

The Paleogene Water-Level Drawdown Hypothesis, Gulf of Mexico: Relationship to the Paleocene-Eocene Thermal Maximum (PETM)

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Abstract

We provide an update on the Gulf of Mexico (GOM) Paleogene waterlevel drawdown hypothesis by updating the original observations of this concept. We suggest attention should be focused on the 56 Ma sequence boundary as the most likely time of drawdown, just before the Paleocene-Eocene Thermal Maximum (PETM). This timing allows the Cuban Arc to begin collision with the Bahamas Platform and close the Florida Straits. We also focus on evidence that there may have been Paleogene karsting in W. Florida and northern Yucatón, and whether evaporites are even necessary for the viability of the hypothesis. We consider the apparent formation of a Gulf-wide unconformity just prior to the PETM where erosion of up to 2500 m of stratigraphy has been documented. The majority of the Paleogene of the onshore and deepwater GOM is represented by the Wilcox Formation (and its equivalents) which is almost devoid of in-situ foraminifera, nannofossils and radiolarians and is often characterized by shallow-water trace fossils. Palynology studies show that large intervals of time are missing from the Paleogene rock record, with at least 8 unconformities identified. The PETM in the GOM has been documented in outcrops in Texas and Mississippi, and in wells in Mexico (Yax21, IODP M0077) and USA (Harrell core), as well as the deepwater GOM (Buckskin Field). We estimate about 19 deep paleo-canyons were formed rapidly around the GOM rim just prior to the PETM. One of the best documented is the Chicontepec canyon complex in eastern Mexico, where erosion removed the entire Paleocene and Cretaceous sequences. Here we have also documented multiple bitumen seeps at the unconformity and have documented an outcrop of the PETM in Mexico. We discuss the details of this outcrop and its relationship to the paleocanyons in the area.