Approaching mud volcanoes on seafloor — for understanding of MV extruding at Kumano Basin Edge Fault Zone

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We conducted a high-resolution acoustic investigation of a Mud Volcano-like feature on the Kumano Basin Edge fault Zone (KBEFZ) using R/V Yokosuka and AUV-Urashima during our cruise YK15-10, and confirmed Mud Volcano (MV). The MV-like feature on the area was found on seismic imageries which were obtained in 2006 as a preliminary survey of NanTroSEIZE drilling program. Our AUV investigation reveals that the MV-like feature shows a prominent bathymetrical feature on multibeam echo sounder data, mud flow-like facies on sidescan sonar imagery, acoustically transparent body below the ~50 m seafloor on sub-bottom profiler image, and anomalous pH sensor data. All of these data strongly indicate MV activity at the KBEFZ.

The Nankai Trough and its accretionary prism is watched out for occurrence of large earthquake disaster. The out-of-sequence thrusts (OOST) and branch faults, which develop through already deformed layer or sequences, is clearly observed on seismic imageries obtained from the Nankai accretionary prism (Moore et al., 2009). One of exposures of the OOST on the seafloor is found on the KBEFZ. The OOST is believed to be issuing fluid and/or deeply sourced materials from the underlying accretionary prism.

On the other hand, MVs are expected as porters of materials from the deep part of the prism beyond our seafloor-drilling results, in case of plate convergent margins. The MV in the KBEFZ may move up to surface along the existing faults and play a role in understanding the OOST and/or plate boundary itself.

To understand the “necessity” and the detailed activity of the exiting MV at the KBEFZ, referential study with the Barbados area and discussion about upwelling route of mud diapers (e.g., Godon et al., 2004; Nishio et al., 2015), and also with onshore MV studies should work well.

Reference


Gordon, A et al., 2004, Origin and evolution of fluids from mud volcanoes in the Barbados accretionary complex, Geochimica et Cosmochimica Acta, 68, 9, 2153-2165

Nishio, Y. et al., 2015, Origins of lithium in submarine mud volcano fluid in the Nankai accretionary wedge, earth and Planetary Science letters, 414, 144-155