Back to the Rocks: Framework of Depositional Acmes in Source Rocks of the Gulf of Mexico Basin and North Caribbean Margin

Andrew S. Pepper

This is Petroleum Systems LLC, Houston, Texas 77077

GCAGS Explore & Discover Article #00083*
http://www.gcags.org/exploreanddiscover/2016/00083_pepper.pdf
Posted September 13, 2016.

*Article based on an extended abstract published in the *GCAGS Transactions* (see footnote reference below), which is available as part of the entire 2016 *GCAGS Transactions* volume via the GCAGS Bookstore at the Bureau of Economic Geology (www.beg.utexas.edu) or as an individual document via AAPG Datapages, Inc. (www.datapages.com), and delivered as an oral presentation at the 66th Annual GCAGS Convention and 63rd Annual GCSSEPM Meeting in Corpus Christi, Texas, September 18–20, 2016.

EXTENDED ABSTRACT

Great progress has been made in understanding the origin of Gulf of Mexico petroleum since the 1970s and 80s, when many geologists considered the young Tertiary reservoirs of the U.S. Gulf Coast and offshore shelf to be charged from interbedded and adjacent mudrocks. We now recognize that these organically lean mudrocks are not material thermogenic source rocks. Rather, considerable vertical migration has occurred from underlying 'real' Paleogene and Mesozoic source rocks (Pepper and Yu, 1995). Due to their extreme burial depth, these source beds are rarely penetrated in situ, but rafts associated with salt canopies in the basin center occasionally present opportunities to reach Mesozoic-Paleogene stratigraphy with the drill bit, for example at the Norton prospect in the Garden Banks protraction area (e.g., Jarvie et al., 2004). A more novel organic-matter sampling method is to use bitumen dike material intruded into the Neogene stratigraphy (Weatherl, 2007), because these bitumens represent liquified and extruded organic matter, rather than migrated petroleum fluids (Han et al., 2010).

Published source rock studies in the Gulf of Mexico typically lack details of precise age, organofacies, and the net thickness represented by the samples studied. Therefore, a 'basin-processing' effort is needed to bring sources of geologic and geochemical data together as a basis for an improved understanding. This is Petroleum Systems LLC (t!Ps) is building a stratigraphic framework for the Gulf of Mexico–North Caribbean within which 'basin-processed' source rock data can be placed, so that the source potential (ultimate expellable potential or UEP) of each source bed can eventually be mapped. This framework names each acme of organic matter deposition for its absolute age in millions of years, which allows easy recognition of regional and even wider global correlations. These equivalences would otherwise be obscured by rapidly varying lithostratigraphic nomenclature.

…

Originally published as: Pepper, A. S., 2016, Back to the rocks: Framework of depositional acmes in source rocks of the Gulf of Mexico Basin and North Caribbean Margin: Gulf Coast Association of Geological Societies Transactions, v. 66, p. 853–858.