



Fluvial monitoring using seismometers: A case study in the Aiyuzi River, central Taiwan

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The fluvial processes including erosion, sediment transport, and deposition, control the evolution of geomorphology and anthropogenic activity close to the river. Hydrological Investigating can help us to observe fluvial processes in different conditions, especially during flood events. Although conventional on-site hydrometric monitoring can provide essential hydrodynamic data, the low sampling rate only provides low time-resolution data (i.e. one data per hour). In the past two decades, many pioneers attempted to applied monitor environmental tremors using seismometers. In this study, we analyze the hydrological data and ground motion signals observed along the Aiyuzi River, a small mountainous stream in central Taiwan. We find the ground motion induced by fluvial processes can be recorded by the seismometers deployed close to the river channel. Horizontal-component of signals is more apparent than vertical-component, which demonstrates that the propagation of energy induced by fluvial processes is through the Rayleigh Wave. In the time domain, the amplitude of ground motion has a great correlation with hydrological data. In the frequency domain, the power spectrum density with frequency-band from 10 Hz to 40 Hz is more sensitive to the hydrological data in the Aiyuzi River. The results show the possibility and provide an insight new method of using seismometers to monitor fluvial processes.

Key words: Seismometer, Flood event, Stream monitoring, fluvial processes