

# Natural gamma ray survey at the active submarine faults southwest off the Sumatra Island, Indonesia

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The Jawa Trench off the Sumatra Island, Indonesia, shows convex shape toward the south suggesting strain partitioning by oblique subduction of the Indian plate. YK02-07 JAMSTEC Yokosuka cruise (chief scientist: Soh, W.) studied the active structures by strain partitioning and cold seeps along active faults by Shinkai 6500 at the area about 1000 km southeast of the 2004 Indian Ocean Earthquake. We carried out natural gamma ray tools for investigation of activity of faulting and cold seep. High total intensities of natural gamma ray have been recognized at many fault zones onland. Igarashi et al.(1995) reported ground-water radon anomaly just before the Hyogo-Ken Nanbu Earthquake. High intensity of gamma ray suggests rock deformation during earthquake processes. There are two systems of gamma ray measurements. One is sensor installed at the sled of the Shinkai (Hattori et al., 1999) and the other is a stand-alone tool with a battery named GRAMS (Ashi et al., 2003). Better gamma-ray data can be recorded by GRAMS because its deployment is conducted by a manipulator without artificial sediment disturbance by submersible.

Contents of U-series, Th-series and K radionuclides can be estimated from specters of gamma ray. High total intensities of natural gamma ray were observed at the cold seep site with bivalves along the southeast extension of the Sumatra fault. Moreover, high contents of U-series radionuclides were recognized in the knoll developed just above the active fault. This knoll is interpreted to be surface expression of a mud diapirism derived from the active fault zone. In contrast, active cold seep site at the deep sea canyon, where the active fault is existed, shows no anomaly of gamma ray suggesting strong dilution by surface interstitial fluids from thick sedimentary layers.

We will also report the preliminary report of natural gamma ray survey during JAMSTEC Natsushima NT05-02 cruise at the epicenter of the 2004 Indian Ocean Earthquake.