

Insight of large tsunami recurrence around the Sea of Japan revealed by surveys of historical and pre-historical tsunami

NISHIMURA, Yuichi^{1*} ; RAZJIGAEVA, Nadya² ; GANZEY, Larisa² ; GREBENNIKVA, Tatiana² ; KAISTRENKO, Viktor² ; GORBUNOV, Alexsey² ; NAKAMURA, Yugo¹

¹Hokkaido University, ²Far East Branch of Russian Academy of Sciences, Russia

Tsunami deposits provides essential information for assessing tsunami and earthquake hazards in areas where recurrence of tsunamis are not known or poorly recorded. Northern coast of the Sea of Japan is one of these areas. Recent earthquakes such as the 1940 Shakotan-oki, the 1983 Nihonkai-chubu and the 1993 Hokkaido Nansei-oki earthquakes caused severe damage along the coastal communities in SW Hokkaido, Japan, however, the past tsunami in this region are not known. The historical tsunamis inundated not only in the Japanese coast but also along the Primorye coast, Russia, located at the other side of the Sea of Japan. We repeated reconnaissance along the Primorye coast to find the historical and pre-historical tsunami evidences. In the region, there are natural lowlands facing sandy beach that are suitable for tsunami deposit formation and preservation. The surveys were done from 2010 to 2013 as a joint research project with Hokkaido University and the Russian Academy of Science. We could trace sandy or muddy tsunami deposits buried in the peat associated with the modern tsunamis, and also found candidate of tsunami deposits at multiple sites along the coast. The sandy layers include significant amount of marine diatoms. Based on the C14 dating results of peat sandwiching the sandy layers, age of the events are estimated to be ca. 350 BP, 600 BP, 800 BP and 2100 BP. In Kit Bay, the southernmost site in our survey area, B-Tm tephra (ca. 1000 AD) were deposited patchy between the 800 BP and 2100 BP. Most of the paleo-event deposits are traced inland up to a few hundred meters from the present coast and they are distributed at 4-5 m above the sea level. These might be the first evidence for the recurrence of large tsunamis around the Sea of Japan in the past.

Keywords: tsunami deposit, Primorye, Sea of Japan, paleo-tsunami, historical tsunami