

# Seismic waves of the 2004 off-Smatra earthquake detected by GEONET

# Yuki Hatanaka[1]; Toshihiro Yahagi[2]; Toru Yutsudo[2]; Hideki Kojima[2]; Tomomi Amagai[2]; Masao Iwata[1]; Atsushi Yamagiwa[2]

[1] Geographical Survey Institute; [2] GSI

Real-time analysis of 1-Hz GPS data of GEONET stations became possible by reinforcement of GEONET system carried out in FY 2002. Seismic waves of the 2004 off-Smatra earthquake (12/26, M9.0) are detected by test analyses of the 1-Hz data with this system.

14 stations between Nojiri (Miyazaki pref.) Umaji (Kouchi pref.) were selected for the analysis. The 1-Hz dual-frequency data of these stations were analyzed by the software RTNET (GPS Solutions, Inc.) in network mode. Phase ambiguities were resolved based on single-epoch solutions with taking into account the continuity of the ambiguity parameters. Troposphere delay was not estimated and smoothing constraint was loosened so that site coordinates are not filtered. Although the distance between Nojiri and Umaji is too long (about 340km) to resolve ambiguities in usual cases, we could get stable solutions by splitting the baselines into shorter baselines of the 14 stations.

The obtained time-series of relative displacement vector of Umaji relative to Nojiri clearly shows seismic waves of period of about 20 seconds before 01:30UT together with waves of longer period. The maximum peak-to-peak amplitude is 7cm (for north-south component), which is about 0.2 ppm of the baseline length. The results also show Rayleigh waves (R2 and R3) of period of about 4 minutes at around 03:40UT and 04:20UT.

High-frequency GPS observation can complement seismographs since it is good at recording long period up to DC component, and is potentially useful to detect events that are dominated by low frequency component, such like so-called Tsunami earthquakes.