

**Opening of the Gulf of Mexico: what we know, what questions remain, and how we might
answer them**

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The Gulf of Mexico is an economically important basin with more than a century-long history of hydrocarbon exploration. However, the opening history of the basin remains debated in the literature for two reasons: 1) the quality of data does not allow for reliable interpretations of crustal features beneath thick and complex overburden, and 2) most industry well and geophysical data are proprietary. The last concerted effort by industry and academia to summarize the state of knowledge regarding the Gulf of Mexico's formation was three decades ago and resulted in publication of a major volume as part of the Decade of North American Geology (DNAG). This paper reviews the key, publicly available, recently published geophysical datasets and geological observations that constrain tectonic history of the basin. We compare and contrast published tectonic models and formulate remaining controversies in the basin. These relate to tectonic affiliation of Triassic redbeds (early syn-rift vs. precursor basin[s]), the timing of seafloor spreading vs. salt deposition, the nature of breakup (magma-rich vs. magma-poor), and remaining ambiguities in restored locations of crustal blocks. We then speculate on the datasets that can help

resolve these controversies. We conclude that continued collaboration between industry and academia partnerships is crucial for advancing our understanding of the Gulf of Mexico formation.