates.

There are three basic lithotypes in the quarries: conglomerate, sandstone (greywacke) and mudstone.

Conglomerates are cropping out in the lower part of the section at Luleč quarry. They are clast supported, polymict, coarse, with well-rounded pebbles, cobbles and boulders, poorly sorted in coarse grained sandstone matrix. The largest clasts are over 1 m in diameter. The lower contacts of conglomerate bodies are erosional.

Sandstones are medium-grained, locally fine-grained, parallel-laminated. The basal contacts of sandstone layers are mostly sharp. The bodies of sandstones are present through the entire profile. The sandstone beds within the conglomerate bodies display amalgamation, sometimes with inversed graded-bedding and erosional lower contact.

Mudstones (fine-grained laminated facies) are in the upper part of the quarry. It comprises millimetre-scale parallel-laminited fine- to very fine-grained sandstones, silstones and mudstones.

The whole described complex represents slope deposits of coarse-grained fan delta system.

The following parts were recognized:
Proximal part, characterized by coarse clastic sediments of gravity flows within channels and lobes (debris flows).

Medial – distal part is characterized by sediments of high density turbidity currents. Sheet sandstones were deposited in the medial part and rhythmites and laminites of sandstones, mudstones and shales in the distal part of the complex.

Imbrication of pebbles and cobbles, ripple marks and cross--bedding indicate statistically most usual transport directions from WSW to ENE. Paleoslope and channel inclination is predominantly of the same direction.

The analyses of pebble composition and detrital garnets indicate some differences between conglomerates of the Olšany and Luleč brachysyncline, nevertheless it could be caused by different erosional level.

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Magnetic basement complexes in the outside of the West Carpathians and of the Eastern Alps

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National research programs involving the airborne geophysical mapping revealed remarkable large-size magnetic areas in Central Europe that continuously pass over the frontiers of individual states.

Almost 450 km long and 60–70 km km wide magnetic belt was found in Austria. It is developed between Innsbruck (W) and Vienna basin (NE). Its western part is widened to Germany – – SE Bavaria, too. Farther to the NE, the magnetic belt continues to the both Czech and Slovak Republics reaching the total length over 200 km in the Czech territory and almost 240 km in the Slovak territory. Its easternmost part is situated in the Carpathian area of the southern Poland being finished in the Cracow region. It means that the total length of the so-called Alpine-Carpathian magnetic belt is about 700 km (Gnojek and Heinz 1993). The next long-wave extensive anomalous area begins behind a narow interruption (magnetic minimum) in the northern Moravia and in the Czech part of Silesia. It continues to the Polish territory covering the whole Upper Silesic basin area.

The wave-length of the individual anomalies of this belt mostly reach tens of kilometers that disclose the depth of their sources in the middle interval of the crust (10–20 km). Below the Berchtesgaden anomaly – which represents the top part of the Austrian/German part of the belt – the magnetic source rocks are expected in the depth interval 8–22 km (Bleil and Pohl 1976). Also in the central part of the Vienna basin area, the source rocks are interpreted to be in the depth exceeding 7 km.

The location of the anomalous belt shows the position of the magnetic rocks below the Alpine Molasse basin, the Flysch belt and the Helveticum unit, as well as below the Mesozoic of the Northern Calcareous Alps.

The source rocks of this magnetic belt, however, are closer to the surface in the southern, central and eastern Moravia. They even outcrop in the Dyje, in the Brno and partly also in the Olomouc Massifs. Similar magnetic complexes (plutonites with a mantle of metamorphites) are situated below the Carpathian Foredeep in the depth about 1 km and below the Outer Flysch Nappes in the depth interval 2–3 km in Moravia. Similar depth position of this source rocks about 2–4 km was also proved by drill holes in the Carpathian part of Poland.

These magnetic complexes dip from this level to the SE and S; beneath the outer margin of the Central Carpathians are supposed to be in the depth about 10 (15) km. The rock composition of the source was well recognized in the southern and the eastern Moravia where 157 drill holes reached the source complex. Magnetic property studies carried-out on the drill-cores of these holes proved that the Neogene, Paleogene, Cretaceous, Jurassic, Carboniferous and Devonian formations covering the crystalline basement are not able to create these strong and extensive anomalies. On the contrary, the crystalline basement rocks both plutonic and metamorphic ones showed the magnetic susceptibilities enabling the origin of these anomalies. This basement complex, thus, is regarded to be fully responsible for the existence of these extensive anomalies.

This crystalline basement complex was studied by Dudek (1980). He determined it as an independent tectonic unit of Proterozoic age (580–600 Ma), consolidated by Cadomic orogeny and he named it as a Brunovistulicum. The best accessible and, thus, the best recognized part of the Brunovistulicum is the Brno pluton, the rock composition of which is interpreted as a segment of an ophiolite unit (Hanžl and Melichar 1997). The association of various Brunovistulic granite rocks with ophiolites were compared with another Cadomic terranes by Leichmann et al. (1996) and by Finger et al. (1998). They concluded that the Brunovistulic unit resembles the Pan-African orogenic system found in the NE Africa and in parts of the Arabic peninsula. An origin from Gondwana is, then, ascribed to the Brunovistulicum.

The extension of this predominantly buried magnetic fragment of Gondwana in the central Europe based on the airborne magnetic maps of Germany, Austria, Czech Republic, Slovakia