

## Tectonic loading processes of the Atotsugawa fault scrutinized by dense GPS observation

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We have been conducting dense GPS observation around the Atotsugawa fault, central Japan for about 10 years in order to investigate detailed crustal deformation pattern. Our GPS network consists of 30 original continuous sites in addition to the nationwide network (GEONET), covering the whole Atotsugawa fault with spacing of 5 to 10km. Horizontal velocities at GPS sites are estimated from precise daily coordinates and their accuracy is mostly less than 1 mm/yr. These velocity vectors demonstrate the detailed interseismic deformation pattern around the Atotsugawa fault. In the central part, a clear right-lateral motion of about 10 mm/yr is recognized across the fault, which is consistent with the fault locked depth of about 15 km corresponding to the thickness of the seismogenic layer. On the other hand, significant contraction ( $>0.2$ ppm/yr) is identified at the both ends of the Atotsugawa fault, indicating laterally heterogeneous deformation along the fault trace. It is probable that the coincidence of the lateral ends of the fault and the large strain spots is not an accident, but implies inelastic deformation processes there. Then the locked portion of the fault is loaded not only from its bottom edge but also from its side edges. In addition, we identify asymmetric deformation pattern near the western end of the fault, which is consistent with the existence of the Shogawa fault, one of the conjugate faults. Thus our observation demonstrates that the possible extent of a future fault rupture is delineated by inelastic deformation and can be identified through a scrutiny of detailed interseismic deformation pattern around active faults, which is analogous to the cases of plate boundaries.

Keywords: Atotsugawa fault, crustal deformation, tectonic loading, strain concentration zone, GPS