

Long-term Probability of a Great Earthquake along the Kurile Trench, Hokkaido Japan (2)

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Great earthquakes (M8 and larger) repeatedly occur along the Kurile Trench off Hokkaido. A much larger one in the 17-th century (17-th type earthquake) is indicated by studies of tsunami deposits, which is considered as representing the simultaneous of Tokachi-oki and Nemuro-oki earthquakes. The Earthquake Research Committee, the Government of Japan has reported the long-term probability of the 17-th type earthquake. We discuss the uncertainty of the long-term probability of the 17-th type earthquake, applying the method by Parsons (2008) to compare the likelihood of both the Brownian Passage Time distribution and the Poisson distribution for recurrent earthquakes. We adopted the seven probable ranges of origin times observed at Mochirippu-toh, and the five ranges at Kiritappu Marsh (Table 7 in the ERC report). Considering two probable ranges of 68% and 95% listed, two different functions of a origin time are adopted as weights; a modified Gaussian function and a step-function. The latter function is fixed so as to reserve the 68% and 95% probabilities in their ranges.

The likelihood ratios of the BPT model to the Poisson one are 0.70-0.79 for the Mochirippu-toh and 1.9-2.0 for the Kiritappu Marsh. The mean of the 17-th type earthquake probability in the next 30 years over the model parameters is about 11% for the Mochirippu-toh and around 21% for the Kiritappu Marsh. Only slight differences of both likelihood ratios and the thirty year probabilities among the three weight functions are observed.

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