

The Fault model of the 2017 earthquake (M5.6) in the Eastern flank of Mt. Ontake estimated from precise leveling survey data

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We conducted the precise leveling surveys in the Ontake volcano after the 2014 Mt. Ontake Eruption. The leveling routes of about 38 km with 98 benchmarks were established on the eastern flank of Mount Ontake volcano. The main routes were extended to the Yashikino village (Kakehashi and Yashikino routes). In order to improve the spatial layout of the benchmarks, a branched leveling routes were established (Kiso-Onsen, Ontake Ropeway and Nakanoyu routes).

The M5.6 earthquake occurred just beneath the leveling routes in June 25, 2017. In order to detect the vertical deformation associated with the M5.6 earthquake, we use the leveling data conducted in April 2017, September 2017 and April 2018. In April 2017 and April 2018, All benchmarks were surveyed. In September 2017, the leveling survey was conducted in the Yashikino and Kiso-Onsen routes. The benchmarks of the Yashikino and Kiso-Onsen routes showed uplift in the period from April 2017 to September 2017. The maximum uplift of 28mm was detected in central part of Yashikino route. We also estimate the deformation associated with the earthquake using InSAR method. The deformations detected from the precise leveling and InSAR are similar pattern.

In order to estimate the fault model of the M5.6 earthquake, the single rectangular fault was assumed. The initial parameters of the fault geometry were assumed from hypocenter distribution of aftershocks. Model parameters were optimized using a genetic algorithm (GA) in order to conform to the deformation observed from April 2017 to September 2017.

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