

Late Quaternary occurrences of methane-related species, *Rutherfordoides cornuta*, in the eastern margin of the Japan Sea

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Introduction

Each Benthic foraminiferal species can be adapted to the various environmental changes of the bottom water and the marine sediments. In the Japan Sea, there are characteristic evidences, that the agglutinated assemblages, differenced from the open ocean, exist in the Japan Sea Proper Water and the drastic changes between suboxic and oxic fossil assemblages correspond to the Quaternary paleoenvironment. On the other hands, unique foraminiferal species might live on some methane seep area around Japan Island because the unique colony of the bacteria and macro-benthos form around methane seep. *Rutherfordoides cornuta*, related to high methane gas content of the sediments in the Sagami Bay (Akimoto et al., 1996), lives on plural area from the northwest Pacific but not from the Japan Sea (Matoba and Nakagawa, 2009). Nakagawa et al. (2009) found the distributions of *Rutherfordoides rotundata* (closely related *R. cornuta*) from the last glacial maximum (LGM; 27-17ka) at the Umitaka Spur, the eastern margin of the Japan Sea. These distributions, corresponded to the negative peak signal of benthic foraminiferal carbon isotope (Takeuchi et al., 2007), indicate to dissociations of methane hydrate and active methane seeps by the lowest sea level.

Purpose

We study benthic foraminiferal assemblages and discover the occurrence of *R. cornuta* (not *R. rotundata*) from the late Quaternary sediment around methane seep area in the eastern margin the Japan Sea (off Joetsu, Oki Trough and Mogami Trough). In this presentation, we will introduce a relationship with the particular geological analysis and the hydrate dissociation at each study area.

Sample and age control

Study samples are collected from three sediment cores recovered on the Umitaka Spur (MD179-3304), a west part of the Oki Trough, and a north part of the Mogami Trough. Each sedimentation age is calculated by the ages of ¹⁴C, tephra, stable isotope events, and bottoms of TL layer.

Results

Obvious occurrences of *R. cornuta* are found from three all core sediments, and these sedimentation ages range to 25-28ka, early LGM. At the thick dark layer (TL-2 layer) above these occurrences, rare benthic foraminiferal number indicates an anoxic bottom condition where most benthic foraminifera couldn't live (Oba et al., 1991), nonetheless, *R. cornuta* and *R. rotundata* lived continuously until LGM. And, these occurrences might show the methane seep environments from 28 ka to LGM (Nakagawa et al., 2009). Therefore, active methane seep events might occur by hydrate dissociations at the Umitaka Spur, west Oki Trough and north Mogami Trough at the same time during the LGM.

In addition, we will discuss the relationship with benthic foraminiferal results and methane seep events during the MIS6 and MIS8, lowstand periods. samples.

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