Monday, December 14, 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.

HGS General Dinner Meeting

Janok P. Bhattacharya
Robert E. Sheriff Professor of Sequence Stratigraphy,
Geosciences Department, University of Houston
Houston, Texas , U.S.A.
James A. MacEachern
Department of Earth Sciences
Simon Fraser University, Burnaby, BC, Canada

Re-evaluating Depositional Models for Shelf Shales

Despite the assumption that the bulk of marine "shelf" mud is deposited by gradual fallout from suspension in quiet water, modern muddy shelves and their associated rivers show that they are dominated by hyperpycnal fluid mud. This has not been widely applied to the interpretation of ancient sedimentary shale successions. We analyze several ancient Cretaceous prodelta shelf systems and their associated river deposits. Paleodischarge estimates of trunk rivers show that they fall within the predicted limits of rivers that are capable of generating hyperpycnal plumes. The associated prodeltaic mudstones match modern hyperpycnite facies models, and suggest a correspondingly hyperpycnal character. Physical sedimentary structures include diffusely stratified beds that show both normal and inverse grading (Fig. 1), indicating sustained flows that waxed and waned. They also display low intensities of bioturbation (Fig. 2), which reflect the high physical and chemical stresses of hyperpycnal environments. Hyperpycnal conditions are ameliorated by the fact that these rivers were relatively small, dirty systems that drained an active orogenic belt during humid temperate to subtropical "greenhouse" conditions. During sustained periods of flooding, such as during monsoons, the initial river flood may lower salinities within the inshore area, effectively "prepping" the area and allowing subsequent floods to become hyperpycnal much more easily. Although shelf slopes were too low to allow long-run-out hyperpycnal flows, the storm-dominated nature of the seaway likely allowed fluid mud to be transported for significant distances across and along the paleo-shelf. Prodelta hyperpycnites form leaner, gas-prone source rocks, prone to the generation of overpressure, versus more slowly deposited, organic-rich, anoxic laminites and condensed-section shales.

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Reference

Bhattacharya, J.P., and MacEachern, J.A., in press, Hyperpycnal Rivers and Prodeltaic Shelves in The Cretaceous Seaway of North America. *Journal of Sedimentary Research*, v. 79.

Biographical Sketch

Dr. Janok P. Bhattacharya is the Robert E. Sheriff Professor of Sequence Stratigraphy at the University of Houston. His research interests include deltaic sedimentology and sequence stratigraphy, the local control of structure on stratigraphy, and the reservoir architecture of clastic depositional systems.

He received his B.Sc. in 1981 from Memorial University. Following his Bachelors degree, he worked at ESSO Resources Calgary, before completing his Ph.D. in 1989 from McMaster University. Following a Natural Sciences and Engineering Research Council post-doc, Janok worked for the Bureau of Economic Geology in Austin, ARCO Research, and the University of Texas at Dallas before joining the University of Houston in the fall of 2005.

Dr. Bhattacharya is an AAPG Grover Murray Distinguished Educator, AAPG Distinguished Lecturer, and AAPG SW Section Distinguished Educator. He was the 2008 GCSSEPM President, and has served on various AAPG Convention committees. He is currently co-chair of the AAPG Education Committee. He has been awarded an AAPG Certificate of Merit, the 2004 Dallas Geological Society Professional Service Award, the 2004 CSPG Best Oral Presentation award, the 2002 Frank Kottlowski Memorial Presentation Award, the 2002 Houston Geological Society Best Oral Paper Award, and the 2001 AAPG "Al" Cox Award for best poster at an AAPG SW section meeting.

He is an associate editor for the *Journal of Sedimentary Research* and has also served as associate editor for the *AAPG Bulletin*. He has authored or co-authored more than 100 abstracts and over 45 technical papers. He also co-edited SEPM Special Publication 83 titled "River Deltas: Concepts, Models and Examples". He is an active member of AAPG, SEPM, GSA and IAS.

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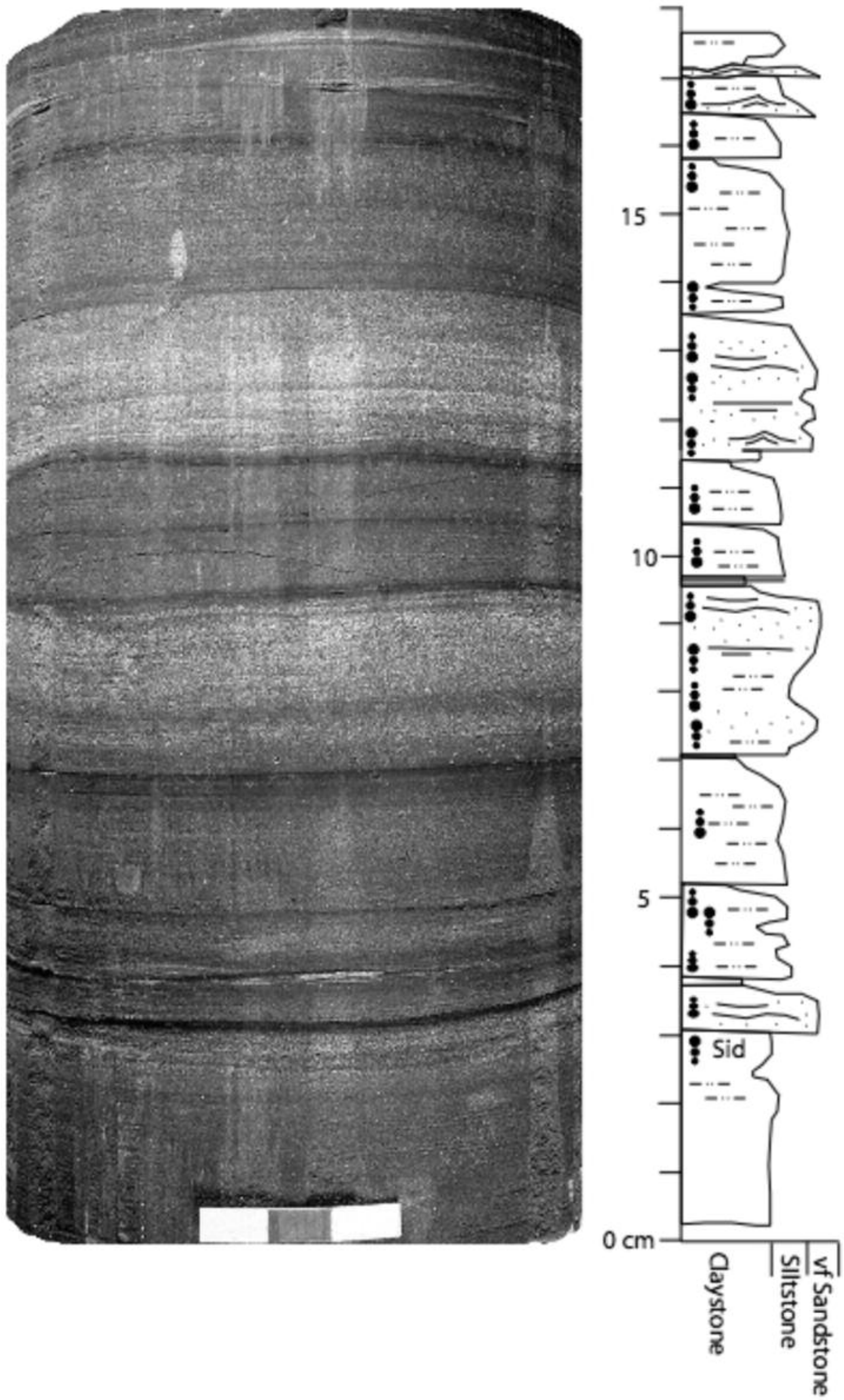

Figure 1. Core photograph of diffusely bedded prodelta mudstones and siltstones, with no bioturbation. Note the inverse grading at 7, 8, and 12 cm. Scale is 3 cm. Core sample is from the Cretaceous Dunvegan Formation, Canada (from Bhattacharya and MacEachern, in press).

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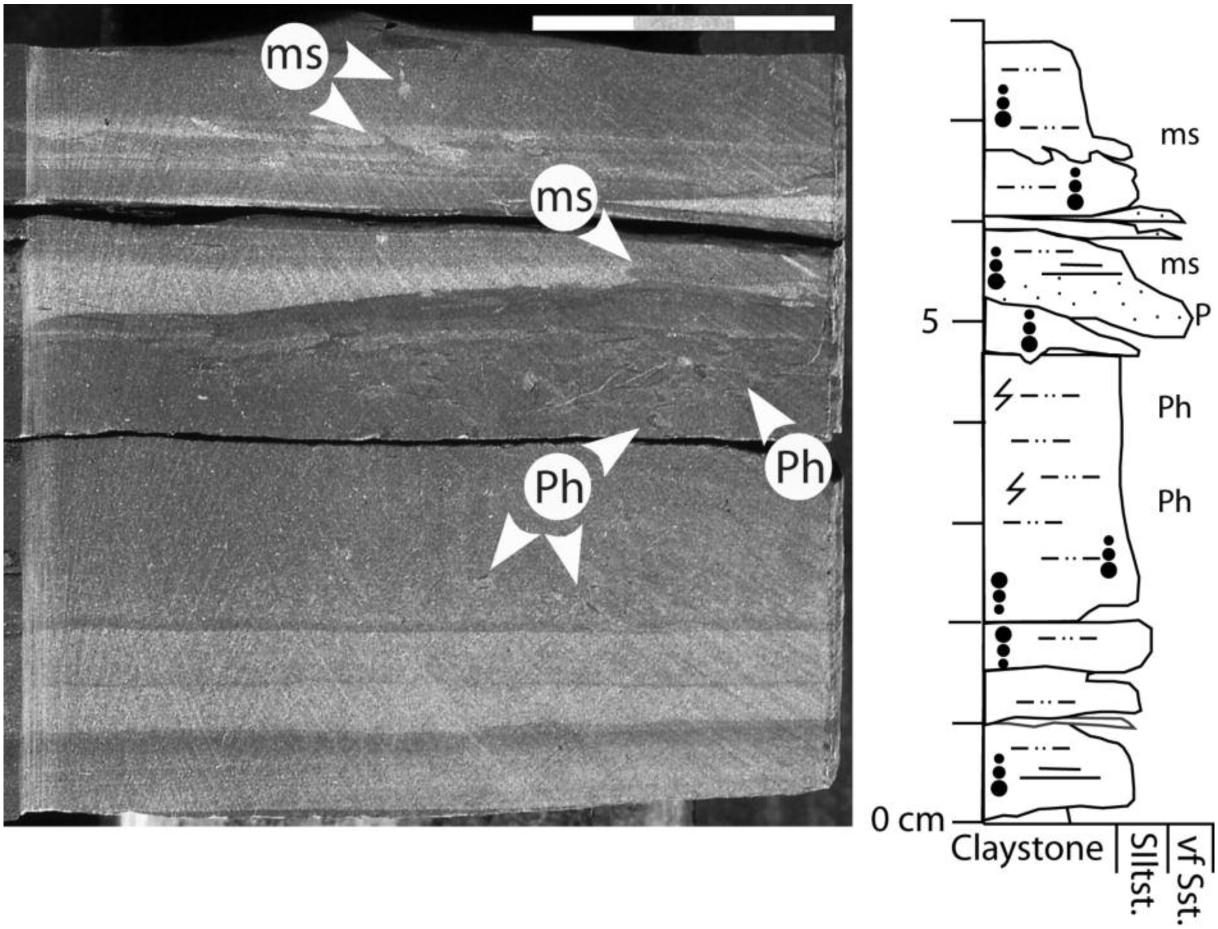

Figure 2. Core photo of prodelta facies of the Cretaceous Dunvegan Formation, showing both inverse and normally graded siltstones. Wispy mud-streaks at 4.5cm are identified as Phycosiphon. Note that these lie in the clayey tops of thick graded siltstone beds, and may reflect colonization of the bed top after deposition. Lateral disruption of sandy and silty laminae may represent "mantle and swirl" (ms) structures, recording the activity of sediment-swimming organisms in the rather soupy substrate. Small flame structures in upper units also indicate soft-sediment deformation. Unlabeled Planolites (P) occurs on the right side of the photo, and marked on the litholog.

Reference

Bhattacharya, J.P., and MacEachern, J.A., 2009, Hyperpycnal Rivers and Prodeltaic Shelves in The Cretaceous Seaway Of North America. *Journal of Sedimentary Research*, v. 79.