

Seismic history of the last 5500 years reconstructed from the topographic development of the Furen-ko barrier system

NANAYAMA, Futoshi^{1*} ; SHIGENO, Kiyoyuki² ; HASEGAWA, Takeshi³ ; WATANABE, Kazuaki¹ ; ISHIWATA, Kazuto⁵ ; IKEDA, Yasuo⁴ ; UCHIDA, Yasuhito⁶

¹Geological Survey of Japan, AIST, ²Meiji Consultants Ltd., ³Ibaraki University, ⁴Kushiro Branch, Hokkaido University of Education, ⁵Betsukai Museum, ⁶Geological Survey of Hokkaido, HRO

There are some active barrier (island) systems in eastern Hokkaido. Since 2011, we have been investigating the Hashirikotan barrier spits in the northern part of Furenko barrier system facing the Sea of Okhotsk/ Nemuro Strait because five branches of spits (BR1-BR5) are clearly observed. According to GPS topographic survey, GPR exploration, hand drilling survey, grain size analysis, AMS 14C dating and tephra chronology, we already got some important geomorphological results as follows.

As a first point, the Furenko barrier system has been established since 5.5 ka, and there were two lagoon-expanding stages at 5.2 and 4.0 ka estimated by volcanic ashes, Ma-e and Ma-d from Mashu volcano. As a second point, the youngest BR5 has occurred after the 17th century and BR4 caused by the last seismic up rifting in the 17th century because it was covered with two historical volcanic ash layers, Ta-a and Ko-c2 from Tarumai and Komagatake volcanoes. BR2 caused by the seismic up rifting in the 9th century because it was covered with B-Tm from Baitoushan volcano in AD 929. BR3 and BR1 were undated clearly, but we are able to assume that BR3 rifted in the 12-13th century and BR2 rifted at 4.0 ka. These two BRs were covered with large eolian dune layers just after emerging each BR.

Since 2003, it was clearly that the great earthquakes (Mw8.5~) have been occurred at an interval of 500 years along the southern Kuril subduction zone. Especially coastal area raised almost 1 or 2m just after the great earthquakes due to the post-seismic displacements. But conversely land subsidence has been continuing at a rate 8.5mm/year since the 17th century until now. We express that geomorphological evolution of the Furenko barrier system has been controlled by the seismotectonics along the southern Kuril subduction zone.

This work was supported by JSPS KAKENHI Grant Number 23540539.

Keywords: Lake Furen-ko, barrier spit, topographic development, Nemuro Strait, sea-level change, seismic history