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Geochemical heterogeneity of Urzhumian section (Volga river region) by EPR spectroscopy

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Electron paramagnetic resonance (EPR) spectroscopy of rock powders is used as an exploration technique for the recognition the geochemical heterogeneity of Urzhumian (Lower Tatarian stage in regional Permian scale) in Volga river region. The EPR signal intensities measured by EPRSCAN program using Al2O3 with Cr3+ (S=3/2) as standard. A lot of EPR parameters have been detected from rock powders: E'(g=2.0005 - quartz), Mn2+ (carbonates), (dolomite), Fe3+, SO2-, SO3-, Rorg. It was revealed remarkable variation of these parameters along the stratotypical Urzhumian section due to sedimentation and diagenesis of rocks. Seven typical mineralogical compositions have been determined by EPR signals composition: 1) calcite; 2) calcite and ferromagnetic minerals; 3) calcite and dolomite; 4) calcite, dolomite and ferromagnetic minerals; 5) calcite and ferromagnetic minerals; 5) dolomite and ankerite; 6) quartz and ferromagnetic minerals. It was demonstrated and estimated the distribution of these compositions within section in comparing with magnetic susceptibility change and variations of ratio Sr/Ba. It was selectively proved the palaeogeographic trend of sedimentary basin evolution from marine to continental environments and influence of late diagenetic processes on rocks formation.