

Potential Use Of PVT Data In Petroleum Exploration – A Case Study From The North Sea

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ABSTRACT

PVT (pressure, volume, temperature) data, which have been used by petroleum engineers for characterising the physical properties of reservoir fluids and calculating the changes during development and production, have the potential to be applicable for oil populations' characterisation, relative maturity estimation, recognition of mixing effects and elucidation of filling histories.

The primary control of the source rock types on the generative reservoir fluids and the physical process occurring as a function of secondary migration are of crucial importance in petroleum exploration. The main focus of this study is on the recognition of source rock control on reservoir fluids composition and migration related process by applying PVT data on both regional and petroleum field scales using the software PVTsim 9, developed by Calsep A. S. – DewPoint A. S. Denmark. The simulated data (Psat, Bo, GOR and phase envelopes), well-logs and regional geological information of the study area (Tampen Spur, northern North Sea) are used directly to trace out systematic variations which may relate to source rock facies, regional maturity trends and/or migration related process like mixing, phase separation and fractionation.

The study area chosen consists of the main petroleum fields of the Tampen spur, northern North Sea. A regional PVT database, which was compiled as a part of this study and different geologic scenarios proposed for the area are used to determine the petroleum populations and migration routes. From the current study five oil populations are recognized in the Tamper Spur with well-defined migration routes. The model is in good agreement with organic geochemistry based oil population maps and migration models proposed for the area. Therefore, PVT modeling has the potential to be a primary screening tool in petroleum exploration due to its quick and cost effective application.