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Submarine landslides and seabed gas emission off SW Taiwan

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The area off SW Taiwan is considered as a potential reservoir of gas hydrate. In the continental slope off SW Taiwan, the gas hydrate becomes instable as evidenced by plenty of gas emission out of seabed. The methane emission is usually associated with the dissociation of the gas hydrates stored in marine sediments on the continental margins. Gas emits out of seabed generally through submarine mud volcanoes and gas seeps. To understand the seabed gas emissions off SW Taiwan linked to the gas hydrate dissociation, we have investigated the distributions of the submarine active mud volcanoes, gas seeps and gas plumes off SW Taiwan. We examine all the available sub-bottom profiler and EK echo sounder data. In total, we have identified 19 submarine mud volcanoes, 220 gas seeps and 295 gas plumes. The gas emissions are generally distributed at the crests of mud diapiric ridges. Particularly, most of the active mud volcanoes and gas seeps cluster at the KASMVG (Kaoping submarine mud volcanoes group) area. In the area with well development of mud volcanoes, large-scale submarine landslides seem not easily happen. The gas seeps in the area without or with few mud volcanoes could reduce the slope stability and generate slides. Near the Fangliao submarine canyon, a large submarine landslide (Fangliao Slide) has occurred. Bounded by mud diapiric ridges, the sliding area is estimated to be $\sim$15 km long and $\sim$10 km wide. The Fangliao Slide is composed of two domains. The triggering of the upper domain of the Fangliao Slide was related to a mud diapirism while the occurrence of the lower domain was probably due to the gas hydrate dissociation at the gas hydrate instability zone.