Students' Thesis Abstracts

Numerical simulation of earthquake-induced submarine landslides

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Recent exploration and expansion of human infrastructure into offshore areas have exposed the existence and ubiquitous nature of submarine mass movements. These geographically prevalent phenomena have been observed in deep-marine offshore environments within various geological settings. There are numerous contributing factors thought to affect the formation of submarine landslides and because of this complex and multi-faceted nature, a comprehensive physical model to explain the generation of submarine landslides has not been fully developed. Furthermore, they have significant potential physical, social, and economic impacts to human society, and offshore or coastal infrastructure which makes understanding their formation of great relevance, especially to the petroleum exploration industry.

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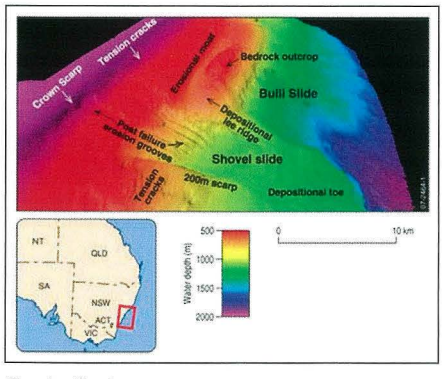

Osorio, Fig. 1.

From the relevant scientific literature, it is believed that earthquakes are among the most critical factors in submarine landslide generation. A case study employing a numerical model of a submarine slope stimulated by earthquake action was then developed to test this hypothesis. Through this case study, it was revealed that submarine slope stability was highly sensitive to changes in excess pore pressure generation as a result of varying earthquake magnitude, demonstrating that earthquakes can indeed be considered a highly probable cause for the formation of submarine landslides. Despite these positive results, the exact physical mechanism responsible for this process is still open to debate and other material parameters utilised in the modelled submarine slope have yet to be calibrated and verified with other types of submarine soils. It is concluded that deep-seated submarine landslides are very likely to be induced by earthquake excitation.