

Temporary observation of micro earthquakes in the northern Ibaraki prefecture by using ready-made IC recorders

Keisuke Saito^{1*}, Kei Katsumata¹

¹Institute of Seismology and Volcanology, Hokkaido University

In order to obtain high quality focal mechanism solutions for earthquakes by using P-wave first-motion polarity data, a dense seismic observation network is required. In this study we propose a new seismic observation system to record a P-wave first-motion polarity. The system consists of a seismometer with a vertical component that price is approximately ten thousand yen and a commercially-supplied IC recorder that price is approximately ten thousand yen. According to the specification of the IC recorder, the recordable frequency band is from 60 to 3400 Hz, Katsumata and Okayama (2012) showed that the IC recorder is able to record seismic waves with a frequency as low as 10 Hz.

In this study, we conducted a temporary observation of micro-earthquakes for one month in the northern Ibaraki prefecture where is the high seismicity area, and addressed the effectiveness of the seismic observation system. The 29 seismic stations were deployed along a road so that it allows a deployment of many stations for a short time. Based on the P-wave first motion polarity, we estimated the focal mechanisms by using HASH program (Hardebeck and Shearer, 2002). In this study, we also use the polarity data recorded at the Hi-net stations that constructed by National Research Institute for Earth Science and Disaster Prevention. We estimated the four focal mechanisms for micro-earthquakes occurred in the study area. Focal mechanisms determined by both Hi-net and the temporary stations were compared with those determined by only Hi-net stations. As a result, we found that focal mechanisms including the temporary stations are more accurate.

For future study we research the frequency specification of the IC recorder in detail, and determine more focal mechanism solutions in the study area. The problems are whether most of them show the normal-faulting type, and whether the seismic observation system developed in this study is really valuable for the studies of focal mechanism.

Keywords: IC recorder