Petrography-based Workflow on Drill Cuttings in Combination with Borehole Gamma Ray Data, and pXRF on Reservoir Rocks from the Vienna Basin Flysch Play

J. A. Ölmez[1,2], B. Busch[1], R. Möbius[3], K. Dasgupta[3], A. L. Gauer[3], F. Tosoratti[3], C. Hilgers[1,2]
[1]Karlsruhe Institute of Technology, Institute of Applied Geosciences, Structural Geology & Tectonics, Karlsruhe, Germany, [2]KIT Campus Transfer GmbH, TTE Reservoir-Geology, Karlsruhe, Germany, [3]OMV Exploration & Production GmbH, Vienna, Austria

An understanding of reservoir properties, diagenesis, the presence of fluid migration pathways, and their influence on fluid flow in a naturally fractured reservoir is necessary for successful exploration and reduction of uncertainties in reservoir development and production. In addition to core material, drill cuttings are the only geological samples that can provide information on petrographic properties and thus aid in understanding of reservoir properties based on thin section analysis. Although fracture and vein orientations in drill cuttings cannot be reconstructed, the presence of vein generations in specific formation sections can be identified and analyzed to possibly link achieved production to petrographic reservoir quality assessments. Even though core material is to be preferred, only cutting material is continuously present to allow a quantitative, statistical calibration. Cathodoluminescence microscopy provides information about vein growth and composition. Borehole gamma ray logs in combination with handheld portable X-ray fluorescence analysis (pXRF) on washed drill cuttings help to fit the cutting samples into the actual depth in the well. For this academia-industry collaboration 84 cutting samples covering ~400 m of stratigraphy, from two wells targeting the Eocene-Cretaceous glauconite sandstone from the Vienna Basin, Austria, were prepared. The sandstone cutting fragments are predominantly cemented with pore-filling ferroan calcite. Also, ferroan calcite, with varying luminescence behavior, is the most prominent vein cement. A comparison based on textural parameters (grain size, sorting, etc.) and the derivation of petrographic properties may unlock additional information relating to locally varying reservoir performance. Along the well sections, especially the content of glauconite, the carbonate vein cement contents, the total carbonate (incl. vein cements) content and textural data differ. These variations are linked to reservoir quality and production performance of single perforations.