An *in situ* rapid burial experiment of “*Calyptogena*" clams for decoding history of submarine mud volcano activities

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Vesicomyid bivalves are representative chemosynthetic animals using sulfide as an energy source and forming dominant communities in both seep and vent sites all over the world. They also often colonize in seep sites supported by submarine mud volcanism, but their taphonomy (fossilization processes) has not yet been fully studied enough to apply their modern analogues for decoding mud-volcano activities in fossil seep-sites and boring core records. This deep-sea *in situ* experimental study focuses on escape ability of vesicomyid clams from rapid burial events to provide constraints on thickness of the event sediments.

Artificial rapid burial experiment was conducted in the JAMSTEC cruise KR12-05, using ROV KAIKO 7000II (Dive#544) on 22nd Feb. 2012. A transparent acrylic enclosure (25 cm X 25 cm with 18 cm height) was set on outer margin of “*Calyptogena*” colony in the seep site, 1170 m in bathymetric depth off Hatsushima Island, central Japan. The acrylic enclosure imprisoned 16 individuals of “*Calyptogena*.” *In situ* mud sediments was shoveled up and covered on the imprisoned clams by Kumade-sampler using the ROV manipulator. The burial surface were tilted in the enclosure, and the burial condition ranged from 3 cm-thick powdered mud to 9 cm-thick mixture of powdered mud and viscous mud clasts.

After the rapid burial, several individuals of “*Calyptogena*” promptly jet water from their exhalant siphons and blow away the covering powdered mud. After about 10 minutes, “*Calyptogena*” clams exposed their siphons above the sediment surface in the 3 cm-thick burial area. After about 20 minutes, “*Calyptogena*” clams pushed up covering mud clasts in the 9 cm-thick burial area, and after about 1 hour, total six individuals of “*Calyptogena*” returned their original semi-infaunal position. Their effective and powerful escape activity is accomplished by the combination of siphon blow-away current and foot movement. These suggest that over 10 cm-thick burial is necessary to form a buried-alive fossil “*Calyptogena*” assemblage.

Keywords: mud volcano, chemosynthetic community, vesicomyid bivalve

