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A chemosynthetic community on plesiosaurid carcass: with focus on distributions of microbes and invertebrate fossils

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Chemosynthesis - based communities are known to have been established not only in hydrocarbon seeps and/or hydrothermal vents but also on Cretaceous plesiosaurid carcasses (Kaim et al., 2008a). However, no detailed reconstruction of chemosynthetic ecosystems on plesiosaurid carcasses has yet been undertaken. To reconstruct the detailed development of ecosystems, we examined distribution patterns of chemosynthetic molluscs and micro- and macroborings around/on a plesiosaurid carcass. The examined carcass derived from a Cretaceous marine deposit distributed in Haboro Town, Hokkaido, and thought to have perhaps supported chemosynthetic ecosystems (Kaim et al. 2008a).

We observed the surface and a cross section of the plesiosaurid specimen. Chemosynthetic gastropods (Abyssochrysoidae) were densely distributed around the plesiosaurid bones (especially on the upper side). Several types of borings (e.g. micron-sized filamentous miroborings and rounded boring holes with apertures) could be found on the plesiosaurid bones. On the basis of their genera shapes and juxtaposition to pyrites, we hypothesize that the filamentous borings might have been formed by sulfur-oxidizing bacteria. The rounded boring holes with apertures within the bones are similar to modern borings made by *Osedax*.

The borings were distributed on the upper side of the bones relative to the lower side, resembling the distribution pattern of chemosynthetic gastropods. Most Recent abyssochrysoid gastropods are known to graze bacterial mats. The coherent distribution patterns of abyssochrysoid gastropods and microborings on the plesiosaurid bones indicate that the gastropods grazed bacterial mats even in the Cretaceous age. In addition, bone-eating animals also accumulated on the upper side of the bones. These distribution patterns might be influenced by the difference in exposure duration times of the upper and lower bone surfaces (upper side exposed on sea floor for a longer time than the lower side due to continuous sedimentation).

Keywords: Reptile fall, Plesiosauridae, distribution patterns, borings, chemosynthetic molluscs