

EGU2020-9261

<https://doi.org/10.5194/egusphere-egu2020-9261>

EGU General Assembly 2020

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## New insights into the internal structure of Turbidite deposits from physical modelling of relevant erosional and depositional processes

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Results are presented from the current experimental campaign which aims to observe the character of supercritical turbidity currents and other supercritical sediment gravity flows (SGFs) as they respond to morphological transition zones, e.g. slope breaks and losses of lateral confinement. This experimental setup aims to reproduce lower slope, channel-lobe transition zone, and, proximal lobe conditions, in order to be analogous to conditions found within deep-marine sedimentary environments such as those found within foreland basins, and on passive margins. Of particular interest is the sedimentological expression of these systems, how sedimentological variability arises in the form of sediment waves and scour fields, and how does an understanding of current dynamics help in the prediction of the internal structures of these features. Thus, this study will yield new data on how turbidity currents impact multi-layered sedimentary beds and determine parametric controls on erosion, deposition and bed restructuring processes. Turbidity currents are scaled via dimensionless parameters representing prevalent flow (e.g. Reynolds, Densimetric Froude Number, and Shields Numbers) and sedimentary (e.g. Rouse and Reynolds Particle Numbers) conditions, following the scaling techniques of de Leeuw et al., (2016) which have now been tested in numerous experimental studies e.g. Pohl et al., 2019.

Investigating how varying experimental conditions such as current parameters, severity of breaks in-slope, and, losses of lateral confinement impact the resulting depositional signature of lower slope, and channel-lobe transition zones. Of particular interest is the impact of previously developed bedforms upon current dynamics which will be studied via UVP and ADV measurements, as well as through the application of digital elevation models (DEM), which will be used to understand how systems evolve over multiple runs. DEM models will be generated using a photogrammetry technique capable of producing a high-resolution model ( $\pm 2\text{mm}$ ). The results of which will then be linked to synchronous sedimentological packages – both on the modern seafloor and preserved within ancient geological outcrops – with the aim of enhancing the

predictive sedimentological concepts applied to these systems when being interpreted within the subsurface.

A seafloor study will focus upon supercritical bedforms generated by SGFs upon a deep-water slope and terrace located offshore of Senegal, West Africa. Combining seafloor seismic images, high-resolution sparker data, and drop cores taken from deep water channels, and overbanks. Through the interpretation of this dataset, it will be possible to understand the sedimentological variability of bedforms present on this slope system and allude to the flow conditions that led to their formation.

#### References

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