

Deep Water Gulf of Mexico High Gamma-Ray Shales and Their Implications for Flooding Surfaces, Source Rocks, and Extinctions

High gamma-ray 'hot' Eocene shales were encountered in southern deepwater Gulf of Mexico wells. The two prominent shales were in the age range of 40 and 50 Ma. The shales were originally deposited in basin floor settings that palinspastically restore to water depths of greater than 20,000' sub-sea total vertical depth. The occurrence of 'hot' shales deposited at such water depths forces the questioning of the association of such 'hot' shales and maximum flooding surfaces. The influence from eustatic sea level changes in very deep water would be minimal. The deep water 'hot' shales alternatively suggest very high global temperature excursions which created extensive algal blooms and anoxic oceanic conditions. The high temperatures would cause the related cascade effects of hydrate melting, global anoxic flooding events, global alginite source rock occurrences, atmospheric compositional change, marine and terrestrial stress/extinctions, and faunal lagerstatten. The age of these

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shales correlates with lagerstatten death assemblages in the Green River shales, the Messel fossil beds of Germany, and Whale Valley in Egypt. The vertebrate death assemblages contain multiple species. The articulated and unscavenged skeletal remains indicate post-death predation was non-existent due to lethal atmospheric temperatures that most likely suppressed predators and scavengers. The large number of specimens also suggests a rapid onset of thermal change. The Whale Valley lagerstatten includes a red bed containing crabs that are found in a hibernation position after mass simultaneous burrowing, which suggests a rapid transition from healthy faunal community to mass death. Periods of high temperatures punctuated by brief episodes of extreme heat would explain the association of marine deep water 'hot' organic shales and terrestrial death assemblages. ■

Biographical Sketch

BILL SERCOMBE, geologist, has worked out of Calgary, Denver, Tulsa, Houston, Islamabad, Cairo, and Kuwait on exploration, development, and petrophysics projects with Amoco and BP. He has published over 50 articles and papers on a variety of geologic topics. Areas of experience include the Alberta thrust belt, American Rockies, Himalayas, Alaska, Carpathians, Alps, Gulf of Suez, Arabian Gulf Basin, deep water GOM, and the Michigan Basin. Areas of interest include regional to subsurface mapping scale structural analyses, paleontology, carbonates, and the petroleum sciences.

