

## **Giant Oil Field Found in a Non-prospective Area Through Integration of Diagenetic Modeling and Tectonics, the Tomoporo field, Venezuela**

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### **Abstract**

Zulia Oriental is the onshore eastern part of the prolific Maracaibo Basin, Venezuela (Fig.1). A large multidisciplinary study was undertaken with a focus on the deeper portions of the Misoa Formation, which has been subject to both, an intense diagenesis and a complex tectonic history. At the time of the study all of the deep prospects in the area encountered tightly cemented Misoa Sands, mainly due to extensive quartz overgrowth cement, late calcite cement, and compaction processes (i.e., Perez et al., 1999a).

This paper only summarizes the detailed 4-D diagenetic modeling study that was conducted in order to assess the reservoir quality of the deep Eocene Misoa sands *through geologic time*, as a function of temperature, overloading, and amount of quartz cement. The studied area, located north of the Venezuelan Andes (Fig. 1), was subjected to repeated tectonic activity of various sorts, such as tilting and inversion (Roure et al. 1997), and was recipient of two distinctive hydrocarbon charging events (c.f., Talukdar et al. 1986). The numerical modeling of the quartz cementation was performed considering the regional and local tectonics, as well as well calibrated and available burial and thermal histories (Rodriguez et al. 1997; Perez et al. 1999a). Every stratigraphic unit within the Misoa Formation was studied independently using variable compositions based on representative samples from each of the recognized sedimentological areas.