Japan Geoscience Union Meeting 2011
(May 22-27 2011 at Makuhari, Chiba, Japan)

SSS033-P01 Room:Convention Hall Time:May 23 10:30-13:00

Geological structures and active fault distributions in the Sagami Trough offshore Boso Peninsula

Ayanori Misawa[1*], Juichiro Ashi[1]

[1]AORI, Univ. Tokyo, [2]JAMSTEC

Around the Boso Peninsula, the Philippine Sea Plate subducts beneath the Honshu Island at the Sagami Trough and the Pacific Plate subducts beneath the PHS Plate and the North American Plate at the Japan Trench. Especially, the offshore Boso Peninsula has very complicated geological histories by the influence of highly oblique convergence of the PHS Plate and collision of the Izu-Bonin Arcs from 15Ma. The geological body of this region is composed of the accretionary prism distributed in the Miura and the southern Boso peninsulas. Moreover, this area is the seismogenic zone in which the large-scale earthquakes called Kanto earthquake repeatedly occurred. The 1703 Genroku and 1923 Taisyo Kanto earthquakes have repeatedly occurred at intervals from about 200 to 300 years. Additionally, the tsunami and crustal movements occurred at the earthquake in this area, too. Tsunamis caused by earthquakes suggest that faults reach the seafloor. However, the distribution of active faults is unclear due to few studies. The objective of this study is to elucidate the subbottom structure and distribution of active faults offshore Boso area, especially Boso canyon (Boso escarpment), in the Sagami Trough using by the bathymetric map, IZANAGI backscattering image, and Multi-channel seismic (MCS) reflection profiles. MCS data using in this study was acquired by JAMSTEC during KR08-04 cruise in 2008 and bathymetric data was acquired by JAMSTEC and Japan Coast Guard.

Seismic reflection survey offshore Boso area provided very clear images of the upper Philippine Sea plate and the subbottom structures of trough fill sediments and the landward slope of the Sagami Trough. Some faults in the accretionary prism are recognized in this area. These faults interpreted as splay faults branched from the PHS plate boundary (Miura et al., 2010). Lineaments as fault topographies were recognized around the Boso canyon in high accuracy bathymetric map. The splay fault distribute under the Boso canyon by our bathymetric map and MCS profiles. This result suggests that the activity of the splay fault contributes to the development of the Boso canyon.

<Reference>

Miura, S., Yamashita, M., Takahashi, N., Nozaki, K., No, T., Kodaira, S., Kobayashi, R. (2010): Deep structural images off Boso region investigating with multichannel seismic reflection profiles. Japan Geoscience Union Meeting 2010, SSS023-05.

Keywords: Sagami Trough, Boso canyon, active fault, Kanto earthquake

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Slip distribution of the 1703 Genroku earthquake by using a curved fault model

Reiji Kobayashi[1*]

[1]Kagoshima Univ.

Great earthquakes along the Sagami trough, where the Philippine Sea slab is subducting, have repeatedly occurred. The 1703 Genroku and 1923 (Taisho) Kanto earthquakes (M 8.2 and M 7.9,respectively) are known as typical ones, and cause severe damages in the metropolitan area. The recurrence periods of Genroku- and Taisho-type earthquakes inferred from studies of wave cut terraces are about 200-400 and 2000 years, respectively (e.g., Earthquake Research Committee, 2004).

After we adopted an updated fault plane model (Sato et al. 2005), which is based on a recent model of the Philippine Sea slab, the asperity around the Miura peninsula moves to the north. Sato et al. (2005) presented the shape in inland part, but less information in oceanic part except for the Tokyo bay. Kimura (2006) and Takeda et al. (2007) presented the shape in oceanic part. In 2008-2010, multi-channel seismic (MCS) survey have been done off Boso peninsula and in the Sagami bay.

In this study, we compiled these slab models, and developed a new curved fault model. Kobayashi (2010, JpGU) inferred the slip distribution of the 1923 Kanto earthquake from geodetic data by using this fault model. In the present paper we infer the slip distribution of the 1703 Genroku earthquake from the geodetic data inferred from studies of wave cut terraces .

The curved fault plane was divided into 56 triangle subfaults. Point sources for the Green's function calculations are located at centroids of the triangles. At the present stage, we assume a 1-dimensional seismic structure model. The Green's functions are calculated by the frequency-wavenumber method of Zhu and Rivera (2002). Our preliminary results shows that a large slip area appears beneath the southern part of the Boso peninsula, which is consistent with our previous studies.

Keywords: asperity, the 1703 Genroku earthquake