

Appendices A

Examples of root classification

- App. A1** - An example of root of class 1A
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**"A Basic European Earthquake Catalogue and a Database
for the evaluation of long-term seismicity and seismic hazard" (BEECD)**

App. A1 - An example of root of class 1A

Ds	Ye	Mo	Da	Ho	Mi	Ax	R	Rc	Nmo	Ix	Io	Lat	Lon	Mm
MUS94	1884	04	22	09	18	COLCHESTER	MNB90	1B	414	80	0	51.820	0.900	46

Root	"MNB90 " = Musson R.M.W., Neilson G. and Burton P.W., 1990. Macroseismic reports on historical British earthquakes XIV: 22 April 1884 Colchester. BGS Seismology Report No WL/90/33.
Information available	<p>"The earthquake was investigated by Raphael Mendola and William White, whose extensive study is extremely valuable in understanding this earthquake.</p> <p>The earthquake was felt as far north as Hull and as far west as Exeter, the earthquake was so newsworthy that far more reports of very low intensities have been preserved than would normally be the case; only in East Anglia was the earthquake strong enough to be generally perceptible.</p> <p>[In some villages south of Colchester] damage was extensive to houses and churches, giving a maximum intensity of 8 MSK."</p> <p>The root contains intensity data points for over four hundred localities.</p>
Main sources	<p>Primary historical sources R. Mendola and W. White (1884)</p> <p>Drawings and photographs</p>

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App. A2 - An example of root of class 1B

Ds	Ye	Mo	Da	Ho	Mi	Ax	R	Rc	Nmo	Ix	Io	Lat	Lon	Mm
POS85	1802	05	12	09	30	OFFANENGO	510	1B	49	80	80	45.383	9.817	51

Root	"510" = Brega F., Stucchi M., Bassi G. e De Martin M., 1985. The Soncino earthquake of May 12, 1802. In: Postpischl D. (ed.), Atlas of isoseismal maps of Italian earthquakes, Quaderni della Ricerca Scientifica, 114, 2A, Roma, pp. 72-73.																																												
Information available	<p>"[...] All sources indicate Soncino as the most damaged locality and a VIII MCS intensity has been assigned to this town. For Orzinuovi [...] not far from Soncino, the same degree of damage is reported, though sources refer specifically to the poor quality of the buildings [...]".</p> <p>List of 49 intensity data points:</p> <table style="margin-left: 20px;"> <tbody> <tr><td>* ALBERA</td><td>45.366</td><td>9.805</td><td>80 *</td></tr> <tr><td>* CASALETTO DI SOPRA</td><td>45.419</td><td>9.782</td><td>80 *</td></tr> <tr><td>* CUMIGNANO SUL NAVIGLIO</td><td>45.354</td><td>9.836</td><td>80 *</td></tr> <tr><td>* GALLIGNANO</td><td>45.439</td><td>9.837</td><td>80 *</td></tr> <tr><td>* MELOTTA</td><td>45.412</td><td>9.805</td><td>80 *</td></tr> <tr><td>* OFFANENGO</td><td>45.379</td><td>9.743</td><td>80 *</td></tr> <tr><td>* ORZINUOVI</td><td>45.402</td><td>9.924</td><td>80 *</td></tr> <tr><td>* ROMANENGO</td><td>45.378</td><td>9.785</td><td>80 *</td></tr> <tr><td>* SALVIROLA</td><td>45.353</td><td>9.780</td><td>80 *</td></tr> <tr><td>* SONCINO</td><td>45.399</td><td>9.874</td><td>80 *</td></tr> <tr><td>* TICENGO</td><td>45.369</td><td>9.827</td><td>80 *</td></tr> </tbody> </table> <p>.....</p>	* ALBERA	45.366	9.805	80 *	* CASALETTO DI SOPRA	45.419	9.782	80 *	* CUMIGNANO SUL NAVIGLIO	45.354	9.836	80 *	* GALLIGNANO	45.439	9.837	80 *	* MELOTTA	45.412	9.805	80 *	* OFFANENGO	45.379	9.743	80 *	* ORZINUOVI	45.402	9.924	80 *	* ROMANENGO	45.378	9.785	80 *	* SALVIROLA	45.353	9.780	80 *	* SONCINO	45.399	9.874	80 *	* TICENGO	45.369	9.827	80 *
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Main sources	<p>Archive documents Archivio Storico Comunale di Crema (1802) Capparotti (1802)</p> <p>Historical compilations Penada (1808) Nannini (1819) Cerutti (1834) Grandi (1856) Sforza Benvenuti (1859) Galantino (1869)</p> <p>Seismological literature Baratta (1896)</p>																																												

Comment

Brega et al. (1985) is a **study** supplying a **list of intensity datapoints**. It is based on some **primary historical sources** ("financial support files" concerning damaged localities, other official archive documents and contemporary scientific papers written on location and/or only a short time after the event), on **compilations of local history** and **seismological literature**.

This root is classified as **1B**.

**"A Basic European Earthquake Catalogue and a Database
for the evaluation of long-term seismicity and seismic hazard" (BEECD)**

App. A3 - An example of root of class 1C

Ds	Ye	Mo	Da	Ho	Mi	Ax	R	Rc	Nmo	Ix	Io	Lat	Lon	Mm
SUK75	1833	01	19			VLORA	MD	1C	14	100	90	40.400	19.400	

Root	The root was chosen among the many references quoted [MD, MF, GGR, AN, MC] by the catalogue compilers and it is " MD " = Mihajlovic D.J., 1951. Catalogue des Tremblements de Terre Epiro-Albanais. Archive Séismologique de l'Institut Séismologique de Beograd. Zagreb, 73 pp.																																						
Information available	The author supplies a table with place names and intensity values: <table style="margin-left: 20px;"> <tbody> <tr><td>* VLORË</td><td>X</td></tr> <tr><td>* SAZAN</td><td>X</td></tr> <tr><td>* KANINA</td><td>X</td></tr> <tr><td>* NARTA</td><td>X</td></tr> <tr><td>* SMOKHTINE</td><td>IX</td></tr> <tr><td>* VELCA</td><td>IX</td></tr> <tr><td>* KARBUNARA</td><td>IX</td></tr> <tr><td>* TEPELENË</td><td>IX</td></tr> <tr><td>* PESHTANI</td><td>IX</td></tr> <tr><td>* MARICAJ</td><td>IX</td></tr> <tr><td>* VASIARI</td><td>IX</td></tr> <tr><td>* KLISYRA</td><td>IX</td></tr> <tr><td>* TURANI</td><td>IX</td></tr> <tr><td>* DUKAJ</td><td>IX</td></tr> <tr><td>* LECCE</td><td>F</td></tr> <tr><td>* MONTEPARANO</td><td>F</td></tr> <tr><td>* BARI</td><td>F</td></tr> <tr><td>* POTENZA</td><td>F</td></tr> <tr><td>* FOGGIA</td><td>F</td></tr> </tbody> </table>	* VLORË	X	* SAZAN	X	* KANINA	X	* NARTA	X	* SMOKHTINE	IX	* VELCA	IX	* KARBUNARA	IX	* TEPELENË	IX	* PESHTANI	IX	* MARICAJ	IX	* VASIARI	IX	* KLISYRA	IX	* TURANI	IX	* DUKAJ	IX	* LECCE	F	* MONTEPARANO	F	* BARI	F	* POTENZA	F	* FOGGIA	F
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Sources	The author does not quote any sources with reference to this earthquake, but just supplies a general list.																																						

Comment

Mihajlovic (1951) is a **study** supplying **intensity data points**, though she does not explicitly mention the macroseismic scale she used. The general list she provided contains references to seismological compilations and a final indication concerning "Notices des journaux du pays et de l'étranger"; the latter could lead to assess a quality B (primary sources and compilations) but the impossibility to find out for which earthquakes she really used primary sources led to a definition of the quality as C (**compilations**).

This root is classified as **1C**.

App. A4 - An example of root of class 2A

Ds	Ye	Mo	Da	Ho	Mi	Ax	R	Rc	Nmo	Ix	Io	Lat	Lon	Mm
POS85	1522	10	04	23		REGGIO EMILIA	75	2A		0	70	44.667	10.667	47

Root	"75" = Baratta M., 1901. I terremoti d'Italia. Torino, 950 pp.
Information available	"1522 October 4 - Reggio Emilia At 7 hours of the night on October 4 in Reggio, a very strong shock which caused much fear; it was distinctly felt in Modena."
Sources	<p>Primary historical sources</p> <p>Bianchi de' Lancellotti (XVI) "1522. This was written on Sunday 5 of October. Yesternight, around 8 hours before the oncoming Sunday, it was felt here [in Modena] an earthquake, which was not very strong."</p> <p>Panciroli (XVI) "[1522] On October 4, around 7 hours of the night, the city of Reggio was shaken by a fearful earthquake."</p>

Comment

Baratta (1901) is a **seismological compilation** listing earthquakes felt over most of the Italian peninsula between the year 1 A.D. and 1898. For each event Baratta gives a description of varying length (ranging from a single line to a few pages) and some references (from one to some tenths of titles).

In this case a very short description is based on two 16th century chronicles. Each one was written in one of the affected localities. The Modena testimony was recorded on the day following the shock. The Reggio testimony was surely written down later as its author was born in 1523. He probably heard of the event from some eyewitness and he was the first who left a written record of the same.

Both sources can be judged as **primary historical sources**.

This root can be classified as **2A**.

**"A Basic European Earthquake Catalogue and a Database
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App. A5 - An example of root of class 2B

Ds	Ye	Mo	Da	Ho	Mi	Ax	R	Rc	Nmo	Ix	Io	Lat	Lon	Mm
POS85	1646	04	28			GRAN SASSO	75	2B		0	70	42.500	13.500	46

Root	"75" = Baratta M., 1901. I terremoti d'Italia. Torino, 950 pp.
Information available	"1646 April - Aquila Shocks began on April 28 and did go on until June. The inhabitants were obliged to sleep in the open. Many chimneys fell down. No palace collapsed nor did the houses of commoners suffer any serious damage, though - as Secinara says - all building shook as ships caught in a fierce storm."
Sources	<p>Primary historical sources Secinara (1652) "As I saw by myself, in 1646 the city of Aquila was shaken for 65 days together [...] without any damage of consequence [...] no palace collapsed nor did the houses of commoners suffer any serious damage. I do believe this was a very great miracle."</p> <p>Late compilations Mozzetti (1836) De Giorgi (1888)</p>

Comment

Baratta (1901) is a **seismological compilation** listing earthquakes felt over most of the Italian peninsula between the year 1 A.D. and 1898. For each event Baratta gives a description of varying length (ranging from a single line to a few pages) and some references (from one to some tenths of titles).

In this case a very short description is based on a **primary historical source** (written by an eyewitness and published in 1652), and on two 19th century compilations.

This root can be classified as **2B**.

**"A Basic European Earthquake Catalogue and a Database
for the evaluation of long-term seismicity and seismic hazard" (BEECD)**

App. A6 - An example of root of class 2C

Ds	Ye	Mo	Da	Ho	Mi	Ax	R	Rc	Nmo	Ix	Io	Lat	Lon	Mm
SHA74	1551	03	26				MF	2C		0	85	46.200	13.700	0

Root	"MF" = Montandon F., 1953. Les tremblements de terre destructeurs en Europe. Genève.
Information available	"1551 March 26. A destructive earthquake in the Isonzo basin, mainly in Tolmein, on the southern foothills of the Julian Alps. The seismic area was very large, including among others places, all the southern part of Germany."
Sources	Seismological Literature Sieberg (1932) "1551 Mars 26. Zerstörendes Ostalpenbeben, besonders in der Gegend von Tolmein, mit grossem Schadengebiet. Gefühlt in ganz Süddeutschland bis Bamberg, Bayreuth und Hof."

Comment

Montandon (1953) is a **seismological compilation** listing earthquakes felt in Europe between the year 1000 A.D. and 1940. A very short description, an intensity and some references are given for each listed event.

In this case Montandon quotes a very late **seismological compilation** by Sieberg (1932) who in his turn **does not provide any reference** for this event.

This root can be classified as **2C**.

App. A7 - An example of root of class 3A

Ds	Ye	Mo	Da	Ho	Mi	Ax	R	Rc	Nmo	Ix	Io	Lat	Lon	Mm
MUS94	1755	08	01	06	40	LINCOLN	BGS9	3A			50	53.070	-0.570	

Root	The reference to this event in the original catalogue reads " BGS material ". This refers to a folder in which references to the earthquake had been collected.
Information available	It was felt all over Lincolnshire, west as far as Nottingham and Leicester, and south as far as Rushden, Northants. The strongest effects, however, were all at the north end of the felt area.
Sources	<p>Contemporary sources</p> <ul style="list-style-type: none"> - William Stukely, a contemporary manuscript account of the earthquake - Gentleman's Magazine (1755) <p>Seismological compilations</p> <ul style="list-style-type: none"> Roper (1889) Davison (1924)

Comment

In compiling the parameters appearing in the source catalogue, the author prepared a sketch map from the information in the two **contemporary sources**, ignoring the compilations. The sketch map was never published (and is lost); it is the real root, so the root classification is **3A - folder information based on contemporary sources only**.

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App. A8 - An example of root of class 3B

Ds	Ye	Mo	Da	Ho	Mi	Ax	R	Rc	Nmo	Ix	Io	Lat	Lon	Mm
RIB82	1689	05	10			TEMENICA V.	HID	3B	0	0	80	45.967	14.850	

Root	No identification of the root among the multiple references [1, 54, 65, 197, 203, 224, 299] was possible.
Information available	The earthquake is located in the Temenica Valley, it caused damage to the Bogensperk castle. There were some aftershocks.
Sources	<p>Contemporary chronicle 54 = Valvasor (1689)</p> <p>Seismological compilations 65 = Mitteis (1862) 299 = Laibacher Zeitung (1885-1895) 1 = Koblar (1896) 197 = Radics (1901) 203 = Radics (1901/1902)</p> <p>Parametric earthquake catalogue 224 = Bernardis et al. (1977)</p>

Comment

It was not possible to identify the root among the sources quoted by Ribaric (1982). Basic data are supplied both by a **contemporary chronicle** (Valvasor, 1689) and by some 19th and 20th century **seismological compilations**.

This root can be classified as **3B**.

App. A9 - An example of root of class 3C

Ds	Ye	Mo	Da	Ho	Mi	Ax	R	Rc	Nmo	Ix	Io	Lat	Lon	Mm
SUK75	1852	08	26			RODON	HI D	3C	0	0	80	41.600	19.500	0

Root	No identification of the root among the multiple references [AL, MF, MD, CA, MIL] was possible.
Information available	The earthquake caused damage in Dürres and to the monastery of S. Antonio in Cape Rodoni.
Sources	Compilations Milne (1911) Cavasino (1931) Mihajlovic (1951) Montandon (1953) Albania, Journal of Archeology (1967)

Comment

Up to now, it was not possible to identify the root among the sources quoted by Sulstarova and Kociu (1975). Basic data come from some 20th century **seismological compilations**.

This root can be classified as **3C**.

**"A Basic European Earthquake Catalogue and a Database
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App. A10 - An example of root of class 4B

Ds	Ye	Mo	Da	Ho	Mi	Ax		R	Rc	Nmo	Ix	Io	Lat	Lon	Mm
ZSA88	1904	03	31	09	41	TRBOVLJE		70	4B		0	60	46.160	14.920	36

Root	"70" = Ribaric V., 1982. Seismicity of Slovenia. Catalogue of Earthquakes (792 A.D.-1981). Ljubljana, 649 pp.														
Information available	Ye	Mo	Da	Ho	Mi	Ax		Ref			Ix	Io	Lat	Lon	Mm
	1904	03	31	08	41	TRBOVLJE, . . .		22, 23, 224, 226, 228, 264, 270			0	60	46.150	14.917	36
Sources	Die Erdbebenwarte (1904) Binder (1905) Allgemeiner Bericht und Chronik... (1906) Oddone (1907) Ribaric (1973) Bernardis et al. (1977) Cvijanovic (1981)														

Comment

Ribaric (1982) is a **parametric earthquake catalogue**; in this case Ribaric quotes two **contemporary sources** (Allgemeiner Bericht und Chronik...; Die Erdbebenwarte), some **compilations** and other **parametric catalogues**.

This root can be classified as **4B**.

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App. A11 - Two examples of root of class 4C

Ds	Ye	Mo	Da	Ho	Mi	Ax	R	Rc	Nmo	Ix	Io	Lat	Lon	Mm
COM82	1868	11	13	07	45		CBE	4C		75	0	45.700	26.600	0

Root	"CBE" = Shebalin N.V., Karnik, V. and Hadzievski, D. (eds.), 1974. Catalogue of earthquakes of the Balkan region. I, UNDP - UNESCO Survey of the seismicity of the Balkan region, Skopje.													
Information available	Ye	Mo	Da	Ho	Mi	Ax	Ref	Ix	Io	Lat	Lon	Mm		
	1868	11	13	07	45		SFJ	0	75	45.700	26.600	0		
Sources	Schmidt (1875)													

Or	Ye	Mo	Da	Ax	Ref	RC	Om	Ix	Io	Lat	Lon	Mm
COM82	1523	11	19		CBE	4C		80	0	46.200	24.400	0

Root	"CBE" = Shebalin N.V., Karnik, V. and Hadzievski, D. (eds.), 1974. Catalogue of earthquakes of the Balkan region. I, UNDP - UNESCO Survey of the seismicity of the Balkan region, Skopje.											
Information available	Ye	Mo	Da	Ho	Mi	Ax	Ref	Ix	Io	Lat	Lon	Mm
	1523	11	19				RCR	0	80	46.200	24.400	0
Sources	Radu (1971)											

Comment

In both cases, Costantinescu and Marza (1982) quote Shebalin et al. (1974), which is a **parametric earthquake catalogue** for the Balkan area, type 4 root.

For the 1868 earthquake, Shebalin et al. (1974) quote a **seismological compilation** (Schmidt J.F., 1875. Studien der Erdbeben. Leipzig). This root can be classified as **4C**.

For the 1523 earthquake, Shebalin et al. (1974) quote another **parametric earthquake catalogue** (Radu C., 1971. Catalogue of earthquakes in Romania, 1801-1900, Io VII, prior to 1800 Io VIII, Bucharest, manuscript). This root can be classified as **4C**.

This case is different from the previous one; considering that no special quality has been yet defined to distinguish between a seismological compilation and a parametric earthquake catalogue, quality C has been chosen as the bottom quality level.