Fault models of the 1703 Genroku and 1923 Kanto earthquakes and issues to be solved by the Kanto Asperity Project

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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. We have proposed seismic monitoring in the Sagami Bay and off Boso region as a part of the Kanto Asperity Project, which is an IODP drilling plan, to characterize asperity and non-asperity regions. The extent of the asperity region is one of important issues.

When the 1923 Kanto earthquake occurred, modern observation systems have been already existed. The geodetic and seismic data were useful and the many fault model have been proposed. Wald and Somerville (1995) and Kobayashi and Koketsu (2005) showed source processes by using the fault plane model based on Matsu'ura et al. (1980). Sato et al. (2005) showed that a new Philippine Sea slab model and that the slip distribution changed due to the corresponding new fault plane model. Pollitz et al. (2005) independently proposed the slip distribution inferred from the geodetic data. These slip models commonly suggest two asperities, but their details are different.

For the 1703 Genroku earthquakes, fault models inferred from crustal deformation data and tsunami data. They have two or three faults. One is the same as the 1923 earthquake, one located at the tip of the Boso peninsula, and one located off Boso region to interprete large tsunami propageted in Pacific ocean. However, no other evidences about these two faults exist. Kobayashi and Koketsu (2004) inferred the slip distribution with the same geometry of the fault as the 1923 Kanto earthquake. An additional asperity is located the southern part of the Boso Peninsula and the maximum slip is over 16 m. However, they cannot be verified for the interpretation of the large tsunamis.

Shape of the upper surface of the Philippine Sea slab is important to constrain extent of the asperities well. Sato et al. (2005) presented the shape in inland part, but less information in oceanic part except for the Tokyo bay. The NIED group show some information in oceanic part. We integrated the Sato and NIED models, and plan to reanalyze the slip distributions of the 1703 and 1923 earthquakes. The Kanto Asperity Project and its site surveys can provide us more information on the Philippine Sea slab in oceanic part.