ANALYSIS OF PETROPHYSICAL PROPERTIES AND COMPOSITION OF CAMBRIAN SILICICLASTIC ROCKS IN BALTIC STATES USING MULTIVARIATE STATISTICS

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Cambrian siliciclastic rocks from the East Baltic region are represented by sandstones, siltstones and clays with thickness of 30-250 m. Cementation of the rocks varies from practically uncemented or loosely cemented sediments in Estonia to well developed secondary quartz cementation in southwestern Lithuania. Cambrian outcrops to the surface in the northern Estonia, but is buried up to more than 2 km in the western Lithuania. Cambrian rocks, represented by 136 samples from Lithuania, 79 samples from Latvia and 59 samples from Estonia were studied for 20 petrophysical and chemical parameters and were analysed using R-mode factor analysis. Magnetic, electrical and density properties were analysed together with SiO2, TiO2, Al2O3, Fe2O3, FeO, MnO, MgO, CaO, Na2O, K2O, P2O5 and SO3 content. In all three data sets three dominant factors were revealed. In Lithuanian succession: porosity, iron minerals and carbonate-clay cementation (42, 17 and 12% of parameter variation); in Latvia: clay and iron minerals, porosity and carbonate cementation factors (46, 13 and 8%), and in Estonia: carbonate (dolomite) cementation, clay minerals and iron minerals factors (34, 18 and 9%) were determined. In the all countries SiO2 content had negative correlation with all dominant factors. Porosity mainly increases in Estonia and decreases in Lithuania with increasing SiO2 content, while in Latvia there was no clear trend. This work was supported by German Federal Ministry for Education, Science and Technology in the frame of the German - Baltic project GEOBALTICA: Characterisation of reservoir rocks and their fluids in the Baltic States.