

Methane distribution in seawater on the continental slope in East China Sea

*Tomohiro Toki¹, Hideki Chibana¹, Teppei Shimabukuro¹, Yo Yamakawa¹

1. Faculty of Science, University of the Ryukyus

Introduction

Methane in the atmosphere is one of strong greenhouse gases with about 20 times of global warming coefficient of the carbon dioxide. Methane in seawater of continental shelf and coastal area plays a role as a source of methane to the atmosphere. In the continental shelf and the Okinawa Trough, mud volcanic geographical features were reported in East China Sea, and the existence of chemosynthetic biological communities was observed in the continent slope area. The methane supply from seafloor in the shallow area of the sea can be a source of methane to the atmosphere, requiring a detail survey of distribution of the methane sources. In this study, we investigated methane distribution in the East China Sea.

Sampling and analytical method

Seawater samples were collected from several sites in the East China Sea during cruise training classes around May or June in 2011, 2012, and 2015. The seawaters were collected by Niskin sampler, and were distributed to 100-mL vials. They were stored in a refrigerator, and analyzed for methane concentration by FID after gas extraction. The precision was within 8%.

Results and discussion

The seawater at some sites in the continental slope area showed anomalous methane concentrations around several hundred meters. These sites include places that have never been reported as mud volcano area, cold seep area, nor hydrothermal area. We cannot identify phenomenon of the methane source, but hydrothermal systems are unlikely considering tectonic setting. Mud volcanoes and cold seeps are likely in this area. Below the seafloor, Shimajiri or Yaeyama Group may be distributed, which is rich in organic matter, and normal faults would be distributed associated with rifting activities of back-arc basin, which would play a role as a pathway of methane from deep layers to surface layers of sediments.

Keywords: East China Sea, continental slope, methane