Bird, D. E., Hall, S. A., Casey, J. F., and Burke, K., 2001, **Geophysical evidence for a possible late Jurassic mantle plume in the Gulf of Mexico** (abstract): Eos, Transactions, American Geophysical Union, v. 82, n. 47, T32C-11.

Gravity, magnetic and seismic refraction data reveal a prominent basement structure beneath the Keathley Canyon area of the western Gulf of Mexico. Several seismic refraction profiles acquired near and over the structure indicate depths to its crest range from 10.5 to 12 km, rising from basement depths of 14 to 16 km below sea level. Because of the presence of extensive salt features, seismic reflection data are unable to accurately image the structure but several reflection profiles indicate the existence of a basement high in the area. A positive free-air gravity anomaly associated with this basement structure extends 200 km from 93.9o W, 26.4o N along a roughly WNW-ESE directed path to 91.7o W, 25.9o N where it turns northeastward. Bathymetric and seismic reflection data indicate the gravity anomaly is not produced by seafloor topography or shallow sedimentary sources, but can be attributed to the basement relief documented. Its amplitude and wavelength decrease to the ESE, from 70 mGal and 100 km wavelength to 35 mGal and 40 km wavelength. A positive magnetic anomaly with a 130 nT amplitude and 30 km wavelength coincides with the WNW end of the free air gravity anomaly. It extends to the ESE in a similar manner to the gravity anomaly, but its amplitude decays more rapidly. Most models for the formation of the Gulf of Mexico basin culminate in a late Jurassic-early Cretaceous phase of seafloor spreading as the Yucatan Block rotates counterclockwise away from North America. The shape of the free air gravity anomaly over the deep basement structure defines a geometry that is similar to those produced by other hotspot tracks, such as the New England Seamounts, Rio Grande Rise or Vitoria-Trindade seamount chain. The WNW-ESE direction is broadly consistent with motion of North America in the hotspot reference frame at the time of basin formation. Such an interpretation suggests that a minor mantle plume may have been active during spreading and played a significant role in the development of the basin. We consider the westerly end of the gravity anomaly to roughly delineate the ocean-continent boundary beneath >15 km of sediments off the Texas coast. At its eastern end, the gravity anomaly turns northeastward and may correspond to the location of a fossil sea floor spreading center.