

Anomaly of Natural Gamma Ray and Geological Structure of the Nankai Accretionary Prism

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Seafloor gamma ray data have been obtained using JAMSTEC submersibles and ROVs, and have been discussed about relations between geological structures and radionuclides. However, gamma-ray spectrometers attached with the submersible or vehicle are affected by short measurement period and seafloor disturbance during landing and taking-off. We developed a stand-alone system of gamma ray measurement, named GRAMS (Gamma Ray Monitoring System) and carried out it to the Nankai Trough off Kumano after the trial measurements in the Sagami Bay off Hatsushima. It is inferred that main slip area during 1944 Tonankai earthquake extends to the Nankai Trough off Kumano. The NanTroSEIZE research group proposes IODP drilling for the seismogenic zone at the Nankai accretionary prism off Kumano where we can penetrate it by deep sea drilling. The authors have conducted multidisciplinary studies including cold seep, geological structures, fluid geochemistry, thermal structure, micro-biology, benthos and so on from 2001. Low salinity pore water of surface sediment and high anomaly of gamma ray intensity were observed at the OOST of the prism slope. Long-term temperature measurements were also conducted and shows high anomaly of heat flow at the bacterial mat. Twenty-two days records of gamma ray monitoring by GRAMS show very high intensity and high anomaly of U-series radionuclide without fluctuation with time. It implies that even short period measurements represent regional values. Therefore, we compiled a large number of gamma ray data for short measurement time in the prism slope and the forearc basin and found that high anomaly of U-series radionuclide is restricted to the narrow region where the OOST cut the seafloor. This suggests effects of pore fluids derived from damaged rock of the deep fault zone.