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熊野沖南海付加プリズムの海底表層変形と冷湧水

Seafloor deformation and cold seep activity in the Nankai accretionary prism off Kumano

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The Nankai Trough where great earthquakes have repeatedly occurred is one of well-investigated subduction zones. Dense seismic reflection surveys including 3D MCS and deepsea drillings were conducted off Shikoku and Kumano. Seafloor survey by submersible, ROV and deep-towed camera have been also extensively done from the forearc basin to the basement high seaward of the trench axis as site surveys for the IODP NanTroSEIZE drilling proposal off Kumano. We present seafloor deformations and cold seeps as expressions of fault activities in the accretionary prism slope and the forearc basin. Swath bathymetry data show three large scarps almost parallel to the trench axis suggesting deformations by offscarping. The scarp at the toe near IODP Site C0 007, where a large detachment fault cut the seafloor, are characterized by exposure of semi-consolidated mudstone without cold seep activity. The middle prism slope shows continuous steep scarps with exposures of steeply dipping strata due to recent crustal movement. Existences of Calyptogena colonies at small terraces suggest active cold seep along thrust fault. The upper prism slope consists of a steep scarp and a gentle slope seaward of it. Based on MCS profiles, these scarps are surface expressions of branch of the megasplay fault. Occurrences of cold seeps are varied along the fault scarp. The slopes around Sites C0004 and C0008 are completely covered by hemipelagic mud without cold seep activity. In contrast, the dense chemosynthetic biological communities are observed along the base of the steep scarp 30 km southwest of these drilling sites. The gentle slope seaward of the steep scarp shows only many traces of bivalves on the seafloor. This suggests dispersion of methane seep within surface cover sediments. Considerable amounts of methane are supplied along the fault plane. Surface sediment cover above the fault is basically controlled by fault geometry. It can be said that fault angles at shallow sequences would not only control scarp morphology, but also features of fluid expulsions.

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