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Regularity Analysis Applied to Well Log Data

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Well logs are an important tool used by oil industries for reservoir characterization. Regularity Analysis (RA), is a new tool based on the measure of the regularity of real signals. We analysed four logs: self-potential, electrical resistivity, density and magnetic susceptibility from KTB borehole (German Continental Deep Drilling Program). The hole goes trough crystalline rocks like amphibolites amphibolite-metagabbros, gneiss, variegated units and granites.
RA allowed information about lithological changes and individuation of fractured zones or faults. The main result is that the various regularity curves obtained from different types of logs resulted well correlated to lithological variations and/or geological structures such as faults. A similar interesting correlation is found with the "Fracture Index (FI)" : note that the regularity curves, built from only one generic log (1 parameter), show result very close to those of FI. Moreover, a good similarity among several regularity curves occurs, in correspondence of the same geological characteristics (rock type or fracturation).