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Travel time change of Toki seismic ACROSS signals observed by Hi-net in Tokai area from 2004 to 2012

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Travel time change of Toki ACROSS signals observed by Hi-net in Tokai region from 2004 to 2012 is reported on. At Toki station, the specifications of seismic signal being transmitted since Feb. 2004 are as follows: <Feb.2004 to Feb.2007> FM signal with a carrier frequency of 13.01 Hz, modulation period 50s in the frequency range 10.25-19.45Hz and ˜2700N in spectrum amplitude. <Mar.2007 to ongoing> FM signal with a carrier frequency of 13.005 Hz, modulation period 50s in the frequency range 10.245-19.445Hz and ˜2700N in spectrum amplitude. The signal and operational mode of rotary transmitter with the vertical rotation axis are optimized for acquiring the accurate tensor transfer function data in frequency domain and Green's function in time domain between the source and receivers located anywhere.

The major results observed at Hi-net Yaotsu (11.3km form Toki station) and Hourai (56.9km) are as follows: Travel time changes of maximum amplitude phases (including direct P wave, direct S wave and these later phases) were calculated using the cross-spectral method. Secular change of travel time is imperceptible at Yaotsu station. At Hourai station, travel time of seismic ACROSS signals are decreasing at the rate of about 0.5ms per year in S wave, about 0.3ms per year in P wave for several years now. This result may indicate stress accumulation in crust.

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Keywords: seismic ACROSS, cross-spectrum, seismic velocity change, secular change, The 2011 off the Pacific coast of Tohoku Earthquake