



Test usage of AMS for the sedimentological and structural analyses in selected regions of the Upper Silesian Coal Basin, Poland

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The principal aim of our mainly methodological work, was to determine anisotropy of magnetic susceptibility (AMS) axes in the stratigraphic profile of clastic Upper Silesian Coal Basin rocks as well as in Devonian carbonate rocks of its north-eastern margin. Furthermore, relations between obtained axes directions and detritus transport and also changeable tectonics were to be defined.

The Upper Silesian Coal Basin is situated in the borderland of Poland and Czech Republic. It was formed over the northern corner of the Upper Silesia massif, as a foredeep of the Moravo-Silesian Fold Zone. Structural development of the basin was strictly related with its geotectonic position. The western part was affected by the fold activity of the Moravo-Silesian Zone, while its central and eastern part was dominated by disjunctive basement processes during the Variscan orogenesis. The Upper Carboniferous coal-bearing strata are considered as molasse sediments of the Variscan orogenic system. The basin was asymmetric. Migration of the axis during the sedimentation caused differences in thickness of separate series. Clastic material of various sources (mainly from the west) was supplied during the basin sedimentary history.

Almost 250 oriented samples from Namurian and Westphalian molasse association (mudstones, sandstones) as well as Middle Devonian carbonates were selected from eight brickyards and mines. Variability of magnetic anisotropy trend was analyzed in all of the sites respectively. Additionally, to test the reliability of the obtained AMS data, detailed petromagnetic analyses of magnetic carriers were performed.

Unique collection of magnetic anisotropy data allowed for simplified model development, that combines rocks' anisotropy with tectonics. Lineation directions observed in carbonates and fine grained clastic rocks are in general perpendicular to the tectonic stress directions interchangeable during the last stages of the Variscan orogen evolution (adjacent to the Upper Silesian Coal Basin from the west and the south probably). Obtained image enabled us to better understand the late Variscan tectogenesis in this region through the completion of knowledge based on classic structural researches carried mainly in the marginal parts of the Upper Silesia massif.