

SCG059-P19

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## Long-term gamma-ray observation on deep seafloor off Hatsushima Island in Sagami Bay

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In the multi-disciplinary cabled observatory located on deep seafloor at a depth of 1175 m off Hatsushima Island in Sagami Bay, which was deployed in March 2000, long-term gamma-ray observation with NaI(Tl) detector has been carried out since the deployment of the observatory. The observatory was recovered in March 2002, and re-deployed in November 2002 about 40 m south of the previously deployed location. Since then, gamma-ray observation has been continued at the same position for more than 8 years up to present. Gamma-ray sensor is installed on seafloor whose 3 inch NaI(Tl) scintillation detector is attached downward touching seabed. It has multi-channel (256 ch) pulse height analyzer and energy spectra of gamma-ray can be obtained. It is known that output signal of NaI(Tl) detector is affected by temperature variation. However, since the water temperature at the observation site on deep seafloor is 3 degree C and is almost constant, the influence with temperature is negligible. On the other hand, some kind of signal drift associated with aging could occur.

The calibration was carried out by using energy peaks of natural radiation, i.e. Bi-214 of U-series, Tl-208 of Th-series and K-40. As the result, channel number that corresponds to each energy peak decreased at almost constant rate. In case of K-40 peak (1461 keV), corresponding channel number decreased as large as 10 channels for the period of 8 years.

As the observational result, significant signal level i.e. net area increase of Bi-214 peak was observed in October 2006. Increase of K-40 was observed when M5.8 earthquake occurred east off Izu Peninsula on April 21st in 2006 which caused mudflow. When M5 class earthquakes occurred on Dec. 17th and 18th in 2009, increase of K-40 seems to be less significant. Tl-208 shows seasonal increase possibly related to the amount of suspended materials in seawater associated with spring bloom at sea surface. This indicates that sedimentation caused by suspended materials could be distinguished from that caused by mudflows through gamma-ray observation. Causes of those observational phenomena will be studied in detail based on further evaluation of long-term gamma-ray data considering those calibration results.

Keywords: gamma-ray observation, NaI(Tl) detector, deep seafloor off Hatsushima Island in Sagami Bay, east off Izu Peninsula earthquake, mudflow, suspended materials