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STT56-P08 Room:Convention Hall Time:May 19 18:15-19:30

Seismograms observed by a strong-motion seismograph at Matsushiro

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At Matsushiro Seismological Observatory, a strong-motion seismograph started from September, 1951 (Yamazaki and Kobayashi, 2006), and a strong motion seismograph has been working still now.Many of the earthquake records on strong-motion seismograph were recorded by the Matsushiro Earthquake Swarm. Matsushiro Earthquake Swarm started in August, 1965 at the Matsushiro town in the Nagano city. The greatest magnitude of Matsushiro Earthquake Swarm was 5.4 which occurred on April 5, 1966.Except the Matsushiro Earthquake Swarm, a few earthquake records on strong-motion seismograph were recorded by large earthquakes with serious damage in Japan, such as the 1995 Southern Hyogo Prefecture Earthquake, the 2004 Mid Niigata Prefecture Earthquake, and the 2011 Off the Pacific Coast of Tohoku Earthquake.In the foreign earthquake, very few earthquake records on strong-motion seismograph were recorded by very large foreign earthquake with serious damage, such as the Off of Sumatra Earthquake of Indonesia on December 26, 2004 and the Sichuan Earthquake of China on May 12, 2008.In order to use these analog records practically, we investigated seismic waveforms on the strong-motion seismograph.

(1)Magnitude

In domestic 628 earthquakes, the minimum magnitude of 346 earthquakes recorded by strong-motion seismograph in the Matsusiro Earthquake Swarm is about magnitude 3, that of 25 earthquakes recorded by strong-motion seismograph around Nagano Prefecture is about magnitude 4 and that of 257 earthquakes recorded by strong-motion seismograph outside of Nagano Prefecture is about magnitude 5.In foreign 52 earthquakes, the minimum magnitude is more than 7. The furthest earthquake recorded by strong-motion seismograph was near India on January 26, 2001(magnitude7.7).

(2) The number of events with each area

When we divided Japan into East Japan and West Japan with the boundary of Nagano Prefecture except the outskirts of Nagano Prefecture, 221 events are in the East Japan and 36 events are in the West Japan.In the foreign earthquakes, 16 events are around the Kuril Islands, 3 events are around the Vladivostok, 4 events are around the Aleutian Islands, 4 events are around the Micronesia, 7 events are around the Philippine Islands, 10 events are around the Indonesia Islands, 6 events are in the China and 2 events are around the India. Frequency of events is biased in each area.

(3) The waveform feature of strong-motion seismogram

In Japan earthquakes, the maximum amplitude and the period of strong-motion seismograph by Matsushiro Earthquake Swarm on April 5, 1966 were about 5 mm and 1-2 seconds, these of strong-motion seismograph by the Southern Hyogo Prefecture Earthquake on January 17, 1995 were about 9 mm and 4-5 seconds, these of strong- motion seismograph by the Mid Niigata Prefecture Earthquake on October 23, 2004 were about 6 mm and 2-4 seconds and these of strong-motion seismograph by the Off the Pacific Coast of Tohoku Earthquake on March 11, 2011 were about 20 mm and 4-7 seconds.In foreign earthquakes, the maximum amplitude and the period of strong-motion seismograph by the Off of Sumatra Earthquake on December 26, 2004 were about 2 mm and 15-20 seconds, these of strong-motion seismograph by the Sichuan Earthquake on May 12, 2008 were 1 mm and 10-15 seconds.In Japan and foreign earthquakes, we have no over-scale strong-motion seismograph. When magnitude of earthquake was larger than 8, the period of strong-motion seismograph was longer than 35 seconds.

For this reason, the strong-motion seismograph were recorded by large earthquakes with serious damage in domestic and foreign earthquakes, and the earthquake with the largest amplitude was the Off of the Pacific Coast Tohoku Earthquake on March 11, 2011.

Keywords: strong-motion seismograph, magnitude, maximum amplitude, period

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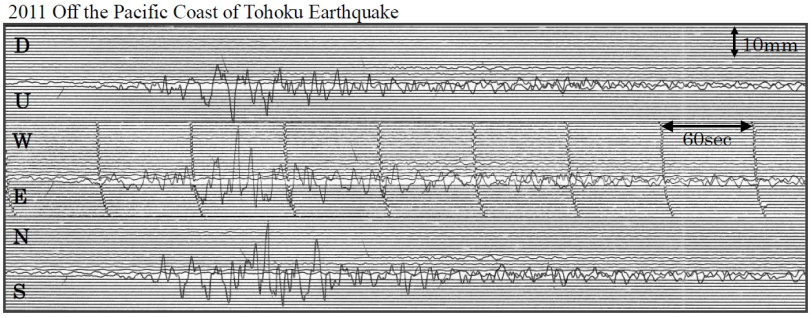
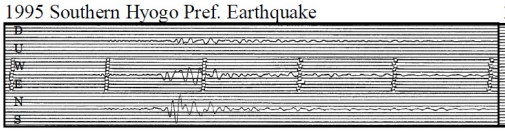
2011 Off the Pacific Coast of Tohoku Earthquake



1995 Southern Hyogo Pref. Earthquake



2004 Mid Niigata Pref. Earthquake