Monday, May 19, 2008

Westchase Hilton • 9999 Westheimer
Social 5:30 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 ***Marek Kacewicz***
Chevron Energy Technology Company
Russell Davies
Rock Deformation Research, USA Inc.
Michael Welch and Rob Knipe
Rock Deformation Research Ltd.

An Integration of Basin Modeling with Fault Seal Prediction through Geologic Time

Pressure prediction in structurally and stratigraphically complex areas using basin modeling approaches requires a good understanding of structural and diagenetic evolution of the basin. Typical models in such areas are based on a series of restorations that provide basic geometric description of the evolving system. They do not address the evolution of the mechanical properties of rocks through geologic time. Failure to appreciate this often leads to the wrong fault and host rock properties being utilized in the models, significant discrepancies with calibration data, and questionable charge and pressure predictions. In this paper, we discuss how such discrepancies can be utilized to iteratively improve the representation of fault rock properties. The proposed approach is an integration of basin modeling with diagenetic and mechanical analysis of fault and matrix rock properties. Examples from the Gulf of Mexico and Southeast Asia demonstrate how the approach helped to reduce fault- and seal-related uncertainty, which resulted in better hydrocarbon charge models and better pressure predictions. ■

Typical models… do not address the evolution of the mechanical properties of rocks through geologic time.

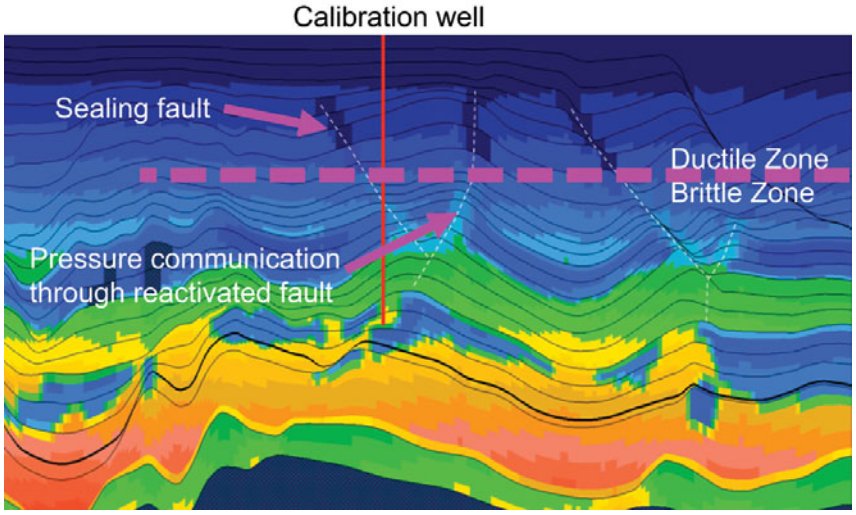

Figure shows an extract from a much longer Gulf of Mexico transect. Calculated effective stress reflects fault and host rock evolution and honors well data. Hot colors correspond to higher effective stress numbers, cool colors correspond to lower effective stress.

Acknowledgments: *We thank Chevron Corporation for permission to present this work.*

Biographical Sketch

Marek Kacewicz is currently with Chevron Energy Technology Company in Houston. He earned an MS degree in computer science/numerical mathematics and a PhD in earth sciences, both from the University of Warsaw (Poland). Prior to joining Chevron, he worked as a research geologist for ARCO E&P Research Center in Plano, Texas, and as a basin modeler for Unocal Exploration & Exploitation Technology in Sugar Land. Dr. Kacewicz has over 20 years of experience in basin modeling, exploration and research. His experience covers a wide range of geographic areas including shelf and deepwater Gulf of Mexico, South and North Atlantic margins, southeast and central Asia, North Sea, Africa, Circum-Arctic basins and many others.

Some of Dr. Kacewicz's professional honors include the 1986 International Association for Mathematical Geology Vistelius Research Award, being an Alexander von Humboldt Fellow (Germany) and the 2005 AAPG Gabriel Dengo Memorial Award for his paper "Towards a Common Earth Model: Combining Seismic Inversion with Basin Modeling." He has published papers and given many conference presentations on a variety of topics including international and domestic exploration, fundamentals of basin modeling and mathematical geology.