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Topographic analysis of submarine cable failures offshore southwestern taiwan

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In 2006, there was large scale of the submarine cable failures offshore southern Taiwan right after the Pingtung Earthquake. Apparently the December 26 Pingtung Earthquake triggered submarine mass movements which generated turbidity currents in the submarine canyons and damaged cables lying across the canyons. In addition, the Typhoon Morakot on August 8-9, 2009 and the Jiashian Earthquake on March 4, 2010 also caused many submarine cable failures offshore southwestern Taiwan. The most of broken cable sites are along the axis of the Gaoping Submarine Canyon (GPSC) and Fangliao Submarine Canyon (FLSC), topography should be an important factor controlling transport processes of submarine mass movement. The cable broken sites indicate that there were submarine mass movement pass through. Therefore, the topographic factor of the cable broken sites can be the threshold to index submarine mass movement. And as, submarine cables are distributed widely offshore southwestern Taiwan, why only a total of 35 sites of submarine cable failures occurred in 2006, 2009 and 2010? We use bathymetry data, CHIRP (compressed high-intensity radar pulse) sonar profile data and the time series of the cable breakage to investigate the characteristics of submarine mass movement and to develop a model for the series of submarine cable failure. Using the Geographic Information System (GIS) software, we analyze the bathymetric data collected before the 35 sites of submarine cable failures offshore southwestern Taiwan. Applying the hydrology in GIS software, the flow movement could be derived from the factors of slope and aspect. We quantify the transport process of submarine mass movement and combine with the time series of the cable breakage to discuss the effect between submarine cable failures. Based on the CHIRP sonar data, we identified the distinct CHIRP echo character patterns after the submarine cable failures and classify the distinct CHIRP echo characters. Using the threshold of topographic factor to expect where will be potential area of submarine mass movement and evidence the result by CHIRP sonar profile data.