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Characteristics of slump units offshore Shimokita: a key to solve ground instability factor in gentle continental slope

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The origin of ground instability leading to submarine landslides has not yet been fully clarified. In general, landslides on land are considered to be caused by changes in the groundwater level or hydraulic gradient due to heavy rains, or the related rapid rise in pore pressure, because such phenomena decrease the frictional properties of the ground. But, the same is not true for landslides that occur in the ocean, where seawater saturates the ground below the sea floor. The behavior of the pore fluid may change the pore pressure and cause ground instability related to submarine landslides. As a result of analysis on a 3D seismic survey of Sanriku-oki basin off Shimokita Peninsula, Japan (METI fundamental seismic survey 2008, Sanriku-oki 3D), we revealed a number of typical deformations due to slumping and the related dewatering structure in the Pliocene and younger formations. The slumping was generated primarily by layer-parallel slip, which seems to have occurred on acoustically typical layers on very gentle continental slope. The formation of the slumping and the dewatering structures is considered strongly related to fluid circulation in heterogeneous sedimentary sequence, which seems to directly lead to creation of slip plane of the slumping. We are focusing on those deformations of the slumps and the dewatering structures as a key to solve submarine ground instability factor.

Keywords: 3D seismic survey, slump, dewatering structure, slip plane, ground instability factor