

New chronology for event deposits before the 1700 CE Cascadia earthquake from the southwest coast of Vancouver Island, Canada

*Koichiro Tanigawa¹, Yuki Sawai¹, Peter Bobrowsky², David Huntley³, James Goff^{4,5}, Tetsuya Shinozaki¹, Kazumi Ito¹

1. Geological Survey of Japan, National Institute of Advanced Industrial Science and Technology, 2. Geological Survey of Canada, Natural Resources Canada, Sidney, British Columbia, 3. Geological Survey of Canada, Natural Resources Canada, Vancouver, British Columbia, 4. School Biological, Earth and Environmental Sciences, University of New South Wales, 5. School of Ocean and Earth Science, University of Southampton

We examined coastal deposits at Tofino, Ucluelet, and Port Alberni in Vancouver Island along the Cascadia subduction zone to improve the earthquake history of the southwest coast of Canada. We found sand sheets interbedded within peat and mud, suggesting deposition by strong flows in a low-energy environment. Based on limiting maximum and minimum ages derived from plant macrofossils, the age of one of the sand sheets below the tsunami deposits of the great Cascadia earthquake in 1700 CE was estimated to be 1330–1430 CE. Onshore paleoseismic evidence has been documented in Vancouver Island, northern Washington, and northern Oregon during this period. However, the newly constrained age is between those of coseismic subsidence Y and W events in southern Washington, which have been recognized as the 1700 CE and the penultimate Cascadia earthquakes, respectively. Meanwhile, the new age partly overlaps with the age of offshore paleoseismic evidence for T2, interpreted to have originated from the penultimate Cascadia earthquake, based on offshore turbidite records. The new chronology before the 1700 CE Cascadia tsunami deposit from Vancouver Island contributes to a better understand of the timing of the penultimate Cascadia earthquake.

Keywords: event deposit, dating, 1700 CE Cascadia earthquake, Vancouver Island, Cascadia subduction zone