



A new dataset of Wood Anderson magnitude from the Trieste (Italy) seismic station

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The standard torsion Wood Anderson (WA) seismograph owes its fame to the fact that historically it has been used for the definition of the magnitude of an earthquake (Richter, 1935). With the progress of the technology, digital broadband (BB) seismographs replaced it. However, for historical consistency and homogeneity with the old seismic catalogues, it is still important continuing to compute the so called Wood Anderson magnitude. In order to evaluate WA magnitude, the synthetic seismograms WA equivalent are simulated convolving the waveforms recorded by a BB instrument with a suitable transfer function. The value of static magnification that should be applied in order to simulate correctly the WA instrument is debated. The original WA instrument in Trieste operated from 1971 to 1992 and the WA magnitude (MAW) estimates were regularly reported in the seismic station bulletins. The calculation of the local magnitude was performed following the Richter's formula (Richter, 1935), using the table of corrections factor unmodified from those calibrated for California and without station correction applied (Finetti, 1972). However, the WA amplitudes were computed as vector sum rather than arithmetic average of the horizontal components, resulting in a systematic overestimation of approximately 0.25, depending on the azimuth. In this work, we have retrieved the E-W and N-S components of the original recordings and re-computed MAW according to the original Richter (1935) formula. In 1992, the WA recording were stopped, due to the long time required for the daily development of the photographic paper, the costs of the photographic paper and the progress of the technology. After a decade of interruption, the WA was recovered and modernized by replacing the recording on photographic paper with an electronic device and it continues presently to record earthquakes. The E-W and N-S components records were memorized, but not published till now. Since 2004, next to the WA (few decimeters apart), a Guralp 40-T BB seismometer was installed, with a proper period extended to 60 s. Aim of the present work is twofold: from one side to recover the whole data set of MAW values recorded from 1971 until now, with the correct estimate of magnitude, and from the other side to verify the WA static magnification, comparing the real WA data with the ones simulated from broadband seismometer recordings.