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Reevaluation of earthquakes magnitude for the main seismic zones of Romania

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The seismic activity on the Romanian territory consists of both shallow and intermediate-depth earthquakes. The subcrustal activity is concentrated at the bend of the Carpathian arc (Vrancea region) within a confined focal volume in the depth range from 60 to180 km. The crustal seismicity is moderate and more scattered in comparison with the intermediate-depth one.
In this paper we approached the problem of the homogeneous determination of local magnitude for earthquakes from the main seismic zones of Romania (Vrancea, Fagaras Mountains, Banat, Transylvania, Dobrogea and Romanian Plain). A database of waveforms digitally recorded is collected to this aim. Wood-Anderson amplitudes are deduced from the available data and the maximum peak-to-peak amplitudes are measured on the horizontal components of the broad-band sensors to define the local magnitude scale.
The duration magnitude (MD) is used as reference to calibrate the new magnitude scale based on amplitudes. The new coefficients are estimated through a multiple regression method.
Our tests show that the new magnitude scale significantly improves the earthquake size evaluation and stability as compared with the size measure obtained by present-day procedures at the National Institute for Earth Physics.