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. According to previous studies, there could be a submarine event that occurred in this area. That event also considered as highly related to the 1781/1782 tsunami event described in the historical records. However, the occurrence of that submarine landslide is still not well-studied. Based on the high-resolution multi-beam bathymetric, reflection seismic profiles and sub-bottom data, this study aims to confirm that whether there was 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. On the other hand, the occurrence of submarine landslide also provides a good opportunity to obtain the geotechnical properties of seafloor material through backward analysis approach, which will highly contribute to the designation for natural energy resources exploration and exploitation purpose. By applying the well-known ArcGIS and Fledermaus techniques, the range of landslide is predicted and mapped and then the identified range is validated by seismic reflection profiles and sub-bottom data. The preliminary result shows that there was a huge submarine landslide occurred in the study area with the dimension of roughly 21 km length, 6 km wide and covering the total area of 83.3 km². In the future work, the pre-event topography within landslide area will be reconstructed. Then, the reconstructed surface is used to do the volume balance and used in the backward analysis for shear strength parameters of seafloor material. Finally, the STABL 5M will be applied to evaluate the possible magnitude of landslide triggering factors.