British Sedimentological Research Group

55th Annual General Meeting

Cambridge

18th-20th December 2016

ABSTRACT VOLUME

1445-1500 – Viet Luan Ho: *Multi-pulsed Turbidity Currents – A Scaling Analysis and Applications for Turbidite Interpretation*
1500-1515 – Paul Jarvis: *Formation and evolution of transverse bedforms: An experimental study*
1515-1530 – Age Vellinga: *Why do some turbidity currents create upstream migrating bedforms while others do not?*

SESSION 11C – PREDICTING SEDIMENTARY ARCHITECTURE (JCR Games Room)
Session chair: Michael Flowerdew (CASP, University of Cambridge)

1430-1445 – Ewan Gray: *Predicting facies distribution in Triassic fluvial systems of the central North Sea using subsurface data*
1445-1500 – Adam McArthur: *Application of deep-water palynofacies scheme to classify reservoir architecture in the Campos Basin, offshore Brazil*
1500-1515 – Menno Hofstra: *The depositional architecture of basin-floor fan systems by wireline log character: an integrated dataset from the Karoo Basin*
1515-1530 – Aurélia Privat: *Early post-rift facies and architectural changes within a coarse-grained deep-water system deposited above a Mass Transport Complex (MTC)*

SESSION 12A – CONTINENTAL SEDIMENTARY ENVIRONMENTS II (Wolfson Theatre)
Session chair: Neil Davies (University of Cambridge)

1535-1550 – Giacomo Medici: *Characterizing flow heterogeneities in a red-bed fluvial succession: Triassic St Bees Sandstone Formation (NW England, UK)*
1550-1605 – Amanda Owen: *Understanding fluvial facies distribution within sedimentary basins: Bighorn Basin, Wyoming*
1605-1620 – Michelle Shiers: *Controls on the depositional architecture of fluvial point-bar elements from a coastal plain setting*

SESSION 12B – EXPERIMENTS & MODELLING IN SEDIMENTOLOGY II (Jock Colville Hall)
Session chair: Esther Sumner (University of Southampton)

1535-1550 – Orla Bath Enright: *Gone with the flow: transportation of soft-bodied organisms in turbidity currents*
1550-1605 – Megan Baker: *The Effect of Clay Type on the Properties of Cohesive Sediment Gravity Flows*
1605-1620 – Diana Sher: *Gravity currents: entrainment, stratification and self-similarity*

SESSION 12C – CLAY MINERALS (JCR Games Room)
Session chair: Michael Flowerdew (CASP, University of Cambridge)

1535-1550 – Luke Wooldridge: *Biofilm origin of clay-coated sand grains*
1550-1605 – Joshua Griffiths: *Predicting Clay Mineral Distribution in Sandstone Reservoirs Using an Analogue Holocene Estuarine Succession*
1605-1620 – Chris Jeans: *Red Chalk, Secondary Bentonite and Volcanogenic Glauconite*

---1620-1640: Coffee & Discussion (Buttery); Meeting Closes---

Early post-rift facies and architectural changes within a coarse-grained deep-water system deposited above a Mass Transport Complex (MTC)

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Local gradient changes and variable accommodation characterize the upper surface of mass transport complexes (MTCs). Bathymetric variability can influence the longitudinal and vertical processes occurring within coarse-grained sediment gravity flows, which are challenging to interpret from the rock record alone.
A 60 m thick succession of very coarse-grained and poorly-sorted matrix-rich sandstones deposited above a seismic-scale mass transport complex (MTC) is investigated in the Jurassic stratigraphy of the Los Molles Formation, Neuquén Basin. The facies types and architectural changes documented within the deep-water succession provide insights into the interactions between coarse-grained sediment gravity flows and uneven seabed inherited from the top of a MTC.
The succession was deposited in the Chacay Melehue hemi-graben outcrops along a 6.5 km long oblique downdip longitudinal profile which permitted correlation of individual beds between 16 stratigraphic sections (1:25 scale). Two units are defined: Unit 1 comprises heterolithic facies grading upwards into poorly sorted, very coarse- to fine-grained, thin- to medium-bedded sandstones with abundant pebble-sized clasts; Unit 2 comprises three thick conglomeratic event beds of very poorly-sorted, granular to medium-grained mud-rich sandstone matrix, supporting polygenic gravels ranging from pebble to boulder and large clasts.
The sandstone-rich division of the deep-water succession studied is interpreted as a lobe complex emplaced by an out-of-equilibrium sand-rich system, which recorded a progressive decrease of confinement from Unit 1 to Unit 2. The MTD-related topography controlled stratigraphic trapping of considerable sand volumes in Unit 1. Once the MTC-related accommodation was filled, relief associated with individual supra-MTC sandbodies produced subtle changes in depositional processes in the Unit 2.
Predictive stratigraphic outcrop-based models can provide insights into spatial distribution and internal architecture of heterogeneous sandbodies able to generate multiscale net/gross variations that make-up the internal complexity of subsurface reservoirs hosted in lobes above MTCs.

Sedimentary Structures in Deepwater Paleogene Wilcox Core Data, Gulf of Mexico, USA; Some New Insights into Deposition of Sands from High Magnitude Turbulent Flows

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Recent acquisition of petrophysical and rock data in the deepwater, Paleogene Wilcox Formation, offshore Gulf of Mexico, USA has delivered many 100s meters of conventional core that record a broad variety of mass flows, turbidite and hybrid event beds. A wide spectrum of sedimentary structures are exquisitely expressed in Computed Tomography (CT) data volumes and extracted images. These high resolution (voxel size less than very fine sand) volumes can be orientated via well data and provide a means to catalog the spectrum of sedimentary structure types, their internal architecture, vertical motifs and their paleocurrent trends.
Wilcox deepwater sands are very fine to fine grained, averaging commonly very fine upper (88-125 microns). Sand composition is lithic arkose-feldspathic to litharenite. Sediment source is from the North American continent with a potential for Appalachian to Laramide Rockies drainage that fed deltaic shelf margins in SE Texas and Central Louisiana. Deepwater transport distances to the location of the core data is 600-700 kilometers and via a slope underlain, in part, by shallow buried, mobile salt.
Our focus is on sedimentary structures in sands that are interpreted as the depositional products of high magnitude, fully turbulent to dominantly turbulent, sediment gravity flows. Context of the sedimentary structures are thicker sand intervals (commonly 10s feet) and in stratigraphic sections interpreted as submarine channels and/or proximal and axial deepwater lobe settings.
We suspect that our description and initial classification of these high energy sedimentary structures includes bedforms that are operating at the threshold of flow velocities capable of entraining and suspending fine sand; the uppermost flow regime and a realm classically of upper plane beds and antidunes. Should these structures be fully explained by flow types and depositional setting within the myriad of deepwater sub-environments, then considerable value will be added to future deepwater reservoir characterization.