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Paleo environment changes and tsunami deposits in Susami city, Wakayama prefecture during the Holocene

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Kii peninsula was attacked by many tsunamis accompanied by the previous Nankai earthquakes. There is little geological evidence supporting past tsunamis in western coast of Kii peninsula (Komatsubara et al. 2007, Fujino et al. 2008), although there are some geological evidences recognized as tsunami deposits in eastern coast. On the other hand, it is suggested that some great earthquakes brought about co-seismic uplift larger than the usual great earthquake such as Showa Nankai earthquake in southern part of Kii peninsula generated (Shishikura et al. 2008). However, information of tectonic movements by past earthquakes is limited. Therefore, we need to obtain the geological evidence of the past tsunamis and tectonic movements due to Nankai earthquakes in western part of Kii peninsula to reveal the recurrence intervals and co-seismic or inter-seismic crustal movements. Against this background, we conducted drilling survey in lowland probably be not affected directly from sea waves at Susami city, Wakayama Prefecture, central Japan and obtained about 800cm long core sample, and also analyzed fossil diatoms.

The core is composed of organic rich mud from 150cm to 300cm, organic-organic poor mud from 300cm to 680cm and gravel deposit of basement rock fragments from 680cm to 760cm depth mainly. Basement rock sedimented in Miocene is recognized below 760cm depth. Also, at least 7 sand or gravel layers are included in organic-rich muddy sediment from 150cm to 300cm depth in the core. Meanwhile, K-Ah volcanic ash (erupted in 7200 cal. BP) layer is recognized at 560cm to 630cm depth. And also we obtained accelerator mass spectrometry (AMS) radiocarbon dates covering during 2000BC-6000BC.

The diatom assemblages included in the mud deposits to 300cm from 760cm depth were dominated by marine and marine-brackish species such as Planothidium delicatulum and Cocconeis scutellu. These species decreased and freshwater diatom such as Eunotia and Pinnlaria increased gradually from lower to upper of the core. Especially, the organic rich mud above 300cm depth contained no marine species. The changes of diatom assemblages in the muddy sediments from 300cm to 760cm depth show the tendency of increase of freshwater diatoms and decrease of marine diatoms, suggesting effects of paleo-sea level changes so called Jomon transgression and its regression. These diatom assemblage changes also suggest that tidal flat was formed in this area during 3500BC-6000BC, and changed to salt marsh after that. On the other hand, the sand and gravel layers from 150cm to 300cm depth contained very small amounts of marine diatoms. It is suggests that these sand and gravel layers were transported by strong current from seaside such as tsunami during 2000BC-3500BC.

Keywords: Nankain trough, Kii peninsula, Tsunami deposit, Fossil diatom assemblage, Holocene