

## Spreading zone of a whale-fall related organic compounds

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The dead bodies of large vertebrates, such as whales, are huge organic masses that are spotted on the seafloor, especially at the bottom of the deep sea, and are used by many organisms in various ways. The biological communities formed around the carcasses are called "whale-falls communities" (e.g. Smith et al., 1989). The whale-fall communities decompose whale-remains and/or reproduce organic matter using inorganic carbon, which is a byproduct of decompositions, through chemosynthetic reaction. Those organic matter related to the whale-falls would be spread on surrounding sediments, however, it is not clear how much and to what extent the organic matter is spread out.

In this study, we investigated the amount of organic matter and its stable carbon isotope ratio in the sediments around a whale-fall submerged in the sea artificially. The whale body was placed on the seafloor at a depth of ca. 15 m off the Noto Marine Laboratory of Kanazawa University, Ishikawa Prefecture, Japan. We collected the surface sediments around the whale-fall, and its total organic carbon (TOC) and stable carbon isotope ratios ( $\delta^{13}\text{C}$  vs. VPDB) were measured.

The TOC of the sediments just below the vertebrae of the whale (about 3 wt%) was higher than TOC in surrounding sediments (ca. 1 wt%) more than 20 cm away from the whale-fall. The  $\delta^{13}\text{C}$  value of the sediments just below the vertebrae of the whale was  $-23.5\text{‰}$ , at a distance of 20 cm from the whale was  $-22.1\text{‰}$ , and gradually increased with distance. The  $\delta^{13}\text{C}$  value increased gently with distance from the whale to  $-21.7\text{‰}$  at 3 m. The lower  $\delta^{13}\text{C}$  values of the sediments just below the whale than those of the surrounding sediments is considered to suggest a result of the influence of organic matter from collagen in the whale-fall ( $\delta^{13}\text{C} = -24\text{‰}$ ) and/or chemosynthetically reproduced organic carbon ( $\delta^{13}\text{C}$  would be  $-40\text{‰}$ ). Both TOC and  $\delta^{13}\text{C}$  anomalies were detected within about 20 cm from the whale-fall. It is suggesting that the range of strong influence of organic matter derived from the whale-falls is narrow, the order in several tens of centimeters.

Keywords: whale-falls, stable carbon isotope ratio, amount of organic carbon, chemosynthetic communities