

Tectonic Setting and Hydrocarbon Trendology of a Reported 7-8 TCF Giant Gas Discovery, Eastern Gulf of Venezuela

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Although Venezuela is the sixth largest oil producer in the world, there is no significant oil or gas production from its offshore basins. The reported discovery of a 7-8 TCF giant gas field in the Gulf of Venezuela would boost Venezuela into the top tier of world gas producers (in 2008, Venezuela had 2.6 percent of the world's proven natural gas reserves). The purpose of this presentation is to review the tectonic setting and hydrocarbon trendology of surrounding oil and gas occurrences of the proposed giant discovery in the eastern Gulf of Venezuela using a compilation of: surface geologic data, radiometric dates of exposed and subsurface basement rocks, gravity, magnetic, seismic, well, and plate tectonic reconstructions. The Gulf of Venezuela is underlain by an east-west-trending belt of Cretaceous metamorphic basement rocks that extends eastward beneath the onland Falcon basin of western Venezuela and the Bonaire basin of offshore Venezuela. This belt of Cretaceous metamorphic basement is distinct from Paleozoic to Precambrian basement to the south beneath the Maracaibo basin and from Cretaceous arc basement to the north that underlies the Leeward Antilles islands. The Cretaceous metamorphic belt is not overlain by proven organic-rich, Cretaceous carbonate rocks and high-quality, Paleogene clastic reservoir units - as present in the supergiant Maracaibo basin to the south - but is instead overlain by a late Eocene to Pleistocene section of sand, shale and limestone. Gas and oil fields to the south and southeast of the Gulf of Venezuela in the Urumaco trough and Falcon basin are sourced by marine organic matter from Oligocene and Miocene shale-rich units within this succession. Oil and gas traps include structures related to the inversion of the Falcon basin and stratigraphic traps produced by sandy pinchouts into thick shale units. Bright spots in late Miocene fans of the offshore Bonaire basin indicate the possibility of an east-west hydrocarbon trend extending eastward from the Falcon basin towards the NCMA gas fields of northern Trinidad.