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# The role of condensed sections on seafloor instability: an example of the Gulf of Lions, Western Mediterranean

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The Gulf of Lions (GoL) is a 200 km long, 70 km wide passive margin where alpine sediments delivered by the Rhone River are deposited on the Rhone delta and deep-sea fan. Seismic data displays multiple sedimentary sequences bounded by high-amplitude reflectors in the upper slope interfluvial areas and turbiditic levees downslope. These sedimentary sequences are attributed, in the upper slope, to 100 kyr-glacio-eustatic cycles that initiated during the Mid-Pleistocene Transition, marking the onset of the Milankovitch cyclicity in the Western Mediterranean. The high-amplitude reflectors are interpreted as condensed sections. The GoL margin presents recurring mass transport deposits throughout the Plio-Quaternary succession. Previous studies highlighted a strong stratigraphic control on the landslide basal surfaces, where the basal surfaces of the landslides coincide with the high-amplitude reflectors. In this study, we show a detailed sedimentological and geotechnical analysis of a sediment core that penetrated one of these high-amplitude reflectors. The combined analysis of sediment cores and in situ penetrometer data (CPTu) shows elevated values of porosity, consistency limits, clay content and undrained shear strength compatible with hemipelagic sediments that deposited during sea-level highstands. The sediments corresponding to these high-amplitude reflectors are stiff and less sensitive than those deposited rapidly during the glacial and deglacial periods. Our results suggest that due to higher stiffness and shear strength, these layers do not essentially fail and rather become a basal surface over which sliding occurs.