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Albitization as Record of the Triassic Paleosurface in the Sudetic Crystalline Massif (Poland)

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Although paleogeographic time markers are available in sedimentary basin, where all strata are chronologically stacked, there is still a lack of such markers for the crystalline basement. This limits the knowledge about the temporal evolution of the continental basement areas. The alteration process of albitization affects both, crystalline and sedimentary rocks, and seems to be highly abundant in the European Palaeozoic basement. Therefore, it could probably be use as a tool to develop time markers for the reconstruction of basement erosion.

Albitization consists in the replacement of the primary igneous feldspars (K, Ca-Na) by secondary albite, the chloritization of the ferromagnesian minerals, and the development of accessory minerals such as hematite, maghemite, sericite, calcite, and apatite. In the crystalline context albitization is conventionally considered as the result of deep metasomatic alteration, while in sedimentary deposits it is interpreted as resulting from diagenetic alteration processes. Nevertheless, recent studies showed that albitization affecting both sedimentary and crystalline rocks are linked to the Triassic paleosurface (Yerle and Thiry, 1979; Schmitt, 1986; Parcerisa et *al*., 2009). This has been also confirmed by paleomagnetic studies that date the associated iron oxide minerals to Triassic ages (Ricordel et *al.,* 2007; Franke et *al.*, 2009).

Albitized rocks are frequent in the Polish Sudetes. So to prove their probable link with the Triassic paleosurface, we study their petrology and spatial distribution. The sections show three albitization facies: (1) pervasively albitized facies, reddish and highly fractured, (2) less intense albitization restricted to fractures walls, (3) a weakly albitization restricted to fractures and to some milimetric spots within the rocks. As the most albitized facies are situated close to the surface, and the less albitized facies are found deeper down the profile, the different albitization level observed here correspond to a nearly 200 meter albitization profile with decreasing intensity from the surface to the depth.

Furthermore, the significant occurrence of iron oxides in the albitized facies supports the assumption of the presence of oxidizing conditions during the development of these facies. The most albitized facies are the most oxidized ones. Moreover, the paleomagnetic dating of these iron oxides formed during the albitization process indicates a Triassic remagnetization (Edel et *al*., 1997; Franke et *al*., 2010).

The Triassic paleosurface can be reconstructed by matching the different sites of the albitized facies. This correlation shows that the remnants of the Triassic paleosurface are preserved in the center of the Sudetes crystalline massif. The paleosurface rises from the basin edge in the NW to the inner zones of the crystalline massif in the SE. The preservation of the Triassic paleosurface proves that the post-Triassic erosion of the basement has been weak, in the order of less than the albitization profile thickness. In some places, non-albitized facies seem contiguous to the albitized facies along the paleosurface. These discontinuities may point to fault zones that previously haven't been noticed due to the lack of reliable benchmarks.

The mapping of the different facies and the Triassic overprints allow to reconstruct the geometry of the Triassic paleosurface. A better understanding of the geomorphology of the paleosurface is a useful tool to date strain events and to clarify the post-Triassic structural history of the Sudetic crystalline massif as well as providing tie points for geodynamical modeling.

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