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Volcanic Facies and Rock Properties: Understanding Lavas and Volcaniclastics in the Subsurface

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ABSTRACT

Volcanic rocks (including intrusive and extrusive) occur in a variety of facies which reflect their composition, mode of emplacement and interaction with their host environment. The resultant volcanic units in turn comprise highly variable rock properties. When we examine the sub-surface, we see an expression of these associated physical properties rather than the facies themselves, and where volcanic facies exist we can often be faced with a number of issues in interpreting what we see, or in some cases don't see! To this extent we can ask the question: what are the key volcanic facies, what are their physical properties and how are these properties spatially distributed? Good onshore analogues provide an integral method of investigating these rock properties and heterogeneities in a way to help inform us as to their likely behaviour in the subsurface. We use an integrated approach to record the types of volcanic facies and intra-facies (within facies) variations that are seen in 3D outcrop, cored sections, image logs, wireline logs, cuttings and high resolution remote geophysical data. This integrated approach allows us to better understand their impacts on the petroleum system.