Sandstones elevations in Lubin-Polkowice-Sieroszowice ore deposits- result of tectonic or deposition?

WOJCIECH ŚLIWIŃSKI, KRZYSZTOF SENDERAK, MICHAŁ PASZKIEWICZ, MARTA RUDOLF, SZYMON NAWROCKI and PAWEŁ RACZYŃSKI

University of Wroclaw, Uniwersytecki 1, PL-50-137 Wroclaw, Poland

The Lubin-Polkowice-Sieroszowice ore deposit located on Fore-Sudetic Monocline is one of the largest polymetallic ores in the world. Dominant ore minerals are copper sulfide. The origin of mineralization is very complicated and ambiguous. At present most researchers consider it to be of post-sedimentation origin. Every year 500,000 tonnes of copper, 1,000 tonnes of silver, 0.5 ton of gold, nickel and lead are mined from this deposit. This ore appears in sedimentary rock mainly in sandstones, shales, limestones and dolomites of the Permian period. Deployment zone of mineralization changes locally covering different parts of profile. They belong to Rotliegend and Zechstein. Rotliegend rocks arisen on land contrast with Zechstein's sea rocks. Thickness of Rotliegends rocks in deposit area is 200–300 m. These rocks are red and brown sandstones, conglomerates and mudrocks of fluvial origin. The dominant colour of rock in the upper part of profile is white, that is why it is called Weissliegend. Ore occurrence is localized in upper part of Weissliegend and lower part of Zechstein. In the deposit area the top of Weissliegendes displays remnant paleomorphological features, among which are evidenced several elevations of which crests are elongated in NW–SE direction. Elevations are a few kilometers long, several dozens length, to several hundred metres width and more than 30 metres height. The average length between crests is more than several hundred metres up to 2 kilometres. In elevations area the inclination of top of Weissliegendes is more than 25° when local inclination is near 2–5°. An interrelationship between elevations and the assemblage of sedimentary facies of copper-bearing series and underlying lower Weissliegendes is pointed out. The Weissliegendes, which belong to the ore-bearing series, show higher variability of facies within the elevations than outside of them. The elevations are typified by relatively greater thicknesses of the Weissliegendes, and also by considerably greater thicknesses of the entire zone of copper mineralization. Within the elevations the ore-bearing series lack the characteristic copper-shale (Kupferschiefer) deposits. On the wings of elevations there are series of tectonic structures like faults and overlaps. They are mainly on the border between Kupferschiefer shale and Weissliegendes sandstones. The origin of elevations has been a mystery with two proposals of solution. The first proposal is a tectonic theory assuming occurring horsts, tectonic trenches and stair faults (Dubicz and Don, 1977). Argumentation beyond this theory assumes traces of brittle and plastic strain or dislocation often of several meters height. The second proposal is a sedimentation theory. In this theory the most important evidence are facies as large-scale cross--stratified sandstones, washout of upper parts of elevations and no shells layers in them. Tectonic disturbances are treated as the effect of inconstant compaction, related with primary thickness of Kupferschiefer deposits. Differences in Zechstein Limestone facials, shows clearly the existence of elevations in Zechstein seabed. In this approach elevations are early Permian dunes sunk at rapid transgression. Our poster shows a range of evidence to support the sedimentary origin of elevations. The demonstrated sedimentary structures and tectonic disturbances can be interpreted as related with each other.

References

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