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Sedimentation processes on the slope and rise offshore Uruguay inferred from reconnaissance high resolution seismic reflection survey

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The Uruguayan continental margin receives huge quantities of terrigenous sediments from the Rio de la Plata which flows into the southwest Atlantic at 35˚S. At the same time, the margin is located within a region of intense oceanic mixing. Our interpretation of recently acquired reconnaissance high resolution multichannel seismic reflection data from the margin suggests that sedimentation processes in the slope and rise areas whilst dominated by gravity-driven processes, have been significantly influenced by bottom current activity and local tectonics.

Our data show a highly unstable slope area dominated by extensive mass sediment movements. In particular, several discrete slide and slump blocks, measuring $>$5 km wide and $>$70 ms TWT thick in dip profile, occur in the upper and middle slope. Downslope mass movements of the sediments have been facilitated by widespread glide planes and listric growth faults. Locally, the toe of the slope is dominated by a broad, $\sim$30 km wide, intensely faulted and deformed uplifted zone which acts as a local barrier to recent downslope sediment movement. On the seafloor, high-angle faults are commonly associated with fault scarps which serve as sites of enhanced erosion by intensified bottom current activity, and thereby giving rise to the development of several contour-parallel erosional gullies. The continental rise is dominated by widespread debris flow deposition imaged as stacks of acoustically chaotic to transparent lenses separated by thin veneers of well-layered medium to strong amplitude reflectors. In deeper waters, the intervening sediment veneers, interpreted as hemipelagic deposits, are commonly associated with sediment waves and drift-like bodies. We identify three regionally traceable seismic reflectors which group the stacks of

debris flow lenses into distinct stratigraphic horizons.

Our study suggests that the slope has been unstable for quite a long time. Mass sediment flows originating from the shelf and slope areas subsequently evolved into debris flows as they moved downslope, and were deposited mainly in the rise as debris flow lenses. The mass movement events must have been episodic. Each major depositional event of the stack of debris flow lenses may have occurred within a lowered sea level stage, and terminated by the deposition of thin hemi-pelagic sediment under the influence of increased bottom current circulation during the subsequent rise in sea level. Our study provides new insights for understanding the sedimentation process history of the margin which is crucial for resolving the palaeoceanographic circulation patterns as well as palaeoclimatic events in the region.