# Submarine landslide: A case study from the southwestern of Taiwan offshore

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## Abstract

Submarine landslides not only regulate the shape of the seafloor and transport sediment into the deep-water environment but also have a significant influence on human life. Palm Ridge is an area located between passive and active continental margin in off southwest Taiwan. According to previous studies, there could be a submarine event that occurred in this area. However, the occurrence of that submarine landslide is still not well-studied. Based on the high-resolution multi-beam bathymetric and reflection seismic profiles, this study aims to confirm that whether there is an ancient submarine landslide in the study area or not. If the landslide does exist, then the 3D model for the proposed landslide will be built. In addition, the STABL 5M software and an infinite slope stability analysis method will be applied to evaluate the possible magnitude of an earthquake and the amount of excess pore pressure resulting from gas-hydrate dissociation. Utilizing ArcGIS techniques, the range of landslide is predicted and then the identified range is validated by seismic reflection profiles. The pre-event topography is also reconstructed by using Topo to Raster interpolation algorithm. The preliminary result shows that there was a huge submarine landslide occurred in the study area with the dimension of roughly 22 km length, 6 km wide and covering a total area of 90.76 $km^2$. The maximum depth of the failure surface is about 375m and the average depth is 226m. This submarine landslide released and deposited a huge amount of sediment with an estimated volume of 4.02 and 4.9 $km^3$, respectively. The infinite slope and STABL 5M analysis indicated that the required amount of excess pore pressure to trigger the slope failure is at least 1066 kPa. In future work, an attenuation relationship will be applied in order to back-analyze the required magnitude of the earthquake.