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東地中海泥火山の噴出供給源
Investigation into source depth of mud volcano in the eastern Mediterranean: A case study of Medee-Hakuho Mud Volcano

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Present-day geodynamic framework in the Eastern Mediterranean Sea and the surroundings is characterized by a complex pattern of active thick-skin crustal tectonics resulting from various plate and microplate interactions [e.g., McKenzie 1972]. Moreover, thick impermeable barrier of the Messinian evaporates exists below the entire Eastern Mediterranean foredeeps exceeding 3 km in thickness [e.g., Polonia et al. 2002]. These geological frameworks result in the Mediterranean Ridge (MedRidge) differing from other accretionary complexes around the world, coupled with formation of mud volcano and brine lake.

Ten-day PENELOPE Cruise in January/February 2007 (KH-06-4 Leg06 survey of the R/V Hakuho-Maru) made detailed mapping and piston/multicores sampling at newly-discovered Medee brine lake and its westward neighboring Medee-Hakuho Mud Volcano (MHMV) in the western branch of the MedRidge. The MHMV has an almost circular dome structure in diameter of ~7km and reaching ~130m high showing very gentle slope, standing on the backstop boundary thrust in water depths of 2260 m. It was initially roughly-recognized during Medee Cruise conducted in 1995 on the basis of its distinct backscatter intensity. The MHMV is interpreted to be active because of existence of many pebbles in the obtained core samples and the high backscattering characteristics.

Little has been clarified the relationship between undergoing collisional tectonics and mud volcanism, although these processes are strongly associated [Kopf 2002]. Mud volcanism in the Eastern Mediterranean Sea is known to be present on contiguous belt along the MedRidge, which is referred to as the “Mediterranean Ridge mud diapiric belt” [Limonov et al. 1996], but mud fields in the western branch of the MedRidge remain poorly solved. This study includes vitrinite reflectance (VR) measurement of the clasts from the pinpoint piston cores obtained from MHMV by means of ROV NSS (Navigable Sampling System), in order to evaluate experienced maximum paleotemperature of the clasts. Some nannofossil ages of the clasts from the MHMV core show ~100 Ma corresponding to the period when Hellenic subduction initiated [Stampfli and Borel 2002]. The subduction system in the eastern Mediterranean has developed dramatically since the period [Ring et al. 2010]. Preliminary results show high VR values suggesting these clusts come from deeper areas as compared with reported results from mud volcano at Kumano Trough [e.g., Muraoka et al. 2011]. Estimating the sediment source and burial depth of MHMV will contribute to qualitatively indicate elevated pore pressure in this subduction zone, or presumably to reveal characterization of the mud volcano coupled with brine lake at the prism-backstop contact.

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