Geomorphological evolution of Furenko barrier system controlled by scismotectonics

Kiyoyuki Shigeno1*, Futoshi Nanayama2, Kazuaki Watanabe2, Hideki Yoshikawa2, Yasuo Ikeda3, Kenji Aoyama3, Ryo Fujioka3, Tomoyuki Kobayashi3, Chihiro Sakai3, Takeshi Hasegawa4, Kazuto Ishiwata5, Yasuhiro Uchida6

1Ibaraki Univ., Meiji Consultant Co., Ltd, 2Geological Survey of Japan, AIST, 3Hokkaido University of Education at Kushiro, 4Ibaraki University, 5Betsukai Town Local Museum, 6Geological Survey of Hokkaido

In general, there is no clear barrier system around Japan because it is currently marine regression or stable stage due to hydroisostasy effect since 5000-6000 years BP. However, there are a few barrier (island) systems in eastern Hokkaido. We have been investigating Hashirikotan barrier spits in the northern part of Furenko barrier system facing the Sea of Okhotsk because five branch of spits (BR1-BR5) are clearly observed. According to our results, 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 from Mashu volcano. On the other hand, the youngest BR1 has occurred after the 17th centuries and BR2 was caused by the last seismic up-rifting in the 17th centuries because it is covered with historical volcanic ash layers from Tarumai and Komagatake volcanoes. BR3 and BR4 were undated clearly, but BR3 was assumed the seismic rifted barrier in the 12-13th centuries, also BR4 was caused in the 9th centuries. These two barriers associated with large sand dune just after emerged each time. Since 2003, it was clearly giant 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. But conversely it has been settling at a rate 8.5mm / year after the last great earthquake until now. We believe the Furenko barrier system has been strongly controlled by the seismotectonics in this region.

Keywords: geomorphological evolution, Furenko barrier system, scismotectonics, southern Kuril trench, eastern Hokkaido