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EVOLUTION OF THE PERMO-CARBONIFEROUS BOSKOVICE FURROW (CZECH REP.)

INTRODUCTION AND GEOLOGICAL SETTING

Boskovice Furrow (BF) is an elongated asymmetrical basin oriented in the SSW-NNE direction filled with Permo-Carboniferous sediments, especially sandstones and conglomerates. Present width of the basin is only 5-12 km and the length is about 90 km, but the original extent was larger. The basin has been formed along the major SSW-NNE trending marginal fault (the main fault of the BF), which represents the continuations of the Diendorf fault in Austria. The whole length of the fault extends 200 km. Tectonic subsidence driven by this fault was important factor that controlled the deposition and depositional processes in the basin. The first stage of formation of the basin was the extensional period, during which the Permo-Carboniferous sediments were formed. The extensional period was accompanied by intermediate to acid volcanism. This period was followed by a compressional stage which deformed the sedimentary fill composed of the Carboniferous and Permian deposits. It also led to thrusting of the Brno Massif and locally also Devonian and Lower Carboniferous rocks over the eastern margin of the basin. Internal part of the basin was overthrust to the west forming a few duplexes.

The basin was also transversally segmented by a number of NW-SE trending faults/elevations. Existence of several sub-basins within the BF with partly different sedimentation history was predetermined by these structures. Tišnov – Kuřim Ridge is the most important transversal bedrock structure within the basin. It divides the basin into the north Letovice depression and the south Rosice - Oslavany depression.

The deposition in the basin started in its southern part (Rosice – Oslavany area) during Stephanian C with coarse-grained red conglomerates and breccias and spreaded towards the N and NE. The sedimentation ceased at different time in various parts of the basin, however, the deposition in the major part of the basin finished during Lower/Middle Autunian.

Strongly asymmetric distribution of sedimentary facies and depositional environments is typical for the BF. The deposition commenced with breccias and conglomerates within the whole basin, however, two different facies successions developed afterwards in the opposite (E – W) parts/ limbs of the basin.

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RESULTS OF THE STUDY

The eastern limb of the BF is characterized by monotonous deposits of the Rokytná conglomerates, which form the dominant fill of this part of the basin. These conglomerates represent a classical proximal facies (sediments of alluvial fans) with a typical rapid unsorted sedimentation. Clasts of older sediments like Lower Carboniferous greywackes and shales together with Devonian limestones dominate in the conglomerates along the whole eastern limb.

The basal formation of the western limb of the BF is represented by the Balinka conglomerates, which grade upward into heterogeneous but generally finer sediments. Clasts with local provenance derived from close vicinity are always present in the material on the base of all studied profiles. Clasts of greywackes, which were found in the highest members of the Balinka conglomerates, can be interpreted as re-sedimented material of the eastern provenance. This feature documents an important role of the axial and transversal transport within the basin.

CONCLUSIONS

In the initial stage of its depositional evolution, the basin represented a narrow and relatively shallow depression. The basal conglomerates (Balinka, Rokytná) provide evidence for this early stage. The basal sediments of the western limb of the BF are developed in the form of local alluvial fans. The clasts were derived from the local material, found in the basement of the studied profiles along the whole length of the western margin of the BF. On the other hand, the sedimentation at the eastern margin of the BF is controlled by the eastern marginal fault, which was a principal feature in the evolution of the depositional environment of the whole basin. The sedimentation took place in that area on slopes of alluvial fans, similarly to the western part of the BF. The Carboniferous sediments (greywackes, etc.), which form substantial portion of the Rokytná (eastern) conglomerates, however, have not been found at the basement of these deposits. Even more, the granitic rocks of the Precambrian Brno Batholith are locally thrust over the Rokytná conglomerates. Only small tectonic slices of Carboniferous sediments are sandwiched between Permian deposits and Precambrian basement.

The observed features with undisturbed transgressional contact of the BF sediments in the West and contrasting highly tectonised contact in the East indicate strong, syn- and postsedimentary movements along the marginal fault. The erosion reached the present day level on the west of the BF probably already in the Carboniferous or in the beginning of Permian, whereas the eastern margin of the BF was strongly modified in the post –Autunian time.

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