



Testing seismic ambient noise monitoring of ground water level on slow-moving landslide area

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Partial liquefaction is one of the most important parameter for studying the trigger mechanism of landslide. Therefore, the continuously monitoring of groundwater level (GWL) on landslide area is needed for a purpose of the early warning of landslide. Compared to the in-situ gauge station of water level, seismic ambient noise monitoring provides a possible solution to measure the GWL, which has been highlighted by recent studies. Our study deployed a few seismic stations on two slow-moving landslide area to test the feasibility of invasive seismic technique. Our analysis can be divided into four steps: (1) Comparing the noise cross-correlation function (NCF) extracted by traditional cross-correlation method (CC) and phase cross-correlation scheme (PCC), (2) testing the data quality between daily NCF and hourly (24-hours) stacked NCF, (3) measuring the relative seismic velocity changes (dv/v) and (4) investigating the relationship between dv/v and GWL. For the wushe landslide area, dv/v with the largest reduction of 0.5% can be measured during the heavy rainfall, coinciding with the GWL of 0.8 m increasing. Our study also highlighted the high potential to use ambient noise monitoring for the GWL measurement on slow-moving landslide area.

Keywords: liquefaction, groundwater level (GWL), noise cross-correlation function (NCF), phase cross-correlation(PCC)