

Monday, November 15, 2010

Westchase Hilton • 9999 Westheimer

Poster Judging 4:30-5:30PM

Poster Viewing during Social Hour 5:30-6:30PM

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.

HGS International Dinner Meeting

John Walsh

*Fault Analysis Group,
School of Geological Sciences,
University College
Dublin, Ireland*

HGS International Dinner Meeting

The Robert E. Sheriff Lecture Series

is sponsored by the University of Houston Department of Geosciences and UH Geoscience Alumni Association (UHGAA) in association with the Houston Geologic Society International Group.

Dr. John F. Casey, Department of Geosciences Chairman, will present an update of activities at UH. The Sheriff Lecture will be given by John Walsh, Professor of Structural Geology at University College, Dublin, Ireland. There will be posters and presentations on current thesis and dissertation research projects of UH graduate students. Volunteers from the UHGAA will judge the student posters.

Come and meet the next generation of geoscientists from UH!!

The Robert E. Sheriff Lecture Series was initiated in 1999 by the University of Houston Geoscience Alumni Association (UHGAA). For the past several years it has been co-sponsored by the International Explorationists Group of the Houston Geological Society. The series honors Dr. Sheriff as an educator, scholar, and a proponent of the geosciences.

Its mission is to:

1. Bring some of the best known geologists and geophysicists in the world to the Houston community in order to share highly relevant ideas to exploration geology and geophysics and,
2. Showcase geoscience activity at the University of Houston.

A full list of the Student Posters will be available at HGS Website.

(Check the HGS Calendar event for the current list of Student Posters.)

Abstracts for those available at press-time are included in this issue of the HGS *Bulletin*.

Thanks to Swift Energy for their Financial Support

R.E. Sheriff Lecture:

The Structure, Content, and Growth of Fault Zones Within Sedimentary Sequences and Their Effects on Hydrocarbon Flow.

Existing models for the growth of fault zones associated with normal faulting of sedimentary sequences range from conceptual models for fault zone architecture, incorporating components such as fault core and damage zone, through to a variety of fault wear models that attempt to explain established quantitative correlations between fault displacement and fault rock thickness. Despite the importance of normal faults in a variety of application areas, no unified model for fault zone evolution has been developed which incorporates the broad range of

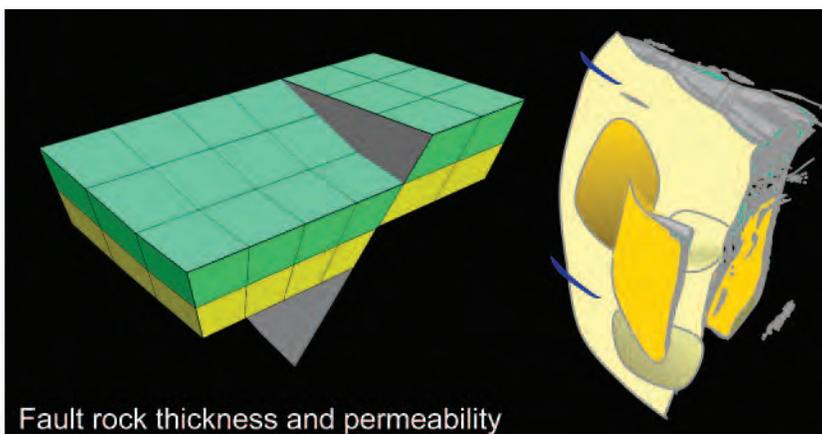
fault-related features and processes. Exploring links between the scaling of different fault zone components and fault displacement, this talk presents a quantitative model for fault zone evolution which attempts to reconcile fault zone structure with the repetitive operation of a small number of processes, including fault segmentation and refraction, and asperity removal. This model helps to reconcile the main characteristics of fault zones developed within a broad range of host rock sequences and at different

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deformation conditions, but still recognizes the inherent complexities of natural fault zones.

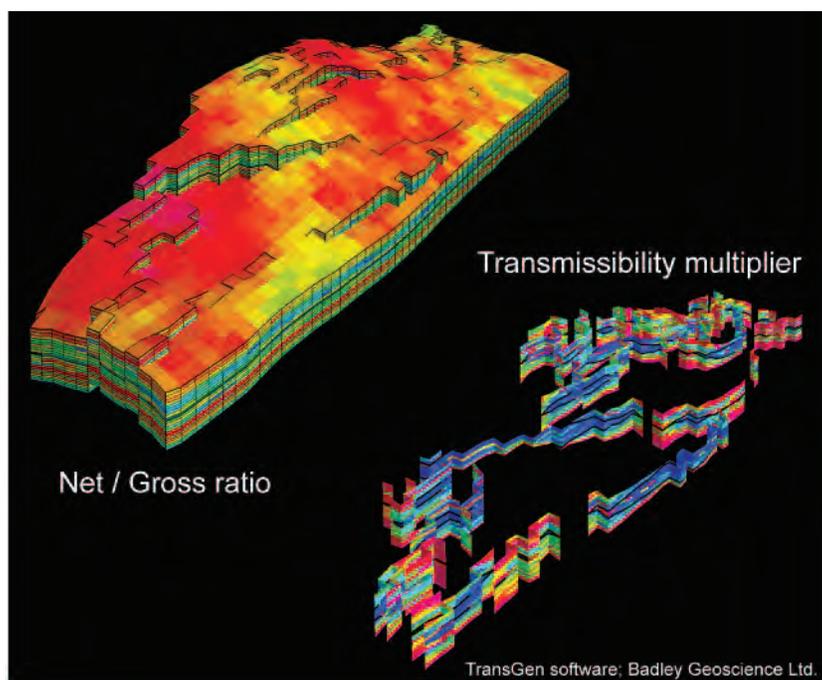
This model for fault zone structure is also consistent with recent studies of high-quality outcrops which illustrate how the combined effect of host-rock rheology and prevailing deformation processes is capable of generating the full range of fault rock types, including those which have a major impact on hydrocarbon flow, such as shale/clay smears within poorly consolidated sediments through to shaley fault gouges within lithified sediments. The incorporation of either shale smears or shaley gouge within fault zones contained in siliciclastic sequences is now recognized as one of

the principal means of forming some fault-bounded traps and can have a major impact on intra-reservoir flow. Existing empirical constraints demonstrate that fault rock permeabilities decrease with increasing clay fraction and provide a means of predicting fault rock permeabilities in the subsurface. New approaches are briefly described which are capable of incorporating the flow effects of faults in both hydrocarbon exploration and production models. Recently published studies show that these methods provide an improved basis for modelling faults contained within reservoir production or hydrocarbon migration flow models of siliciclastic sequences, in which faults behave as barriers or baffles to flow. ■



Fault rock thickness and permeability

Faults are represented as planes in conventional reservoir cellular models and yet they contain fault rocks with permeabilities that differ from those of the host rock. From Manzocchi et al. (1999). Petroleum Geoscience, 5, 53-63.



Faults in a reservoir model in which across-fault sequence juxtaposition is explicitly included in the model geometry, with fault rock properties represented by cross-fault transmissibility multipliers on the cell faces along the fault surface (using the method of Manzocchi et al. 1999).

Biographical Sketch

JOHN WALSH is a Professor of structural geology at University College Dublin and Joint Director of the Fault Analysis Group, an externally funded research group (formerly of



University of Liverpool) currently comprising six post-doctoral researchers and six Ph.D. students (www.fault-analysis-group.ucd.ie). The group conducts basic research on all aspects of faults and fractures, and applies their research results to practical problems within the petroleum, mineral, and coal industries. They have published more than 100 scientific papers in international journals or special publications on issues relating to the geometry and growth of faults and related structures, earthquake characteristics of fault systems, the impact of faults on fluid flow, and the development of methods for modelling the geometry, mechanics, and related fluid flow of faults. Their methods are implemented in the software packages for fault and fault property modelling in the petroleum industry. Professor Walsh has been a Distinguished Lecturer for the American Association of Petroleum Geologists (2008), the European Association of Geoscientists and Engineers (2004), and the Petroleum Exploration Society of Australia (1993). He has also been co-chairman of the AAPG's Reservoir Deformation Research Group. He is a member of the editorial boards of the *Bulletin of the Geological Society of America*, *Geological Journal*, and *Journal of Structural Geology*, and has previously occupied the same role for *Petroleum Geoscience*.

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