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A Late Cretaceous mixed-drift system on the Uruguayan Margin: sedimentary and paleoceanographic significance

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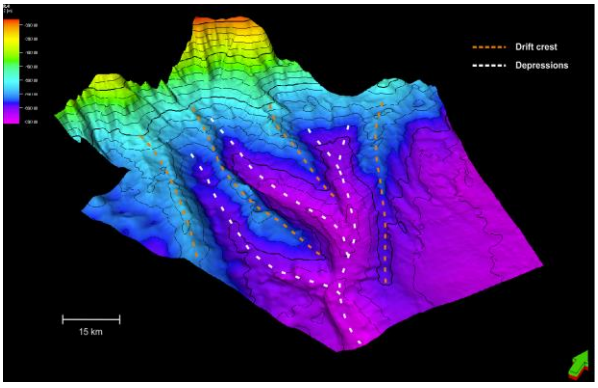
Down-slope (gravity-driven) and along-slope (bottom-currents) sedimentary processes have been proven to be fundamental forces in controlling the morphology of continental margins [1]. While both processes may be isolated, spatially and temporally, they often coexist resulting in mixed (turbidite-contourite) systems. The consequences of these interactions, and resulting deposit geometries and internal stacking characteristics are poorly documented [2]. Using 2D and 3D seismic data from the Uruguayan margin, this presentation aims to offer insights into the evolution of a Late Cretaceous mixed-drift system across the Pelotas Basin of the Uruguayan Margin.

Four large (>25 km wide and up to 100 km long) asymmetrical drifts have been identified propagating obliquely from the middle-slope, before terminating on the lower slope. Drifts have over 1 km of local relief over adjacent depressions, which amalgamate towards the SE following underlying basement topography. Internally, drifts are characterised by a series of convex-up, low to medium amplitude reflections which prograde away from the slope, and prograde/aggrade laterally towards the southwest. Basal reflections can be traced across multiple drifts, though later, these terminate into adjacent depressions or pinch-out against internal discontinuities. Along lee slopes (SW), slumps displace sediment down into depressions, prior to subsequent reworking by gravity flows.



Three stages can be recognised: an early **Pre-drift** stage is dominated by down-slope systems fed from the NW and SW, and ponding within inter-basin depocentres. Throughout the **growth** stage, down-slope systems remain active, though prolific growth (< 1 km) of drifts occur following a progradation of drifts towards the SE, prior to a lateral aggradation of drifts during later stages. The **burial-stage** is characterised by draping of reflections over underlying drift-topography, following the termination of turbidite activity and the dominance of the along-slope system.

Sediment availability appears fundamental in controlling the growth of channel-drifts. Prominent growth coincides with highly active down-slope systems and deltaic progradation along the shelf, correlating with the initiation and intensification of ocean circulation following the opening of tectonic gateways (e.g. Falkland-Agulhas Seaway, Walvis Ridge/Rio-Grande Rise). Bottom current activity during the Cretaceous Thermal Maximum controlled the morphology of subsequent deposits, forming mixed-drift system rather than a traditional channel-levee system. Similar characteristics have also being documented across the present-day the Antarctic Peninsula Pacific margin [3].

References:

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