

Mud Volcanism, one of geological features which transport fluid and sediment from depth to surface: a case study of Kumano Basin along Nankai Trough, central Japan

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Mud volcano (MV) is geological feature that are observed all over the world, especially along plate convergent margins. MVs bring fluid and sediment to the surface from depth. Original depths of mud volcanoes are often at several meters ~ a dozen kilometers below the surface. The reason why sediment at depth come up to the surface is buoyancy. Sediment at depth acquire a buoyancy by heating, accumulation of fluid, and reverse of rock density, in many cases over the world.

MVs are often observed with cold seepage at ocean floor. MVs along Japan Islands are mostly found on ocean floor rather than on land, at forearc basins along southwest Japan. They are often lied by accretionary prism in this area, thus are expected as a transporter of sediment and fluid from deeper part of the prism. In case of the Kumano Basin, one of the forearc basin along the Nankai Trough, at least 14 MVs are reported. Most of MVs in the Kumano Basin are exist at the northern sedimentary basin floor upon large mud diapirs. On the other hand, at least one of MVs, the 14th MV exists southern edge of the Kumano Basin. The 14th MV is situated at few km above a splay fault and an intersection of two differently trending fault systems (normal faults and the Kumano Basin Edge Fault Zone (KBEFZ)). Acoustic investigation using R/V Yokosuka show that the 14th MV and partly rough seafloor are outstanding feature on the larger “acoustically characteristic area” which is characterized 3x7 km area covered by scaly facies with high-backscatter strength of acoustic signals. The feature indicates that there is relatively harder seafloor than surrounding sedimented seafloor, suggesting mineralization and/or hard shells living at shallow part of the seafloor. The developed two fault systems near the 14th MV may assume a role as a root of fluid at the southern edge of the Kumano Basin, thus may support active MVism and keep the “acoustically characteristic area” by fluid migration. Investigation to know cold seepage on seafloor should important to understand MVism in this case.

Keywords: Mud Volcano, Nankai Trough, acoustically characteristic area