

Real-Time Strong Motion Observation System aiming at the EEW application by CEORKA (The Committee of Earthquake Observation and Research in the Kansai Area)

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The Committee of Earthquake Observation and Research in the Kansai Area (CEORKA), arraying stations throughout the Kansai district, has obtained high resolution seismic records, not only records of major earthquakes (e.g. 1995 Hyogoken-nanbu earthquake, 2000 Tottoriken-seibu earthquake, 2007 Niigataken Chuetsu-Oki earthquake and 2008 Iwate-Miyagi Nairiku earthquake) but also records of moderate ones ($M_{JMA}=2$ or larger) occurred at the near field. Figure 1 shows the location of CEORKA observation sites. The earthquake information, including seismic intensity and waveforms of major earthquake, are published via the Web (<http://www.ceorka.org/>) as needed.

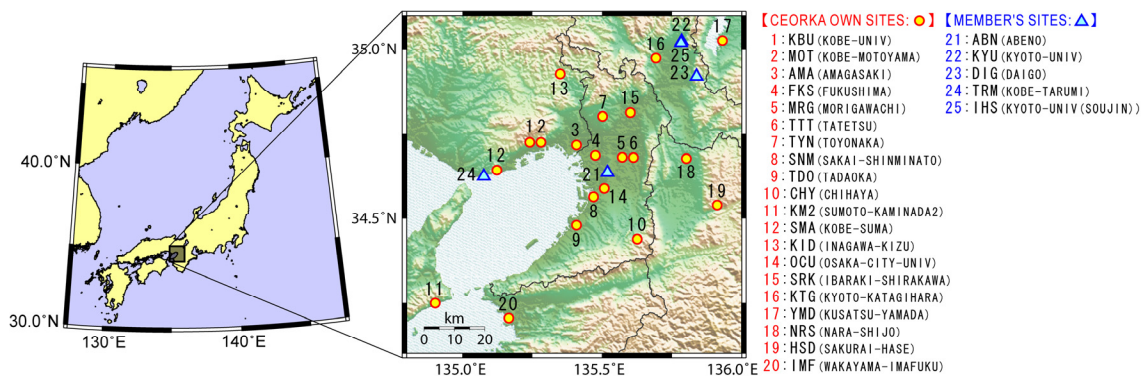
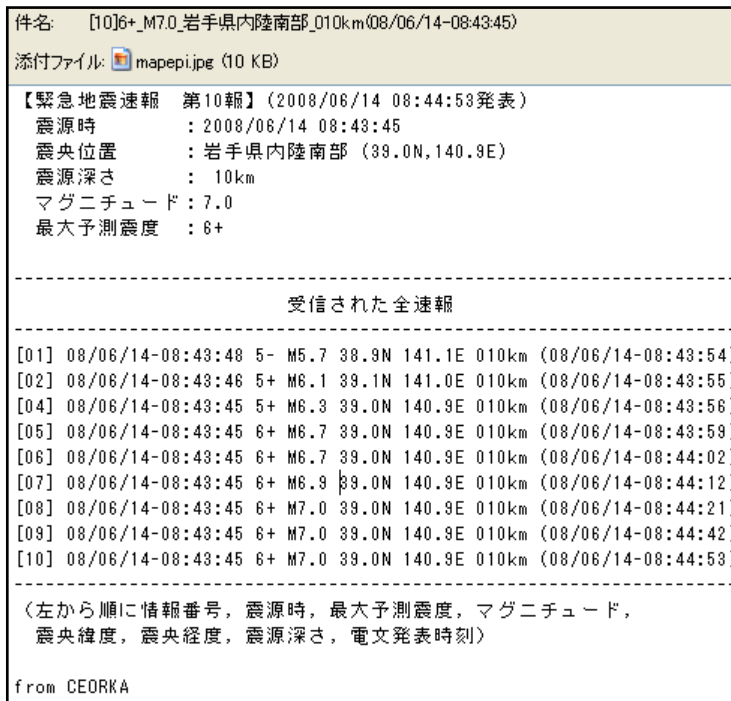


Fig.1 Location of CEORKA observation sites

Additionally, CEORKA is redistributing by e-mail the Earthquake Early Warnings (full version, delivered by JMA to a limited number of qualified users) to CEORKA members. For example, Figure 2 and Picture 1 show the e-mail distributed during 2008 Iwate-Miyagi Nairiku earthquake. The former is for PC, and the latter is for mobile phone. The recipients can guess about estimated location and magnitude of the earthquake by the e-mail subject. The attached figure of estimated epicenter location facilitates understanding of earthquake. Furthermore, the body text of e-mail for

PC contains all distributed telegrams. This system doesn't have immediacy. However, the recipients can quickly guess about the earthquake information.



Attached figure

Body text

Fig.2 E-mail distributed for PC during 2008 Iwate-Miyagi Nairiku earthquake



Subject



Body text

Picture 1 E-mail distributed for mobile phone during 2008 Iwate-Miyagi Nairiku earthquake

The major challenge of the CEORKA network is the data transfer system from observation sites to server. By connection constraint specific to the used data logger, CEORKA is adopting system, which sends observation information to server using phone line after calming of the

earthquake-induced vibration. Therefore, before this system can begin the transfer of data from observation sites to server, it takes a few minutes for small event and tens of minutes or one hour for long time vibrations. Additionally, by constraint of a capacity of memory card installed into the data logger, the recordable time is around one hour.

Currently, we are considering constructing strong motion observation system, which can send observed data in real-time. The expecting specifications of new data logger are as follows.

1. Attachable to the existing sensor.
2. Observed data are transmittable in real-time.
3. Long time recording is possible.
4. High dynamic range.
5. Clock time is corrected by GPS.
6. Long time operable by internal battery during a failure of power supply.
7. Low price.

Figure 3 shows concept of new observation system. Main feature of new observation system is to maintain the existing observation by branching signals of seismometer. By such parallel observation, the observed data are stored by at least one data logger even if another breaks down. Additionally, this system assures the high accuracy of time by using GPS system. The stock-produced data loggers, which sold by manufacturers, have up to 6 functions. However they have high price also. In this March, Osaka Institute of Technology began test observation using a newly-developed low cost data logger (KS-001) at several sites of CEORKA. We will support the test and validate toward official introduction.

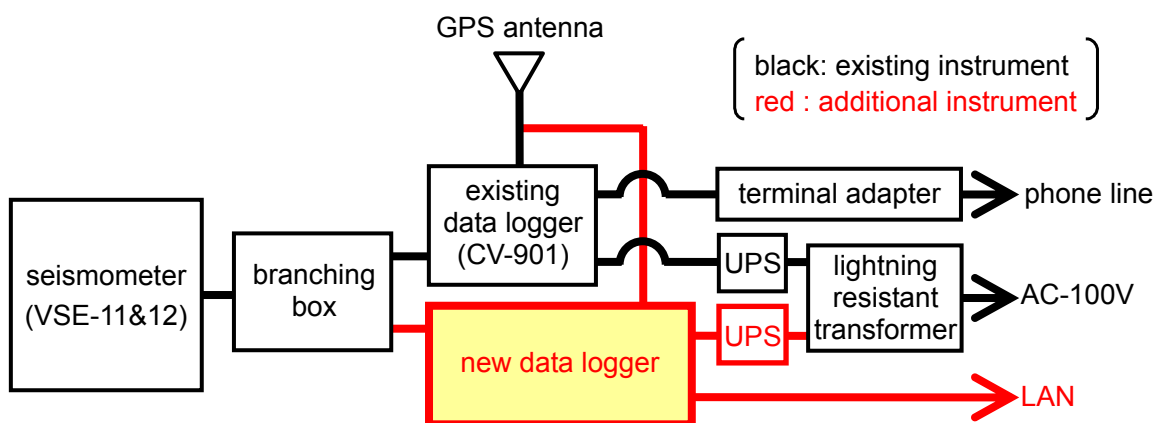


Fig.3 Concept of new observation system