
New drilling technologies and their implications on the quality of well data for geological and geochemical interpretation. Problems and solutions

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The success or failure of a well may depend on the accuracy of the interpretation carried out using well data directly collected at rigsite, such as drilling cuttings and hydrocarbon shows. These data can be often critical to complement the traditional Formation Evaluation techniques. The steady development of both drilling technologies and fluids systems in recent years has increased the impact of the drilling environment on well data quality. Some of related effects can not be remediated, affecting the evaluation and even leading to misinterpretation. PDC bits, combined with turbines and mud motors, because of their shear and thermal effects, dramatically modify the original texture of the rocks ('metamorphosed' cuttings), affecting lithology evaluation (e.g. calcimetry overestimation particularly in carbonates), destroying biofacies (microfossils and palynomorphs) and altering physical and mechanical properties (e.g. density and strength). As to drilling fluids pollution, internal studies have shown that OBM, SBM hydrocarbon-based components and glycols systems, difficult to be removed by cleaning processes, strongly interfere on source rock evaluation and distribution of free hydrocarbons both on cuttings and fluid samples. Furthermore, some organic additives (especially fatty acid-based lubricants) degrade at high temperature to alcoholic components that influence the gas chromatograph response, being detected as alkanes ("false" gas shows). In other cases, these chemicals can mask the true response of formation fluids so as to impair oil shows analysis. Several case histories due to the above problems are presented and solutions are proposed, together with some hints for improving PDC bit configuration and selecting the most suitable drilling fluid systems. Finally, shared practices between drilling, fluid engineers and operations geologists involved in well construction are suggested.
