

## Slip distributions of the 1963 great Kurile earthquake and the largest aftershock estimated from tsunami waveforms

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On October 13, 1963, great Kurile underthrust earthquake (Mw 8.5, Mt 8.4) occurred in the Kurile-Kamchatka subduction zone. Also the largest aftershock (Ms 7.2, Mt 7.9) occurred on October 20. This aftershock generated an unusually large tsunami relative to the size of the seismic waves. Recently the 2006 Kurile earthquake occurred northeast of the 1963 earthquake. To examine whether seismic gap exist between 1963 and 2006 earthquakes and source processes of the main shock and the largest aftershock, slip distributions of the 1963 great earthquake and the largest aftershock were estimated using tsunami waveforms recorded at tide gauges along the Pacific Ocean and Okhotsk Sea coast. In case of the main shock, the extended rupture area was divided into 24 subfaults, and the slip on each subfault was determined by the tsunami waveform inversion. The result shows that large slip amounts were found at the intermediate depth and the shallow part of the rupture area. The total seismic moment was estimated to be  $2.4 \times 10^{21}$  Nm (Mw 8.2) by assuming that the rigidity is  $4.0 \times 10^{10}$  N/m<sup>2</sup>. The 2006 earthquake occurred just next to the 1963 earthquake and no seismic gap exists between source areas of the 1963 and 2006 earthquakes. For the largest aftershock, the slip distribution was determined by the tsunami waveform inversion using 9 subfaults. The largest slip amount of 3.8 m was found at the shallow part of the rupture area. Large slip amounts were estimated on the shallow subfaults near the Kurile trench. The largest aftershock ruptured subfaults where the slip amount of the main shock is relatively small. The total seismic moment was estimated to be  $1.2 \times 10^{21}$  Nm (Mw 8.0) by assuming that the rigidity is  $4.0 \times 10^{10}$  N/m<sup>2</sup>. This largest aftershock is tsunami earthquake of slow slip and rupture of shallow subfaults.

Keywords: tsunami, 1963 Kurile earthquake, slip distribution