

**AAPG Annual Convention  
Salt Lake City, Utah  
May 11-14, 2003**

Karla Kane<sup>1</sup>, Sanjeev Gupta<sup>1</sup>, Howard Johnson<sup>1</sup>, Bruce Trudgill<sup>1</sup>, Colin Murray<sup>2</sup> (1) Imperial College, London, United Kingdom (2) Amerada Hess Limited, London, United Kingdom

### **Turbidite Dispersal Patterns Controlled by Fault Array Evolution in Late Jurassic Sub-Basins of the Moray Firth Rift, North Sea**

Although there have been several studies of deep-water sedimentation in structurally active settings, control of extensional fault growth, particularly intrabasinal faults, on turbidite dispersal remains poorly understood.

The North Sea proves an ideal setting to study structural evolution and coeval sedimentation in rift systems. Late Jurassic extension created a trilete rift framework comprising the Moray Firth, Central, and Viking Grabens. The Moray Firth rift arm was highly segmented by sub-basins, separated by basin floor structural barriers, into which turbidites were deposited during late syn-rift to early post-rift times.

Extensive 3-D seismic coverage provides a rare opportunity for turbidite geometry to be directly related to fault growth history. Recently developed models of fault segmentation and linkage are applied to individual sub-basins and related to dispersal patterns. Additionally, dense wireline and core databases enable the detailed study of structurally confined turbidite distribution and architecture.

The E-W trending Halibut Horst divided the Outer Moray Firth into two and sourced many turbidite deposits of surrounding sub-basins. Growth and interaction of E-W trending structural barriers with earlier NE-SW faults resulted in progressive confinement of Claymore Sands in the North Halibut Graben, and influenced distribution of Ettrick Sands in the North Buchan Graben. Similarly, the Fladen Ground Spur, a major high to the NE, sourced Galley Sands into the evolving North Telford Basin.

Our observations indicate that capture of turbidity flows by an increasingly restricted basin-floor result in many depositional changes, including depocentre migration, increased sandbody thickness, and evolution from distal to more proximal facies.