The permo-carboniferous troughs of Northern Switzerland

Autor(en): **Diebold, P.**

Objekttyp: **Article**

Zeitschrift: **Eclogae Geologicae Helvetiae**

Band (Jahr): **85 (1992)**

Heft 3: **Symposium on Swiss Molasse Basin**

PDF erstellt am: **13.09.2024**

Persistenter Link: https://doi.org/10.5169/seals-167035

REFERENCES

DIEBOLD, P. & NAEF, H. 1990: Geology and tectonics of Northern Switzerland (several articles). Nagra Bulletin 12/2.

LAUBSCHER, H. P. 1986: Struktur des Grundgebirges und des Paläozoikums in der Nordschweiz. Expertenbericht zum Projekt Gewähr. Hauptabteilung für die Sicherheit von Kernanlagen (HSK), Würenlingen.

MAZUREK, M. 1992: Phase equilibria and oxygen isotopes in the evolution of metapelitic migmatites: A case study from the Pre-Alpine basement of Northern Switzerland. Contrib. Mineral. Petrol. 109, 494–510.

MAZUREK, M. & PETERS, T. 1992: Petrographie des kristallinen Grundgebirges der Nordschweiz und Systematik der herzynischen Granite. Schweiz. mineral. petrogr. Mitt. 72, 11–35.

MEYER, J. 1987: Die Kataklase im kristallinen Untergrund der Nordschweiz. Eclogae geol. Helv. 80, 323–334.

MÜLLER, W. H., HUBER, M., ISLER, A. & KLEBOTH, P. 1984: Erläuterungen zur geologischen Karte der zentralen Nordschweiz 1:100000. Nagra Technischer Bericht NTB 84-25.

PETERS, T. 1987: Das Kristallin der Nordschweiz: Petrographie und hydrothermale Umwandlungen. Eclogae geol. Helv. 80, 305–322.

WIMMENAUER, W. 1984: Das prävariskische Kristallin im Schwarzwald. Fortschr. Mineral. 62, Bh. 2, 69–86.

The Permo-Carboniferous troughs of Northern Switzerland

By P. DIEBOLD

Schwerzleweg 11, CH-5027 Herznach

Geophysical surveys and deep coreholes by Nagra have revealed at least two major Late Palaeozoic sedimentary basins in the subsurface of Northern Switzerland; a northern trough referred to as the Permo Carboniferous Trough of Northern Switzerland or **NPT** and to the south, the adjacent Olten-Lenzburg Trough. The latter has not been confirmed, as yet, by drill holes and seismic data are insufficient for a regional compilation.

The overall shape of the **NPT** is that of an ENE-WSW trending asymmetric half-graben (trap-door basin) dextrally offset by WNW-ESE wrench faults (e.g. in Eggberg and Vorwald fault zones). The latter seem to divide the **NPT** into a western and eastern segment, which differ in depth and the direction of asymmetry. Seismic evidence indicates thrusting and folding in parts of the sedimentary basin-fill, mainly evident in the western segment, which is the result of a phase of lateral transpressive compression which can be dated as Early-/Middle Permian (Saalian). Tectonic events are also reflected by sedimentation in the **NPT**:

- The older basin-fill comprises Stephanian to Lower Permian coal measures and lake deposits which are overlain by a syntectonic suite characterised mainly by fan-deposits, with rapid lateral facies changes and synsedimentary deformation.
- The younger basin fill is made up to Permian redbeds which unconformably overlay the lower basin-fill. Its overall depositional pattern is indicative of an extentional tectonic regime involving low angle normal faulting. Sediments of the late basin-fill overstep the shoulders of the NPT and reach far beyond the older deposition-centre.

After a period of virtual quiescence during the Mesozoic, fault zones of the NPT were reactivated as normal faults and flexures mainly during the Paleogene. These faults and flexures constitute an important component of the structural grain at the northern rim of the Molasse Basin.

Structural Configuration of the Swiss Molasse Basin: Eastern part (NFP 20)

By O. A. PFIFFNER
Geolog. Institut, Universität Bern, Baltzerstr. 1, CH-3012 Bern

Within the Swiss national research program NFP 20 several new seismic lines were acquired and other existing industry lines were exchanged and reprocessed. In the transect of eastern Switzerland traded lines through the Molasse basin and the adjoint Alps were reprocessed by M. Stäuble (Stäuble & Pfiffner 1991) and complemented the line NFP 20-EAST (Pfiffner et al. 1990) which crosses the Helvetic and Penninic zones of the Alps.

The Plateau Molasse is characterized by southward thickness increase of the Tertiary strata, namely the USM, and, to a lesser degree, OMM and OSM. This thickness increase is associated-with onlap structures. The Mesozoic strata beneath thin southward and show a notable change in seismic character at the transition between Plateau and Subalpine Molasse. This change may well be related to synsedimentary faulting in early Jurassic times. The Mesozoic strata dip at a shallow angle towards the south. An abrupt change to a steeper dip occurs at the southern end of the Plateau Molasse and is related to the northward pinch-out of the UMM. Steeply dipping faults dissect either the entire Molasse section (and are thus of post Mid-Miocene age) or they affect only the Mesozoic strata. Basin inversion leads to the formation of a classic triangle zone at the transition between Plateau and Subalpine Molasse. The triangle zone involves also the "Randunterschiebung", a southvergent thrust fault located at the southern margin of the Plateau Molasse. Within the Subalpine Molasse the thrust faults seemingly flatten out at depth. They are most likely related to folding and thrusting on the northern flank of the Aar massif. The transition between the UMM beds, underlying the Helvetic nappes (Säntis nappe) north of Walensee and the North-Helvetic Flysch, underlying the Glarus nappe south of Walensee might be represented by a change in seismic character as seen just north of Sargans in the line NFP 20-EAST.

REFERENCES

STÄUBLE, M. & PFIFFNER, O. A. 1991: Processing, interpretation and modeling of seismic reflection data in the Molasse Basin of eastern Switzerland. Ecologae geol. Helv. 84, 151–175.

PFIFFNER, O. A., FREI, W., VALASEK, P., STÄUBLE, M., LEVATO, L., DUBOIS, L., SCHMID, S. M., SMITHSON, S. B. 1990: Crustal shortening in the Alpine orogen: results from deep seismic reflection profiling in the eastern Swiss Alps. Tectonics 9, 1327–1355.