

Romanian Historical Earthquakes: Observation, Recording and Study. What it was done and what will be done

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Romania has a long tradition of observing, recording and studying historical earthquakes using both macroseismic methods and instrumental techniques. Beginning with the first instruments mounted in Bucharest by Hepites in 1895 (Tacchini Guzzanti microseismoscope and a Tacchini pendulum) a large number of stations and seismological observatories were founded in Romania along the last century; e.g. Timisoara (1902), Cluj-Napoca (1911), Focşani, Bacău (1942) (1942), Câmpulung Muscel (1943), Iaşi (1951) and Vrancea (1952). In Romania there are two important archives (seismograms and bulletins) at Timisoara and Bucharest with hundreds of thousands of historical seismograms obtained on smoked paper, photo paper or ink records. Both have made a significant contribution in EuroSeismos 2002-2007 and Neries-Sismos 2008-2009 Projects. Researchers involved in the two projects have exploited the Sismos and EuroSeismos databases (digitized seismograms and bulletins) and have conducted a series of studies on Romanian historical earthquakes helping to improve seismicity, hazard and seismotectonic models, by reviewing and updating the focal parameters (locations, focal depths, M_w , focal mechanisms). Using all the data they have obtained valuable results that have extended the instrumental catalogue for crustal Romanian earthquakes back in time to the beginning of the 20th century. There were determined for the first time the focal mechanisms of several historical earthquake using different modern inversion techniques based on instrumental data (polarities, synthetic seismograms, moment tensor) and on the macroseismic data (shape of isoseismals of maximum intensity). There were also instrumentally calibrated the macroseismic attenuation relations for crustal earthquakes from the Western half of Romania (project partnership SHARE 2009-2012) using recent macroseismic and instrumental data. Using these new relationships and primary macroseismic data, there were relocated historical earthquakes occurred before 1900 and there were determined M_w and focal depths on a high quality processing support (MEEP-Musson and Jimenez 2008 and Bakun and Wentworth, 1997 methods). In addition, these results have thus allowed a mutual validation of focal parameters of historical earthquakes obtained by the two methods, macroseismic and instrumental respectively. The National Institute of Earth Physics has also achieved a database still in development (www.archive.infp.ro) which contains seismograms and seismic bulletins in digital format. Until now they were scanned and archived tens of thousands of seismograms and the bulletins of Romanian seismic stations. It is intended in the future i) the continuation of the review of all Romanian historical earthquakes using the same procedure, all available instrumental data (seismograms, bulletins) and macroseismic data (original data, historical context studies) and ii) the finalizing of the historical digital database.