

Development and validation of a low-cost three-component recorder for H/V method application

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The application of the Horizontal-to-Vertical (H/V) spectral ratio method requires a minimum equipment that consists in a triaxial sensor and a portable recorder system with at least three digitization channels. There are many commercial recorder systems but they are usually so expensive, which means that not all institutions can access to this kind of equipment.

In this work, a low-cost three-component seismic noise recorder has been implemented. The developed equipment consists of the following parts: an Arduino Due board which includes an analog to digital converter; a SD (Secure Digital) Shield for data storage; an anti-aliasing filter and two amplifiers for signal conditioning. The developed seismic noise recorder is complemented by a user-friendly graphical user interface (GUI), which has been developed for the data acquisition management, such as the selection of the voltage gain, the sampling frequency, etc.

In order to validate the developed acquisition system, seismic noise was recorded in several sites where the H/V response had been obtained previously using different commercial equipment for the data acquisition. In all the cases, the sensor used was a Mark L4 3D sensor, which assures the comparison of the acquisition system. The good agreement between the estimated H/V curves and the previous results shows that the developed system can perform successfully seismic noise records in order to apply H/V method.

The computer code and the electronic hardware are open source and open hardware, with the aim of allowing any researcher to implement it for educational or research purposes.