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Experimental modelling of slope instabilities along strike-slip continental margins

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We conducted several experiments based on data from the French-Guiana margin, where multiple gravitational instabilities occurred divergent and strike-slip segments of the margin.
The models comprised one or several low-permeability layers beneath which air pressure was applied, simulating the upward migration of methane gas due to hydrocarbon cracking at depth in nature. High pore-fluid pressure causes a significant decrease in rock's shear strength, thus allowing instabilities to develop. During the experiments, we tested the influence of the absence of lateral buttress seaward, as is the case along the strike-slip segments of the French-Guiana margin. Results show that the absence of lateral buttress favors the onset of gravity instabilities, which propagate retrogressively upslope. We also tested the influence of the basal slope inherited from the margin's subsidence history. Instabilities developped where the low-permeability layers and their cover were tilted seaward or horizontal, whereas, even where fluids were present, no slides occurred where the strata were tilted landward.