

Chemosynthesis-based associations on Cretaceous plesiosaurid carcasses

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Mesozoic chemosynthesis-based communities developed on large marine reptile carcasses have been found. Micro-grazing provannid gastropods (typical of chemosynthetic communities) are associated with plesiosaurid skeletons in the Upper Cretaceous deposits of Hokkaido, northern Japan. The cancellous bones of the examined plesiosaurid bones contain a ubiquity of iron sulfides within the bone trabeculae, which provides evidence of anaerobic sulfate reduction of the bone lipids. We also report numerous microborings in the bone trabeculae, which might result from the activity of sulfur-oxidizing bacteria. This finding addresses the hotly debated problem of the emergence and radiation of whale bone faunas. We postulate that vertebrate bone environments in the Northwest Pacific region were settled repeatedly by animals from a regional pool of chemosynthesis-based communities that flourished in the methane seeps and/or hot vents that were present during the Late Cretaceous-Miocene.