Earthquake ground motion properties of mountainous district in Totsukawa village, Nara pref. based on the seismic observation –A fundamental study of landslides caused by earthquake –

*Tomoyuki Iida[1], Ryuji Yamada[1], Shigeki Senna[1], Hidemitsu Tokui[2], Tetsuya Onodera[2], Hiroshi Kawabe

1. National Research Institute for Earth Science and Disaster Prevention, 2. Technicallink Kabushiki kaisya

The quantity of seismic information has been accumulated enormously in Japan since seismometer networks, such as K-NET or KiK-net, were completed nationwide. However, most of seismometers are installed in the plain area or hill area, and there are extremely few seismometers installed in the mountainous area where landslides may occur. Therefore, the information about earthquake ground motion properties in the mountainous area, such as the amplification characteristic which may greatly influence landslides, is not enough. It is expected that factors such as the relative position of topography will affect earthquake ground motion properties in the mountainous area together with the ground structure such as AVS30 (the average shear-wave velocity in the upper 30 m). Therefore, we pay particular attention to the influence of topography on earthquake ground motion properties and continuously observe earthquake ground motions at the ridge.

NARH01, one of the KiK-net observation spots, is situated on the ridge which extends to the east and west direction. Two seismometers are installed on NARH01, one is on the surface and another one is underground of approximately 100-m depth. The geology of this area is accretionary wedge called the Shimanto layer. We installed accelerometers (Hakusan industry JU210) in four places of around NARH01 and started the earthquake observation continuously from November, 2017, in order to supplement the observation data of NARH01 and grasp earthquake ground motion properties at each part of the slope. Setting points of the accelerometers are located at the direct perigee of the NARH01 (823 m above sea level), the east-west point on the eastern ridge along the extension of the ridge line (733 m), the north-south point on the northern slope perpendicular to the ridge line (670 m), and the valley bottom (565 m).

During the observation period over one year, we could observe four small earthquakes that were also observed by NARH01 (one of them is the North Osaka earthquake on June 18th, 2018). The result of Fourier spectrum analysis shows that amplification properties of the earthquake ground motion will be affected by the topography, ground structure, and relative position of epicenter.

Keywords: earthquake ground motion, landslide, seismic observation, amplification property, Totsukawa-village, Nara pref.

