

THE FOHNSDORF BASIN – NEW INSIGHTS FROM SEISMIC REFLECTION LINES

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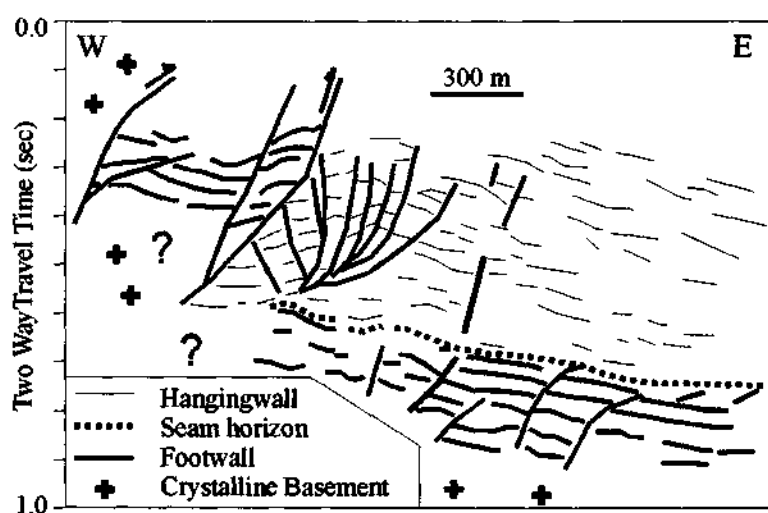
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Sinistral faults along the Noric Depression and dextral faults along the Pöls-Lavanttal Fault System played a major role during Neogene eastward extrusion of the central Eastern Alps. The Fohnsdorf Basin formed at the intersection of both systems. It is, therefore, located in a key area for the understanding of the Tertiary evolution of the Alpine-Pannonian realm.

The Miocene basin fill overlies discordantly crystalline basement rocks. It consists of 2000 m thick early Miocene deposits (footwall sediments, seam horizon, hanging wall sediments) and 1000 m thick middle Miocene deposits (Polesny, 1970). According to the classical view, the early Miocene sediments form an asymmetric syncline with a shallow dipping northern limb and an overturned southern limb, which is exposed southwest of Judenburg (Petrascheck, 1924/29). However, because of a vast Quaternary cover, the structure of the basin is still poorly understood.

A NNW-SSE trending seismic reflection line between the Wodzicky dump and Weißkirchen crosses the presumed center of the basin. It shows that the depocenter is located south of Farrach in –1200 m (s.l.) depth. This agrees well with gravimetric investigations (Walach, 1979). The fold axis of the hangingwall sediments is located in a more southern position. Sediments in the Weißkirchen area dip northward at small angles. Overturned sediments cannot be observed. This suggests that the zone with steeply dipping sediments is restricted to a narrow zone along the southwestern basin margin. A change in seismic facies of the footwall sediments occurs a few km north of Weißkirchen. The hangingwall sediments prograded southward over the seam horizon. However, sediment transport from southern directions along the southernmost part of the line also occurred.

The W-E trending seismic reflection line Fo9702 (Fig. 1) is located north of Judenburg in an area where the western basin margin is completely covered by Quaternary sediments. It shows that the western margin is formed by reverse faults, which are SE-striking according to the regional geology (Metz, 1973; Gnjezda, 1988). In the westernmost part crystalline rocks locally overlie footwall sediments. The latter overthrust hanging wall sediments forming an intensely faulted anticline. Taking this into consideration, it is likely that the overturned deposits southeast of Judenburg represent footwall sediments, which were verticalized along the southeastern continuation of the above reverse faults.



The reverse faults form part of the dextral Pöls-Lavanttal fault system and are interpreted as the northeastern branch of a positive flower structure. Probably, coal bearing sediments in the Feeberg valley, which are separated from the Fohnsdorf Basin by uplifted ranges with pre-Tertiary basement rocks (Falkenbergzug, Lichtensteinberg) represent the southwestern part of the „flower“.

Fig. 1: Line drawing and interpretation of seismic line Fo9702.

References:

- Gnjezda, G. (1988): Unpubl. Thesis. Univ. Wien.
Metz, K. (1973): Mitt. Abt. Geol. Paläont. Landesmus. Joanneum, 33, 4-33.
Petrascheck, W. (1924/29): Kohlengologie der Österreichischen Teilstaaten, 145-212, Katowicze.
Polesny, H. (1970): Unpubl. Thesis. Univ. Wien, 233 S.
Walach, G. (1979): Geologischer Tiefbau der Ostalpen, 7/II, 46-48.