

**Regional Setting of the Late Jurassic Deep Panuke Field, Offshore Nova Scotia, Canada - Cuttings-Based Sequence Stratigraphy and Depositional Facies Associations Abenaki Formation Carbonate Margin - A Unique Hydrocarbon System and Play Type**

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Deep Panuke, discovered in 1998, is the only carbonate gas field in the eastern North America continental shelf. Several recently published studies (Weissenberger et al., 2006; Wierzbicki et al., 2005, 2006; EnCana 2006) give details on the hydrothermally-dolomitized reef margin gas field itself. Expanding on those studies using mainly cuttings and core data, Panuke is placed in a larger context between the northeast contemporaneous major Sable Island paleodelta prograding ramp shelf and the southwest thicker cleaner carbonate platform. Wells can be grouped based on geometry and position relative to the shelf margin as follows: prograding ramp margin (only a few of the numerous wells in the Sable Island paleodelta are included), margin slope, margin with full shoaling sequence, margin with paleohighs and encased pinnacles (typical of Deep Panuke area), margin inboard flexure with shoals, interior platform oolitic shoals, interior platform shaly lagoon and 'moat' and near-shore ridge/siliciclastic-rich. The large-scale (second order?) vertical full-shoaling stratigraphic sequence is seen in nearly all margin wells. It comprises a basal transgressive oolite usually, then forereef with microbial mud mounds, then shallow coral-coralline sponge reefs, then oolites and two types of capping beds - either oolites (with or without sandstone interbeds) or lithistid sponge-rich beds. Only Deep Panuke does not show this pattern. Laterally there is a curious pattern to the argillaceous sponge-rich cap beds in being flanked by wells with oolite caps both nearer the delta and south-westward of the Panuke area wells. There is also a regional trend in the color from darker to lighter (and finally even red in the slope beds) away from the Sable Island paleodelta. These facies trends relative to the Sable Island delta and the associated early, deep prodeltaic burial are key factors that contributed to Deep Panuke's possibly unique hydrocarbon system of reservoir, trap, seal and charge properties