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Effect of structural inheritance on the distribution and importance of slope instabilities along a passive transform margin. The example of the French Guyana margin.

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The French Guyana continental margin has been recently surveyed in the framework of the EXTRAPLAC French program (Guyaplac survey, Ifremer-IFP–SHOM-IPEV). During Guyaplac cruise (2003) EM12 bathymetry and backscatter imagery, seismic data and 3,5 kHz profiles have been collected.

The study area is characterized by different morphostructural domains: 1/ the western Guyana margin, including a part of the eastern Demerara rise, a large relief prolongating the continental platform. This domain is bounded by 1a/ the northern border of the Demerara rise – which appears quite sharp and corresponds to a transform segment, 1b/ the eastern border of the Demerara rise thought to be a divergent segment of the margin, 2/ the eastern Guyana margin, which corresponds again to an extremely gullied transform margin segment, 3/ the abyssal plain.

Analysis of surface data (bathymetry + acoustic imagery + 3,5 kHz echogramms) show a great variability of slope instabilities in these different domains:

- The northern Demerara rise shows a segmented morphology, low slope gradients, and a very rough surface (ripples perpendicular to the slope direction). Structural steps in early Cretaceous basement correspond in the more recent sedimentary cover to collapses of hecto-kilometric blocks towards northeast. Slumps initiate along these directions. The rough bathymetry seems in turn related to creeping processes. Numerous

debris flows have been observed in this area on seismic data and even at the foot of the main escarpment on 3,5 kHz profiles. At a regional scale, this part of the margin seem to be a collapsed part of the transform segment.

- The eastern Demerara rise is in turn characterized by numerous imbricated slumps. Some of these failures seem to be emplaced in the prolongation of the structural steps identified on the Demerara rise.

- finally, the eastern Guyana Margin slope is characterized by numerous imbricated debris flows (at least three generations on 3,5 khz profiles) and undulated masses, probably corresponding to creeping sediments or to older mass-wasting events. This transform margin segment is nearly entirely destabilized.

- The abyssal plain is characterized southwards by channels probably belonging to the distal tip of the Amazon fan and northwards, at the foot of Demerara rise by sediment waves.

All of these provinces are also characterized by numerous tracks of fluid ascents (seen on swath bathymetry and 3,5 kHz profiles), probably generating important overpressures and slope instabilities.

To conclude, this area appears as an opportunity to test the effect of structural control by the basement evolution on the initiation of slope instabilities.