Event deposit and Holocene environmental change preserved in coastal marsh in Osatu, Toba, central Japan part1

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The coastal lowland areas in the Shima Peninsular have been often struck by the tsunami after the Nankai earthquakes and Tounankai Earthquakes. The non-disturbed sampling with the Geo-slicer was carried out at three sites in the coastal marsh in Osatsu Toba City, in order to investigate its environmental change and the relation with the event deposits such as tsunami deposits. The sediments mainly consist of unconsolidated silt and clay intercalated thin sand layers. The lower most part at the B site, 472-580cm in depth, consists of gray massive clay with shell fragments. This clay layer is interpreted as bay mud. This clay layer is overlain by dark gray to black silt with organic materials, such as wood and plant fragments, interpreted as coastal marsh sediment. This silt layer is interbedded with over ten sand layers. The several layers in these sands have good horizontal continuity and similar lithofacies. These sand layers include fragments of shell and foraminifer and its base of these sand layers have evidence of erosion. The lower part of the sand layer consists of medium to coarse grained sand with reverse grading. The middle part includes mud crusts and gravels, 5mm of diameter. These lithofacies are similar to the characteristics of the tsunami deposits. Because the surrounding inland area of the investigation site can not supply coarse grained crusts under the geomorphologic environments, These sand layer is considered to event deposits such as tsunami and high waves.

The 14C dating with wood fragments gave 5796 to 798 yr BP to these sediments. The result of the dating is consistency to the stratigraphic relation of the volcanic ash layer correlated with the Kikai-Akahoya tephra. According to the lithology and 14C age, it is considered that the inner bay environments had continue until about 5900 yr BP, and then, changed to the coastal marsh. These 14C ages suggest that these sand layers were deposited by the events recorded the historical document and older one.

Based on the ecological spectra of the diatoms grouped into marine, brackish and freshwater, sediments were classified into five diatom zones as follows:

Zone1:Fresh water species are various and dominant relatively, and its ratio increases toward upper horizon.

Zone2:Marine-brackish and brackish-fresh species are dominant and comprise more than 90%.

Zone3:Fresh water species are relatively dominant.

Zone4:Fresh water species are most dominant. This zone is characterized by the species that are hardly found in other zones.

Zone5:Fresh water species are various and dominant relatively. The diatom assemblages of this zone are similar to those of Zone1 and Zone3.

The sharp rise and fall in ratio of freshwater indicate the salinity changes. Boundaries between each zone are in agreement with some of the horizon of sand layers. So, those salinity changes were possibly caused by tsunamis.