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Evaluating shale-gas potential by analysing (organic) shale facies, micro-mineralogy and desorption capacity, Whitehill Formation, Karoo, South Africa

The Whitehill Formation has been identified as a significant potential area with organic rich shale in the Karoo Basin of South Africa for the exploration of shale gas. The study aims to investigate the gas resource potential (gas in-place) of the Whitehill Formation, lithofacies distribution of the shale and properties as well as the processes that lead to accumulations of gas. This will commence with as a field oriented characterisation of shale lithofacies and their continuity. If natural fractures are non-existent, then, but not exclusively, adsorption and desorption capacity of gas will be measured. Research activities will involve integrating lithostratigraphic analysis, organic geochemical and, mineralogical properties of gas shale as well as comprehensive analysis of its hydrocarbon system. Also, the geological parameters of the rock mechanism from investigation of the desorption capacity of the shale gas will be used to determine its producibility. In order to achieve these objectives, an integrated approach will be adopted which include; petrographic (scanning electron microscopy and x-ray diffraction) for shale diagenesis, geochemical (total organic carbon and kerogen type), maturation (vitrinite reflectance), and sorption isotherms analyses. The integrated parameters will be used in a model of the predictive indices for unconventional hydrocarbon exploration in frontier basins.
Keyword: shale gas, lithofacies, organic geochemistry, adsorption, desorption and Whitehill Formation

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