

Bacterial magnetosome morphology in Hiroshima Bay sediments

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Magnetotactic bacteria play an important role in remanent magnetization acquisition of sediments. Bacterial magnetosome morphology depends on chemical conditions with burial depth in deep-sea sediments, and can be classified into three different groups according to shape: teardrop, elongated, and equant (Yamazaki et al., 2019). In order to clarify reaction time of bacterial magnetosome morphology, the distribution of magnetotactic bacteria in surface sediments was investigated in Hiroshima bay as a reference area. Vertical stratification of the water column in the bay changes throughout the year, and magnetic hysteresis parameters and mineralogy in the bay sediments vary in response to changes in redox conditions of bottom waters (Kawamura et al., 2016). Surface sediments (0-1 cm) were taken using a hand sampler at three stations in February and July 2019. The remanent coercivity/coercivity ratio (H_{cr}/H_c) of the sediment samples also varies, both spatially and temporally, which reflects changes in magnetic mineralogy. Magnetic minerals were extracted from the dried sediment samples (10.0 g), and were counted using a transmission electron microscope (TEM). They were classified into the groups depended on temperature and nutrient in seawater. From magnetic minerals of February 2019 seen in TEM images, grains in 20~100 nm size which seem to have formed by bacteria are rare. In contrast, the equant-shaped chained magnetic minerals are recognized in June 2019 samples at all stations. Seawater temperature and nutrients in July are higher than February. The results imply that magnetotactic bacteria increase in the bay within six months at least.

Keywords: Magnetotactic bacteria, Magnetosome morphology, Seasonal changes