SHEEC 1000-1899 structure description

A. Rovida and M. Stucchi, January 2013

Introduction

For the purpose of harmonizing seismic hazard across Europe, the SHARE Project required a homogeneous catalogue based on the most updated knowledge, compiled in terms of Mw, by means of transparent and repeatable procedures, and with uncertainty estimates of the main parameters. As a collaborative project, SHARE also required to consider the regional knowledge supplied by the best regional, current catalogues.
To fulfill these requirements, for each earthquake in SHEEC 1000-1899 two sets of main parameters (lat, lon, h, Io, Mw) have been determined, together with their uncertainty, according to two approaches:

dataset (1) parameters determined by SHARE Task 3.1, processing MDPs (Macroseismic Data Points) with homogeneous, repeatable procedures supplying location, Mw and uncertainty estimates;

dataset (2) parameters determined adopting or processing the parameters of the most reliable regional catalogues; in particular, whenever possible, Mw has been assessed from the epicentral intensity (Io) provided by the regional catalogues coherently with dataset (1).

The SHEEC 1000-1899 parameters have been determined from dataset (1) and dataset (2) as follows:

- the epicentral parameters (latitude, longitude, uncertainty) have been selected from either dataset (1) or (2) according to a priority scheme;
- the Mw value and related uncertainty has been:
  a) determined as the weighted mean of datasets (1) and (2), when are both available;
  b) obtained from dataset (1), when it is the only available one;
  c) obtained from dataset (2), when it is the only available one.

The compilation of datasets (1) and (2) and the strategies for the determination of the final SHEEC parameters are fully described in Stucchi et al. (2012). This document describes the format of the catalogue file and website, focussing on how the different data sources and sets of parameters are compiled.

Earthquake number (*En*)

The *Earthquake number* represents the unique identifier of a catalogue entry; numbers respect the chronological order of the earthquakes.

MDPs source (*MDPsSource, Nmdp, Ix*)

The MDPs source is the source that provides the MDPs processed to obtain parameters dataset (1), as described in Stucchi et al. (2012). For the earthquakes for which MDPs are available, the catalogue supplies: i) the short bibliographical reference of the study providing MDPs (*MDPsSource*), ii) the number of provided MDPs (*Nmdp*), and iii) their maximum macroseismic intensity (*Ix*). The full list of MDPs sources is presented in Table 1.

Source catalogue (*CatSource*)
The source catalogue is the one that provides the parameters from which dataset (2) has been determined, as described in Stucchi et al. (2012). Whenever dataset (2) is available, the column *CatSource* contains the short bibliographical reference of the source catalogue. The full list of source catalogues is presented in Table 2 (see also Appendix 2 in Stucchi et al., 2012).

Origin time (*Year, Mo, Da, Ho, Mi*)
The earthquake origin time is taken either from 1) the MDPs source for all the events for which it is available, or 2) from the source catalogue.

Epicentral area (*Ax*)
The epicentral area represents a conventional geographical denomination to identify, together with the origin time, an earthquake. In SHEEC 1000-1899 it derives from the homogenization of the denomination provided by i) the MDPs source for all the events for which it is available, or ii) the source catalogue, in all other cases. When not available from the selected source, it was compiled in accordance with that of earthquakes located in the same area. The epicentral areas compiled by SDHARE are between square brackets.

Region of macroseismic attenuation (*Reg)*
The codes in this column define the five regions for which were derived both macroseismic intensity attenuation models for the MDPs processing and the Mw(Io) regressions (for details see Table 3 and Stucchi et al., 2012):

- *SCR*: stable continental
- *WAP*: Western Alps and Pyrenees
- *BET*: Betic
- *APD*: Apennines, North-Eastern Alps and Dinarides
- *BAS*: Broad Aegean, shallow

For the four remaining regions - *ICE* (Iceland), *BAI* (Broad Aegean, intermediate), *TSZ* (Transform Source Zone Offshore Portugal), and *VRD* (Vrancea, deep events) - no attenuation model was derived; in these cases the code represents a geographical indication only.

Epicentre (*Lat, Lon, TEpi*)
The epicentral location (in decimal degrees) has been adopted either from i) MDPs processing - dataset (1), or ii) the source catalogue - dataset (2). Details on the selection criteria of the determination of the epicentre are given in Stucchi et al. (2012). The column *TEpi* contains the following codes:

- *bx*: SHARE determination from MDPs with Boxer (Gasperini et al., 1999; 2010)
- *bw*: SHARE determination from MDPs with B&W (Bakun and Wentworth, 1997)
- *me*: SHARE determination from MDPs with MEEP (Musson and Jiménez, 2008)
- *cat*: from the source catalogue (see *CatSource*)
- *prel*: preliminary epicentre of events for which no magnitude was assessed.

When the source catalogue is Baumont and Scotti (2011), *Lat*, *Lon*, and *Io* are from SisFrance (2010), as specified by the authors.
For the earthquakes for which no Mw value has been determined (because background information is contradictory), preliminary locations were adopted ("*prel*" in the column *TEpi*) for mapping purposes, only.

Epicentral uncertainty (*LatUnc, LonUnc, TEpiUnc*)
The epicentral uncertainty is expressed in km, in both latitude and longitude. It was compiled according to the codes reported in the column *TEpiUnc*:

- *orig*: values directly resulting from the MDPs processing or taken from the source catalogue when it expresses epicentral uncertainty with values in km;
- *conv*: values derived from the conversion of the uncertainties expressed in decimal degrees by the source catalogue or from translating the uncertainty classes given by the source catalogue;
- *def*: default values assessed by the SHEEC compilers for the following cases: i) the number of MDPs is too small to allow the MDPs method to calculate the uncertainty; ii) the uncertainty in the source catalogue is not directly convertible into km; iii) the source catalogue does not assess any uncertainty.

For each source catalogue, Table 4 supplies details on how the original uncertainties were converted or assessed.

Depth (*H, HUnc, TH*)
Depth values and related uncertainties are expressed in km. They are taken from the source catalogue ("*cat*" in the column *TH*) or determined from MDPs processing by MEEP only ("*me*" in the column *TH*).

Epicentral intensity (*Io, TIo*)
Epicentral intensity is taken from the source catalogue ("*cat*" in the column *TIo*) or determined from MDPs processing by Boxer only ("*bx*" in the column *TIo*).

SHEEC moment magnitude (*Mw, TMw*)
The columns contain the moment magnitude values of SHEEC (*Mw*) and the type of determination (*TMw*). The SHEEC Mw values are obtained from the SHARE MDPs processing (*MMw*) and/or from processing the source catalogue (*CMw*); the values of *MMw* and *CMw*, with their type and uncertainty are given in the last columns, for the sake of clarity.
The SHEEC Mw values have been determined according to one of the following rules:

a) when both *MMw* and *CMw* are available, SHEEC Mw has been determined as their mean, weighted as follows (see also Appendix 2 in Stucchi et al., 2012):
    - a weight of 0.75 has been given to *MMw* and a weight of 0.25 to *CMw*;
    - the opposite weighting scheme, i.e. 0.25 for *MMw* and 0.75 for *CMw*, has been adopted for the entries from Baumont and Scotti (2011) and from Fäh et al. (2011), since these catalogues are compiled - in their turn - making use of MDPs;
b) when only *MMw* is available, it has been adopted;
c) when only *CMw* is available, it has been adopted.

The origin of the SHEEC Mw is explained by the codes in the column *TMw*:

- *wm* weighted mean of *MMw* and *CMw*;
- *MMw* determined from SHARE MDPs processing
- *CMw* determined processing the original size parameters of the source catalogue
- *nd* not determined, because the background information on the event is contradictory.

SHEEC moment magnitude uncertainty (*MwUnc*)

SHEEC Mw uncertainty is assessed according to the following rules:

a) when *TMw* = *wm*, *MwUnc* is calculated as the square root of the sum of the squares of the uncertainties, each multiplied by its own assigned weight:

$$MwUnc = \sqrt{w_m * MMwUnc^2 + w_c * CMwUnc^2}$$

where *MMwUnc* and *CMwUnc* are the uncertainties of the magnitude values determined, respectively, from MDPs and from the regional catalogues, and w_m and w_c are the weights respectively assigned to them.

b) when *TMw* = *MMw*, the value in *MMwUnc* has been adopted;

c) when *TMw* = *CMw*, the value in *CMwUnc* has been adopted.

Moment magnitude from the SHARE, MDPs processing (*MMw, TMMw, MMwUnc*)

The moment magnitude from the SHARE MDPs processing has been determined with three methods calibrated in each of the five regions reported in column *Reg*. The selected method is specified by the codes in column *TMMw*:

- *bx*: SHARE determination from MDPs with Boxer
- *bw*: SHARE determination from MDPs with B&W
- *me*: SHARE determination from MDPs with MEEP

The magnitude uncertainty (*MMwUnc*) provided by the selected method has been adopted, as it is, if larger than 0.3; otherwise it has been fixed at 0.3. The same value has been adopted when the MDPs methods fail to compute the uncertainty.

Moment magnitude from the source catalogue size parameters (*CMw, TCMw, CMwUnc*)

The moment magnitude (*CMw*) from the source catalogue size parameters has been determined as specified by the codes in column *TCMw*:

- *wor*: *CMw* is the original Mw from the source catalogue, when an Mw is provided;
- *RIo*: *CMw* is obtained from the conversion of the Io value provided by the source catalogue with the Mw(Io) regression of the attenuation region where the earthquake is located (see Table 3);
- *Gra09*: *CMw* has been obtained from the conversion of the ML value provided by the source catalogue with the regression by Grünthal et al. (2009);
- *Ms*: *CMw* has been considered equivalent to the Ms value provided by the source catalogue;
- *wa*: CMw has been assumed equivalent to the magnitude of unspecified type provided by the source catalogue.

The moment magnitude uncertainty (*CMwUnc*) for *CMw* has been assessed as follows:

i) when *TCMw* = *wor*, and the source catalogue provides uncertainty, this has been adopted. In the case of Baumont and Scotti (2011), who supply asymmetrical uncertainty, the maximum of the two values has been used;

ii) when *TCMw* = *wor*, and the source catalogue does not provide Mw uncertainty, a default value of 0.3 has been adopted;

iii) when *TCMw* = *Io*, *Ms* or *wa*, a default value of 0.5 has been adopted;

iv) when *TCMw* = *Gra09*, the uncertainty associated to the regression by Grünthal et al. (2009) has been adopted.

Table 1. Bibliographical references of the MDPs sources.

MDPsSource	Reference
Albini & Pant., 2004	Albini P. and Pantosti D., 2004. The 20 and 27 April 1894 (Locris, Central Greece) Earthquake Sources through Coeval Records on Macroseismic Effects. Bulletin of the Seismological Society of America, 94, 1305-1326.
Albini & Rodrig., 2001	Albini P. and F. Rodriguez de la Torre, 2001. The 1828-1829 earthquake sequence in the provinces of Murcia and Alicante (Southeastern Spain): a reappraisal of the historical sources. In: T. Glade, P. Albini and F. Frances (eds.), The Use of Historical Data in Natural Hazards Assessment. Advances in Natural and Technological Hazards Research, vol. 17, Kluwer, Dordrecht, 35-54.
Albini & Rovida, 2010	Albini P. and Rovida A., 2010. The 12 May 1802 earthquake (N Italy) in its historical and seismological context. J. Seismol., 14, 629-651.
Albini et al., 1994a	Albini P., Bellettati D., Camassi R., Moroni A., Stucchi M. and Zerga A. (eds.), 1994a. Revisione dei terremoti di interesse per il territorio della Provincia di Trento. Rapporto tecnico per la Provincia Autonoma di Trento, IRRS-CNR, Milano, 210 pp. Macroseismic Data Points available at http://emidius.mi.ingv.it/DBMI11
Albini et al., 1994c	Albini P., Cecic I., Morelli G., Sovic I. and Zivcic M., 1994c. A preliminary investigation of the January 4th, 1802 earthquake. In: P. Albini and A. Moroni (eds.), Materials of the CEC project "Review of Historical Seismicity in Europe", CNR, Milano, vol. 2, 205-214.
Albini et al., 1997b	Albini P., Alinaghi H.H., Mirto C. and Leschiutta I., 1997b. Investigation of earthquakes (1700-1899) in Albania. Excerpt from an internal report on the Adriatic-Balkanic area, BEECD project, IRRS-CNR, Milano, 8 pp.
Albini et al., 2003	Albini P., Migliavacca P. and Moroni A., 2003. Studio di alcuni terremoti di intensità epicentrale moderata in Italia settentrionale. Rapporto tecnico, INGV-MI, 58 pp. + appendices. Macroseismic Data Points available at http://emidius.mi.ingv.it/DBMI11
Albini, 2001	Albini P., 2001. Studio preliminare di alcuni terremoti di energia medio-bassa nell'area di Vittorio Veneto (sec. XIX). Rapporto tecnico INGV-MI per il Progetto GNDT "Scenari di danno in area veneto-friulana", Milano, 6 pp. Macroseismic Data Points available at http://emidius.mi.ingv.it/DBMI11
Albini, 2010	Albini P., 2010. Studies on three earthquakes in the Balkans (1280, 1520, 1667). NERIES NA4 Report, INGV, Milano, 6 pp.
Alexandre et al., 2008	Alexandre P., Kusman D., Petermans T., Camelbeek T., 2008. The 18 September 1692 Earthquake in the Belgian Ardenne and its aftershocks. In: J. Fréchet, M. Meghraoui, M. Stucchi (eds.), Historical Seismology, Interdisciplinary Studies of Past and Recent Earthquakes, Springer, 209-230.
Alexandre, 1990	Alexandre P., 1990. Les séismes en Europe occidentale de 394 à 1259. Nouveau catalogue critique. Observatoire Royal de Belgique, Série Geophysique, Bruxelles, 267 pp.
Alexandre, 1994a	Alexandre P., 1994a. Historical seismicity of the lower Rhine and Meuse valleys from 600 to 1525: a new critical review. Geologie en Mijnbouw, 73, 431-438.
Ambraseys, 1985a	Ambraseys N.N., 1985a. The seismicity of western Scandinavia. Earthquake Engineering and Structural Dynamics, 13, 3, 361-399.
Arch.Mac.GNDT, 1995	Archivio Macrosismico GNDT, 1995. Studi preliminari di terremoti attraverso i repertori sismologici. Archivio macrosismico del GNDT, Milano. Macroseismic Data Points available at http://emidius.mi.ingv.it/DOM
Azzaro & Barb., 2000	Azzaro R. and Barbano M.S., 2000. Analysis of the seismicity of Southeastern Sicily: a proposed tectonic interpretation. Ann. Geofis., 43, 1, 171-188.
Azzaro et al., 2000	Azzaro R., Barbano M.S., Antichi B. and Rigano R., 2000. Macroseismic catalogue of Mt. Etna earthquakes from 1832 to 1998. Acta Vulcanol., 12, 1-2, 3-36 + CD
Azzaro et al., 2007	Azzaro R., Bernardini F., Camassi R. and Castelli V., 2007. The 1780 Seismic Sequence in NE Sicily (Italy): Shifting an Underestimated and Mislocated Earthquake to a Seismically Low Rate Zone. Natural Hazards, 42, 1, 149-167.
Baptista et al., 2007	Baptista M.A., Miranda J.M., Lopes Fernando C., Luis Joaquim F., 2007. The source of the 1722 Algarve earthquake: evidence from MCS and tsunami data. Journal of Seismology, 11, 4, 371-380.
Barbano et al., 1980	Barbano M.S., Cosentino M., Lombardo G. and Patané G., 1980. Isoseismal maps of Calabria and Sicily earthquakes (Southern Italy). CNR-PFG, pubbl. 341, Catania, 116 pp.
Barbano et al., 1996	Barbano F., Azzaro R., Birritta P., Castelli V., Lo Giudice E. and Moroni A., 1996. Stato delle conoscenze sui terremoti siciliani dall'anno 1000 al 1880: schede sintetiche. GNDT, Rapporto interno, Catania, 287 pp. Macroseismic Data Points available at http://emidius.mi.ingv.it/DOM

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Barbano et al., 2001	Barbano M.S., Rigano R., Cosentino M. and Lombardo G., 2001. Seismic history and hazard in some localities of South-Eastern Sicily. Boll. Geof. Teor. Appl., 42, 1-2, 107-120.
BGS, nd	British Geological Survey (BGS), nd. Report. Macroseismic Data Points available at http://quakes.bgs.ac.uk/historical/
Boschi & Guid., 2001	Boschi E. and Guidoboni E., 2001. Catania terremoti e lave dal mondo antico alla fine del Novecento, INGV-SGA, Bologna, 414 pp.
Boschi & Guid., 2003	Boschi E. and Guidoboni E., 2003. I terremoti a Bologna e nel suo territorio dal XII al XX secolo, INGV-SGA, Bologna, 597 pp.
Boschi et al., 2000	Boschi E., Guidoboni E., Ferrari G., Mariotti D., Valensise G. and Gasperini P. (eds.), 2000. Catalogue of Strong Italian Earthquakes from 461 B.C. to 1980. Ann. Geofis., 43, 4, 609-868.
Bulg. Macro DB, 2010	Bulgarian Macroseismic Data, 2010. Macroseismic Data Points of the Institute of Geophysics, BAS, compiled and made available to the public in the frame of the activities of the EU NERIES project, NA4 module "A Distributed Archive of Historical Earthquake Data".
Burton et al., 1984	Burton P.W., Musson R.M.W. and Neilson G., 1984. Macroseismic report on historical British earthquakes IV: Lancashire and Yorkshire. BGS Global Seismology Report No. 219 (2 vols). Macroseismic Data Points available at http://quakes.bgs.ac.uk/historical/
Camassi & Cast., 2004	Camassi R. and Castelli V., 2004. Looking for "new" earthquake data in the 17th-18th century European "newssellers" network. Journal of Earthquake Engineering, 8, 3, 335-359.
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Dell'Olio & M., 1980	Dell'Olio A. and Molin D., 1980. Catalogo macrosismico del Lazio dall'anno 1000 al 1975. ENEA, Rapporto interno, Roma, 143 pp. Macroseismic Data Points available at http://emidius.mi.ingv.it/DBMI11
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ENEL, 1985	ENEL, 1985. Studi e indagini per l'accertamento della idoneità tecnica delle aree suscettibili di insediamento di impianti nucleari per le Regioni Piemonte, Lombardia e Puglia: indagini di sismica storica. Rapporti tecnici predisposti da ISMES-SGA, Roma. Macroseismic Data Points available at http://emidius.mi.ingv.it/DOM
ENEL, 1988	ENEL, 1988. Ricerca di sismica storica per la Garfagnana. Rapporto interno, Pisa. Macroseismic Data Points available at http://emidius.mi.ingv.it/DOM
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Fischer et al., 2001	Fischer J., Grünthal G., Schwarz J., 2001. Das Erdbeben vom 7. Februar 1839 in der Gegend von Unterriexingen. Thesis, Wissenschaftliche Zeitschrift der Bauhaus-Universität Weimar, 1-2, 8–30.
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Gisler et al., 2004a	Gisler M., Fäh D., Kästli P., 2004a. Historical Seismicity in Central Switzerland. Eclogae Geol. Helv., 97, 2, 221-236.
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Guidoboni et al., 2007	Guidoboni E., Ferrari G., Mariotti D., Comastri A., Tarabusi G. and Valensise G., 2007. CFTI4Med, Catalogue of Strong Earthquakes in Italy (461 B.C.-1997) and Mediterranean Area (760 B.C.-1500). INGV-SGA. http://storing.ingv.it/cfti4med/
Hammerl, 2008	Hammerl Ch., 2008. Studies on 1000-1750 earthquakes in Austria. NERIES NA4 collaboration’s report. ZAMG, Vienna.
Inst. And.Geof., 2003	Instituto Andaluz de Geofisica, 2003. Terremotos historicos del Sur de Espana, Periodo 880-1999, http://www.ugr.es/~iag/divulgacion/boletines/b1.html

MDPsSource	Reference
Inst. Geog. Nac., 2010	Instituto Geografíco Nacional, 2010. Bases de datos macrosísmica. Macroseismic Data Points available at http://www.ign.es/ign/layoutIn/bdmacrosismica.do
Justo & Salwa, 1998	Justo J.L. and Salwa C., 1998. The 1531 Lisbon Earthquake. Bull. Seismol. Soc. Amer., 88, 2, 319-328.
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Table 3. Main features of the datasets used for deriving the Mw(Io) relations for the calibration regions and relevant linear equation with its standard deviation(from Stucchi et al., 2012).

Region	N. of events	Io range	Mw range	Equation	σ
BET	32	4.0 - 8.0	3.3 - 6.2	Mw = 1.487 + 0.552*Io	0.38
SCR	26	4.5 - 8.0	3.6 - 5.6	Mw = 0.528 + 0.655*Io	0.25
WAP	17	5.0 - 8.5	3.5 - 5.8	Mw = 1.441 + 0.502*Io	0.31
APD	345	5.5 - 11.0	4.0 - 7.0	Mw = 2.182 + 0.423*Io	0.34
BAS	62	5.0 - 10.0	4.6 - 7.1	Mw = 3.404 + 0.355*Io	0.25

Table 4. Epicentral uncertainties in the source catalogues and their translation in SHEEC 1000-1899.

CatSource	Original uncertainty	SHEEC LatUnc	SHEEC LonUnc	SHEEC TEpiUnc	SHEEC rec.
Ambraseys & Sig., 2000		39.9	39.9	def	8
Baumont & Scotti, 2011 (epic. from SisFrance, 2010)	A: quelques km	5.0	5.0	conv	12
	B: autour de 10 km	10.0	10.0	conv	25
	C: entre 10 et 20 km	20.0	20.0	conv	47
	D: de quelques km à 50 km	50.0	50.0	conv	249
Boborikin et al., 1993		39.9	39.9	def	5
CPTI Work. Gr., 2004		39.9	39.9	def	324
Ecos, 2009	1: <= 5 km	2.5	2.5	orig	6
	2: <= 10 km	5.0	5.0	orig	67
	3: <= 20 km	10.0	10.0	orig	194
	4: <= 50 km	25.0	25.0	orig	301
	5: <= 100 km	50.0	50.0	orig	125
	6: > 100 km	99.9	99.9	def	4
	0: unknown	99.9	99.9	def	6
Grigorova et al., 1978		39.9	39.9	def	10
Grünthal et al., 2009		39.9	39.9	def	12
Grünthal, 1988	2 km	2.0	2.0	orig	4
	3 km	3.0	3.0	orig	11
	4 km	4.0	4.0	orig	5
	5 km	5.0	5.0	orig	9
	6 km	6.0	6.0	orig	2
Herak, 1995		39.9	39.9	def	156
Iceland. Met. Of., 2007		39.9	39.9	def	13
Kondorskaya & S., 1982	2: ± 0.05°	5.0	4.0	conv	1
	4: ± 0.20°	20.0	15.0	conv	2
	5: ± 0.50°	55.0	40.0	conv	5
	6: ± 1.00°	99.9	80.0	conv	1
Kondorskaya & U., 1999		39.9	39.9	def	1
Labak & Brouc., 1995	B +- 10 km	10.0	10.0	orig	14
	C +- 20 km	20.0	20.0	orig	30
	D +- 50 km	50.0	50.0	orig	8
	E > 50 km	99.9	99.9	def	9
	F not assessed	99.9	99.9	def	7
Leydecker, 1986	2: ± 5 km	5.0	5.0	orig	1
	3: ± 10 km	10.0	10.0	orig	2
	4: ± 30 km	30.0	30.0	orig	3
	<emtpy>	49.9	49.9	def	45
LNEC, 1986	a: dados suficiente para determinar o epicentro	39.9	39.9	def	7
	b: nao è claro o local do epicentro	49.9	49.9	def	3
	c: existem poucos dados	99.9	99.9	def	14
Martinez S. & L., 2004		49.9	49.9	def	1

CatSource	Original uncertainty	SHEEC LatUnc	SHEEC LonUnc	SHEEC TEpiUnc	SHEEC rec.
Martinez S. & M., 2002	A: 0-10 km	10.0	10.0	orig	3
	B: 10-20 km	20.0	20.0	orig	48
	C: 20-50 km	50.0	50.0	orig	41
	D: > 50 km	99.9	99.9	def	24
Martins & M. V., 2001*		39.9	39.9	def	2
		49.9	49.9	def	4
		99.9	99.9	def	3
Meidow, 1995		39.9	39.9	def	11
Musson & Sarg., 2007		39.9	39.9	def	11
Musson, 1994		39.9	39.9	def	10
Nikonov, 1992		39.9	39.9	def	1
Obs. Roy. Bel., 2010		39.9	39.9	def	3
Olivera et al., 2006		39.9	39.9	def	1
Oncescu et al., 1999**		29.9	29.9	def	64
		49.9	49.9	def	48
Pagaczewski, 1972		39.9	39.9	def	4
Papazachos & P., 2003	5 km if coordinartes are rounded at centesimals	5.0	5.0	orig	3
	10 km if coordinates are rounded at decimals	10.0	10.0	orig	53
Pelaez et al., 2007		39.9	39.9	def	1
Postpischl, 1985		39.9	39.9	def	3
Shebalin & Ley., 1998	a = ± 0.1	10.0	8.0	conv	1
	b = ± 0.2	20.0	15.0	conv	9
	c = ± 0.5	20.0	40.0	conv	4
	d = ± 1.0	50.0	40.0	conv	9
	<emtpy>	99.9	99.9	def	1
Shebalin et al., 1974		39.9	39.9	def	2
Soysal et al., 1981	A1, A2	39.9	39.9	def	10
	B1	49.9	49.9	def	29
	B2, B3, C1, C2	99.9	99.9	def	84
Sulstarova & K., 1975		39.9	39.9	def	51
Uni. Helsinki, 2007	A < 0.2 degrees	20.0	10.0	conv	4
	C > 1.0 degrees	99.9	55.0	conv	58
	? location uncertain	99.9	99.9	def	12
Vilanova & Fo., 2007		29.9	29.9	def	1
Wahlström & G., 1994		39.9	39.9	def	2
ZAMG, 2010		39.9	39.9	def	57
Zivcic, 2009		39.9	39.9	def	311
Zsìros et al., 1988	B = ± 10 km	10.0	10.0	orig	49
	C = ± 20 km	20.0	20.0	orig	32
	D = ± 50 km	50.0	50.0	orig	4
	E = unidentified	99.9	99.9	def	28

* *Uncertainty of 39.9 km has been assigned to local events reported from Lisbon, 99.9 km to offshore events.*

** *Uncertainty of 29.9 km has been assigned to Vrancea deep events, 49.9 km to crustal events.*

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