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Can sea level rise cause large submarine landslides on continental slopes?

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Submarine landslides are one of the volumetrically most important sediment transport processes at continental margins. Moreover, these landslides are a major geohazard as they can cause damaging tsunamis and destroy seabed infrastructure. Due to their inaccessibility our understanding of what causes these landslides is limited and based on hypotheses that are difficult to test. Some of the largest submarine landslides, such as the Storegga Slide off Norway, occurred during times of eustatic sea level rise. It has been suggested that this global sea level rise was implicated in triggering of the landslides by causing an increase in excess pore pressure in the subseafloor. However, in a homogeneous slope a change in the thickness of the overlying water mass is not expected to affect its stability, as only the hydrostatic pressure component will change, whereas pore pressures in excess of hydrostatic will remain unaltered. Whether sufficiently rapid sea level rise, aided by rather impermeable sediment and complex layering, could cause excess pore pressures that may destabilise a continental slope is more difficult to answer and has not yet been tested. I use Finite Element Modelling to explore and quantify the direct effect of changes in the thickness of the overlying water mass on the stability of a generic sediment column with different stratigraphic conditions and hydro-mechanical properties. The results show that the direct effect of sea level rise on continental slope stability is minimal. Nevertheless, sea level rise may foster other processes, such as lithospheric stress changes resulting in increased seismicity, that could potentially cause large submarine landslides on continental slopes.