

Characteristics of the rupture processes of two large earthquakes off the south-east Kushiro area in Hokkaido in 2004

*Tomoyuki Sagawa¹, Yuichiro Tanioka¹, Takuji Yamada²

1.Institute of Seismology and Volcanology, Department of Natural History Sciences, Graduate School of Science, Hokkaido University, 2.Ibaragi University

In this study, Source processes of two Kushiro-oki earthquakes, which occurred in November and December, 2004 (Mw7.1 and Mw6.9), are analyzed. These earthquakes occurred with short time interval and with short distance separation at the same plate boundary. In 1961, two earthquakes of M7 also occurred with a time difference of 3 months at the same plate boundary. In addition, this plate boundary is surrounded by the source area of the large earthquakes of M8, such as the 1973 Nemuro-oki earthquake and the 2003 Tokachi-oki earthquake. Therefore, it is important to study source characteristics of two 2004 Kushiro-oki earthquakes in order to understand the complexity of the plate interface.

We estimate the source time function at each strong motion station (K-net) using empirical green's function method. Then, the directivity effect is analyzed from those estimated source time functions. In consequence, the result suggests that the rupture propagated concentrically for the earthquake occurred in November and propagated about 8 km to the north for the earthquake occurred in December. Moreover, for the earthquake occurred in December, the stress drop was found to be uniform, because few aftershocks occurred within the source area of the earthquake. The earthquake occurred in November affected by the postseismic slip of the Tokachi-oki earthquake. Because the earthquake occurred in December did not increase enough stress at the edge of the source area of the 1973 Nemuro-oki earthquake, the rupture propagated to the north instead of to the south.

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