

南海トラフ付加体堆積物内の粘土鉱物の脱水は泥火山起源の一因となりうるか？

Can dehydration of clay minerals below the Kumano Basin, a part of Nankai Trough, be one of factors for making original mud of Mud Volcanism?

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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. MVs along Japan Islands are mostly found on ocean floor, at forearc basins along southwest Japan. They are often lied by accretionary prism in this area, thus are expected as a transporter of information from deeper part of the accretionary prism, hopefully from shallow portions of the seismogenic zone. To understand MVism around Japan and use information that MVs bring from depth, we should understand original depth and material of MVs in our geological condition and tectonic-in scale.

To see requirements of MVism, I try to order a related information of MV activities around Japan.

- MVs in Japan is mostly known in the Kumano Basin. There are sedimentary basin underlaid by thick accretionary prism and at least 14 MVs. Most of MVs are developed in the northern basin floor. They are possibly supported by underlying diapir (Morita, 2004). At least one MV is developed at the southern edge of the basin, in a fault zone.
- MVs are also reported from off-Tanegashima area. Nakayama et al. (2010) reports that dehydrated water from clay minerals is sampled at the MVs in the area.
- Fluid migration related to surface methane hydrate formation is reported at shallow seafloor along the Sea of Japan side. They have pockmarks but not have km-scale topographic highs alike to MVs in the Kumano Basin.
- Nakata et al. (2004) shows a result of slaking test of rock samples taking from coal mine tunnel below seafloor. They suggest that dried rock samples are disintegrated in distilled water but does not in blackish water.
- To keep chemosynthetic animals alive and several tens meters of height of MVs on seafloor, MVs should eject fluid and sediment continuously. It indicates that large amount of fluid and fluidized mud is required at an original depth of MVs and/or along a route to the seafloor.

I suggest things below:

- Both “dehydrated water from clay minerals” and “seawater-saturated mud rock” may be required for generation of fluidized mud.
- Total amount of dehydrated water (original fluid) and mud rock (original sediment) may affect on a resultant amount of fluidized mud, and local activity of MVs.

Of course, things such as a possible difference of original depth of water and sediment, selected route of water, and origin of fluidized mud at depth as I suggested above, are still in debate.

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