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Pipe structure formation as a trigger for submarine slope failures?

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Submarine slope failures are a hazard to coastal and seafloor environment. Many slides overlap spatially with the occurrence of gas hydrates. Previous studies concentrated on the impact of gas hydrate dissociation on slope stability without finding conclusive proof for an interrelation. Here, we argue that overpressure below the gas hydrate stability zone may initiate retrogressive submarine slope failure by creating hydrofractures that transfer overpressure to weak layers in the shallow subsurface. This process is a more likely trigger for slope failures in gas hydrate provinces than gas hydrate dissociation as it does not require any changes in the gas hydrate stability conditions. It is able to explain hydrate-related slope failure initiation at all water depths where hydrates sufficiently reduce the sediment permeability for free gas to accumulate below.