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受け盤大規模岩盤地すべり地における地震観測
Seismic observation in a large, incipient rockslide on an anaclinal slope

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Japan has experienced mega earthquakes and catastrophic coseismic landslides (e.g. the 2004 Niigata Chuetsu earthquake and the 2011 off the Pacific coast of Tohoku Earthquake). However, it is not well understood how the slopes behave under strong shaking because seismic observations on the slope are crucially insufficient.

In 2014, we started seismic observations in Kawashimo landslide, a large, incipient rockslide on an anaclinal (infacing) slope in Ehime Prefecture, southwest Japan. The length, the relative height and the width of the Kawashimo landslide are approximately 700 m, 450 m and 150 m, respectively. On the lower side of the landslide, rocks are highly fractured so that long cracks are densely observed. We installed two seismometers there, with the separation distance of 30 m. Ten earthquakes with high signal to noise (S/N) ratios were recorded from Oct. 30, 2014 to Jan. 7, 2015. We first calculated the spectra using the waveforms of ten seconds after the twice of S times because scattering waves are considered to be coming from all the directions in this time window. Then, we took the spectral ratios of two horizontal components to the vertical one for the purpose of cancellation of source spectra. The obtained spectral ratios are stable among ten earthquakes we analyzed, regardless of their back-azimuths. Horizontal components have a spectral peak around 7 Hz at both stations but the peak values of the spectral ratios are larger in NS components than in EW at one station, indicating that dip direction of the slope and/or shape of the landslide block may affect the characteristics of slope vibration. These results will provide basic information for considering the motion of the landslide materials on a slope during earthquakes.