

Three-dimensional modeling of petroleum generation in the southeast flank of the Bredasdorp Basin, off the south coast of South Africa

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ABSTRACT

The aim of this study was to investigate the evolution of petroleum system in the southeast flank of the Bredasdorp Basin. In this study, we have applied a two-dimensional, later up-scaled to a three-dimensional, modeling approach in order to advance our understanding of the petroleum systems evolution in the southern flank of the Bredasdorp Basin.

Prior to the modelling, mapped seismic horizons were depth converted using the *VoK* method. The model is based on the interpretation of 64490m two-dimensional seismic-reflection profiles, as well as the analyses of well logs and cores that constrain the sedimentary facies distribution and the units' age. Three main source rock intervals (Barremian, Aptian and Turonian) were modeled for maturity and hydrocarbon generation.

The simulation was performed using Petromod[®] 3D package (version 10, IES Germany). Source rock intervals were assigned properties such as Total Organic Content (TOC) data from the respective wells that intersected these intervals. Calibration data to the model included vitrinite reflectance and bottom-hole temperature (BHT). Results obtained from petroleum generation indicate that the Barremian and Aptian source rocks are mature whereas the Turonian source is immature. Modelling output suggests that the said source rocks started petroleum generation as from 80 Ma but halted about 69 to 35 Ma and generating very slow from period between 12 to 0 Ma both periods of generation owing to minimal burial depth of sediments.