

Phenomenologic aspects of seismicity in Latium

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ABSTRACT

A catalogue of the earthquakes with maximum macroseismic intensities $I_0 \geq VI$ M.C.S. occurred in Latium during the last 20 centuries has been compiled. The study of the listed earthquakes has allowed the evidentiatio of some phenomenologic aspects of Latium seismic activity and the correlation of their characteristic parameters. In particular, the study of activity migration has made it possible to indicate approximately some areas of particular interest for future research in the field of earthquakes prediction.

RIASSUNTO

Sono stati catalogati i terremoti di intensità epicentrale $I_0 > VI$ M.C.S. che hanno interessato il Lazio dall'anno 0 dell'Era Volgare ai giorni nostri. L'esame dei terremoti catalogati ha consentito di evidenziare al-

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cuni aspetti fenomenologici della sismicità laziale e di correlarne i parametri caratteristici. In particolare lo studio dell'evoluzione temporale dell'attività sismica ha reso possibile l'approssimativa indicazione di alcune aree di particolare interesse per future ricerche nel campo della previsione dei terremoti.

1. — This study deals with some of the phenomenologic aspects of seismicity in Latium, such as the focal depth, the b value, the migration of activity, ignoring seismotectonic implications.

A general analysis, not taking into account the geological details of the region, allows the identification of five rather well distinct zones: proceeding from North to South, along the western belt, one: meets the true volcanic area extending from Bolsena to the Alban Hills, subdivided into two parts by the geothermal area of Cesano; to the South of the Alban Hills there are the ramifications of Valle Latina characterized by older volcanites. Moving along the western belt, one finds geological structures which are typical of Umbria and Marche in the North, and of Latium and Abruzzi in the South.

In order to carry on a detailed study of seismicity in Latium, it is convenient to examine its phenomenologic aspects in each of the five above mentioned zones, also trying to connect the various parameters characterizing the events. To this purpose the earthquakes with maximum macroseismic intensity $I_0 > VI$ M.C.S. occurred during the last 20 centuries were taken into consideration. They are listed in Table 5.

Information concerning the events was drawn from chronicles of the time (Agamennone, 1911-1933; Console et al., 1972; Di Filippo, 1942; Gasparini et al., 1973; Marcelli et al., 1962-1963), from old and recent national catalogues (Baratta, 1901; Caloi, 1942; Carozzo et al., 1973; Cavasino, 1935; De Panfilis, 1959), from seismological bulletins (B.C.I.S.; Bollettino I.N.G.; U.S.C.G.S.) and a critical comparison was made to derive the data appearing in the table.

2. — The serial numbers in the catalogue correspond to the different earthquakes or to the localized sequences when

the available information was not sufficient to specify the time sequence.

For each event its date is specified and the zone including the epicentre is indicated, the symbols 1N, 1C, 1S, 2N, 2S corresponding to the five zones described in paragraph 1 and shown in Fig. 1*.

Indications have been given concerning the epicentre location of the events, reporting, when possible, their coordinates as derived from microseismic data or calculated by other authors; in the other cases the localization of the epicentre presents difficulties which are greater for older events. Nevertheless, the epicentre location was evaluated using macroseismic indications found in the literature.

For intensities Mercalli-Cancani-Sieberg scale degrees are used; when an evaluation in units of some scale was not available an effort was made to make quantitative, as uniformly as possible, the qualitative information. The seismic sequences for which it was impossible to find an evaluation in term of independent events were considered as a group of seisms; their number was reckoned according to the duration of the sequence and their intensities by comparison with that of the principal shock.

When possible, the focal depth was evaluated. The values indicated with an asterisk were derived from microseismic data. When the seismograms allowed the determination of the magnitude but not of the depth, this value, indicated with M_k , was calculated using the formula (Kárník, 1969)

$$M = \frac{2}{3} I_0 + 1.4 \log h - 1.25 \quad [1]$$

* For the denomination 1S_L of the zone relative to some earthquakes, see paragraph 3.

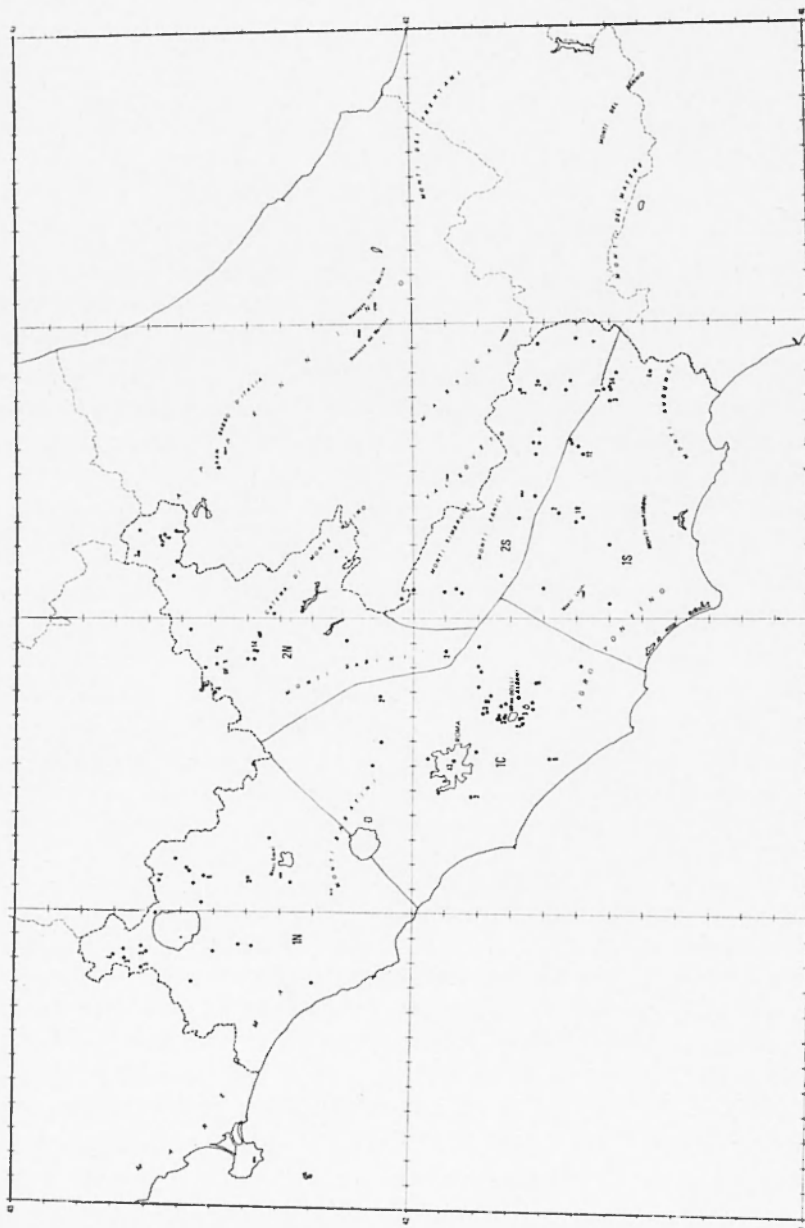


Fig. 1 - Epicentres of earthquakes with $I_0 \geq VI$ M.C.S. occurred in Latium during last 20 centuries. The figure indicates the multiplicities of the events.

valid for central Italy, in which I_0 is the intensity at the epicentre. The values of h indicated with h_i were derived from the relationship

$$h = \frac{s_n}{\sqrt{10 \frac{I_0 - I_n}{3} - 1}} \quad [2]$$

where s_n is the radius of the isoseimal of intensity I_n using isoseismals found in the literature or constructed to this purpose. When the available information was too poor to construct reliable isoseismals, the h values, indicated with h_d , were derived considering the distance from the epicentre at which the earthquake had a given intensity. When both the above mentioned methods were possible, the value of the depth given in the table, denoted with $h_{i,d}$, was obtained by averaging the two values of h_i and h_d weighted with the inverse of the respective errors.

When computable, the half of the maximum spread was taken as the error of the depth; in the other cases the error was calculated by using the mean relative error of the focal depth derived from the same kind of information; isoseismals, distances of both.

The mean relative errors are, for the three cases

$$\left(\frac{\overline{\Delta h}}{h} \right)_i = 19\% \quad ; \quad \left(\frac{\overline{\Delta h}}{h} \right)_d = 42\% \quad ; \quad \left(\frac{\overline{\Delta h}}{h} \right)_{i,d} = 19\%$$

These evaluations do not take into account the errors due to the uncertainties in the definition of h .

The magnitude M is expressed in Richter scale and the values derived from microseismic data are indicated with an asterisk; in the absence of these data, when it was possible to reckon the focal depth, the value of the magnitude was calculated by means of equation [1].

In cases in which it was impossible to evaluate the focal depth, the magnitude was calculated using Marcelli-Montecchi (1962) equations

$$M = 0.481 I_0 + 1.407 \quad (I_0 \leq \text{VIII}) \quad [3]$$

$$M = 0.024 I_0^2 + 0.206 I_0 + 2.157 \quad (I_0 > \text{VIII}) \quad [4]$$

For relations [3] and [4] the authors have suggested additional corrective terms different for the different geological zones to which they refer; no corrective term had been estimated for Latium because of the poor number of available data.

The 14 earthquakes having an intensity $I_0 \leq \text{VIII}$ occurred in Latium area and whose magnitude was derived on the basis of microseismic data were then used; the parameters relative to the best straight line representing M as a function of I_0 were calculated in order to compare them to those appearing in Marcelli-Montecchi linear relation. The straight line thus obtained has the following equation

$$M = 0.497 I_0 + 1.058 \quad [5]$$

and is shown in Fig. 2.

The difference between the magnitudes calculated by means of [3] and [5] varies from 0.22, corresponding to $I_0 = 8$, and 0.25 corresponding to $I_0 = 6$; the considerable spread of the experimental data makes this difference meaningless; in fact the standard deviation of the value $M (I_0 = 0)$ amounts to + 0.59.

In order to calculate M , relations [3] and [4] were then used without introducing any corrective terms.

The energy E released in the various earthquakes was evaluated using the relation (Di Filippo, Marcelli, 1950).

$$\log E = 9.154 + 2.147 M \quad [6]$$

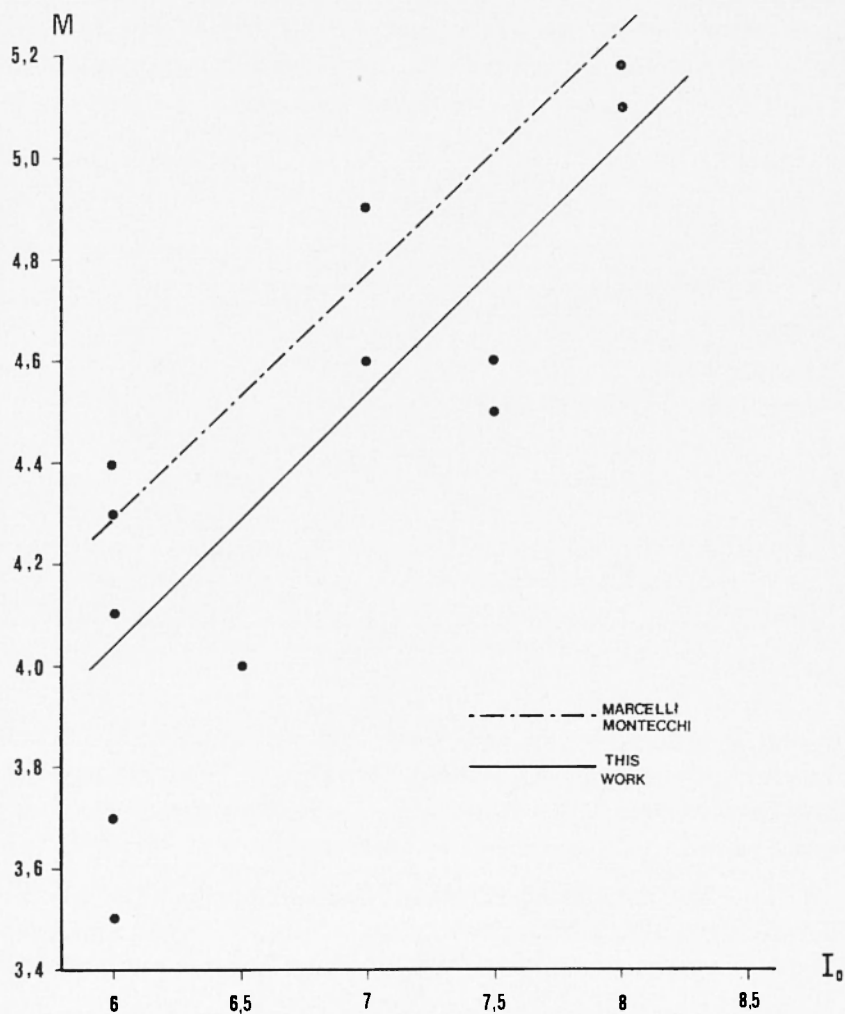


Fig. 2 - Magnitude M as a function of the maximum macroseismic intensity I_0 according to Marcelli-Montecchi and to this paper.

In Fig. 1 the epicentres of the earthquakes occurred in Latium in the Christian Era are reported together with the corresponding multiplicities. There are in all 223 events with $I_0 \geq VI$ and their numerical distribution among the different zones is given in Table 1.

TABLE 1

ZONE	EARTHQUAKES NUMBER
1 N	43
1 C	77
1 S	42
2 N	38
2 S	23

According to the catalogue, the magnitude of the considered earthquakes is generally within the range 4.1—5.7; it is greater than 5.7 only in 8 earthquakes (N. 11, 13, 22, 50, 56, 59, 61, 134) and less than 4.1 in 29 cases corresponding to the 13% of the total.

3. — The data listed in Table 5 form a useful basis for the identification of typical aspects of seismicity in Latium area with reference to the zones into which this area has been subdivided.

A) For each of the above mentioned five zones the average value of the focal depth was calculated, each value of h being weighted with its error (obviously the meaning of this error is only an indication of the spread of the calculated values of h). The average values thus obtained are reported in Table 2.

The value of \bar{h} for the zone 1S was calculated ignoring the earthquakes to the south of Monte Cairo in the small triangle

formed by the localities of Montecassino (Abbey), S. Germano and Villa S. Lucia, the effects of which had a very limited extension. These shocks, indicated with 1S_L in the third column of the catalogue, must be considered as originating from a surface focus the depth \bar{h} of which was estimated 1.7 ± 0.1 Km.

TABLE 2

ZONE	$\bar{h} \pm \Delta\bar{h}$ (Km)
1 N	4.4 ± 0.6
1 C	5.9 ± 0.3
1 S	9 ± 2
2 N	8 ± 2
2 S	9 ± 2

As it turns out from Table 3, the average focal depth, proceeding from North to South along the volcanic belt, increases. Furthermore, one can see that zones 1N and 1C are characterized by values of \bar{h} less than those of the remaining Latium zones; one has in fact

$$\bar{h}_{1N+1C} = 5.4 \pm 0.5 \text{ Km}$$

$$\bar{h}_{1S+2N+2S} = 9 \pm 2 \text{ Km}$$

The last value is in agreement with the result obtained by Kárník 1969, indicating, for central Italy, a characteristic focal depth of 10-15 Km, showing for the earthquakes in zones 1S, 2N and 2S aspects which are typically connected to tectonic-orogenic phenomena in the Apennines.

B) As it is known, the b value appearing in the relation (Gutenberg, Richter, 1954)

$$\text{Log } N = a - bM \quad [7]$$

in which N is the number of the earthquakes having a magnitude falling in a given range around M , is a quantity expressing the seismic activity of a region.

The b value was evaluated by Kárník, 1969, as 1.03 for central Italy. It would be interesting to specify this value for the different zones considered in Latium area.

In Table 3 the values of the parameters a and b appearing in relation [7] as calculated by the least squares method are reported (*).

TABLE 3

ZONE	$a \pm \sigma_a$	$b \pm \sigma_b$
1 N	4.6 ± 0.1	0.74 ± 0.01
1 C	4.8 ± 0.2	0.74 ± 0.04
1 S + 1 S _L	3.1	0.40
2 N + 2 S	4.5 ± 0.2	0.67 ± 0.03
1N ± 1C	6.1 ± 0.2	0.98 ± 0.04

Earthquakes occurred since A.D. 1200 were taken into account, the previous information being hardly reliable. When only two experimental points were available it was impossible to calculate the standard deviations σ_a and σ_b : however, it seems

(*) Relation [7] is valid in the range of the M values which are more frequent in the considered region.

reasonable to consider them of the same order of the calculated ones. Obviously, also the earthquakes relative to the surface focus of Montecassino are to be included in the group of those occurred in region 1S.

As is possible to see from Table 3 the b value decreases abruptly, along the Latium volcanic belt, in the zone 1S.

The available data were too scarce to detect significantly a similar effect along the western belt of the region; as an indication the b value for the zones 2N and 2S considered as a whole was then calculated.

It is also possible to see from Table 3 that zones 1N and 1C are characterized by b values greater than those relative to the remaining zones.

Both the observed effects are in agreement with those concerning the focal depths; in fact deeper events release more energy thus lowering the absolute value of b in relation [7]. The b value relative to the whole Latium area turns out to be $b_L = 0.90 \pm 0.03$.

The value which refers to the very volcanic belt (zone 1N+1C) is in the best agreement with the one given by Kárník.

C) A further elaboration of the collected data was carried out in order to identify the time behaviour of the seismicity. The migration of the average of the epicentres for the earthquakes occurred in each zone in given periods was taken as an indication of this evolution (Biagi et al., 1974).

The values of latitude φ and longitude λ of the average epicentres (Table 4) were calculated effecting a weighted average the magnitude being the weight. The periods were fixed in such a way as to include comparable amounts of shocks.

The migration of the activity in every single zone is plotted in Fig. 3 starting from A.D. 1200; the period before A.D. 1200 was not taken into consideration because of the poor reliability of the available information concerning the dislocation of the epicentres.

From the figure one can see at first that in each zone it is possible to identify a direction (two for zone 2N) along which

TABLE 4

ZONE	PERIOD		1	2	3	4	5	6	7	8	9	10	11
	Years A. D.	Coordinate											
1N	0	φ	42°25'	42°30'	42°25'	42°38'	42°38'	42°38'	42°39'	42°15'	42°32'	42°41'	42°29'
	999	λ	12°07'	12°00'	12°07'	12°06'	12°06'	11°58'	11°58'	11°46'	11°56'	11°53'	12°06'
1C		φ	41°54'	41°54'	41°53'	41°57'	41°52'	41°46'	41°46'	41°46'	41°48'	41°51'	
		λ	12°29'	12°29'	12°31'	12°30'	12°32'	12°43'	12°40'	12°40'	12°40'	12°38'	
1S + 1S _L		φ		41°31'	41°32'	41°29'	41°29'	41°29'	41°29'	41°29'	41°30'	41°30'	41°36'
		λ		13°40'	13°34'	13°49'	13°47'	13°33'	13°48'	13°48'	13°42'	13°42'	13°36'
2N		φ	42°30'		42°21'	42°22'	42°38'	42°32'	42°04'	42°24'	42°28'	42°31'	42°31'
		λ	12°45'		13°10'	13°10'	13°17'	12°54'	12°53'	12°52'	12°57'	13°02'	13°10'
2S		φ			41°55'	41°40'	41°37'	41°37'	41°47'	41°47'	41°42'	41°46'	41°41'
		λ			13°06'	13°35'	13°46'	13°16'	13°16'	13°40'	13°40'	13°33'	13°44'

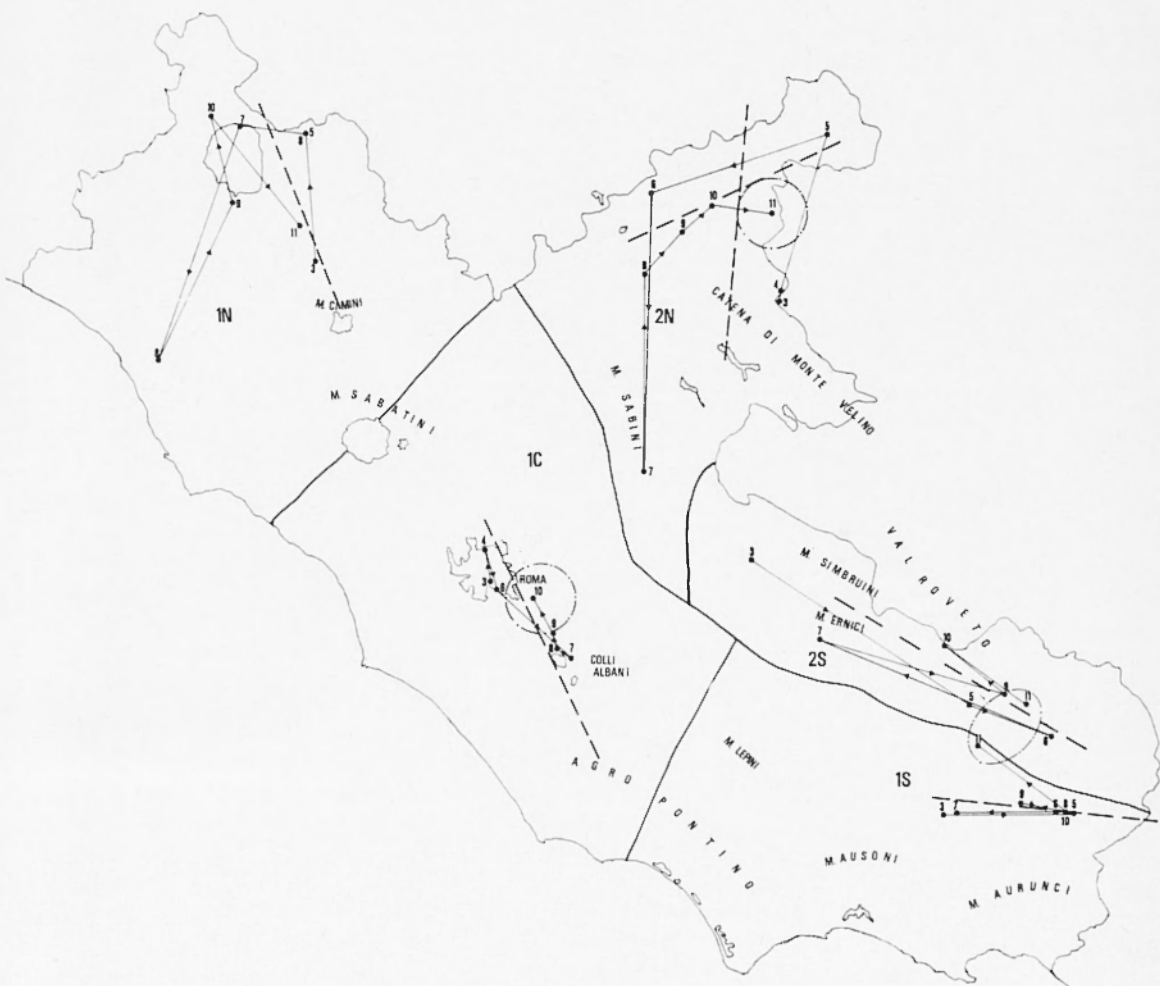
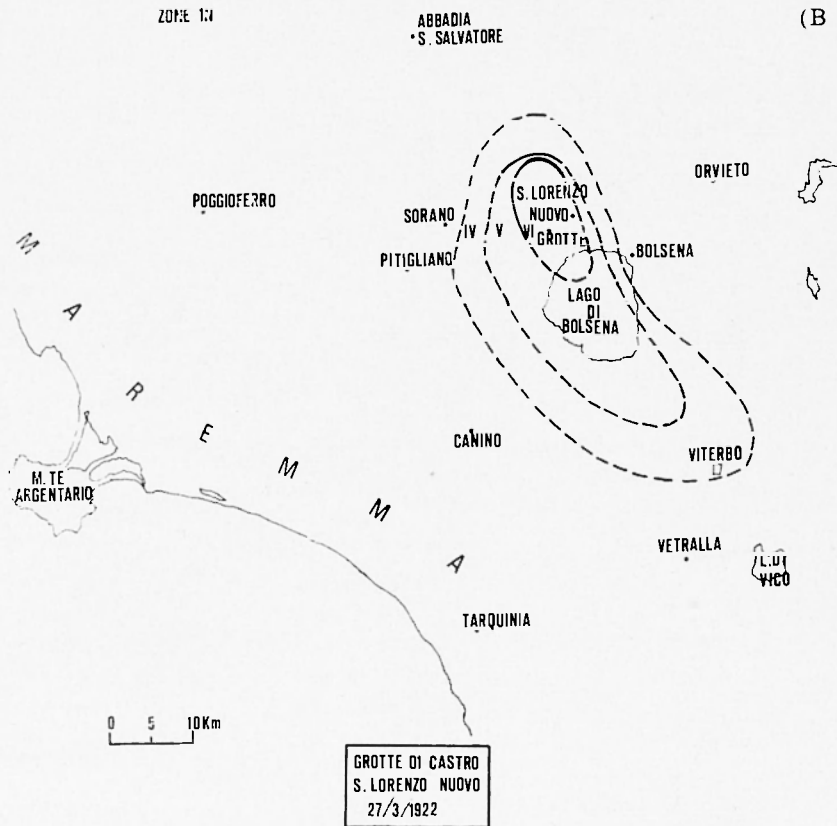


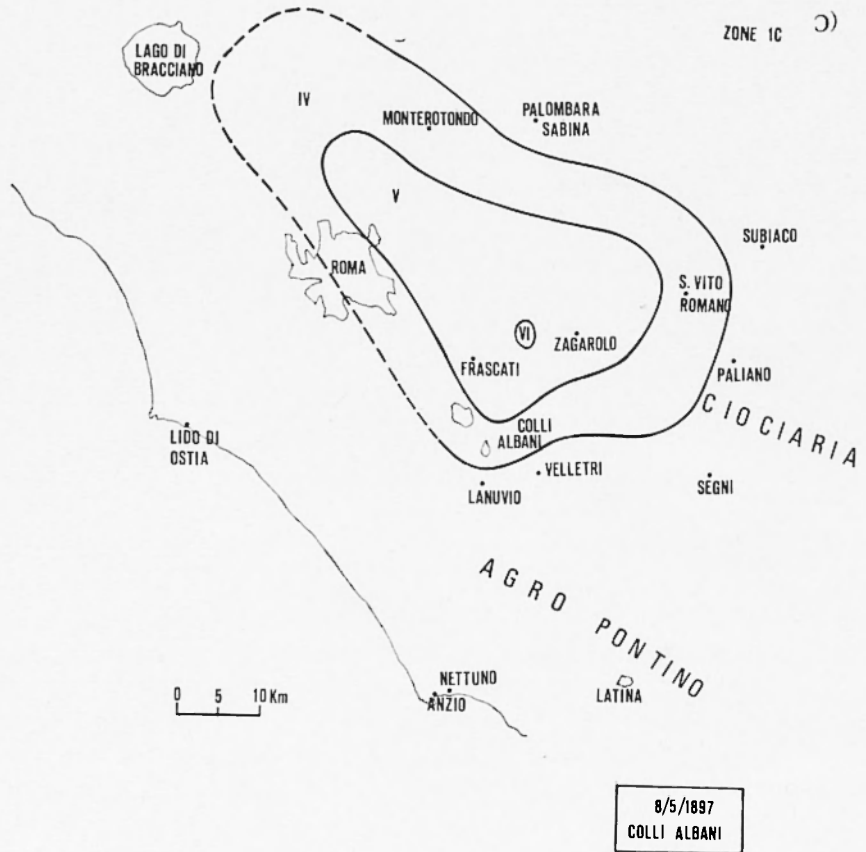
Fig. 3 - Activity migration in Latium region since A.D. 1200. Dotted lines represent preferential directions of migration. The areas delimited by point-dot lines are those of more recent convergence of the seismic activity.



preferentially the average epicentre migrates (dotted lines in Fig. 3).

The parameters relative to these lines were derived as a weighted average of those of the segments joining the average epicentre of each period with the next one; the assumed weight was the sum of the numbers of earthquakes used to calculate the average epicentres forming the end points of each segment.

A comparison in each zone of these directions with the elliptical elongation of the isoseismals (Fig. 4A, B, C) shows a substantial agreement, thus showing that the anisotropy in the elastic characteristics of the crystal rocks seems to favour coherently the migration of the epicenter.



It also results from Fig. 3 that in the more recent periods there has been in zone 2N a tendency of activity to shift along a preferential line in a given direction; a similar, though less important behaviour, is also present in zone 1C. In the adjacent zones 1S and 2S the average epicentre seems to have a tendency to migrate towards a same area.

These effects allow the approximate identification of zones, only indicatively delimited in Fig. 3, in which it might be convenient to undertake an experimental investigation, for instance on the variation of the ratio of compressional-to-shear wave ve-

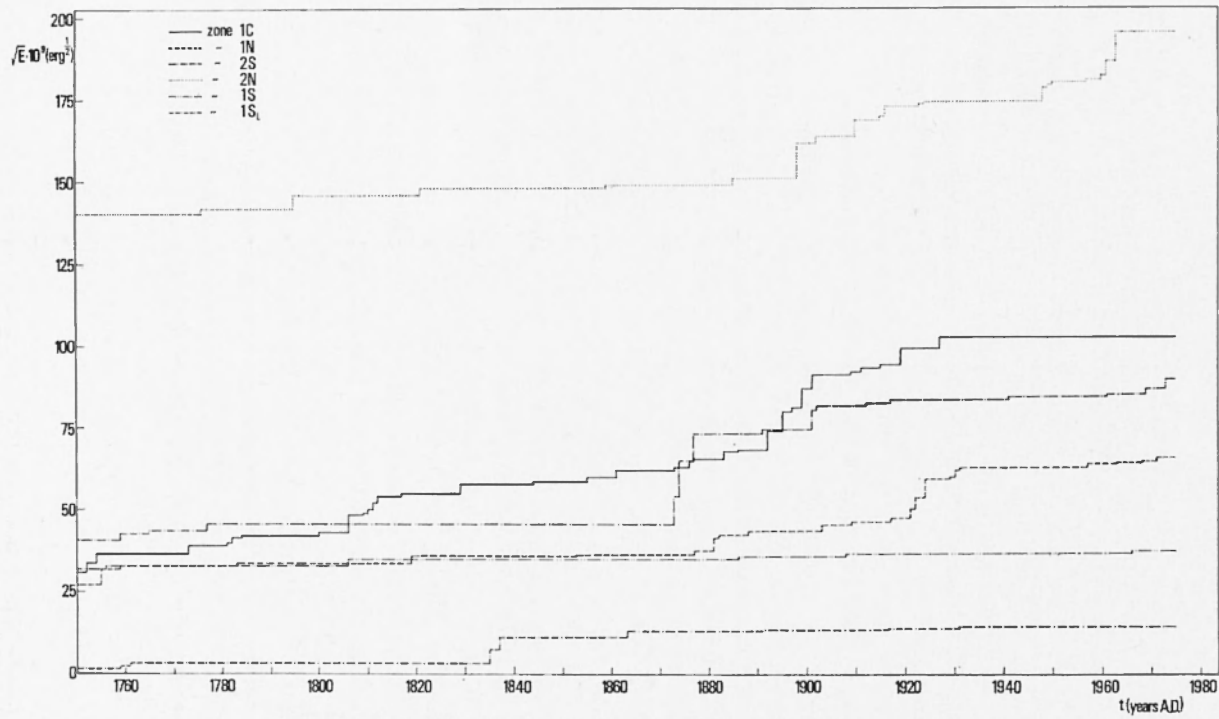


Fig. 5 - Benioff diagrams for the different Latiium zones since A.D. 1750. The cumulative values of \sqrt{E} until A.D. 1750 can be read on the vertical axis on the left.

localities on the variation of radon concentration in wall water, etc.

D) In Fig. 5 Benioff, 1951, plots of elastic strains since 1750 for the considered zones are reported.

As is seen, the elastic-strain energy has revealed itself in zone 1S fairly regularly in time, without any violent collapses; the same can be observed for the area 1S_L with the exception of the period 1835-1863. In the remaining zones, throughout the period from 1865 to 1935 approximately, the accumulated strain energy was released in a convulsive way, showing an instability in the elastic field in almost the whole Latium region.

In the years before the period above there were no violent and sudden releases of energy in zones 2N, 2S, 1N whereas a convulsive and irregular instability in the elastic field was already active in zone 1C; after the year 1935 the situation in the above mentioned zones seems to invert, an accumulation of energy appearing in zone 1C, which is still present today.

4. — In conclusion, the study carried out up to now has allowed the differentiation of some phenomenologic aspects of the seismicity in different zones of Latium region. In particular the focal depth turned out to be less in the volcanic belt (from Bolsena to the Alban Hills) than in the remaining zones, also increasing from North to South; the *b* value showed an opposite behaviour. The time evolution of the seismic activity showed in some cases well defined characteristics, thus indicating approximately areas of particular interest for future experimental investigations. With a better geotectonic knowledge of Latium it will be possible to have a complete picture of the correlations between elastic-strain energy and structural characteristics.

ACKNOWLEDGEMENTS

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TABLE 5

N.	DATE	ZONE	EPICENTER	EPIC. LATIT.	EPIC. LONGIT.	INT.	h (K.m)	M	E (erg)
1	15 A. D.	1C	ROMA	41° 54' N	12° 29' E	VIII		5.3	3.1×10^{20}
2	20	1C	ROMA	41° 54' N	12° 29' E	VI		4.3	2.4×10^{18}
3	25	1C	ROMA	41° 54' N	12° 29' E	VII		4.8	2.9×10^{19}
4	27	1C	FIDENA	41° 58' N	12° 31' E	VIII		5.3	3.1×10^{20}
5	85	1C	ROMA	41° 54' N	12° 29' E	VIII		5.3	3.1×10^{20}
6	94	1C	ROMA	41° 54' N	12° 29' E	VIII		5.3	3.1×10^{20}
7	116	1C	ROMA	41° 54' N	12° 29' E	VIII		5.3	3.1×10^{20}
8	191	1C	ROMA	41° 54' N	12° 29' E	VIII		5.3	3.1×10^{20}
9	9-9-223	1C	ROMA	41° 54' N	12° 29' E	VII		4.8	2.9×10^{19}
10	17-9-223	1C	ROMA	41° 54' N	12° 29' E	VII		4.8	2.9×10^{19}
11	258	1C	ROMA	41° 54' N	12° 29' E	IX		6.0	1.1×10^{22}
12	21-1-304	1C	ROMA	41° 54' N	12° 29' E	VII		4.8	2.9×10^{19}
13	2-11-306	1N	VITERBO	42° 25' N	12° 07' E	IX		6.0	1.1×10^{22}

(cont. Table 5)

N.	DATE	ZONE	EPICENTER	EPIC. LATIT.	EPIC. LONGIT.	INT.	h (Km)	M	E (erg)
14	392	1C	ROMA	41° 54' N	12° 29' E	VII		4.8	2.9×10^{19}
15	441	1C	ROMA	41° 54' N	12° 29' E	VIII		5.3	3.1×10^{20}
16	467	1C	ROMA	41° 54' N	12° 29' E	VII		4.8	2.9×10^{19}
17	477	1C	ROMA	41° 54' N	12° 29' E	1 (VIII)		5.3	3.1×10^{20}
	sequence, duration 40'd					1 (VII)		4.8	2.9×10^{19}
						3 (VI)		4.3	2.4×10^{18} (x 3)
18	508	1C	ROMA	41° 54' N	12° 29' E	VIII		5.3	3.1×10^{20}
19	678	2N	RIETI	42° 30' N	12° 45' E	VIII		5.3	3.1×10^{20}
20	739	1C	ROMA	41° 54' N	12° 29' E	VII		4.8	2.9×10^{19}
21	780	1C	ROMA	41° 54' N	12° 29' E	VII		4.8	2.9×10^{19}
22	896	1C	ROMA	41° 54' N	12° 29' E	IX		6.0	1.1×10^{22}
23	1004	1S	MONTECASSINO	41° 29' N	13° 49' E	14 (VI)		4.3	2.4×10^{18} (x 14)
	sequence, duration 15 d					1 (VII)		4.8	2.9×10^{19}

(cont. Table 5)

N.	DATE	ZONE	EPICENTER	EPIC. LATIT.	EPIC. LONGIT.	INT.	h (Ktm)	M	E (erg)
24	1005 sequence, duration 3 m	1C	ROMA	41° 54' N	12° 29' E	6 (VI)		4.3	2.4×10^{18} (x 6)
25	1114	1N	VITERBO	42° 30' N	12° 00' E	VIII		5.3	3.1×10^{20}
26	1120 sequence, duration 1 y	1S	environs of CASSINO	41° 34' N	13° 38' E	1 (VIII) 6 (VI) 5 (VII)		5.3	3.1×10^{20}
27	1135 sequence, duration 1 y	1S	MONTECASSINO	41° 29' N	13° 49' E	6 (VI)		4.3	2.4×10^{18} (x 6)
28	1140	1S _H	MONTECASSINO - SAN GERMANO	41° 29' N	13° 47' E	VII		4.8	2.9×10^{19}
29	1152 sequence, duration 1 y	1S	MONTECASSINO	41° 29' N	13° 49' E	6 (VII) 6 (VI)		4.8	2.9×10^{19} (x 6)
30	15-10-1160	1S	VEROLI - FROSINONE	41° 38' N	13° 21' E	VII		4.3	2.4×10^{18} (x 6)
31	14-1-1161	1S	VEROLI - FROSINONE	41° 38' N	13° 21' E	VII		4.8	2.9×10^{19}

(cont. Table 5)

N.	DATE	ZONE	EPICENTER	EPIC. LATIT.	EPIC. LONGIT.	INT.	h (Km)	M	E (erg)
32	9-5-1170 sequence, duration 10 d	1S	CECCANO	41° 35' N	13° 20' E	1 (VIII) 4 (VII) 5 (VI)		5.3	3.1 x 10 ²⁰
33	1200	1S	CECCANO	41° 35' N	13° 20' E	VII		4.8	2.9 x 10 ¹⁹ (x 4)
34	1216	2S	SUBIACO	41° 55' N	13° 06' E	VIII		4.3	2.4 x 10 ¹⁸ (x 5)
35	1229 sequence, duration many days	1C	ROMA	41° 54' N	12° 29' E	1 (VII) 4 (VI)		4.8	2.9 x 10 ¹⁹
36	1-6-1231	1S	MONTECASSINO - S. GERMANO	41° 29' N	13° 47' E	VIII		5.4	5.6 x 10 ²⁰
37	1256	1C	ROMA - ANAGNI	41° 49' N	12° 50' E	VII		4.8	2.9 x 10 ¹⁹
38	1287	1C	ROMA	41° 54' N	12° 29' E	VI		4.3	2.4 x 10 ¹⁸
39	1315 sequence, duration 30 d	2N	CITTADUCALE	42° 21' N	13° 10' E	1 (VIII) 1 (VII) 2 (VI)		5.3	3.1 x 10 ²⁰
								4.8	2.9 x 10 ¹⁹
								4.3	2.4 x 10 ¹⁸ (x 2)

(cont. Table 5)

N.	DATE	ZONE	EPICENTER	EPIC. LATIT.	EPIC. LONGIT.	INT.	h (Km)	M	E (erg)
40	1320	1N	VITERBO	42° 25' N	12° 07' E	VII		4.8	2.9 x 10 ¹⁹
41	1321	1C	ROMA	41° 54' N	12° 29' E	VII		4.8	2.9 x 10 ¹⁹
42	1350	1C	ROMA	41° 54' N	12° 29' E	VIII		5.3	3.1 x 10 ²⁰
43	17-3-1403	1C	ROMA	41° 54' N	12° 29' E	VI		4.3	2.4 x 10 ¹⁸
44	1425	1C	ROMA	41° 54' N	12° 29' E	VII		4.8	2.9 x 10 ¹⁹
45	4-11-1448	1C	ROMA	41° 54' N	12° 29' E	VI		4.3	2.4 x 10 ¹⁸
46	19-1-1484	1C	MENTANA-CASTELNUOVO	42° 05' N	12° 34' E	VII	10 (d)	4.8	2.9 x 10 ¹⁹
47	1502 sequence, duration 40 d	2N	CITTADUCALE	42° 22' N	13° 10' E	1 (VIII) 2 (VII) 3 (VI)		5.3	3.1 x 10 ²⁰
48	1582 sequence, duration 1 y	2N	CITTADUCALE	42° 22' N	13° 10' E	6 (VI)		4.8	2.9 x 10 ¹⁹ (x2) 2.4 x 10 ¹⁸ (x3)
49	8-10-1639	2N	AMATRICE	42° 38' N	13° 17' E	VI		4.3	2.4 x 10 ¹⁸ (x6)

(cont. Table 5)

N.	DATE	ZONE	EPICENTER	EPIC. LATIT.	EPIC. LONGIT.	INT.	h (Km)	M	E (erg)
50	8-10-1639	2N	AMATRICE	42° 38' N	13° 17' E	VIII-IX	12 (d)	5.9	6.6×10^{21}
51	14-10-1639	2N	AMATRICE	42° 38' N	13° 17' E	VII-VIII		5.0	7.7×10^{19}
52	17-10-1639	2N	AMATRICE	42° 38' N	13° 17' E	VI-VII		4.5	6.5×10^{18}
53	12-10-1642	1S	MONTECASSINO	41° 29' N	13° 49' E	VI		4.3	2.4×10^{18}
54	30-5-1646	1S	MONTECASSINO	41° 29' N	13° 49' E	VI		4.3	2.4×10^{18}
55	12-3-1650	1S	MONTECASSINO	41° 29' N	13° 49' E	VII		4.8	2.9×10^{19}
56	23-7-1654	2S	SORA - ARPINO	41° 40' N	13° 35' E	X	8 (i, d)	6.7	3.5×10^{23}
57	10-6-1658	1S	MONTECASSINO	41° 29' N	13° 49' E	VII		4.8	2.9×10^{19}
58	10-6-1695	1N	BAGNOREGIO - LUBRANO	42° 38' N	12° 06' E	VI		4.3	2.4×10^{18}
59	11-6-1695	1N	BAGNOREGIO - LUBRANO	42° 38' N	12° 06' E	I (IX)	11.6 (i, d)	6.2	2.9×10^{22}
	sequence, duration 12 d					I (VII)		4.8	2.9×10^{19}
						I (VI)		4.3	2.4×10^{18}

(cont. Table 5)

N.	DATE	ZONE	EPICENTER	EPIC. LATIT.	EPIC. LONGIT.	INT.	h (Km)	M	E (erg)
60	7-7-1695	1N	BAGNOREGIO - LUBRANO	42° 38' N	12° 06' E	VII		4.8	2.9×10^{19}
61	16-1-1703	2N	AMATRICE - CITTADUCALE	42° 38' N	13° 15' E	XI	10 (i)	7.5	1.8×10^{25}
62	3-2-1703	1C	ROMA	41° 54' N	12° 29' E	VI		4.3	2.4×10^{18}
63	15-2-1703 sequence, duration 4 d	2N	ACCUMOLI - AMATRICE	42° 30' N	12° 45' E	1 (VII) 3 (VI)		4.8	2.9×10^{19}
64	25-4-1703	1C	ROMA	41° 54' N	12° 29' E	VI		4.3	2.4×10^{18}
65	25-5-1703	1S	MONTECASSINO	41° 29' N	13° 49' E	VI		4.3	2.4×10^{18}
66	25-5-1703	1S	MONTECASSINO	41° 29' N	13° 49' E	VII		4.8	2.9×10^{19}
67	28-8-1703	1S	MONTECASSINO	41° 29' N	13° 49' E	VI		4.3	2.4×10^{18}
68	1712	1C	ROMA	41° 54' N	12° 29' E	VI		4.3	2.4×10^{18}
69	7-6-1720	1S	MONTECASSINO	41° 29' N	13° 49' E	VII		4.8	2.9×10^{19}
70	27-8-1720	2S	ATINA	41° 37' N	13° 46' E	VII	13 (d)	5.0	7.7×10^{19}
71	12-9-1723	1S	MONTECASSINO - SAN GERMANO	41° 29' N	13° 47' E	VII		4.8	2.9×10^{19}

(cont. Table 5)

N.	DATE	ZONE	EPICENTER	EPIC. LATIT.	EPIC. LONGIT.	INT.	h (Krm)	M	E (erg)
72	11-10-1723	1S	MONTECASSINO - S. GERMANO	41° 29' N	13° 47' E	VI		4.3	2.4×10^{18}
73	18-10-1723	1S	MONTECASSINO - SAN GERMANO	41° 29' N	13° 47' E	VII		4.8	2.9×10^{19}
74	24-1731	1S _L	SAN GERMANO	41° 30' N	13° 45' E	VII	6 (d)	4.5	6.5×10^{18}
75	26-4-1731	1S	SAN GERMANO	41° 30' N	13° 45' E	VII		4.8	2.9×10^{19}
76	26-6-1731	1S	SAN GERMANO	41° 30' N	13° 45' E	VI		4.3	2.4×10^{18}
77	1738	1N	BAGNOREGIO-LUBRANO	42° 38' N	12° 06' E	VII	10 (d)	4.8	2.9×10^{19}
78	October 1745	1S	MONTECASSINO - SAN GERMANO	41° 29' N	13° 47' E	1 (VII) 3 (VI)		4.8	2.9×10^{19}
	sequence, duration 40 d							4.3	2.4×10^{18} (x 3)
79	11-9-1748	1C	FRASCATI - MARINO	41° 47' N	12° 40' E	VII	13 (d)	5.0	7.7×10^{19}
80	28-1-1750	1C	FRASCATI - ALBANO	41° 46' N	12° 40' E	VII		4.8	2.9×10^{19}
81	8-2-1750	1C	FRASCATI - MARINO - ALBANO	41° 46' N	12° 40' E	VI	19 (d)	4.5	6.5×10^{18}
82	20-9-1752	1C	VELLETRI	41° 41' N	12° 47' E	VI	7.6 (d)	4.0	5.5×10^{17}
83	26-9-1752	1C	FRASCATI - VELLETRI - MARINO	41° 45' N	12° 42' E	VIII	5 (d)	5.1	1.3×10^{20}

(cont. Table 5)

N.	DATE	ZONE	EPICENTER	EPIC. LATIT.	EPIC. LONGIT.	INT.	h (Km)	M	E (erg)
84	7-6-1754	1C	PALESTRINA - ARICCIA - TIVOLI	41° 50' N	12° 46' E	VII	12 (d)	4.9	4.7×10^{19}
85	5-5-1755	1N	BAGNOREGIO-VITERBO	42° 32' N	12° 07' E	VI		4.2	1.5×10^{18}
86	18-11-1755	1N	ACQUAPENDENTE - GROTTE - VITERBO	42° 43' N	11° 50' E	1 (VII) 2 (VI)		4.8	2.9×10^{19}
	sequence, duration 1 d							4.3	2.4×10^{18} (x 2)
87	2-2-1756	1S	SEZZE	41° 30' N	13° 03' E	VI		4.3	2.4×10^{18}
88	14-6-1759	1N	S. MICHELE IN TEVERINA	42° 36' N	12° 10' E	VI		4.3	2.4×10^{18}
89	5-10-1759	1S	MONTECASSINO - S. GERMANO	41° 29' N	13° 47' E	VI		4.3	2.4×10^{18}
90	1759	2S	AFFILE	41° 52' N	13° 05' E	VII		4.8	2.9×10^{19}
91	5-4-1761	1S _L	MONTECASSINO	41° 29' N	13° 49' E	VI		4.3	2.4×10^{18}
92	August 1765	2S	ANAGNI - PIGLIO	41° 47' N	13° 09' E	VI		4.3	2.4×10^{18}
93	March 1773	1C	ZAGAROLO	41° 50' N	12° 50' E	VI		4.3	2.4×10^{18}
94	23-4-1773	1C	FRASCATI	41° 48' N	12° 41' E	VI		4.3	2.4×10^{18}
95	22-6-1773	1C	ARICCIA	41° 43' N	12° 40' E	VI		4.3	2.4×10^{18}

(cont. Table 5)

N.	DATE	ZONE	EPICENTER	EPIC. LATIT.	EPIC. LONGIT.	INT.	h (Km)	M	E (erg)
96	29-3-1776	2N	RIETI	42° 24' N	12° 52' E	VI-VII		4.5	6.5×10^{18}
97	19-8-1777	2S	SORA - ISOLA LIRI - VEROLI	41° 42' N	13° 33' E	VII		4.8	2.9×10^{19}
98	25-2-1781	1C	ARICCIA	41° 43' N	12° 40' E	VI		4.3	2.4×10^{18}
99	24-9-1792	1C	MONTEPORZIO	41° 49' N	12° 43' E	VII	1.3 (d)	3.6	7.6×10^{16}
100	7-11-1793	1N	BOLSENA	42° 39' N	11° 59' E	VI		4.3	2.4×10^{18}
101	March-April 1794	1C	ARICCIA	41° 43' N	12° 40' E	VI		4.3	2.4×10^{18}
102	15-8-1795	2N	SAN GREGORIO	41° 55' N	12° 53' E	VII	8 (d)	4.7	1.8×10^{19}
103	15-8-1795	2N	SAN GREGORIO	41° 55' N	12° 53' E	VII		4.8	2.9×10^{19}
104	29-12-1800	1C	VELLETRI	41° 41' N	12° 47' E	VII	7.0 (d)	4.6	1.1×10^{19}
105	21-7-1806	1S	CASSINO	41° 29' N	13° 50' E	VI	27 (d)	4.7	1.8×10^{19}
106	26-8-1806	1C	VELLETRI - FRASCATI NEMI	41° 44' N	12° 43' E	VIII	9 (i, d)	5.4	5.6×10^{20}
107	Winter 1809	1C	MONTECOMPATRI	41° 48' N	12° 44' E	VII	0.4 (d)	2.9	2.4×10^{15}
108	1810	1C	ARICCIA	41° 43' N	12° 40' E	VI-VII		4.5	6.5×10^{18}

(cont. Table 5)

N.	DATE	ZONE	EPICENTER	EPIC. LATIT.	EPIC. LONGIT.	INT.	h (Km)	M	E (erg)
109	18-2-1811	1C	ROMA	41° 54' N	12° 29' E	VI-VII	15 (d)	4.7	1.8×10^{19}
110	22-3-1812	1C	ROMA	41° 54' N	12° 29' E	VII		4.8	2.9×10^{19}
111	26-3-1817	1C	FRASCATI-GENZANO	41° 46' N	12° 40' E	VI		4.3	2.4×10^{18}
112	26-5-1819	1N	TARQUINIA	42° 15' N	11° 46' E	VII		4.8	2.9×10^{19}
113	22-3-1821	2N	RIETI	42° 24' N	12° 52' E	VII		4.8	2.9×10^{19}
114	22-5-1829	1C	ALBANO	41° 43' N	12° 39' E	VI		4.3	2.4×10^{18}
115	1-6-1829	1C	ALBANO	41° 43' N	12° 39' E	VII	4 (i)	4.3	2.4×10^{18}
116	25-6-1829	1C	COLLI ALBANI	41° 45' N	12° 42' E	VI		4.3	2.4×10^{18}
117	23-12-1835	1S _L	MONTECASSINO	41° 29' N	13° 49' E	1 (VII)		4.8	2.9×10^{19}
	sequence, duration 1 d					1 (VI-VII)		4.5	6.5×10^{18}
						1 (VI)		4.3	2.4×10^{18}
118	2-4-1837	1S _L	MONTECASSINO - S. GERMANO	41° 29' N	13° 47' E	VI		4.3	2.4×10^{18}

(cont. Table 5)

N.	DATE	ZONE	EPICENTER	EPIC. LATIT.	EPIC. LONGIT.	INT.	h (K.m)	M	E (erg)
119	12-4-1837	1S _L	MONTECASSINO - S. GERMANO	41° 29' N	13° 47' E	VI		4.3	2.4 x 10 ¹⁸
120	14-5-1837	1S _L	MONTECASSINO - S. GERMANO	41° 29' N	13° 47' E	VII		4.8	2.9 x 10 ¹⁹
121	17-7-1844	1C	PALESTRINA	41° 50' N	12° 54' E	VII	3 (d)	4.1	9.1 x 10 ¹⁷
122	1853	1N	GROTTE DI CASTRO	42° 40' N	11° 52' E	VI		4.3	2.4 x 10 ¹⁸
123	29-5-1855	1C	FRASCATI	41° 49' N	12° 41' E	VI	3 (d)	3.4	2.8 x 10 ¹⁶
124	29-6-1855	1C	FRASCATI	41° 49' N	12° 41' E	VI-VII	7.3 (d)	4.3	2.4 x 10 ¹⁸
125	30-6-1855	1C	FRASCATI	41° 49' N	12° 41' E	VI	5 (d)	3.7	1.3 x 10 ¹⁷
126	17/18-2-1859	2N	AMATRICE	42° 38' N	13° 17' E	VI		4.3	2.4 x 10 ¹⁸
127	12-12-1861	1C	MONTEPORZIO	41° 49' N	12° 43' E	VI-VII		4.5	6.5 x 10 ¹⁸
128	19-1-1863	1S _L	MONTECASSINO - SAN GERMANO	41° 29' N	13° 47' E	VI		4.3	2.4 x 10 ¹⁸
129	20-1-1863	1S _L	MONTECASSINO - SAN GERMANO	41° 29' N	13° 47' E	VI		4.3	2.4 x 10 ¹⁸
130	12-12-1872	1S _L	MONTECASSINO	41° 29' N	13° 49' E	VI	0.8 (d)	2.6	5.4 x 10 ¹⁴
131	19-1-1873	1C	MARINO - NEMI - MONTE PORZIO	41° 46' N	12° 41' E	VI	10 (i, d)	4.1	9.1 x 10 ¹⁷

(cont. Table 5)

N.	DATE	ZONE	EPICENTER	EPIC. LATIT.	EPIC. LONGIT.	INT.	h (Kmt)	M	E (erg)
132	12-7-1873	2S	ALVITO - S. DONATO	41° 40' N	13° 47' E	VIII	11 (i)	5.5	9.2×10^{20}
133	26-7-1873	2S	ARPINO - SORA - ISOLA LIRI	41° 41' N	13° 36' E	VII		4.8	2.9×10^{19}
134	6-12-1874	2S	ALVITO - S. DONATO - ATTINA	41° 42' N	13° 56' E	VIII	21 (i)	5.9	6.6×10^{21}
135	26-10-1876	1C	PALESTRINA	41° 50' N	12° 54' E	VII	6.48 (i)	4.5	6.5×10^{18}
136	16-8-1877	1C	ROCCA DI PAPA	41° 46' N	12° 43' E	VI	9.3 (i)	4.1	9.1×10^{17}
137	24-8-1877	2S	VEROLI	41° 42' N	13° 25' E	VIII	15 (i)	5.7	2.5×10^{21}
138	23-12-1877	1N	CAPANNACCE - LA CURA	42° 18' N	12° 06' E	VI- VII	6.9 (i)	4.3	2.4×10^{18}
139	20-9-1881	1N	CELLENO	42° 34' N	12° 09' E	VII	2.6 (d)	4.0	5.5×10^{17}
140	29-11-1881	1N	TUSCANIA - LA ROCCA	42° 24' N	11° 53' E	VII	14 (d)	5.0	7.7×10^{19}
141	January 1882	1N	LA ROCCA - LATERA	42° 30' N	11° 52' E	VI		4.3	2.4×10^{18}
142	2-9-1883	1C	FRASCATI - GROTTAFERRA TA - ROCCA DI PAPA	41° 48' N	12° 42' E	VII	6 (i)	4.5	6.5×10^{18}
143	17-6-1885	2N	MORRO REATINO	42° 32' N	12° 50' E	VII	8 (i, d)	4.7	1.8×10^{19}
144	17-1-1886	1C	ARICCIA - GALLORO	41° 43' N	12° 40' E	VII	1.2 (d)	3.5	4.7×10^{16}

(cont. Table 5)

N.	DATE	ZONE	EPICENTER	EPIC. LATIT.	EPIC. LONGIT.	INT.	h (Kkm)	M	E (erg)
145	28-7-1886	1S	CECCANO	41° 34' N	13° 20' E	VI	7 (d)	3.9	3.4×10^{17}
146	11-8-1888	1N	GROTTE DI CASTRO - S. LORENZO NUOVO	42° 40' N	11° 52' E	VI- VII	2.2 (i)	3.6	7.6×10^{16}
147	30-8-1888	1N	GROTTE DI CASTRO - S. LORENZO NUOVO	42° 40' N	11° 52' E	VI		4.3	2.4×10^{18}
148	9-5-1891	2S	SORA - ISOLA LIRI	41° 43' N	13° 36' E	VI	14 (i)	4.3	2.4×10^{18}
149	1-10-1891	1S _L	MONTECASSINO	41° 29' N	13° 49' E	VI- VII	1.9 (d)	3.5	4.7×10^{16}
150	22-1-1892	1C	GENZANO	41° 42' N	12° 42' E	VIII	8 (i, d)	5.3	3.4×10^{20}
151	1-11-1895	1C	CECCHIGNOLA (Roma)	41° 52' N	12° 24' E	VIII	9 (d)	5.4	5.6×10^{20}
152	6-11-1895	1C	CECCHIGNOLA (Roma)	41° 52' N	12° 24' E	VI		4.3	2.4×10^{18}
153	8-5-1897	1C	ROCCA DI PAPA	41° 47' N	12° 41' E	VI	10.5 (i)	4.2	1.5×10^{18}
154	28-6-1898	2N	RIETI - COPPAELLI BASSO	42° 24' N	12° 52' E	IX	5 (i)	5.7	2.5×10^{21}
155	30-8-1898	2N	CITTADUCALE	42° 23' N	12° 57' E	VI	8 (d)	4.0	5.5×10^{17}
156	9-9-1898	2N	RIETI	42° 24' N	12° 52' E	VI		4.3	2.4×10^{18}
157	19-7-1899	1C	FRASCATI - MARINO - GROTTAFERRATA	41° 47' N	12° 40' E	VIII	10 (i)	5.5	9.2×10^{20}

(cont. Table 5)

N.	DATE	ZONE	EPICENTER	EPIC. LATT.	EPIC. LONGIT.	INT.	h (Ktm)	M	E (erg)
158	24-4-1901	1C	STAZZANO - CRETONE - PALOMBARA	42° 05' N	12° 44' E	VIII	5 (i)	5.1	1.3 x 10 ²⁰
159	7-5-1901	1C	STAZZANO - CRETONE - PALOMBARA	42° 05' N	12° 44' E	VI		4.3	2.4 x 10 ¹⁸
160	31-7-1901	2S	PESCOSOLIDO - SORA - VILLETTA BARREA	41° 44' N	13° 47' E	VII- VIII	14 (i, d)	5.3	3.1 x 10 ²⁰
161	14-8-1901	2S	PESCOSOLIDO - SORA - VILLETTA BARREA	41° 44' N	13° 47' E	VI		4.3	2.4 x 10 ¹⁸
162	21-9-1902	2S	ALATRI	41° 44' N	13° 21' E	VI- VII		4.5	6.5 x 10 ¹⁸
163	23-10-1902	2N	RIETI - CITTADUCALE	42° 24' N	12° 55' E	VI- VII	17 (i)	4.8	2.9 x 10 ¹⁹
164	21-6-1903	1N	BAGNOREGIO	42° 38' N	12° 06' E	VII	7 (d)	4.6	1.1 x 10 ¹⁹
165	21-8-1908	1S	MONTECASSINO	41° 29' N	13° 49' E	VI		4.3	2.4 x 10 ¹⁸
166	31-8-1909	1C	MONTE ANTENNE (Roma)	41° 56' N	12° 25' E	VI		4.3	2.4 x 10 ¹⁸
167	20-9-1909	1N	ISCHIA DI CASTRO	42° 33' N	11° 46' E	VI		4.3	2.4 x 10 ¹⁸
168	6-3-1910	2N	LEONESSA	42° 34' N	12° 58' E	VI		4.3	2.4 x 10 ¹⁸
169	22-12-1910	2N	ACCUMOLI	42° 42' N	13° 14' E	VI	12 (d)	4.3	2.4 x 10 ¹⁸
170	22-12-1910	2N	ACCUMOLI	42° 42' N	13° 14' E	VI		4.4	4.0 x 10 ¹⁸

(cont. Table 5)

N.	DATE	ZONE	EPICENTER	EPIC. LATIT.	EPIC. LONGIT.	INT.	h (Kkm)	M	E (erg)
171	26-12-1910	2N	ACCUMOLI	42° 42' N	13° 14' E	VI-VII	13 (i, d)	4.6	1.1×10^{19}
172	10-4-1911	1C	MONTECOMPATRI - MARIANO - ALBANO - CIAMPINO	41° 47' N	12° 40' E	VI	11 (i)	4.2	1.5×10^{18}
173	7-7-1912	2S	SORA - ALVITO - ARPINO	41° 41' N	13° 39' E	VI	5 (d)	3.7	1.3×10^{17}
174	15-2-1915	2N	CITTADUCALE	42° 23' N	12° 57' E	VI	4 (d)	3.6	7.6×10^{16}
175	15-2-1915	1C	LEPRIGNANO	42° 06' N	12° 30' E	VI		4.3	2.4×10^{18}
176	16-11-1916	2N	CITTAREALE	42° 37' N	13° 09' E	VII-VIII	9 (i)	5.1	1.3×10^{20}
177	12-9-1917	2S	SORA - ISOLA LIRI	41° 42' N	13° 36' E	VI	12 (d)	4.3	2.4×10^{18}
178	14-10-1917	1N	MONTEFIASCONE	42° 32' N	12° 02' E	VII	4.0 (i)	4.3	2.4×10^{18}
179	3-12-1917	1S _L	MONTECASSINO	41° 29' N	13° 49' E	VI	1.69 (i)	3.1	6.5×10^{15}
180*	22-10-1919	1C	ANZIO - NETTUNO	41° 23' N	12° 35' E	VIII		5.3	3.1×10^{20}
181	29-11-1921	1N	GROTTE DI CASTRO - S. LORENZO NUOVO	42° 41' N	11° 53' E	VI	4 (d)	3.6	7.6×10^{16}
182	1-12-1921	1N	GROTTE DI CASTRO - S. LORENZO NUOVO	42° 41' N	11° 53' E	VI-VII		4.5	6.5×10^{18}

(*) In spite of the availability of news about this shock, h was not evaluated because the epicenter is located in the sea.

(cont. Table 5)

N.	DATE	ZONE	EPICENTER	EPIC. LATIT.	EPIC. LONGIT.	INT.	h_z (Kkm)	M	E (erg)
183	1-12-1921	1N	GROTTE DI CASTRO - S. LORENZO NUOVO	42° 41' N	11° 53' E	VII	2.6 (i)	4.0	5.5 x 10 ¹⁷
184	27-3-1922	1N	S. LORENZO NUOVO	42° 41' N	11° 53' E	VI	7.1 (i)	3.9	3.4 x 10 ¹⁷
185	27-3-1922	1N	S. LORENZO NUOVO	42° 41' N	11° 53' E	VI		4.3	2.4 x 10 ¹⁸
186	27-3-1922	1N	S. LORENZO NUOVO	42° 41' N	11° 53' E	VI		4.3	2.4 x 10 ¹⁸
187	27-3-1922	1N	S. LORENZO NUOVO	42° 41' N	11° 53' E	VI		4.3	2.4 x 10 ¹⁸
188	13-5-1923	2N	BORGO COLLEFEGATO	42° 12' N	13° 14' E	VI	11 (i)	4.2	1.5 x 10 ¹⁸
189	9-4-1924	1N	ACQUAPENDENTE	42° 45' N	11° 51' E	VII		4.8	2.9 x 10 ¹⁹
190	9-4-1924	1N	ACQUAPENDENTE	42° 45' N	11° 51' E	VI		4.3	2.4 x 10 ¹⁸
191	10-4-1924	1N	ACQUAPENDENTE	42° 45' N	11° 51' E	VII		4.8	2.9 x 10 ¹⁹
192	10-4-1924	1N	ACQUAPENDENTE	42° 45' N	11° 51' E	VI		4.3	2.4 x 10 ¹⁸
193	15-9-1924	2N	RIVODUTRI	42° 30' N	12° 51' E	VI	1.1 (d)	2.8	1.5 x 10 ¹⁵
194	26-12-1927	1C	NEMI	41° 43' N	12° 43' E	VIII	5 (i)	5.1	1.3 x 10 ²⁰
195	12-12-1929	1N	ONANO	42° 41' N	11° 49' E	VI	3.2 (i, d)	3.5	4.7 x 10 ¹⁶

(cont. Table 5)

N.	DATE	ZONE	EPICENTER	EPIC. LATIT.	EPIC. LONGIT.	INT.	h (Kilom.)	M	E (erg)
196	22-12-1930	1N	ONANO	42° 41' N	11° 49' E	VI	2 (d)	3.2	1.1×10^{16}
197	22-12-1930	1N	ONANO	42° 41' N	11° 49' E	VI		3.7	1.3×10^{17}
198	22-12-1930	1N	ONANO	42° 41' N	11° 49' E	VI		4.3	2.4×10^{18}
199	22-12-1930	1N	ONANO	42° 41' N	11° 49' E	VI		4.3	2.4×10^{18}
200	13-5-1931	1N	CELLENO	42° 34' N	12° 09' E	VI	5.4 (i)	3.8	2.1×10^{17}
201	26-5-1931	1S _r	VILLA S. LUCIA	41° 31' N	13° 47' E	VI- VII	2.1 (i)	3.5	4.7×10^{16}
202	8-9-1941	2S	CERVARA	42° 01' 59" N	13° 04' 32" E	VI	10*	4.2	1.5×10^{18}
203	31-12-1948	2N	RIVODUTRI-GRECCIO	42° 27' N	12° 45' E	VII	19 (i)	5.2	2.1×10^{20}
204	4-1-1949	2N	RIVODUTRI-GRECCIO	42° 27' N	12° 45' E	VI- VII		4.5	6.5×10^{18}
205	12-3-1950	2N	ACCUMOLI-AMATRICE	42° 42' N	13° 18' E	VI		4.3	2.4×10^{18}
206	11-4-1957	2N	PETRELLA SALTO - VARCO SABINO	42° 17' N	13° 02' E	VI	9 (k)	4.1*	9.1×10^{17}
207	6-12-1957	1N	ACQUAPENDENTE - S. LORENZO NUOVO	42° 43' N	11° 52' E	VI- VII		4.5	6.5×10^{18}
208	16-3-1960	2N	AMATRICE - CITTAREALE	42° 36' N	13° 12' E	VI	15 (i)	4.4	4.0×10^{18}
209	10-4-1961	2S	ARSOLI - CERVARA	42° 00' N	13° 05' E	VI	9 (k)	4.1*	9.1×10^{17}

(cont. Table 5)

N.	DATE	ZONE	EPICENTER	EPIC. LATIT.	EPIC. LONGIT.	INT	<i>h</i> (Km)	<i>M</i>	E (erg)
210	31-10-1961	2N	ANTRODOCO - BORGO VELINO - COLLE RINALDO	42°21'20.4"N	13°01'05.5"E	VIII	6*	5.18*	1.9 x 10 ²⁰
211	2-2-1963	2N	CITTADUCALE	42° 24' N	12° 54' E	VIII	5 (k)	5.1*	1.3 x 10 ²⁰
212	21-7-1963	2N	ARAFRANCA	42° 36' N	13° 18' E	VII	11 (k)	4.9*	4.7 x 10 ¹⁹
213	24-7-1963	2N	ARAFRANCA	42° 36' N	13° 18' E	VI	15 (k)	4.4*	4.0 x 10 ¹⁸
214	24-7-1963	2N	ARAFRANCA	42° 36' N	13° 18' E	VI	13 (k)	4.3*	2.4 x 10 ¹⁸
215	2-9-1963	1N	VALLERANO-VIGNANELLO	42° 22' N	12° 15' E	VI	3 (k)	3.5*	4.7 x 10 ¹⁶
216	16-10-1966	1S	ARPINO - SANTOPADRE	41° 36' N	13° 36' E	VI	6 (d)	3.8	2.1 x 10 ¹⁷
217	4-1-1968	1N	COLLEVECCHIO - TARANO	42° 24' N	12° 30' E	VI	5 (k)	3.7*	1.3 x 10 ¹⁷
218	17-4-1969	2S	TERELLE - CASSINO	41° 36, N	13° 48' E	VII- VIII	6*	4.6*	1.1 x 10 ¹⁹
219	22-11-1970	2S	S. VITTORE	41° 32' N	13° 56, E	VI	6*	3.8	2.1 x 10 ¹⁷
220	5-2-1971	1N	TUSCANIA	42° 25' 07" N	11° 52' 43.6"E	VII- VIII	2*	4.5*	6.5 x 10 ¹⁸
221	30-10-1973	2S	VALLEROTONDA	41° 35' N	13° 57' E	VI	13 (k)	4.3*	2.4 x 10 ¹⁸
222	5-11-1973	2S	ATINA - FROSINONE	41° 41' N	13° 48' E	VI- VII	5 (k)	4*	5.5 x 10 ¹⁷
223	5-11-1973	2S	ATINA - FROSINONE	41° 41' N	13° 48' E	VI	7 (k)	4.6*	1.1 x 10 ¹⁹

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USCGS: U.S. Coast and Geodetic Survey - Washington.