Monday, March 28, 2011

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.

Dominic A. Armitage
Jacob A. Covault

"Exceptional" Turbidite Systems in High-latitude and Tectonically Active Settings and the Obsolescence of Ubiquitous Sequence Stratigraphic Models

Popular models for the development of deep-sea turbidite systems hypothesize their initiation during falling sea level, when voluminous sand-rich sediment gravity-flows bypass the continental shelf through incised valleys. Resulting submarine fans are predominated by large erosional canyons and depositional leveed channels on fan surfaces that lap onto the lower continental slope. However, recent studies of turbidite-system development across high-latitude, glacially influenced margins and tectonically-active margins show that the timing of initiation, developmental processes, and turbidite architectures can vary from those predicted by such widely used models. Here, two "exceptional" turbidite systems are compared from the high-latitude, passive Southwest Scotian Slope offshore southeastern Canada and the tectonically active California Borderland. The high-latitude Scotian Slope is sensitive to climatic variability associated with rising sea level during glacial-to-interglacial transitions; and, as a result, received voluminous coarse-grained sediment from subglacial outwash. Large subglacial pulses of sediment contemporaneously carved out a line of shelf-indenting canyons, which transitioned to straight, wide, and flat-based channels that coalesce near the base of slope. These contemporaneous canyons and channels provided sediment to submarine fans generally characterized by coarse-grained, braidplain-plain-like turbidite architectures. Canyon-and-channel activity in the California Borderland is not as sensitive to sea-level fluctuations during glacial cycles. Rather, tectonic activity maintained a relatively narrow shelf, which facilitated canyon-head incision across the shelf nearly to the modern beach. During falling and lowstands of sea level, fluvial systems provided sediment to canyon-head point sources; however, during highstands of sea level, such as at present, littoral cells are important

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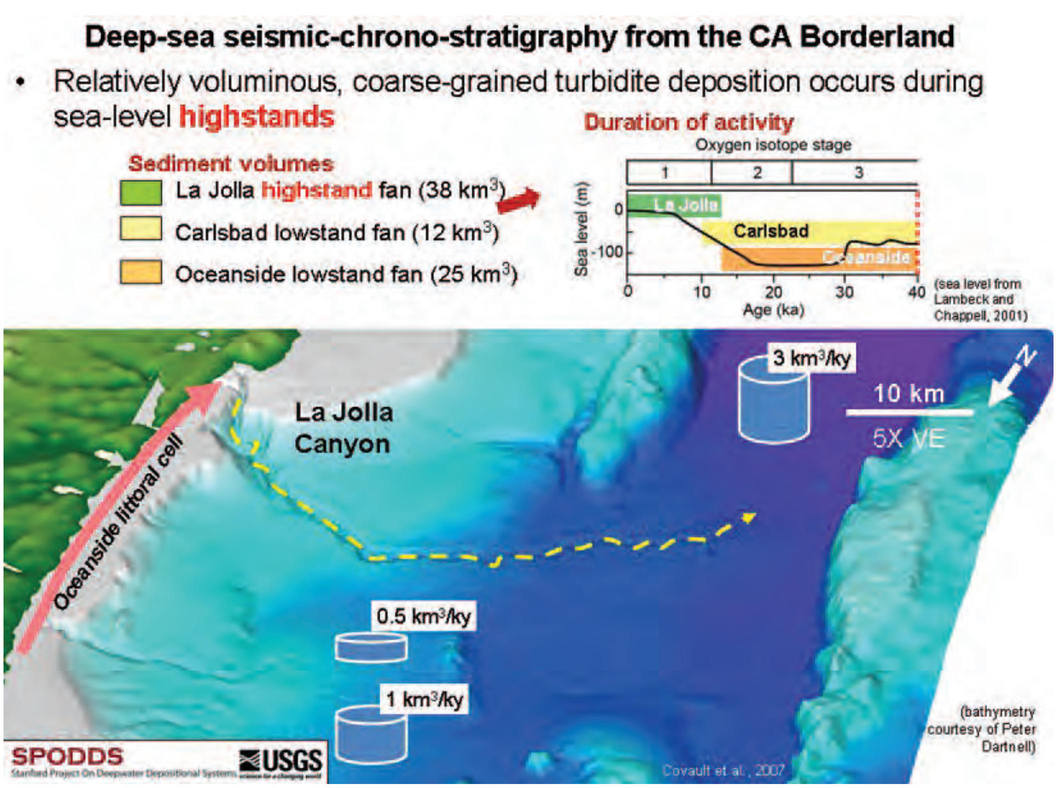

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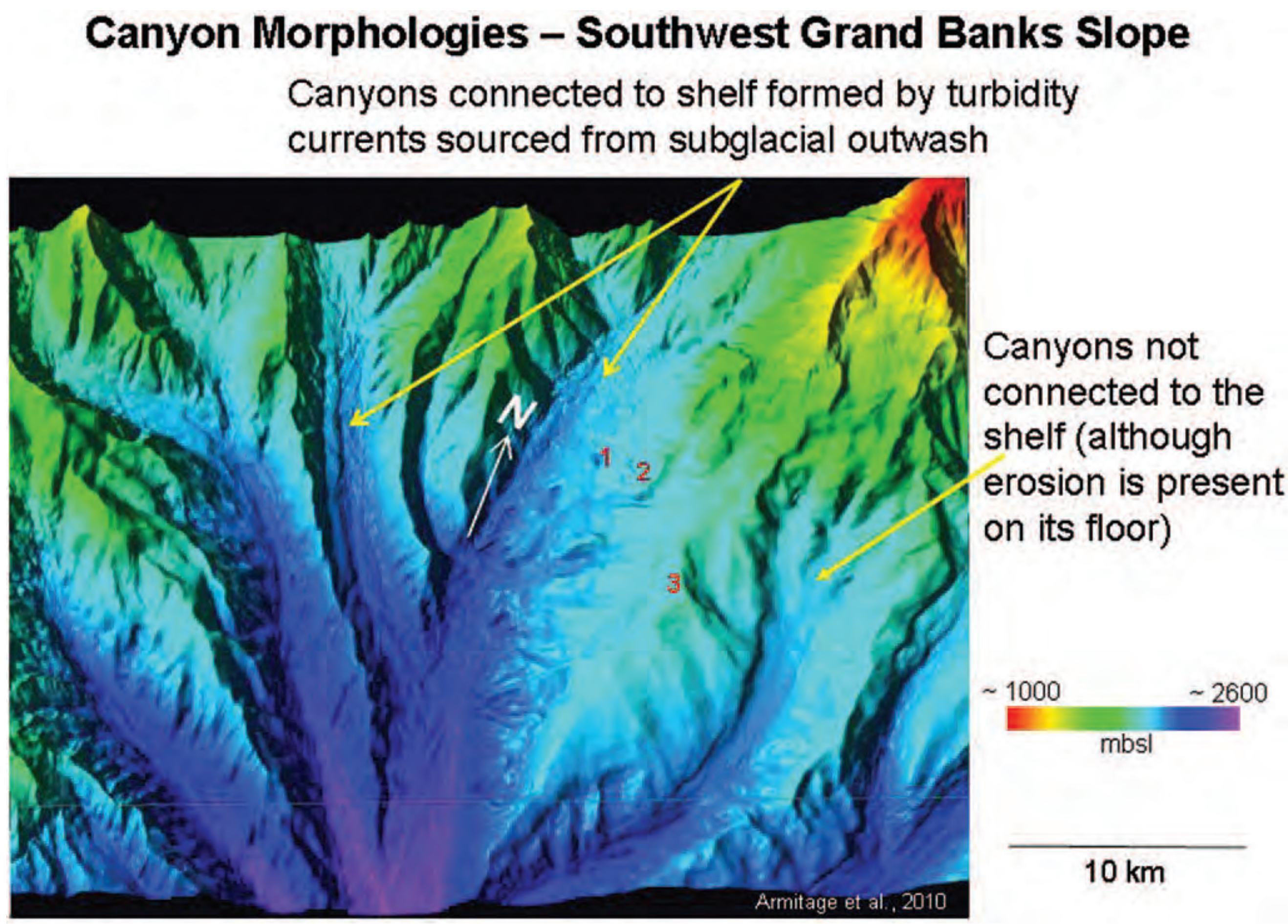

contributors of longshore-drift-transported sediment to canyon-head point sources at narrow segments of the shelf. Turbidite architectures include predominantly erosional slope conduits and sand-rich base of slope fan lobes. Results of this study highlight exceptions to the general "rules" of deep-sea deposition. Furthermore, are such high-latitude and tectonically active margins and their turbidite systems really that "exceptional" in the first place?

Biographical Sketches

Dominic Armitage is a deep-water sedimentologist in the Subsurface Technology group at ConocoPhillips Company, Houston. He started at ConocoPhillips in 2009 after first earning his M.Sci. from University College, London, then his Ph.D. from Stanford University. His Ph.D. thesis focused on the evolution of deep-water depositional elements using outcrop and subsurface data from a broad range of geographic locations, including Patagonia (Chile), West Africa, and Southeast Canada. Current interests include the influence of mass-transport deposit topography on the subsequent distribution of turbidites, and the reservoir properties of hybrid event beds. While at ConocoPhillips, Dominic has worked on stratigraphic analysis and prediction for a variety of Gulf of Mexico projects.

Jacob Covault is a research scientist at the US Geological Survey National Center in Reston, Virginia. He is the coordinator of carbon dioxide sequestration assessment efforts in the western region of the USA and Alaska. Prior to his experience with the USGS, he worked as a research geologist at Chevron Energy Technology Company and received Ph.D. and B.S. degrees in geological and environmental sciences at Stanford University. Dr. Covault has authored over 20 peer-reviewed journal articles and more than 50 conference abstracts. He received the 2005 and 2009 A.I. Levorsen awards of the AAPG Pacific Section and was a co-author of the 2009 AAPG Pacific Section H. Victor Church Memorial Award for best poster at the annual convention. Dr. Covault also received the 2008-2009 Stanford-USGS Fellowship. His research has focused on ocean sciences and sedimentary geology, including marine geology, geomorphology, sedimentary basin analysis, sequence stratigraphy and climate evolution.