

## Scientific drilling for elucidation of submarine landslide mechanism

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Submarine landslide is known to sometimes threaten our life by cutting off submarine cables, causing tsunami, eroding coastlines, and it is also said that submarine landslides may enhance dissociation of natural methane hydrate below the seafloor. However, the causes of submarine landslides have not been understood very much at this moment. So, the current IODP (Integrated Ocean Drilling Program) raised Mechanism of submarine landslides as one of the high-priority scientific targets in the science plan for the next IODP (International Ocean Discovery Program), which will begin in 2013. A landslide type, Circular Slip, has been often taken as general landslide model, however, lots of issues remain in lithology and in rock properties due to their heterogeneity. On the other hand, Layer-parallel Slip, a simple model of landslide, is going to be an appropriate target for scientific drilling. So as to explain the strategy of the scientific drilling, this presentation introduces submarine landslides in Sanrikuoki Basin as an instance of the layer-parallel slip.

In high resolution 3D seismic data, the submarine landslide deposits in the Sanrikuoki Basin are characterized by a number of typical deformations due to slumping and the related dewatering structure (Morita et al., 2011a). The structure tells that the dewatering structure occurred on the slip plane of landslide at the same time as slumping. It implies that excess fluid in the slip plane caused a lubrication to enhance mass movement of the surface ground. The seismic phases within the landslide deposits imply there is natural gas component in the formation water, which can absolutely affect stability of the ground. Slip plane at the bottom of each landslide deposit is traceable to a layer corresponding to the slip plane in the lateral normal formation, in which the layer is generally characterized by low amplitude of some thickness (Morita et al., 2011b). Thus, the structure related to the submarine landslides in this area is very clear to understand.

A scientific drilling in such location of the layer-parallel slip will enable us to trace the elementary step of the slip plane formation. This will be achieved by comparison of detailed structures and the physical properties between in the slip plane and in the layer corresponding to the slip plane. Also, the natural gas contribution to the elementary step will be examined. The data to be collected by the drilling in the simple structure of the layer-parallel slip will be very practical for landslide modeling to approach the true mechanism of submarine landslides.

This study uses three dimensional seismic data from METI fundamental seismic survey 2008, Sanrikuoki 3D.

Keywords: Submarine landslide, IODP, scientific drilling, layer-parallel slip, slip plane, 3D seismic survey