



High-resolution seismic structure analysis of an active submarine mud volcano area off SW Taiwan

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In order to better understand the subsurface structure related to an active mud volcano MV1 and to understand their relationship with gas hydrate/cold seep formation, we conducted deep-towed side-scan sonar (SSS), sub-bottom profiler (SBP), multibeam echo sounding (MBES), and multi-channel reflection seismic (MCS) surveys off SW Taiwan from 2009 to 2011. As shown in the high-resolution sub-bottom profiler and EK500 sonar data, the detailed structures reveal more gas seeps and gas flares in the study area. In addition, the survey profiles show several submarine landslides occurred near the thrust faults. Based on the MCS results, we can find that the MV1 is located on top of a mud diapiric structure. It indicates that the MV1 has the same source as the associated mud diapir. The blanking of the seismic signal may indicate the conduit for the upward migration of the gas (methane or CO₂). Therefore, we suggest that the submarine mud volcano could be due to a deep source of mud compressed by the tectonic convergence. Fluids and argillaceous materials have thus migrated upward along structural faults and reach the seafloor. The gas-charged sediments or gas seeps in sediments thus make the seafloor instable and may trigger submarine landslides.