The 2018 Hokkaido Eastern Iburi earthquake (M_{JMA} = 6.7) was triggered by a strike-slip faulting in a stepover segment: Insights from the aftershock distribution and the focal mechanism solution of the mainshock

*Kei Katsumata[1], Mako Ohzono[1], Hiroshi Aoyama[1], Ryo Tanaka[1], Masamitsu Takada[1], Masayoshi Ichiyanagi[1], Teruhiro Yamaguchi[1], Kazumi Okada[1], Hiroaki Takahashi[1], Shin'ichi Sakai[2], Satoshi Matsumoto[3], Tomomi Okada[4], Toru Matsuzawa[4], Shuichiro Hirano[5], Toshiko Terakawa[6], Shinichiro Horikawa[6], Masahiro Kosuga[7], Hiroshi Katao[8], Yoshihisa Iio[8], Airi Nagaoka[8], Noriko Tsumura[9], Tomotake Ueno[10], the Group for the Aftershock Observations of the 2018 Hokkaido Eastern Iburi Earthquake

1. Institute of Seismology and Volcanology, Faculty of Science, Hokkaido University, 2. Earthquake Research Institute, University of Tokyo, 3. Institute of Seismology and Volcanology, Faculty of Science, Kyushu University, 4. Research Center for Prediction of Earthquakes and Volcanic Eruptions, Graduate School of Science, Tohoku University, 5. Nansei-Toko Observatory for Earthquakes and Volcanoes, Graduate School of Science and Engineering, Kagoshima University, 6. Earthquake and Volcano Research Center, Graduate School of Environmental Studies, Nagoya University, 7. Graduate School of Science and Technology, Hirosaki University, 8. Research Center for Earthquake Prediction, Disaster Prevention Research Institute, Kyoto University, 9. Graduate School of Science, Chiba University, 10. National Research Institute for Earth Science and Disaster Prevention

The Hokkaido Eastern Iburi earthquake (M_{JMA} = 6.7) occurred on 6 September 2018 in the Hokkaido-corner region where the Kurile and the northeastern Japan island arcs meet. We relocated aftershocks of this intraplate event immediately after the mainshock by using data from a permanent local seismic network and found that the aftershocks concentrated in depths from 20 to 40 km, which is extraordinarily deep when comparing with other shallow intraplate earthquakes in the inland area of Honshu and Kyushu, Japan. Moreover, we found that the aftershock area consists of three segments. The first one is located in the northern part of the aftershock area, the second one is located in the southern part, and the third one is located in a stepover segment between the first one and the second one. The hypocenter of the mainshock, which is a rupture initiation point, is located in the stepover segment. The centroid moment tensor solution for the mainshock indicates a reverse faulting, whereas the focal mechanism solution determined by using a first motion polarity of *P* wave indicates a strike-slip faulting. To explain this mismatch qualitatively, we present a model that the rupture started as a small strike-slip faulting in the stepover segment of the aftershock area and it is followed by the large rupture of two reverse faulting in the northern and the southern segments.

Keywords: the Hokkaido Eastern Iburi earthquake, aftershock distribution, focal mechanism solution

