

## Studies of the source depth and the depositional environment of the mud volcano by using of drilling cores in the Kumano

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Submarine mud volcanoes are formed as conical mounds composed of erupted unconsolidated or partially consolidated sediments from mud diapirs. Hence submarine mud volcanoes have been attracting attention as a tool that can get substance beneath the seafloor without super deep drilling. It is expected to contribute in order to understand the formation of accretionary prisms and the mechanism of large earthquakes. On this view, researchers of mud volcanoes all over the world tried to measure the physical properties of mud volcano's sediments and estimate source depth of mud volcanoes. However, in the Nankai Trough known as a seismogenic zone, the source depth of mud volcanoes developed in Kumano basin have been unsolved.

The purpose of this study is to estimate the source depth and to discuss the formation process by using of shallow drilling cores from two sites (C9004, C9005) at the summit of the mud volcano in the Kumano basin, during CK09-01 using Deep-Sea Drilling Vessel CHIKYU, in March, 2009. We conducted mainly measurements of vitrinite reflectance, porosity, density, nannofossil age dating and anisotropy of magnetic susceptibility.

We estimated the depositional depths of various clasts in the mud volcano from the vitrinite reflectance, the nannofossil age and the geothermal gradient near this study area.

In the result, the source depth was estimated to be approximately 1900 mbsf by maximum burial depth of clasts. Focus of the discussion is about whether the materials of the source depth are derived from the accretionary prism or the forearc basin. It is inferred that the environment of the source was the forearc basin in view of the following two points. 1) Clast densities versus estimated burial are inconsistent with the logging results of the accretionary prism off Kumano. However a density decreases at the boundary between the forearc basin and the accretionary prism, the decay has not appeared in clast densities of the mud volcano. 2) Clay mineral composition of the mud volcano differs from one of the upper accretionary prism indicated from an examination of IODP Expedition 314 by Deep-Sea Drilling Vessel CHIKYU. The abundance ratio of smectite is large in the upper accretionary prism, whereas it is low in the deepest estimated clasts of the mud volcano. These results show that the source of the mud volcano is the forearc basin. Besides, the depth is the deeper, clast ages of the mud volcano are the older by the nannofossil age, but at 1700 mbsf, the age versus the depth indicates the gap of the age. If the source is not the accretionary prism, it would be considered that the gap shows the old forearc basin sediments. Therefore, it would appear that the unconformity is developed in the boundary between the present and the old forearc basin near 1700 mbsf. This study suggests that the thickness of the Kumano basin is more than about 2000 m.

We will also discuss particle arrangements within erupted materials to understand grain fabric and its deformation by anisotropy of magnetic susceptibility.

Keywords: mud volcano, mud diapir, vitrinite reflectance, forearc basin, Nankai Trough