

Decomposition of the plant in the ocean of the Late Cretaceous

-Focused on the Upper Cretaceous Yezo Group distributed in Nakagawa Town, Hokkaido, Japan-

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Land plants, mainly composed of cellulose and lignin, are an important carbon reservoir on the earth. However, those organic compounds are relatively difficult to decompose for most organisms. In modern marine environments, wood-boring bivalves, which have symbiotic microbes to decompose cellulose, can mechanically break up the wood by their shells and consume cellulose. Then, decomposed organic compounds are useful for benthic organisms which have no ability to decompose original wooden material. Based on such degraded organic matter and other chemical compounds produced during decay of woods, sunken-wood communities will be established. Thus, it is important to know role of wood-boring bivalves through the ages. The wood-boring bivalves have appeared in the Early Jurassic and diversified in late Cretaceous. However, degradation process of the wood by boring bivalves in the Cretaceous ocean hasn't been fully revealed. Thus, the current study aim to reveal the degradation process of the wood in the ocean using the fossils from the Cretaceous Yezo Group distributed in Nakagawa Town, Hokkaido, Japan.

Totally 67 carbonate concretions were collected from the localities where Cretaceous deposits were exposed. Surface of the observation, cut polished surface and thin section of the observation, X-ray CT imaging, such as the cleaning of containing invertebrate fossils were carried out in the laboratory. Within the sample, ca. 70 % of concretions contained wooden trunk fossils. Within the concretions contained wooden fossils, about 34 % were bored by wood-boring bivalves. Detailed observations of borings suggest that the all bore holes were made by xylophagous wood-boring bivalves which are known as deep-sea wood borers. Within the bore holes, aggregations of framboidal pyrites, indicating activity of sulfate reducing bacteria were frequently found, and pyrites accumulated within the wood and around the wooden fossils. Fecal pellets, sometimes contain wood fragments, were also accumulated around the woods. It indicates that it was revealed that at least about 30% of the wood is degraded by deep-sea wood-boring bivalves and sulfate reducing bacteria in the deep sea zone of Yezo basin of the Cretaceous.

Keywords: Wood-boring bivalves, Sulfate reducing bacteria, Cretaceous