

Seismic waves and crustal deformations of the 2004 Niigataken Chuetsu earthquake observed by kinematic GPS

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We applied a kinematic GPS analysis for the GEOENT data of the 2004 Niigataken Chuetsu earthquake with a 1 s and 30 s sampling. We estimate relative site positions of the GEONET stations in Niigata prefecture every sampling epoch by using RTD, a GPS analysis software. The Geographical Survey Institute keeps the 30 s sampling data, although a trouble of communication lines made the 1 s sampling data lost at the GEONET stations near the epicenter. GPS time-series with 1 s sampling clearly show the seismic waves as well as the permanent displacements (e.g. crustal deformation) at the 950240 stations closest to the epicenter. 30 s sampling data can distinguish between the coseismic deformations of the main-shock and the largest aftershock which occurred 38 minutes after the main-shock. Standard deviations for 30 s sampling data is 6.8 mm, 7.3 mm, and 55.5mm for NS, EW, and UD components during 3 to 6 AM on October 24 at the 960568 station, respectively. Application of a sidereal filtering can reduce standard deviations in the most cases.