

Assignments of source parameters of the 1703 Genroku Kanto Earthquake and Holocene crustal movement

Masanobu Shishikura[1]; Shinji Toda[2]; Kenji Satake[1]; Hitoshi Takeuchi[3]

[1] Active Fault Research Center, AIST, GSJ; [2] Active Fault Research Center, GSJ/AIST; [3] Eartheon

To propose the future assignments, we review our previous studies that are the analysis for source parameters of the 1703 Genroku Kanto earthquake (M8.2) and Holocene crustal movement associated with activity of mega-thrust along the Sagami Trough.

Sagami Trough, extending NW-SE off South Kanto, is convergent plate boundary where the Philippine Sea Plate subducts beneath the North American Plate. Two major historical earthquakes, the 1703 Genroku Kanto Earthquake (M 8.2) and the 1923 Taisho Kanto Earthquake (M 7.9) occurred along the trough. We estimated the amount of vertical crustal movement associated with the 1703 earthquake by analyzing historical records, marine terrace and bio-constructions. The Miura peninsula and the Oiso coast were 1-2 m uplifted as well as the 1923 earthquake, but the crustal movement in the Boso Peninsula was quite different. The Boso peninsula was steeply tilted northward by three times larger uplift of over 6 m than the 1923 earthquake.

According to above results, it is inferred that the fault source model of the 1703 Genroku Kanto earthquake consists of a combined fault system of fault A, B and C. The fault A is an inter-plate fault ruptured beneath the Miura peninsula and the Oiso coast, which is same as the source of the 1923 earthquake. Steep tilting in the Boso Peninsula was due to the rupture of fault B characterized by low angle dip and large slip (12m). This fault is consistent with the highest rate area of slip deficit (30-40mm/year) analyzed by GPS data. Holocene marine terrace suggests that four events accompanied with same slip of this fault have recurred with interval of 2000-2700 years. Since mean slip rate is calculated to be 5mm/year, it is incongruous with the rate of slip deficit.

The fault C is set off the eastern coast of Boso Peninsula to explain larger tsunami than 1923 event. To judge the necessity of such fault, we are simulating the tsunami inundation along the eastern coasts of Boso Peninsula using detailed DEM. The result will be shown in this meeting. According to recent GPS observation, it is suggested that slow slip event have occurred periodically in this area. Studying the relation between such plate motion and potential of tsunami source is an important assignment.

The area around the fault C has another problem of relation between uplift process and plate motion. Although the eastern part of the Boso Peninsula was not accompanied with crustal movement during both events of 1703 and 1923, height of Holocene marine terrace reaches to 5-10 m in altitude. Late Pleistocene marine terrace also indicates accumulating large uplift in this area.