

Evidence for widespread mud diapirs in norther Kumano Basin, Nankai Trough forearc basin

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Although mud volcanoes (MV) have been studied in Kumano Basin for almost 20 years, the roots of the MVs have received little attention. Morita et al. (2004) published a seismic line across the basin showing mud diapirs sourcing the MVs, but the extent of these diapirs has remained underappreciated. We present JAMSTEC 2D seismic lines across and along the basin axis showing that much of the northern part of the basin is underlain by mud diapirs. The diapirs feed at least 11 MVs in the northern part of the basin, all of which have been surveyed with multibeam bathymetry, high-resolution sonar and sampling. The diapirs range in diameter from 4-6 km and have seismic expression to at least 2-3 km below the seafloor. Older sedimentary layers are tilted upward adjacent to the diapirs and have internal onlap features that indicate several stages of uplift. Bottom simulating reflections (BSRs) that cross-cut the sediment and diapirs are locally disrupted under the MVs, indicating upward migration of fluids through the methane hydrate layers to the surface. Morita et al. (2004) report that mudstone fragments carried to the surface by the MVs range in age from 18.2-13.6 Ma (late Early Miocene –early Middle Miocene), indicating that the mud diapirs, which probably originate within the underlying accretionary prism, passed through the older layers of the forearc basin.

Reference: Morita, S., J. Ashi, K. Aoike, and S. Kuramoto (2004), Evolution of Kumano basin and sources of clastic ejecta and pore fluid in Kumano mud volcanoes, Eastern Nankai Trough, In: Proceedings of the International Symposium on Methane Hydrates and Fluid Flow in Upper Accretionary Prisms, Engineering Geology Laboratory, Department of Civil & Earth Resources Engineering, Kyoto University, Kyoto, pp. 92–99.

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