Amplitude variation with offset (AVO) techniques are valuable tools that assist exploration, development and production teams to identify hydrocarbons in clastic depositional settings. The clastic reservoirs in the Sergipe Basin offshore Brazil are well suited for quantitative interpretation, best illustrated by the classic bright spot which can be observed on the accompanying section at a depth of 4,700m near the well bore. The recent announcement by the Brazilian energy regulatory agency ANP that the Sergipe Basin is likely to be included in Round 13 suggests that there will be considerable opportunity for additional prospecting in this basin. AVO techniques will prove to be important both for prospecting and for reducing drilling risk as the exploration cycle expands and progresses to development in the Sergipe Basin.
The Sergipe Basin is a relatively mature hydrocarbon province on the north-east coast of Brazil, comprising 46,170km², both onshore and offshore. The onshore portion of the Basin (24,500 km²) is considered mature, with over 2 Bbo in place and 50% oilfield since 1935. However, Petrobras has made several discoveries since 2010, including the 2010 Barra well (1SES-158) and the subsequent Barra 1 appraisal well (1-SES-162). The wells targeted oil- and gas-charged Maastrichtian sands, and numerous potential AVO anomalies and eliminates leads and prospects without such indicators. In the relatively mature Sergipe Basin, AVO anomalies can be used to highlight prospective anomalies and eliminate leads and prospects without such indicators. The 2D seismic data was acquired with an angle stack. Angle stacks are used in place of other ranges so they are optimized for the geology and objective depth. For the purpose of determining whether AVO attribute stacks can identify potential hydrocarbon reservoirs we look at 2D seismic profiles that tie the Barra discovery well. For such ‘off-shelf profiles we compute an SPR and FNxF stack, both of which should show visible anomalies for the high porosity, gas-saturated sands found in the Barra discovery well. SPR change is the weighted sum of the AVO intercept and gradient, where the weight is determined by the background Vp/Vs ratio of the geology. The SPR attribute is a final forward AVO attribute that should illuminate hydrocarbon-saturated reservoirs and marginally wet to bitumen-saturated reservoirs. The FNxF attribute is computed by considering the difference between the far angle stack and the near angle stack, and multiplying the difference by the far angle stack. Angle ranges are used in place of other ranges so they are optimized for the geology and objective depth. The event and overlaying attribute on the profile are quite similar to what has been described, with a strong negative AVO response. The lack of a double peak in this instance indicates that should illuminate the sand or other subjacent sands. The Emerson logo is a trademark and a service mark of Emerson Electric Co. © 2014 Emerson Electric Co. With RMS™, reservoir modelling solution – Better Decisions, Better Returns. users are provided with a full licence to simulate reservoirs. This enables a complete representation of the data in less time, with users able to quickly integrate and share knowledge across the prospect lifecycle. By placing uncertainty management at the heart of the decision-making, Rockstar delivers the confidence and understanding that enables operators to enhance their recovery and unlock the value of their assets. For more information go to www.realsoftware.com

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