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Multiple slope failures shaped the lower continental slope offshore NW Svalbard in the Fram Strait

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Bathymetry data show that the lower slope (between 1300 m and 3000 m water depth) of the NW-Svalbard passive margin has been affected by multiple slope failure events. The single events differ in terms of extension, volume of mobilized sediments, morphology of the slide scar, run-out distance and age. As for several mega-scale and minor Arctic slides, the trigger mechanism is still speculative and may include high sedimentation rates, dissociation of gas hydrates, excess pore pressure, or earthquakes caused by isostatic rebound. In this study, we discuss the potential trigger mechanisms that have led to the multiple slope failure events within what we suggest to be named the Fram Strait Slide Complex. The slide complex lies in proximity to the tectonically active Spitsbergen Fracture Zone where earthquakes events, occurrences of potential weak layers in the sediment column, low sedimentation rates, and extended gas hydrate-bearing sediments may all have contributed to the causes leading to multiple slope failures. Preliminary results obtained from 14C dating on N. pachyderma sin. from sediment cores from the Spitsbergen Fracture Zone slides (SFZS 1 and 2), coupled with sub-bottom profiler data (frequency 9 to 15 KHz) show that the two shallowest glide planes within one of the observed slide scars failed ∼100,000 and ∼115,000 yr BP. Whilst SFZS 1 affected an area of 750 km2 mobilizing a total sediment volume of 40 km3, SFZS 2 moved an area of 230 km2 with a sediment volume of 4.5 km3.