

Microstratigraphic studies using UT13 piston cores around methane seep areas, eastern margin of the Japan Sea

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1. Introduction

Microbiostratigraphy is important for the submarine resources survey to research the chronology and paleoceanography. Furthermore, benthic foraminiferal studies are also useful to clear the environmental impacts caused by the dissociation of subsurface methane hydrate in shallow sediments of the Umitaka Spur and Joetsu Knoll of the Joetsu basin 30 km off Joetsu city, Niigata Prefecture (Matsumoto et al., 2009). It is possible to estimate the age and environments of core sediments in detail, because the Microbiostratigraphy during the past 130 ka could be evident in the giant piston cores recovered by MD179 cruise in June 2010.

In this poster, we introduce the late Quaternary microbiostratigraphy of diatom and foraminifera off Joetsu in the eastern part of the Japan Sea, and applied these results and foraminiferal ¹⁴C dates to the core sediments in the other hydrate areas of the Japan Sea.

2. Microbiostratigraphy of diatom and foraminifera off Joetsu

12 foraminiferal biozones (Biozone I to XII in descending order) in the last 32 ka and 8 diatom zones (A-H diatom zones) in the last 130 ka were recognized based on some piston cores off Joetsu and indicate the paleoenvironmental changes of the surface and bottom sea water, respectively (Nakagawa et al., 2009; Akiba et al., 2014).

3. UT13 studies

In July 2013, Umitaka-maru sailed to two new areas to delineate the entire sequence of gas hydrate mound in the Oki-Trough and the Mogami-Trough. Piston corer penetrated down to 6-8 mbsf on hydrate mounds and recovered some massive methane hydrate and 13 core sediments. We analyzed microfossil assemblages and ¹⁴C dating of these sediments and estimated each sedimentation rate by comparing with the previous studies.

3-1. Result 1 - Sedimentation rates of Oki Trough

Main core sediments in the Oki Trough have similar sedimentation rates (about 15 cm/kyr) from 3-4 ka to present, but PC1302 reduced top sediments has a higher rate and PC1305 included methane hydrates a relative lower rate. The sediment age upon massive hydrates from the bottom of PC1305 was calculated ca. 40 ka.

3-2. Result 2 - Microbiostratigraphic features in Mogami Trough

Three cores in the Mogami Trough indicate the lack of sediments around LGM because of older ¹⁴C dates and occurrences of the extinct benthic foraminifera, *Epistominella pulchella*. In particular, whole foraminiferal assemblages of PC1311 sediments are characterized by the distributions of *E. pulchella* and poor preserved specimens, whereas mixed the well-preserved subtropical planktonic species. These features might indicate the gas hydrate activities from the deep seafloor.

Keywords: the eastern margin of the Japan Sea, methane hydrate, microbiostratigraphy, stable isotope, sedimentation rate, extinct species