

Provenance and Paleogeography of the Late Jurassic Norphlet Formation

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Knowledge of reservoir distribution and quality in the offshore eastern Gulf of Mexico (EGOM) is essential for future economic development of hydrocarbon resources. The Norphlet Fm. has been a significant hydrocarbon reservoir in the onshore EGOM region since the late 1960's; however, due to sparse lithologic data in the offshore EGOM, predicting Norphlet Fm. reservoir distribution in this area is speculative. A preliminary paleogeographic model of the late Jurassic Norphlet Fm., developed from data collected in the onshore and state waters areas of Alabama, was created in order to predict offshore reservoir distribution.

U-Pb analysis of detrital zircons taken from 7 Norphlet Fm. cores in onshore Alabama indicate major age populations between 350-500, 500-650, and 1000-1300 Ma. These are consistent with an Appalachian orogen sediment source. Modal analysis of detrital framework grains from thin-section petrography and petrology indicates sub-arkose, sub-litharenite, and lithic arkose type sandstones. Norphlet Fm. compositional data plot along QFL diagrams within continental block and recycled orogen provenance fields.

The integration of U-Pb ages and compositional data support rocks of the Appalachian Orogen as the dominant source of Norphlet Fm. In addition, 540- 580 Ma zircons support the possibility of Pan-African Suwannee terrane sources. This eastern source may indicate a higher possibility of Norphlet Fm. reservoir facies in distal regions of the EGOM. Core descriptions indicate wadi, eolian dune, interdune, and marine environments of deposition. Provenance and facies analyses suggest the possibility that Norphlet Fm. reservoir rocks were distributed in more distal regions of the EGOM than previously considered.