

Sequence stratigraphy and palynology, Upper Missisauga Formation, Glenelg area, offshore Nova Scotia

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The Glenelg field, situated south of Sable Island in the Scotian Basin, consists primarily of gas reservoirs hosted in Lower Cretaceous sandstone. This study focuses on the sequence stratigraphy of the Upper Missisauga Formation, and extends from the level of the underlying "O-Marker" within the Verrill Canyon Formation to the top of the overlying Naskapi Member of the Logan Canyon Formation. The study uses a combination of conventional core (sedimentology and ichnology), electrical log, and palynological data collected from 5 well sections, integrated with seismic data.

Eight main lithofacies can be recognized, representing primarily deltaic and prodeltaic paleoenvironments, including the notable occurrence of tidally-influenced distributary channels with tidal rhythmities and mud-draped dune-scale crossbedding. At Glenelg, the lower part of the Upper Missisauga Formation appears to have been a fluvial-dominated delta system, while the upper part was more likely

wave-dominated. Lithofacies stacking patterns, palynofacies trends, and electrical log trends demonstrate the presence of one major regressive-transgressive cycle from the level of the "O-Marker" (Lower Hauterivian), reaching its regressive acme (sequence boundary) in the lower part of the Upper Missisauga Formation (Barremian). The rest of the Upper Missisauga Formation becomes transgressive, continuing into the overlying Naskapi Member (Barremian-Aptian). Four smaller-scale progradational sequences occur in the same interval and strongly overprint the longer-term trends. They correlate through the Glenelg area, and are probably recognizable in wells up to 10 km away. The occurrence of tidally influenced facies at Glenelg suggests it is close to the margin of the ancient Sable Delta system, which has important implications for the distribution of reservoir sands more distally.