

Role of slump deposits in a high-methane-flux gentle continental slope

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A great number of submarine landslide deposits (slump deposits) are known to be buried in Pliocene and the upper formations in northern part of Sanrikuoki Basin (Morita et al., 2011). The slump deposits are mainly made up of imbricated thrust sheets of stacked sedimentary layers which were peeled off from ancient bottom surface. The slump deposits often show dimmed facies as an acoustic characteristic and have dewatering structure from the slip surface, and sometimes have gas chimney at the roof of the slump deposits. These indicate that the slump deposits are strongly related to natural gas in formation water. A key to grasp the nature of the slump deposits is likely in a comparison with a result of previous scientific drilling. Site C9001 is a drill site which was operated by D/V CHIKYU in this survey area (Higuchi et al., 2009). By the result of the expedition, the sedimentary basin is mostly composed of mud and few thin ash and sand layers. The sediments are normal and the parts judged as mass transport deposits (MTD) by visual core description are very limited even in the depth domain interpreted as slump deposits in seismic data. However, methane detected in head space gas and methane hydrate bearing sediments recovery were reported only in the slump deposits domain interpreted in the seismic data. Previous reports with respect to MTD indicate that MTDs generally have the nature as seal where the beds have higher shear strength and density due to compaction. Nevertheless, the nature of the slump deposits in the Sanrikuoki Basin is opposite to those of the other MTDs, and may indicate as if reservoir. The difference of the natures is maybe caused by the environment of very gentle continental slope where the slumping has repeated. There is a hint of it in the fact that slump deposits in the survey area avoided fatal collapse by sliding on the very gentle slope and basically formed the imbrication of block-supported structure.

Keywords: submarine landslide, mass transport deposits, slump, Sanrikuoki Basin, CHIKYU, methane hydrate