

Marine Snow Hypothesis: What is controlling faunal composition of the methane-seep since Mesozoic?

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Fossil record of the methane-seep communities shows several interesting phenomena. One of it is the decreasing of epifaunal bivalve/brachiopod in Late Cretaceous. There are several hypotheses, e.g.

“sulfate hypothesis” by Kiel (2015), are proposed to explain the situation. Here, I propose another hypothesis to explain the lacking of epifaunal bivalves/brachiopods in the Late Cretaceous. Occurring pattern of epifaunal bivalves/brachiopods through Paleozoic to Neogene is apparently corresponding to the oil resources in sedimentary rocks in each age. The oil production in the sediments are largely related to the primary production in marine, and the origin of methane is ultimately related to the organic matter in the sediment as almost same as oils. The organic matter, deposited on the sea floor, was subsequently used for the generation of methane in the anoxic condition beneath the sea floor after buried. In the case of increasing organic matter settled onto the sea floor, production of methane would be increasing, and if the organic matter decrease, the production rate of methane would be decrease. These methane is energy source for the chemosynthetic community, thus, the primary production rate at the sea surface level by the photosynthesis may control the presence/absence of epifaunal bivalve/brachiopod in seep environment. I coined this hypothesis as 'Marine Snow Hypothesis', because the particulated organic matter sinking to the sea floor is called marine snow.

Keywords: organic flux, methanogenesis, chemosynthetic community