

Recurrent coastal uplift events recorded in the sediments on Sanriku coast NE Japan

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Unusual tsunami deposits and consolidation characteristics of the materials beneath coastal marshes in Sanriku coast NE Japan records at least six emergence events during the past 2000-6000 years, probably resulted from deep aseismic slip following infrequent unusual earthquakes along the Japan subduction zone. The stratigraphy in Sanriku coast marshes and bay was studied using over 10 cores. Seven emergence events in Sanriku coast were marked by paleotsunami deposits. Radiocarbon ages of plant show the dates of these seven events are 5450-5350, 5000-4900, 4300-4200, 3800-3650, ca.3100, 2500-2400 and 2000-1900 cal yr B.P. (Haraguchi et al., 2007) The tsunami deposits indicate that unusual earthquake occurred every about 500 to 700 years over the past 2000-6000 years.

In Otsuchi-Kirikiri, consolidation characteristics of the materials were investigated by means of 5 oedometer tests performed on samples from various depths in the boring. The consolidation yielding stress shows the value which is 17 to 22 kN per square meter bigger than normally-consolidated clay. This value is equivalent to the stratum thickness of 2 m, means the thickness of the maximum pre-load in the past and about 2 m coastal uplift per once.

Such emergence events may solve a conflict of vertical crustal movement in Sanriku coast northeastern Japan. This tectonically active area, where the Pacific plate subducts at 8 cm/yr, has been steady submerging at fast rate of 5-10 mm/yr in the twentieth century as recorded by tide gauges. Holocene non-marine strata in marshes, however, imply 0.5-1 mm/yr of net subsidence during the past 6,000 years. To balance these two movements, emergence events as found this study was needed. The coastal uplift, the most likely cause of the emergence in this area, might be generated by infrequent a-seismic slip in the Japan subduction zones, although such large-scale emergence events have not been recorded in interplate earthquake cycle of 19-20th century.