Paleo-enviromental history in the Ashigara plain and seismotectonics of the Kozu-Mtasuda fault system, analyzed by drilling cores

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1.Introduction and purposes

The Ashigara coastal plain is a tectonically subsided basin by the Kozu-Matsuda fault (KM fault below) system that is a part of the collisional plate boundary between the Eurasia and Philippine Sea plates. Recent seismic reflection profiling revealed the progressing front thrust migration as an active system on the KM fault (Miyauchi et al., 2003). We carried out two 100m drilling at the downthrown side and the upthrown side, respectively, to reconstruct the geologic - geomorphic environment and to clarify the paleo-activity of the KM fault, based on lithofacies and C14 dating. We report that the seismotectonics by paleoearthquakes from the KM fault system, especially through the core at downthrown side.

2.Environmental analysis of drilling cores and the KM fault-related seismotectonics

The 104m long core at downthrown side was collected at the Moritogawa plain in altitude of 7 m. The lithofacies of the core is subdivided into three facies; Uf, Mm and Lf from the top. The Uf (7 to -13 m) is composed of fluvial sediments (mainly volcanic gravel) displaying the fan-deltaic environment. Marker tephras from Mt. Fuji are also found.. The humic sediments are dated at CalBP6,190. The Mm (-18 to -55 m) mainly consists of marine muddy sediments and the upper change to be sandy. In situ shell fossil are recognized between -18 m to -42 m horizon; Anomalocardia squamosa, Batillaria zunalis, Rhinoclaris kochi etc. These fossil provide C14 dates of 8220 CalBP.(-19.5m) to 9610 CalBP.(-42.5m). This implies that the Mm is bayou sediment related to the younger Holocene transgression. The Lf (below -55 m) has the alternation of organic sediment (soil), fluvial gravelly beds and, air-fall and reworked pumice layers (below -64m). The humic soil at –58 m is dated at CalBP11,060 and the wood at - 90 m is dated at CalBP42,680. These age and facies indicated that the Lf has been accompanied by braided river system corresponding to the lower sea level in the latter period of the Last Glacial stage.

The above evidence suggests the following seisomotectonic scenario on the KM fault system. The existence of the fluvial Uf (above -18m) shows that the this area was never submerged since ca.7000 years ago and uplifted with ca.2 m considering the position of –20 m of sea level at that time. No submergence in this duration suggests that high uplift passing the sea level rise until 6500 years ago and the rapid subsidence after the peak of Holocene transgression. While, the Mf-indicated information shows that at least 20 m uplift occurred during ca.2000 years (10,000 to 8,000 year ago). These leads us to prominent seismotectonics uplift in wide area including the downthrown side by frontal fault activity in younger Holocene, but the complex tectonics of uplift and subsidence by the additional KM fault movement in late Holocene.