Monday, April 16, 2007

HGS International Explorationists Dinner Meeting

Register Now! Registration deadline is Friday, April 13 5:30 PM
Westchase Hilton • 9999 Westheimer
Social Hour 5:30-6:30 p.m.
Dinner 6:30 p.m.

Cost: $28 Preregistered members; $35 non-members & walk-ups

The HGS prefers that you make your reservations on-line through the HGS website at www.hgs.org. If you have no Internet access, you can e-mail reservations@hgs.org, or call the office at 713-463-9476 (include your name, e-mail address, meeting you are attending, phone number and membership ID#).

by ***Alex Martinez, David McAdow and Matthew Novak***

Sponsored by Dickson International Geosciences (DIGs) and Geochemical Solutions International

West Africa DHI's: Pushing the Envelope

University and College Students Please Note: the first 14 students can attend for free, compliments of Swift and ConocoPhillips. Additional students will be charged the emeritus rate, half the regular member rate. Students are encouraged to call the HGS office in advance of the meeting they wish to attend and to make a reservation; but walk-ins are also accepted at events. Students will need to identify themselves and provide school name and ID.

Tertiary clastic sedimentary rocks (primarily slope shales and turbidite sandstones) in the deepwater Lower Congo Basin have acoustic rock properties that allow seismic data to exhibit direct hydrocarbon indicators (DHI's). To date, DHI technology has been successfully used to help discover billions of barrels of hydrocarbon in the basin.

Not all seismic anomalies are DHI's and not all DHI's are of equal quality. For this reason a DHI rating and risking method has been developed to aid data analysis and determine risk of leads showing seismic amplitude anomalies. The method involves comparing the observed seismic anomaly to expected seismic responses and to other known DHI's for calibration. DHI attributes fall into general categories associated with the observed amplitude response and with conformance to structural and fluid contact reflections, but vary by other typically compaction-related rock properties. Seismic data quality and overlap between expected wet and hydrocarbon reservoir responses are also key factors used in the rating and risking process. Integration and rationalization of the DHI risk with geologic risk assessment is a final, critical step to ensure plausibility and reasonableness of the interpretations.

Historically, dry holes and sub-economic hydrocarbon accumulations have been associated with anomalies exhibiting only one or two DHI criteria. Those anomalies are now attributed to low-hydrocarbon saturation, anomalous shales or silts, very high porosity sands, or inadequate and/or substandard seismic data. Examples are presented to illustrate the techniques used to identify the spectrum of AVO classes and highlight the challenges in DHI prediction. Ultimately, our experience indicates that multiple DHI criteria (e.g., AVO, amplitude conformance, etc.) are associated with successful wells. Care should be taken to not technically rationalize the lack of these characteristics when fundamental rock physics suggests otherwise. ■

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Biographical Sketch

Alex Martinez graduated from the University of Missouri, Rolla, with a BS in Geology and Geophysics in 1992, and the University of Kansas with an M.S. (1995) and PhD (1999) in Geophysics. While at KU he worked as a research assistant in the Petroleum Research Section of the Kansas Geological Survey. He was hired by Exxon Exploration Company and joined their Geophysical Applications group in 1999. Since then he has worked on geophysical problems in a variety of basins around the world. His specialties include seismic DHI/AVO analysis, rock properties, ground-penetrating radar and marine controlled-source electromagnetics (CSEM).

DIGs, Geochemical Solutions International (GSI) and our Associates demonstrate hydrocarbon migration pathways and structural compartmentalization along the Gulf of Guinea margin from Nigeria to Angola by integrating multiple disciplines of geology, geochemistry and geophysics. For an illustration of data sets and methods at the April 16 HGS meeting, we will show our AAPG Long Beach poster "Doing The Geochemical 'Cotton Eye Joe' In West Africa (Niger Delta To Angola): Identifying The Source Of Radarsat Slicks With Piston Cores, Oil Samples, Potential Fields And Near-surface Seismic." http://aapg.confex.com/aapg/2007am/techprogram/A111096.htm