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# Evidence for lateral and longitudinal compensational stacking in sub-basins based on numerical models of turbidity currents on complex margin topographies

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Complex seafloor topography, such as salt-induced topographies, on passive continental margins plays a significant role in controlling turbidity current behavior and sediment dispersal pattern. One method to investigate the interaction of sediment gravity currents and topography is the use of process-based numerical simulations. Potential topographical templates can be generated from laboratory analogue experiments or directly obtained from 3D bathymetry data.
In the present study we adopt the above two sets of topographical seafloor data, experimental topographies and high-resolution surfaces from areas of the present-day seabed, where there is evidence of near-bed salt or mud diapirism and withdrawal. These inputs not only provide both experimental and 'real-world' templates to investigate the extent these topographies affect flow character, routing and the resulting deposit geometry, but also offer a perspective on the validation of the experimental method by comparison among a variety of results.
To simulate natural subaqueous density flows, a range of parameter combinations (flow volume, height, input velocity, frequency) has been chosen within the appropriate ranges expected to occur in nature. A significant result we found is that in local depressions, or mini-basins, not only lateral compensational stacking occurs, but also in the direction of the flow. This longitudinal compensational stacking occurs as deposition on the counterslopes shifts the topographic lows upstream, which in turn moves the depocenters upstream. Continued infill there moves subsequently the depocenters again downstream. These cycles are repeated until the topographic depression is no longer an active sediment trap and bypass occurs.