Evidences of six horizons of tsunamis around Akkeshi Town, east Hokkaido, which occurred during past 3,000 years

Yuji Soeda[1], Futoshi Nanayama[2], Ryuta Furukawa[3], Nobuhiro Kumasaki[4], Morio Akamatsu[1]

[1] Historical Museum of Hokkaido, [2] MRE, GSJ/AIST, [3] AIST, [4] Akkeshi Marin Memorial Senter

1. Introduction Many earthquakes and tsunamis occur along the Pacific coast of eastern Hokkaido. Many marshes and lakes of sea origin formed after Jomon transgression have been known in this area and active studies about the tsunami deposits, which accumulated in the peat and lacustrine deposits of past several thousands of years (Nanayama and Shigeno, 1998; Hirakawa et al., 2000). Presence of ten event deposits formed during past 3,000 years is known from Kiritappu Marsh at Hamanaka Town and twenty event deposits formed during past 9,000 years is known from the lake sediments of Harutori Lake at Kushiro City (Nanayama et al., 2001, 2002). Akkeshi Town area is situated between Kushiro City and Nemuro City and presence of old Kokutai-ji Temple which was built in 1804 is known. In the Nikkanki and timber remnants which derived from this temple, descriptions of the 1843 Tokachi earthquake and tsunami are reported. However there are no historical documents of tsunami, which are older than this report. In this study we investigated the lowland of ca. 2.2 m above sea-level that is distributed at the places in front of the previous Kokutai-ji Temple and present Kokutai-ji Temple. This Akkeshi area is situated between Kiritappu Marsh and Harutori Lake, and therefore these tsunamis related sediments are expected from the coastal marsh deposits in this area.

2. Method The samples were collected from simple trench wall which were excavated by power shovel. Plastic boxes were inserted successively the trench wall from the bottom to the surface, and then sediments were picked up in the state of keeping original sedimentation. Peat was obtained from almost all layers and four volcanic ash layers of a few cm are intercalated and four layers of sandy silt or fine sand of a few cm and tens of cm are also found. Volcanic ash layers were extracted from the peat and their major chemical elements were analyzed by EPMA. The results are compared with the previously data (Furukawa et al., 1997) and we estimated the source of the volcanic ashes and the approximate ages. Analysis of diatom thanatocoenosis was done by making slides of every 5 mm interval and observed and made for identification. 350 diatom individuals were counted in every slide.

3. Results Chemical analysis is now under investigation and we cannot present any decisive conclusion. Comparing to Holocene volcanic ashes that are previously reported from eastern Hokkaido, we can suggest that two ash layers just below the surface may be correlated to the mixed layer of Ta-a (1739) , Ko-c2 (1694) and Ta-b (1667). And ash layer of 25 cm below this layer may be correlated to B-Tm (947; Hayakawa and Koyama, 1998) and ash layer below 31 cm from this layer may be correlated to Ta-c2 (ca. 2,500 yrs BP). Consequently, we can estimate that the peat was accumulated during past 3,000 years. From the present diatom analysis the following estimation can be pointed out. (1) Fresh water species such as Pinnularia viridis, Navicula elginesis and terrestrial species such as Hanztschia amphitoxys, Pinnularia borealis were predominating in almost all peat samples, and from sand layers marine species such as Palaria sulcata, Cocconeis scutellum, Nitzschia granulata are obtained. (2) The individuals from the sand layers were extremely fewer than peat. From this fact we can conclude that the sand layers are marine event sediments which are derived from the ocean. If it compares with stratigraphy of the tsunami events from Kiritappu Marsh and Harutori Lake, tsunami events of Ts3 to Ts8 are clearly included in our samples. Thus, there were six times of giant tsunamis during past 3,000 years at Akkeshi area as same as other Pacific coast areas of eastern Hokkaido.