Japan Geoscience Union Meeting 2015
(May 24th - 28th at Makuhari, Chiba, Japan)

SSS24-05 Room:A06 Time:May 27 10:00-10:15

How to utilize the information acquired by home seismometers spread across Japan

NAITO, Shohei[1*] ; NAKAMURA, Hiromitsu[1] ; AZUMA, Hiroki[1] ; FUJIWARA, Hiroyuki[1] ; FUJIMAKI, Shizuko[2] ; KAWANO, Tsubasa[2] ; KACHI, Masaaki[2]

[1]National Research Institute for Earth Science and Disaster Prevention, [2]A2 Corporation

1. Introduction

The Japan Meteorological Agency has started the practical service of Earthquake Early Warining (EEW) system since 2007. But, because of limitations imposed by station spacing and the determination and transmission of earthquake source parameters in real-time, the automatic system cannot issue an EEW to areas within 30 km of the earthquake parameters [Horiuchi et.al (2009)]. So, Horiuchi et.al (2007) pointed out that by spread of home seismometer, the receiving unit of EEW equipped with a CPU and memory, the extra addition of cheap seismometer and A/D converter, we would have over 10 times of the number of the current seismic stations, also we can get more rapid warning information near focal areas.

Yamamoto et.al (2007) also issued about the development of the home seismometer, an inexpensive, compact and user-friendly EEW intelligent system based upon a MEMS accelerometer. Besides, Nakamura et.al (2008) reported about demonstration test in house to observe seismic signal and noise. Furthermore, Horiuchi et.al (2008) developed a function in the home seismometer to discriminate seismic signal from noise event. Moreover, A2 Corporation have been provided the EEW information service for a price by utilization of the home seismometer and these research achievements.

In this study, we issue about the number of the adoption of home seismometers, also consider how to utilize the information acquired by them.

2. Diffusion of home seismometers

At the point of 2014, 7 years have passed since the first release, there are approximately 4,000 home seismometers in Japan. The distribution of locations are heterogeneous. The urban areas located around Kanto, Osaka, and Noubi Plain are densely installed. On the other hand, there are many sparse installed areas in a thinly populated area such as island or mountain.

3. Utilize the information acquired by home seismometers

For the purpose of estimating seismic damages and delivering information with a high degree of accuracy, we have been provided data recorded when approximately 8,700 earthquakes happens from A2 Corp. Meanwhile, we have to take into account how to utilize these data because they have considerable variation factors, for example, soil conditions, building structures, settings, surrounding noises.

For an experiment, Figure 1 shows a plot of JMA intensity versus epicentral distance using a number of seismic waves recorded by home seismometers and K-NET / KiK-net stations. Each data have nearly consistent tilt, but home seismometers show higher dispersion.

In consideration of these dispersion, it will be possible to utilize data recorded by home seismometer by using of interpolate K-NET and KiK-net data. So, we are going to research about the way to decrease these dispersion, and think about the way to utilize data for the purpose of estimating detailed seismic damaged areas and delivering information in real time.

Reference

Shigeki Horiuchi et.al: Home Seismometer Spread Plan, JPGU, 2007.

Shigeki Horiuchi et.al: Home seismometer for earthquake early warning, Geophysical Research Letters, Vol.36 No.5. L00B04, 2009.

Shunroku Yamamoto et.al: Making of home-seismometer and its performance, JPGU, 2007.

Hiromitsu Nakamura et.al: Measurement performance of Home-seismometer and its demonstration test in house, JPGU, 2008.

Shigeki Horiuchi et.al: Development of a function in the home seismometer to discriminate seismic signal from noise event(2), JPGU, 2008.

Keywords: Home Seismometer, EEW, MEMS

SSS24-05 Room:A06 Time:May 27 10:00-10:15