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A complete characterization of 27 OSOP Raspberryshakes performed at EOST Seismic Instrumentation Facility

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In the scope of SeismoCitizen project, 17 Raspberry Shake 3D (3 components geophone), 5 Raspberry Shake 1D (1 vertical geophone) and 5 Raspberry Shake 4D (3 components MEMS accelerometer and 1 vertical geophone) have been fully characterized at the EOST Seismic Instrumentation Facility, before field deployment.
Its missions are to test and characterize seismic instrumentation. It can handle unitary broad-band acquisition systems as a consequent batch of instruments dedicated to dense arrays. For those purposes, some basic tasks have been automated, like acquisition, backup and retrieval data. The seismometers were all tested on a dedicated concrete pier, close to a calibrated reference sensor.
To characterize the complete transfer function of the 27 units, we performed an adapted calibration relative to the reference using ground motion, whose algorithm includes a statistical sorting of inconsistent values. Regarding the self-noise, we used a well-known correlation analysis technique, normally using signal from 3 colocated sensors, here upgraded by using more sensors to get a better estimation resolution.
For each instrument, we computed its individual transfer function and self-noise. We therefore calculated the expected error with respect to the nominal response and a standard self-noise model for each type of sensor. We finally highlighted the advantages and disadvantages of such all-in-one systems, and their potential implications in scientific studies.