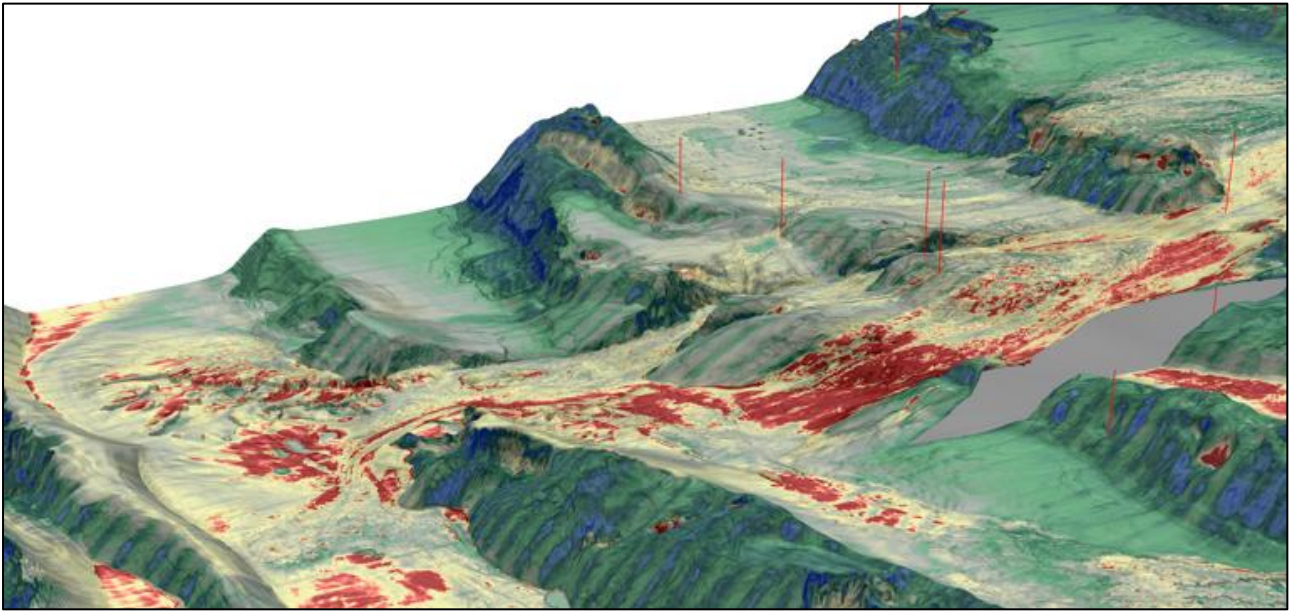


Stepped slope and downslope transport, deepwater off Northwest Borneo



High-resolution seafloor image off NW Borneo highlighting downslope sediment transfer. Sabah Multiclient 3D Data set courtesy of PGS and JV Partners. From: Johansson, van Doorn, Stow, Roberts, Phillips, Farag (2023)

Problem: what exactly are the processes active in these downslope sediment fairways?

The downslope processes off Northwest Borneo act across a structurally controlled tectonically-active slope system, with multiple linear shale diapirs transverse to slope that create a stepped slope morphology. The confined turbidity currents produce fill-and-spill sediments, where the topographical highs cause ponding, rapid deposition and diverted flows alongslope, interacting with and weaving around structural obstacles at the seafloor. The turbidity currents also interact with megabeds (MTDs) formed from mass transport processes derived from local slope collapse and large mega-slope failure. These MTDs are highly erosive and remove the previous turbidite deposits and redeposit the sand mixed in with the chaotic muds. The modification of these downslope deposits by subsequent contour currents is unclear and identification of contourites is difficult as their seismic characteristics are masked by the slope-parallel geomorphology of some of the turbidite systems. However, the complexity and strength of modern-day oceanographic currents would seem likely to affect the downslope sediments, by cleaning and polishing turbidite sands into a hybrid turbidite-contourite facies and, perhaps, by helping to shape the large-scale sediment waves observed along structurally confined slope terraces.

This present-day slope system offers an important analogue for the subsurface Tertiary succession off Sabah and in the Dangerous Grounds region.