

Paleostress Analysis in the Region of Western Bohemia

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Paleostress analysis of the fault-slip data is carried out in the area of the western Bohemia. Orientations of fault planes and striae were measured mostly at sites situated in the granites of the Smrčiny pluton and the Karlovy Vary pluton. Preliminary results of the analysis are presented here. First, the fast and simple method of Angelier and Mechler (1977) was used. More detailed results were obtained by application of the numerical inverse method. Program BRUTE3 (Hardcastle and Hills 1991) was used for computation of reduced paleostress tensors.

A heterogeneous population of fault-slip data was found. Two different orientations of principal axes of the post-Variscan paleostress fields were determined but the existence of more than two paleostress fields follows from the analysis of fault-slip data sets. In the case of the first paleostress field found both in the Smrčiny pluton and the Karlovy Vary pluton, s_1 axis (maximum compression) is orientated NE-SW or NNE-SSW and s_3 axis (minimum compression) is orientated NW-SE or WNW-ESE. The second paleostress field was determined at site 36 located in the Smrčiny pluton south of Skalná. s_1 axis dips

west, s_3 axis is orientated NNE-SSW in the case of the second paleostress field.

The Recent seismo-tectonic activity is known from the area of western Bohemia. Results of stress analyses of focal mechanisms in the epicentral area of Nový Kostel show the orientation of s_1 axis (maximum compression) in the direction NW-SE and the orientation of s_3 axis (maximum extension) in the direction NE-SW. The discussed results of paleostress analysis therefore markedly differ from the Recent orientations of the stress field.

References:

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Tilting of Devonian Carbonate Platform along Eastern Borders of the Bohemian Massif: Evidence and Possible Explanations

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1. Main part of the platform. Examination of drilling records for 32 wells at the edge of the Bohemian Massif (Fig. 1) revealed a significant correlation of the high-frequency sequence architecture across the whole carbonate platform. The best data come from continuously cored wells. Strongly expressed lateral continuity consistently results from three methods: well logging, biostratigraphy and petrology. The cyclic development within the carbonate strata suggests that the major lithologic changes result from sea-level changes. Applying the sequence stratigraphy concept, we consider the initiation of the finer part of the cycle, frequently associated with a positive gamma-ray anomaly, as corresponding to the maximum flooding surface. Stromatoporoid-algal platform sediments of highstand to highstand-falling sea-level phases produce low gamma-ray values. Especially the connection of identical highstand phases in late Middle Givetian-early Late Frasnian intervals produces a fan-shaped pattern in cross-sections, which thins landwards. Even in one of the most easterly located well, where the carbonate sequence is highly reduced and represented by less than 100 m of carbonate strata, almost all of the cycles

can be recognized. It simply corresponds to rotation of linear array, when increasing thickness and increasing distance seawards show these strictly linear relationships with only little variation. Neither erosion terraces with younger sediments in lower position, nor ramp wedges with deep facies termination were found in these parts of the complex. Thus, the carbonate platform with abundant reef fauna and algae was in close contact with the sea level and, consequently, we must explain very slow tilting of the basement seawards. Relatively high integrity even in high frequencies does not support application of tilting models using the partial synsedimentary faults. This part of the Givetian-Frasnian platform was extremely coherent in these times.

2. Platform margins and slope. Wild and different subsidence patterns occur at different sites along the platform edge. For example, abrupt subsidence events are characteristic for the Middle Frasnian of Hranice n.M. They are reflected by the presence of atoll-like reef structures, as well as its distal ramp cover (sliding of blocks to the basin?). Thinning and fining upwards in the carbonate slope sediments from Konice (Báček 1996) may indicate almost exponentially bas-