Monday, October 5, 2009

Westchase Hilton • 9999 Westheimer
Social Hour 5:30–6:30 p.m.
Dinner 6:30–7:30 p.m.

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

To guarantee a seat, you must pre-register on the HGS website and pre-pay with a credit card.
Pre-registration without payment will not be accepted.
You may still walk up and pay at the door, if extra seats are available.

Robin Pilcher, James Trude, Bill Kilsdonk, Michael Quinn, and Rod Graham
Hess Corporation

Primary Basin Boundaries in the Gulf of Mexico: Three Hydrocarbon Trap Types with Distinct Petroleum Systems Implications

The primary basins of the Gulf of Mexico form stratigraphically continuous successions on autochthonous salt and therefore contain all the elements of the petroleum system (i.e. source rocks, reservoir intervals, traps, seals). In most of the deepwater northern Gulf the autochthonous salt was deformed during primary basin deposition, initially upward in stocks and walls, and later extruded laterally in a widespread allochthonous salt canopy. As a result, most primary basins are encased either entirely in salt or in some combination of salt and welds. Deepwater Gulf of Mexico exploration is currently focused on targets within primary basins and increasingly on targets at their lateral boundaries. However, because primary basin targets are commonly deep and sub-salt, their boundaries are usually poorly imaged with current seismic technology. Robust structural models are critical to interpreting the structural geometry and evolution of primary basins and to understanding petroleum system implications at their boundaries.

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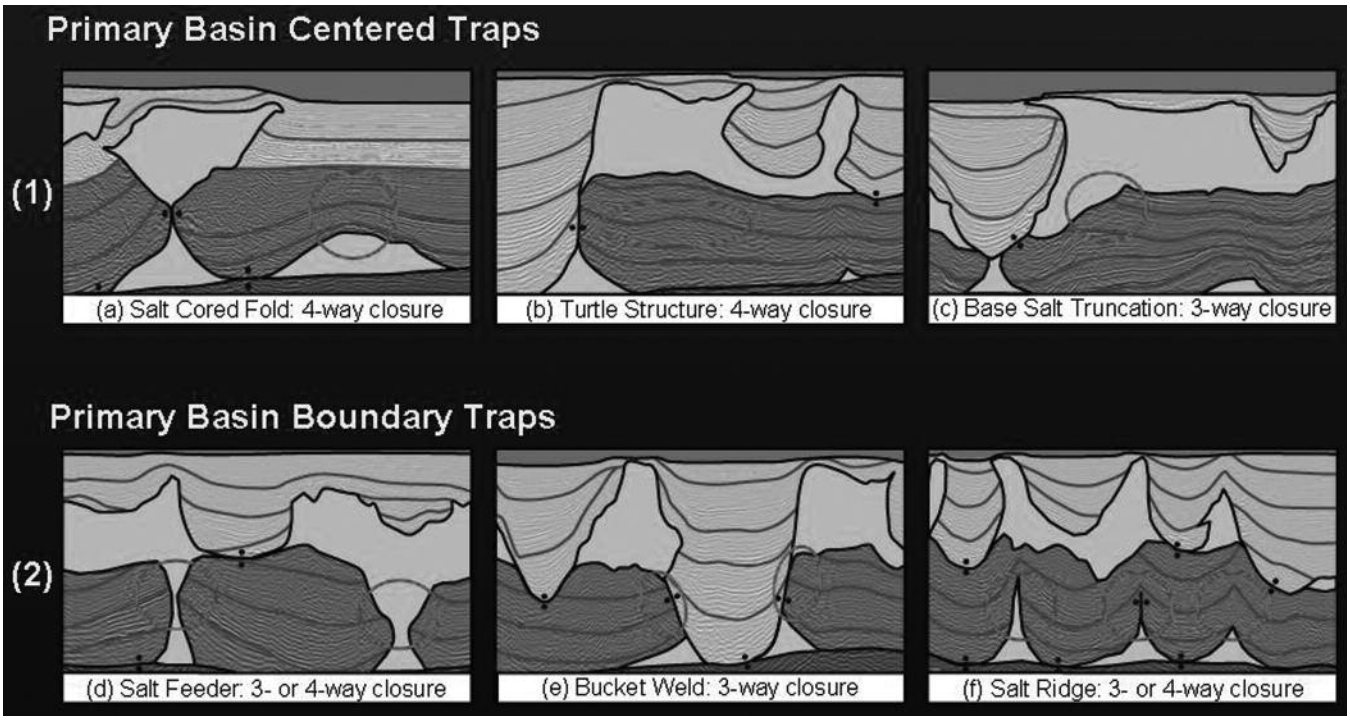
Using modern pre-stack depth-migrated 3-D seismic data, three

HGS North American Dinner *continued on page 13*



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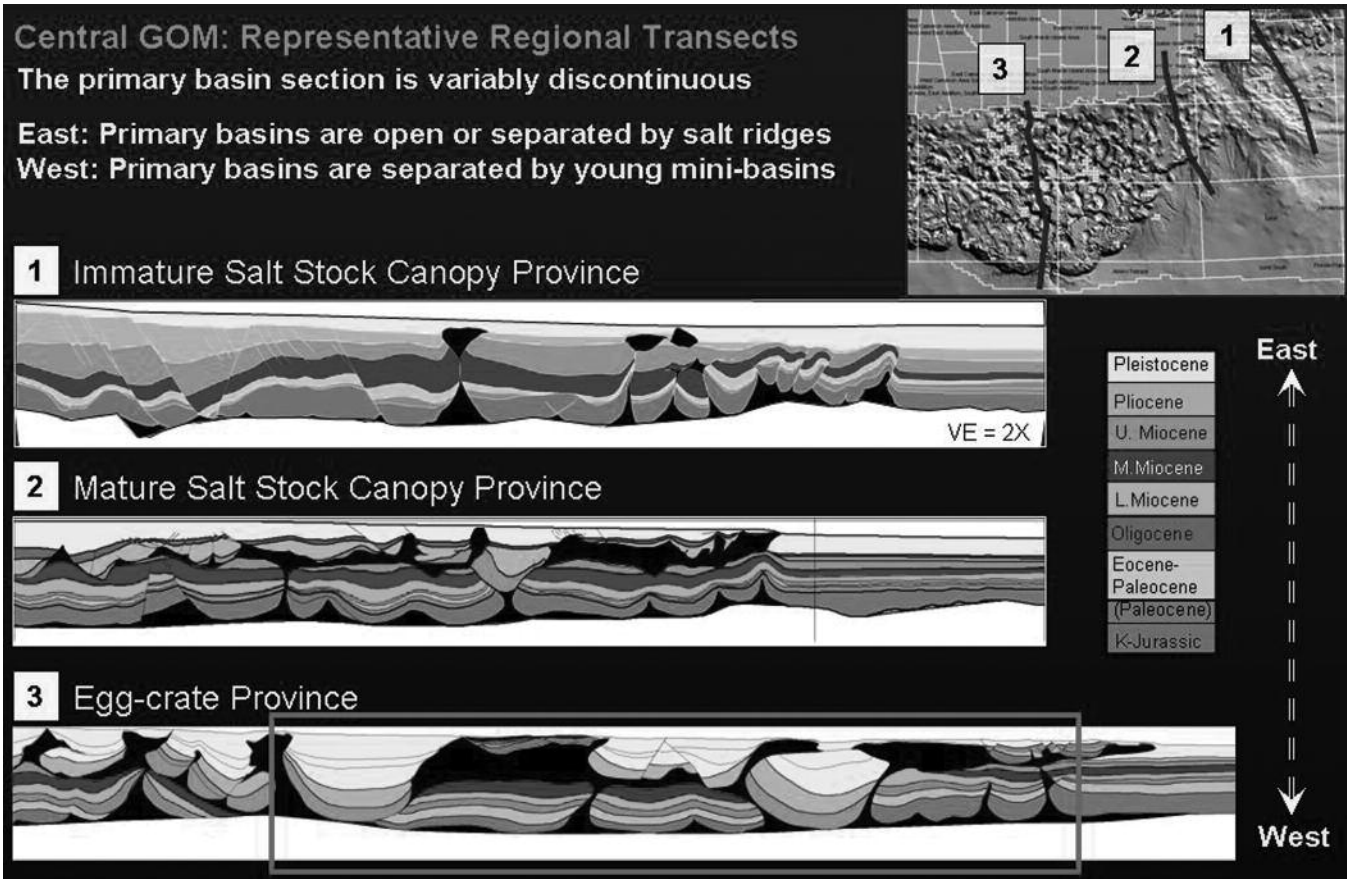

major tectono-stratigraphic provinces that characterize primary basin depocenters have been defined: (1) an immature salt stock canopy province in Mississippi Canyon; (2) a mature salt stock canopy province in northern Atwater Valley, southeastern Green Canyon, Walker Ridge, and southern Keathley Canyon; and (3) an "egg-crate" province comprising a polygonal network of primary basins and deep secondary basins, located in western Green Canyon, Garden Banks, and northern Keathley Canyon.

Six classes of trapping geometry in the primary basins are also recognized: (1) autochthonous salt-cored folds; (2) turtle structures; (3) base-of-salt truncations; (4) salt feeders; (5) salt ridges; and (6) bucket welds. Most primary basin exploration to date has targeted traps in one of the first three styles. Future primary basin exploration will increasingly focus on the traps formed by feeders, bucket welds, and ridges. Each of these features implies a specific, contrasting evolutionary scenario. This in turn has implications for reservoir continuity, charge access, and trap configuration. Of the three primary basin-boundary trap types, salt feeders have the lowest petroleum system risk, followed by bucket welds, and lastly salt ridges with the highest risk. ■

Biographical Sketch

Robin Pilcher received a B.Sc. in Geology from Durham University (1992) and a M.Sc. in Applied Structural Geology from Imperial College, London (1993). He went on to complete a Ph.D. at Birkbeck and University College, London (1997) on the structural and tectonic evolution of the Huqf Uplift in Central Oman. Mr. Pilcher is currently working with Hess Corporation in Houston as Senior Geological Advisor for the Gulf of Mexico exploration team. Prior to this assignment, Robin worked in a wide variety of regional to prospect-scale exploration roles in the Gulf of Mexico, Brazil, West Africa, and the North Sea. His expertise is in structural geology with particular interest in salt tectonics. He teaches Hess's internal structural geology courses in Colorado-Utah and the southern Alps. Robin's current research interests include salt-sediment interaction, extensional and strike-slip tectonics, and sea-bed fluid escape features.