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Fault slip of the Genroku EQ from Holocene paleoshoreline data on Boso and Miura using an earthquake cycle model - III

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1. Introduction

South Kanto district has suffered repeatedly from large earthquakes such as the 1923 Kanto Earthquake (Taisyo type) and the 1703 Genroku Earthquake (Genroku type). Sato et al. (2006, 2007) and Higuchi et al. (2006) developed a new method that can divide the coseismic, interseismic and permanent displacements from marine terrace data using our earthquake cycle model, and estimated slip distribution of the 1703 Genroku earthquake from marine terrace data on the Boso Peninsula. Recently, Endo & Miyauchi (2011) presented a reexamination in ages and altituds of Holocene emergent coastal geomorphology at the Boso Peninsula. In this presentation, we use the revised data on the Boso and add data on the Miura, and conduct an inversion analysis with larger slip area and a slip direction constraint.

2. Method

Our earthquake cycle model can estimate the permanent displacements if we have two or more paleoshoreline data whose ages are different, and can divide the coseismic, interseismic and permanent displacements (Sato et al. 2006). We estimate slip distribution of the 1703 Genroku Earthquake with constraints of smooth slip distribution and slip direction parallel to plate convergence using ABIC inversion method (Matsu'ura et al. 2007). In this calculation, we use a plate boundary configuration between the Philippine Sea plate and the North American plate proposed by Tsumura et al. (2009). They showed a subducted sea mount at the off Boso Peninsula. The data on Holocene paleoshorelines in south Boso region are from Endo & Miyauchi (2011) and Shishikura (2001), and in Miura region from Kumaki (1981) and Shishikura and Echigo (2001).

3. Results

The estimated slip distribution of the 1703 Genroku earthquake shows large slip amount more than 28m beneath the Sagami Bay and the southern Boso Peninsula. The estimated Magnitude is about Mw 8.5. Most of slips occur at shallow part (less than 10 km depth) of the plate boundary. Amount of coseismic uplift is about 4m at south tip of the Boso Peninsula from estimation of post seismic viscous rebound, permanent deformation and slip deficit by interplate coupling. This amount is smaller than that formerly known as 5-6m.

Keywords: source mechanism, marine terrace, earthquake cycle model, megaquake