
**Potential for lacustrine source rocks in Middle Triassic-
Early Jurassic synrift basins offshore eastern
North America**

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Recent discoveries of super-giant pre-salt oil fields in Brazil's offshore basins, and related discoveries in its African conjugates, have highlighted the great importance of synrift / pre-breakup fluvial-lacustrine successions to the success and efficiency of their petroleum systems. Improvements in seismic acquisition and processing technologies were keys in imaging the architecture of the underlying rift basins, and interpreting the basin fill and internal depositional facies later confirmed by drilling.

Middle Triassic to Early Jurassic synrift basins are exposed onshore eastern North America (Newark Supergroup) and extend into adjacent offshore areas, with equivalent basins in Portugal and Morocco northwest Africa. Organic-rich lacustrine successions occur in a number of the onshore USA synrift basins, although no commercial discoveries have been made. The basin-fill model for sedimentary successions in these extensional basins defines four tectonostratigraphic (TS) units: TS I: Unconformity-bounded, fluvial-lacustrine sequence (Late Permian); TS II: Fluvial (and some lacustrine) strata (underfilled, hydrologically open basin); TS-III: Lacustrine sequence (closed basin or one in hydrological equilibrium); and TS IV: Playa / lacustrine (and basal CAMP volcanic rocks) successions.

Seismic profiles in the Fundy/Chignecto (Canada) and Newark (USA) basins reveal high amplitude, laterally continuous reflections adjacent to the boarder faults. They are distal to Middle to Late Triassic TS-II fluvial successions and interpreted to represent deep water lacustrine facies. This architecture infers high levels of tectonically driven extension resulting in the basins being closed from their inception facilitating lake formation. During TS-II deposition (late Anisian to early Carnian), paleomagnetic data places these basins within a north equatorial, tropical humid belt. They are thus in a position favourable for the evolution of lakes with conditions favourable for organic matter creation and preservation. If correct, this interpretation would have a significant impact on the potential for hydrocarbons sourced from lacustrine successions in pre-salt synrift basins offshore Nova Scotia and Morocco.