

The long-period ground motion between P and S arrivals observed by the deep borehole strainmeters and stressmeters

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We deployed multi-component borehole instruments equipped with strainmeters and/or stressmeters around the Tono Research Institute of Earthquake Science (TRIES). We recorded the continuous data at a rate of 1-50 Hz for these instruments. In these records, we observed the long-period variations between P and S arrivals from large earthquakes. In order to investigate the nature of these long-period variations, we estimated the dominant periods of these variations. After we manually picked the P and S wave arrivals for each waveform, we calculated spectrum of the records between P and S wave arrivals. We found that the dominant periods of these long-period variations are typically a few tens seconds. Though W phase (Kanamori, 1993) is well known as the long-period phase between P and S arrivals, the periods of W phase are usually hundreds seconds or more, and are longer than our observed dominant periods. We consider that the observed long-period variations are responsible for other effects, such as PL wave caused by the leaking mode (Yoshii, 1970). These long-periods variations are also recorded by seismometers equipped with the same borehole instruments installed in deep borehole. The long-periods variations observed at seismometers, however, will be clearly found, after we applied the bandpass (0.01 -0.1 Hz) filter. Because the strainmeters and stressmeters have enough sensitivity to DC, we consider that the strainmeters and stressmeters are also useful to detect the long-period ground motions. We will present the results obtained from the analysis.

Keywords: long-period ground motion between P and S arrivals, strainmeters, stressmeters, borehole