

Petroleum systems analysis of the United States Atlantic margin

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With the possible reversal of restrictions on hydrocarbon exploration and production activity on the US Atlantic Seaboard, we look at which basins and plays have the greatest potential. The US Atlantic Continental Shelf extends for over 2000 km, and although over 50 exploration wells have been drilled in the area only minor gas and condensate discoveries have been made with exploratory drilling ceasing in the middle 1980s. The potential of the basins is therefore largely unknown.

The four prospective basins, Georges Bank, Baltimore Canyon, Carolina Trough and Blake Plateau extend from New England in the north to Florida in the south. Petroleum plays range from the Middle Jurassic to the Pliocene, and all are mixed carbonate and clastic systems. Each basin was assessed through detailed analysis of candidate source, reservoir, and seal horizons. The distribution, extent, and quality of each candidate horizon and likely trapping and charge mechanisms were assessed to estimate which basins hold the greatest exploration potential. The basins are underexplored and in many areas there is a lack of data; as a result a combination of predictive models and analogous data sets along with 1D thermal modelling were used to evaluate reservoir quality and source rock presence and maturity.

Multi-BCF fields and discoveries have been made in Canadian waters to the north (e.g., Scotian Basin's Venture, Thebaud, Deep Panuke fields, etc.) and significant discoveries have recently been made along the conjugate West African margin from Morocco to Senegal. The exploration success in these regions provides compelling indications that a working petroleum system could exist in the basins of the US Atlantic margin.

We conclude that Baltimore Canyon has the greatest potential of the four basins, which is in agreement with the 2012 BOEM report: "Assessment of Undiscovered Technically Recoverable Oil and Gas Resources of the Atlantic OCS". This shows broadly the same area (Mid Atlantic OCS) identified as having the greatest potential (4.87 BBOE). However, further observations from predictive mapping (MERLIN+) also show significant source potential in Triassic lacustrine rift basins analogous to the onshore Newark Supergroup basins.