



Design and first tests of a Macroseismic Sensor System

Ewald Brueckl (1), Stefan Polydor (2), Klaus Ableitinger (2), Walter Rafeiner-Magor (2), Werner Kristufek (2), Stefan Mertl (3), and Wolfgang Lenhardt (4)

(1) Department of Geodesy and Geoinformation, TU Wien, Vienna, Austria, (2) TGM - Technisches Gewerbemuseum, Vienna, Austria, (3) Mertl-Research, Vienna, Austria, (4) Zentralanstalt für Meteorologie und Geodynamik, Vienna, Austria

Seismic observatories are located in remote, low-noise areas for good reason and do not probe areas of dense and sensitive infrastructure. Complementary macroseismic data provide dense, qualitative information on ground motion in populated areas. Motivated by the QCN (Quake Catcher Network), a new low-cost sensor system (Macroseismic Sensor System = MSS) has been developed to support the evaluation of macroseismic data with quantitative information on ground movement in populated and industrial areas. Scholars, alumni and teachers from a technical high school contributed substantially to this development within the Sparkling Science project Schools & Quakes and the Citizen Science project QuakeWatch Austria.

The MSS uses horizontal 4.5 Hz geophones and 16Bit AD conversion, and 100 Hz sampling, formatting to MiniSeed, and continuous data transmission via LAN or WLAN to a server are controlled by an integrated microcomputer (Raspberry Pi). Real-time generation of shake and source maps (based on proxies of the PGV in successive time windows) allows for differentiation between local seismic events (e.g., traffic noise, shock close to the sensor) and signals from earthquakes or quarry blasts. The inherent noise of the MSS is about 1% of the PGV corresponding to the lower boundary of intensity $I = 2$, which is below the ambient noise level at stations in highly populated or industrial areas. The MSS is already being tested at locations around a quarry with regular production blasts. An expansion to a local network in the Vienna Basin will be the next step.