Dense GPS observations across the Atotsugawa fault, central Japan –Adding results of a new western GPS network-

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The Atotsugawa fault is located within the high strain rate belt running from Niigata to Kobe, central Japan, NKTZ (Niigata-Kobe tectonic zone) (Sagiya et al., 2000). GSI (Geographical Survey Institute), Japan, conducted repeated precise EDM measurements in several portions across the fault. In the central portion of the fault, the fault surface creep with a rate of 1.0-1.5 mm/year has been observed. The Atotsugawa fault is the only fault in Japan, where the fault surface creep has been recognized. We set up a dense GPS array across the central portion the fault, where the surface fault creep has been observed, in 1997, and continue the GPS observations. We use dual-frequency GPS receivers, Z-12. Together with the GEONET data provided by GSI, we have so far analyzed GPS data with Bernese GPS software, and revealed the detailed displacement rate field around the Atotsugawa fault and NKTZ. Further, we have proposed a viscoelastic structural model to explain the obtained rate field around NKTZ. The model includes the thin elastic crust just beneath NKTZ. And, for explaining the discontinuity of fault-parallel displacement rate across the Atotsugawa and the Ushikubi faults, we include fault creep with rates of 1.5 mm/yr and 2.0 mm/yr, respectively, estimating the fault creep area from low activity region of micro-earthquake.

In 2002, we set up another dense GPS network crossing the western portion where there has been found no fault creep by EDM measurements. We use low-power consumption dual-frequency GPS receivers, Trimble 5700. The data at 7 sites are observed every 30 seconds and telemetered to Nagoya University through public phones. At one site, since there is no electric power, the solar battery system is used and the data are stored at the site. The data are analyzed with PPP (Precise Point Positioning) in GIPSY. Though the observation period is rather short, the analyzed results are so scattered that it is a little difficult to estimate the stable displacement rates. However, we discuss the detailed displacement rate field around the Atotsugawa fault including these new rate data.