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Distribution and origin of the 17th century tsunami deposit in the Iburi coast, Shiraoi district, central Hokkaido

Ryo Nakanishi[1*], Okamura Satoshi[1], Takashimizu Yasuhiro[2], Sagayama Tsumoru[3], Nishina Kenji[3]

[1]Hokkaido University of Education, [2]Niigata University, [3]Geological Survey of Hokkaido

Pacific coast in Hokkaido is frequently suffered tsunami disaster caused by earthquakes associated with the Kuril Trench subduction. The 17th century tsunami deposits are discovered in eastern Hokkaido (Nemuro-Kushiro), central Hokkaido (Iburi coast) and western Hokkaido (Uchiura bay). But the tsunami deposits in the Iburi coast have unconfirmed trigger of tsunami yet. Conceivable candidates of its trigger are 1640 Hokkaido Komagatake eruption, 1611 Keicho-Sanriku earthquake and earthquake along the Kuril subduction zone occurring 300-500 years interval. We surveyed Shiraoi district in the Iburi coast, blank area of research, and studied distribution and origin of the tsunami deposits. We draw 4 survey lines perpendicular to shoreline, and investigated by a handy boring method.

Shiraoi district reaches back marsh behind sand dune, and is characterized by flat to gentle slope topography toward shore. Shikotsu pyroclastic flow deposits distribute inland. The Stratigraphic units of the Shiraoi district are divided into Us-b (1663) tephra, tsunami deposits (with thin peat at most upper part), peat, B-Tm tephra (20cm lower part from tsunami deposits), in descending order. The tsunami deposits are distributed with 14km length along the Iburi coastline and 0.6-0.9km width to landward. The deposits rapidly decrease in thickness at half inland of the deposition, and indicate a thin sheet-like distribution to the landward. The finer grain size distribution and increasing pumice grain to landward. Diatom fossils in the tsunami deposits include marine species of 18%. Constituting particles are similar grain sizes and assemblages to beach sand and dune sand. These results suggest that the deposits are transported from seaside, and correlate to the 17th century tsunami deposits distributed widely along the Iburi coast, Tomakomai and Mukawa.

Vertical sedimentary structure of the deposits near the coastline indicates inverse grading (lower unit), normal grading (middle unit) and normal grading (upper unit), in ascending order, which suggests at last two tsunami inundation events. Grain-fabric analysis of the each unit indicates that these deposits were formed by inflows with NNW paleo-flow directions. Distribution scales, a distance from the seacoast and a highest altitude of the deposit, in comparison with other 17th tsunami deposits from the Iburi coast, are more larger at eastern Mukawa area than western Siraoi and Yufutsu areas, which suggests the deposits are attributed to the eastern Kuril Trench origin earthquake.

Keywords: Tsunami deposit, Hokkaido, 17th century, Grain size analysis, Grain-fabric