

## Facies description of 15 valley-filled tsunami deposits observed in Lake Tokachi-Chobushi for the past 2500 years and evaluation of their recurrence intervals

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It is known that M8-class trench-type earthquakes occur every 100 to several decades in the eastern Pacific coast of Hokkaido. In addition to this, it has been clarified that interlocking giant earthquakes of Mw 8.5-9 class with the epicenters off Tokachi and Nemuro offshore occur repeatedly at intervals of 300 to 500 years (Nanayama et al., 2003; Nanayama, 2020). It can be considered that the giant tsunami trace stratigraphy between Tokachi coast and Nemuro coast has been almost established by the research results of the past 20 years. However, the estimated tsunami size and recurrence period are not clear because the number of tsunami deposits differs depending on the area, even if the interval between giant tsunamis is about 300 to 500 years. In particular, the number of tsunami deposits recorded is regulated by topography and sedimentary environment. In previous studies, tsunami deposits were found to occur more frequently in sediments filling the valley topography than in the surrounding marsh environment.

Lake Tokachi-Chobushi is a brackish lake with a width of about 1.8 km and a maximum depth of about 1.5 km. It is known that a tidal inlet emerges at the southwestern edge of the lake due to the seasonal break of the sand bar. On the southern shore of this tidal inlet, large cliffs of sea cliffs of about 9 m in height appear continuously. Here, there are two fissured valleys with a width of about 50 to 100 m that erode the Upper Pliocene to Pleistocene long nodule (diatomaceous silt deposit). This valley is filled with a Holocene peat layer of about 3.5 m thickness. The fifteen tsunami-originated event sand layers are sandwiched in this peat layer. The fifteen event sand layers consist mainly of fine-grained sand to silty sand, with a thickness of several centimeters to several tens of centimeters. The base may have a sub-round to sub-angular gravels and these diameters are 1 to 2 cm. From the degree of sorting, sand particles are assumed to originate from marine sand.

Four clear Holocene tephras were interposed in the peat layer, and the top tephra was found to be Ta-b (AD 1667 eruption from Tarumai Volcano), the tephra at the bottom is assumed to be Ta-c (2.5 cal kyr BP eruption from Tarumai Volcano). Using the ages obtained from these tephras, the recurrence interval of the event sand layer for the last 2500 years is estimated to be about 150 years. This value is significantly lower than the 300-500 years thought to have been caused by the tsunami associated with the giant earthquake. In this case, it is suggested that the tsunami caused by the M8 class interplate earthquake that occurred every 100 to tens of years in the Kuril Trench is also preserved. However, it is difficult to determine the magnitude of the earthquake or tsunami that caused each event deposit by at least outcrop observation alone.

### References

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