

Helium isotopes in Tachibana Bay and Shimabara Bay, Nagasaki

*Ma. Teresa Escobar¹, Yama Tomonaga², Hajime Obata¹, Shigenobu Takeda³, Naoto Takahata¹, Yuji Sano¹

1. Atmosphere and Ocean Research Institute, University of Tokyo, Kashiwanoha, Kashiwa, Chiba, Japan, 2. Eawag,, Swiss Federal Institute of Aquatic Science and Technology, Department of Water Resources and Drinking Water, Ü berlandstrasse 133 CH-8600 ,Dübendorf, Switzerland, 3. Graduate School of Fisheries and Environmental Sciences, Nagasaki University, Nagasaki, Japan

Noble gases are powerful tracers to study physical transport processes in aquatic system. Moreover, helium isotopes have been shown to be very useful to infer the origin of fluids. Shimabara Peninsula is located on western side of the Beppu-Shimabara graben in Kyushu, SW Japan. In the region, there are some hot springs and groundwaters which indicate magmatic helium with high $^3\text{He}/^4\text{He}$ ratio. Although some researchers report helium isotopic ratio on land, there is no data in the sea.

The surrounding bays around Shimabara Peninsula in Nagasaki were recently studied for the existence of hydrothermal springs and vents. Physico-chemical properties characteristic of hydrothermal activity were detected on the seafloor. For this study, we use helium isotopes to detect the occurrence of hydrothermal springs on the seafloor in both Tachibana Bay and Shimabara Bay. Samples were collected using a CTD-CMS system and analyzed using a Noble Gas Mass Spectrometer. Our data supplements the discovery of hydrothermal venting along known faults on the seafloor. We present the results of noble gas measurements conducted on water samples and discuss the relationship between our observations and the tectonic setup of the surrounding region.

Keywords: Helium Isotopes, Hydrothermal vents, Tachibana Bay