

Detrital Zircon Provenance and Timing of Igneous Activity during Triassic-Jurassic Rifting of the Eastern Gulf of Mexico and Western Bahamas

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Abstract

Detrital zircon U–Pb radiometric age data on igneous and siliciclastic samples from wells in the SE Gulf of Mexico–western Bahamas area (Shell 265–1, Bass Enterprises Pumpkin Bay 12–2, Chevron Great Isaac–1) indicate that early Mesozoic sediment provenance was primarily locally sourced. Neoproterozoic–Cambrian zircons were eroded from nearby Suwannee Terranegrantic rocks; some Paleozoic zircons were eroded from overlying Ordovician–Devonian sedimentary rocks. Archean–Paleoproterozoic zircons were derived from erosion of cratonic South American sources, with possible minor contributions from rocks in the Bové Basin (West Africa). Additional Paleozoic and Neoproterozoic–Cambrian zircons were eroded from Yucatán/Maya Block and NW South American crustal terranes. Triassic–Jurassic zircons were derived from igneous rocks of the Southwest Florida Mesozoic Volcanic Province and the Demerara/Bahamas hotspot, with at least one active before, during and after more regional CAMP magmatism. Igneous activity in the eastern Gulf of Mexico and western Bahamas was continuous over a wide geographic area. Igneous activity began in the NE Gulf and western Bahamas during the Middle Triassic (Anisian, 247.2–242 Ma). Regionally extensive magmatism, associated with widespread rifting along the Atlantic margins, began in northern Florida during the early Late Triassic (Carnian, 237–227 Ma), and propagated to the south Florida–western Bahamas area later in the Triassic (Norian–Rhaetian, 227–201.4 Ma). CAMP–associated magmatism occurred in the south Florida–western Bahamas area but was of less overall importance (only 22% of all Triassic–Jurassic zircon ages in this study). Magmatism in the eastern Gulf of Mexico and western Bahamas peaked during the Early–Middle Jurassic (Sinemurian–Toarcian, 199.5–174.7 Ma, mainly north, central Florida) but continued across the south Florida–western Bahamas area from the Sinemurian–Bathonian (Early–Middle Jurassic, 199.5–165.3 Ma). Previously documented hotspot-related magmatism (Demerara) is now proposed to include the south Florida–western Bahamas area, and lasted from the late Pliensbachian–Bajocian (Early–Middle Jurassic, about 185–170 Ma).