

The mode of occurrence of a fossil chemosynthetic assemblage from the Pliocene Takatoriyama Pyroclastics Member

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We discovered an exposure in which vesicomyid, lucinid and thyasirid bivalves occur abundantly, near the Takatoriyama, northern Miura Peninsula, Pacific side of central Japan. This exposure, 9.5 m in outcrop width and 5.5 m in height, consists mainly of tuffaceous medium- to coarse-grained sandstones and conglomerates, with minor amount of tuffaceous muddy sandstones and coarse ash tuffs, of the Pliocene Takatoriyama Pyroclastics Member, Ikego Formation, Miura Group. Authigenic carbonates massively to weakly develop in concordant well with beddings in the exposure.

The bivalve fossils occur sporadically or aggregately in seven horizons and their shells may be dissolved entirely. The bivalve aggregated horizons show two types in their occurrences: (1) disarticulated shells are dominated with minor amount of shell fragments, and (2) articulated and disarticulated shells occur in nearly the same amount. We measured the orientations of commissure plane of the bivalves. The commissure planes of articulated shells show both the alignments of the parallel and nearly perpendicular to the bedding planes, and those of disarticulated shells align nearly parallel to the beddings.

Considering estimated water depth of Takatoriyama Pyroclastics Member (between 500 and 1000 m) (Eto et al., 1987), we interpret that the disarticulated and some articulated shells with alignments parallel nearly to the bedding planes, had been reworked by physical disturbances, probably in bottom currents or sediment gravity flows. The articulated shells preserved perpendicular nearly to the beddings may be interpreted to have retained their life positions in spite of such high energy depositional environments evidenced by coarse grained substrates. Utsunomiya et al. (2015) reported an *in situ* vesicomyid-dominated cold-seep assemblage from Urago Formation, a conformably overlain formation of the Ikego (Utsunomiya et al., 2012), of the Kazusa Group. The Urago assemblage occurs in association with ¹³C-depleted authigenic carbonates in cross-bedded or massive sandstones, and the bivalves occur mostly in disarticulated conditions with minor amount of articulated ones some of which are preserved normal nearly to the beddings in their commissure planes. Utsunomiya et al. (2015) considered they were preserved in their life positions. The modes of fossil occurrences reported herein are similar to those of the Urago.

Keywords: fossil chemosynthetic assemblage, Miura Group, Pliocene, Ikego Formation, Takatoriyama Pyroclastics Member