

Coseismic crustal movements estimated from the last 900-years stratigraphic record along the western coast of Shizuoka Prefecture

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Two types of coseismic crustal movements were estimated from the stacking pattern of a late Holocene strand plain system along the western coast of Shizuoka Prefecture. Height distribution of the former foreshore deposit indicates the accumulation of vertical crustal movements accompanied with the subduction-zone earthquakes that occurred around the Nankai Trough during the last 900 year.

Stratigraphic succession of the strand plain system in the coast of Kosai City, Shizuoka Prefecture, up to 4.4 m thick, was obtained from orient-controlled four cores excavated by using the 30 cm wide geoslicer. It is composed of upper shoreface sand, foreshore sand, backshore sand and back marsh mud, in ascending order (Fujiwara et al., submitted).

Upper boundary of the foreshore sand, now 0.45-0.65 m in height, approximately indicates the former tide level. Age of the foreshore sand is estimated to the 12th Century or a little old (Fujiwara et al., submitted). Estimated height of the former tide level is settled into the range of present high tide level around the study area, +7 cm to +74 cm in height. Then, little accumulation of vertical crustal movement is recognized from the height distribution of the foreshore sand during the last 900 years.

According to the geodetic records, study area shows an uplifting trend with rate of about 3 mm/y between the great subduction-zone earthquakes (Xia and Fujii, 1992; Kunimi et al, 2001). On the contrary, about 0.6 m coseismic subsidence was observed around the study area at the AD 1854 Ansei Earthquake (Hatori, 1985). If the uplift with a rate of 3 mm/y has been continued without interruption by coseismic subsidence during the last 900 years, the foreshore sand in the study area ought to be distributed around the height of 2.7 m.

This 2.7 m gap between the estimated and observed heights of the upper boundary of foreshore sand probably indicates the accumulated value of coseismic subsidence. Since the 12th Century, seven subduction-zone earthquakes occurred around the Nankai Trough (Sangawa, 2004). The last AD1944 Earthquake was not accompanied with coseismic subsidence (Fujii, 1980). Average value of coseismic subsidence by remaining six earthquakes is calculated to be about 45 cm and close to the value at the AD 1854 Earthquake.

Another type of crustal movement, probably coseismic uplift, was occurred before the 12th Century. The succession of upper shoreface sand, foreshore sand and backshore sand shows a progradation and emergence of the beach system. Coastal dune, about 100 m wide, covers the emerged beach. Emergence of the beach system is probably attributed to the rapid fall of relative sea-level and may indicate a coseismic uplift of the coastal area.

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