

Succession of whale-fall ecosystems at shallow waters: mainly based on one year monitoring of deployed whale carcasses in aquarium tank and natural environments in Tsukumo Bay, Ishikawa, Japan

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A whale carcass which sank into the sea-floor supports unique ecosystem called "whale-fall community" (Smith, 1989, Nature). Some of the communities are supported by microbial activities during degradation of organic matter within the bones. The community is thought to be change in its community structure over time through degradation process of carcass (Smith and Baco, 2003). Those whale-fall communities are well known in deep-sea environments and such schematic faunal succession has been proposed based on research in the deep-sea. Because of technical limitation of observations in the deep-sea, changes of microbial mat hasn't been fully analyzed. In addition, whale-fall community in the shallow waters are also not well known so far.

So, we tried experiments on deployed whale bones in aquarium tank. Fresh sea water continuously flow into the tank. In addition, we put whale-bones at 11 m in depth in Tsukumo Bay, Ishikawa, Japan.

As a result, the whale bones floated within few days after deployment. Many bubbles of gas, probably hydrogen sulfides, gushed out from the bones. A week later, green algae and white giant bacteria appeared on the bones. Two to three weeks after the deployment, the chemosynthetic ciliate (*Zoothamnium niveum*) and Hyalogyrinidae gastropod (*Xenoskenea* sp.) appeared in the tanks. *X.* sp. grazed on both microbial mats, white bacterial mat and green algal mat. After appearance of those biota, abundance of those changed through a year. The green algae and the gastropods decreased in the winter and flourished in summer. Whale bones deployed in the natural environments, ca. 11 m deep, more than 1.5 years had encrusting animals such as barnacles, and very few area of the bone surface were covered by microbial mats.

We succeed to make a whale-fall community from fresh bone in aquarium tank with continuous supply of fresh sea water. It allow more detailed observations. Based on the observations, the shallow water whale-fall communities including chemosynthetic biota have establish within few weeks.

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