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Crustal deformation data is available via WWW server in real-time

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We started to operate real-time crustal deformation data exchange system between institutions concerned. You can access strain, tilt, barometric pressure, groundwater, gravity, and seismogram data. This system can accept any kind of time-series data including above examples. Only IP connection with a free port is required to send data to our system. Please access to following address, and pass your comments to us for improvements. Any data which can join our system are welcome.

http://crust-db.sci.hokudai.ac.jp/db/login.php

You can access this from anywhere in the world with internet connection and web browsers. ID and password will be issued after your application via above web site. Data is basically open for researchers, and no permission is required for personal use, for example, watching and temporal preliminary analysis. If users try to make public presentation, analysis and/or publication, they should apply to get permission for data usage to institutions which have responsibility for station operation and data production.

Data format is win-packet (Urabe, 1992). JDXnet (Takano et al., 2005), which have been stably used for nationwide real-time seismic waveform data exchange, is also used for our system. Users who have direct connection to JDXnet can receive packet data in real-time using channel-table information. We also offer a unified crustal deformation database system (Yamaguchi et al., 2010) to users who have no direct connection to JDXnet. This database is collecting and storing all exchanging data in real-time, and provides following functions; drawing on any time and sensitivity windows, filtering of high-pass, low-pass and band-pass window (Saito, 1985), tidal and trend analysis using Baytap-G (Tamura et al., 1991), strain analysis, streaming strain analysis (Okubo, 2005), detrending and auto-zero, cumulative amplitude of long duration seismogram, fault mechanisms information archive based on Global-CMT and JMA catalogues.

Strain sensors have follow advantages; having linear response from several Hz to DC component, records represent physical value directly, do not require instrumental response correction operation, no mechanical saturation, and having ultra-high sensitivity. These positive facts suggest real-time operation is preferable than GPS or broadband seismographs which require lead time for pre-analysis and deconvolution.

Real-time Mw estimation is required for effective tsunami warning for Mw>8.5 mega earthquakes and tsunamigenic slow earthquakes. The 2011 Tohoku earthquake revealed current magnitude estimations, including earthquake early warning system, are not proper. Near-field strain seismograms, which contain transient static strain change and dynamic strain waveform, represent strain release due to faulting directly. We are challenging to apply our nationwide strain observation network data to real-time Mw estimation especially for Mw>8.5 mega-events for robust quantitative tsunami warning.

Keywords: Crustal defornation data, Strain meter, Tilt meter, Real-time data exchange, Data open for researchers