

# Missing, duplicates and fakes: Not just macroseismic events

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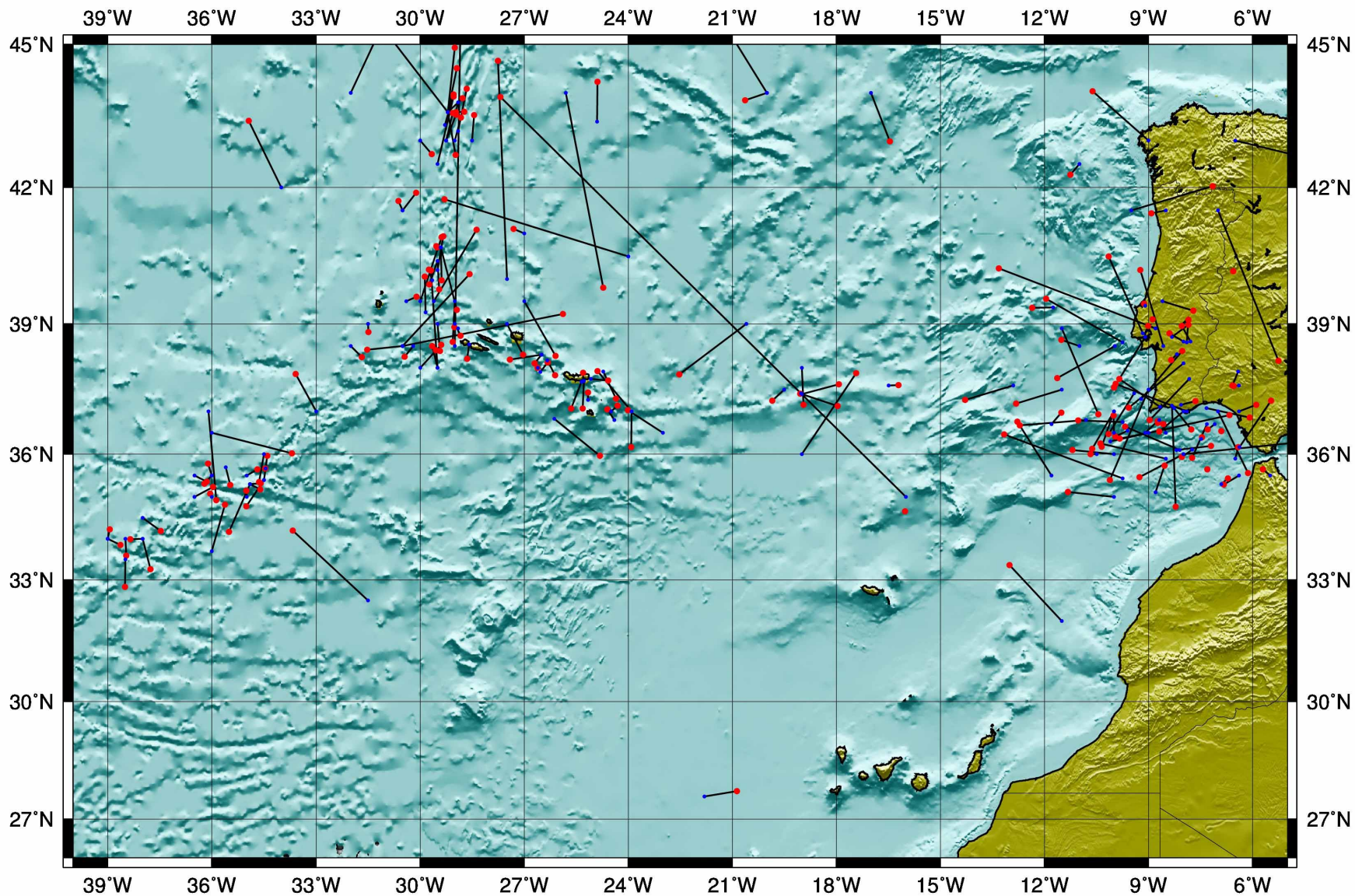
# Fake events in Macroseismology

Fake events:

- It never happened
- There is a location error
- There is a origin time error
- It is a duplication

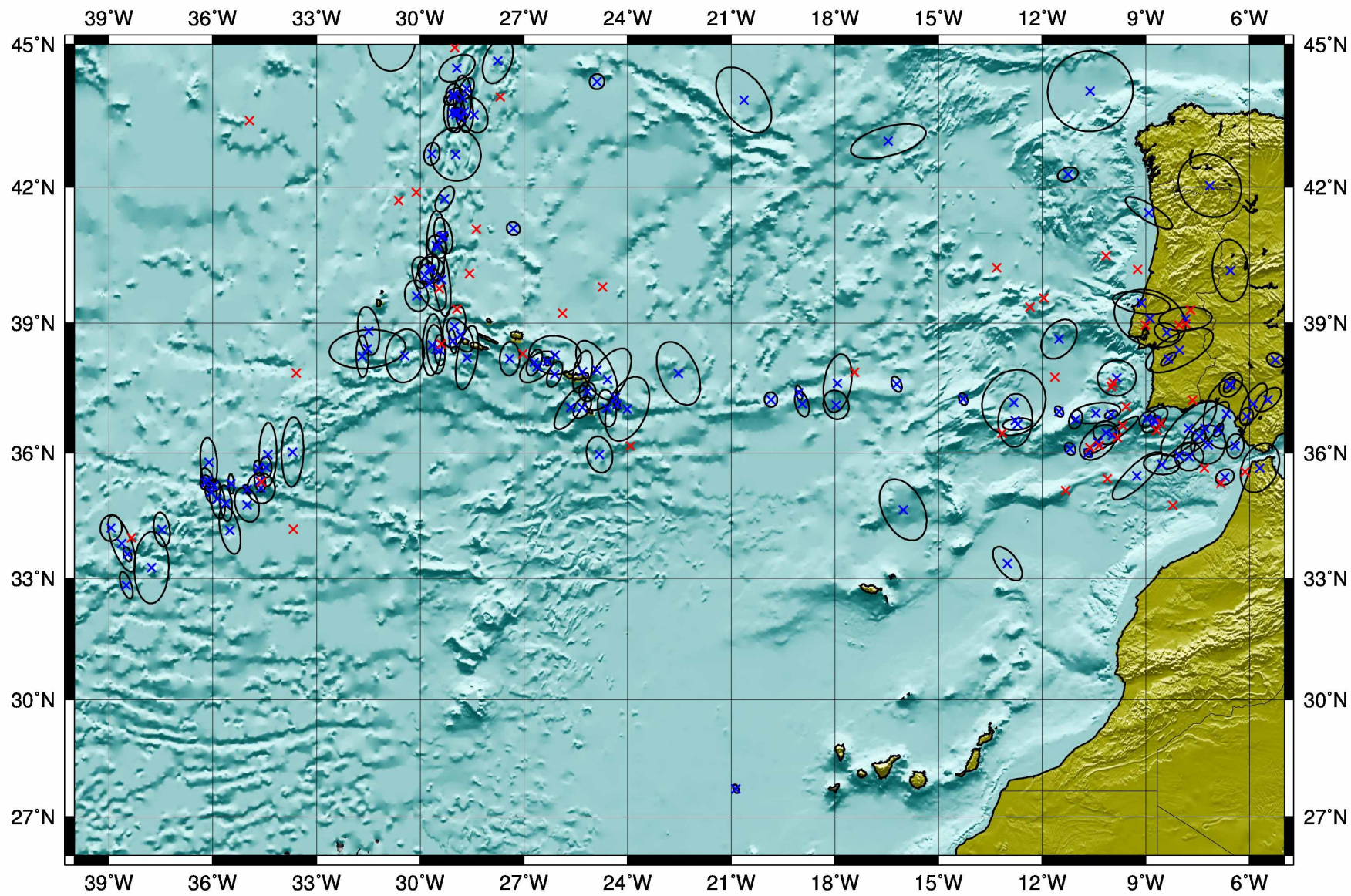
We have been reviewing the Portuguese seismicity in the period 1900-1960 (project INSPIRE, PTDC/CTE-GIX/122262/2010) and...

Similar problems are found in the instrumental period (more frequently than expected)



Relocation differences of the studied earthquakes (blue point – old locations; red circles – new locations)







# A catalogue with 1052 events was build up

But:

- Only 349 are instrumentally recorded (1/3 of the whole catalogue)
- Just 178 have enough data to be relocalized.
- Still in the last years...

	Total	Recorded	Located
1959	27	22	9
1960	25	17	14

Some examples:

1919-09-10 10:40, 10:56  
38.12N 0.85W (SE-Spain)  
 $M_w = 5.4$





Original bulletins of the International Seismological Summary (ISS) have been obtained thanks to funding provided by the US National Science Foundation through grant EAR-9725140 (Villaseñor et al., 1997) and have been scanned and collected by SGA Storia Geofisica Ambiente (Bologna) thanks to funding provided by the Istituto Nazionale di Geofisica e Vulcanologia (Rome), in the frame of the EUROSEISMOS project.

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Sept. 10d. 10h. 44m. 30s. Epicentre 44°

$\Delta = +719$  B = +

	$\Delta$	P.	O
	m. s.	m. s.	
Besancon	4.0	1 33	+
Paris	4.9	e 0 40	+
Strasbourg	5.8	e 2 10	+
Uccle	6.9	e 1 54	+
Oxford	8.2	13 4	+
De Bilt	8.3	—	—
Hamburg	10.8	—	—
Edinburgh	12.5	5 30	?S

Additional records: Paris ePV = +0m  
Hamburg record for L and M prob.  
record as then probably L.

Sept. 10d. 10h. 56m. 5s. Epicentre 41°

It is assumed as before that Coim

	$\Delta$	Az.	P.
	m. s.	m. s.	m. s.
Coimbra	1.7	220	e (3) 1
Granada	5.1	148	1 3
San Fernando	5.1	173	2 2
Tortosa	5.7	94	1 3
Barcelona	6.8	87	1 4
Algiers	9.1	118	2 2
Marseilles	9.3	75	e 3 5
Oxford	11.0	19	—
Strasbourg	12.5	50	—
Helwan	32.9	98	5 5

The above shock appears to be follow  
4 1/2 minutes later, as before; to face  
4m.30s., has been retained. Col

Sept. 10d. 11h. 0m. 35s. Epicentre 44°-0

	$\Delta$	P.	O
	m. s.	m. s.	
Besancon	4.0	1 23?	—
Paris	4.9	e 0 51	—
Strasbourg	5.8	e 0 5	—
Uccle	6.9	2 1	—
De Bilt	8.3	—	—
Edinburgh	12.5	5 55	—

De Bilt gives MN = +6.4m.

Sept. 10d. 11h. 58m. 30s. Epicentre 41°

It is assumed, as before, that Coim

	$\Delta$	Az.	P.
	m. s.	m. s.	m. s.
Coimbra	1.7	220	e (3) 4
Granada	5.1	148	1 2
Tortosa	5.7	94	1 1
Barcelona	6.8	87	e 2 5
Oxford	11.0	19	—
Helwan	32.9	98	11 3

Sept. 10d. 12h. 3m. 0s. Epicentre 44°

indications are De Bilt eL =  
but these are in such good ac  
possibility seems worth record

Sept. 10d. 10h. 56m. 5s. Epicentre 41° 5' N. 7° 0' W. (as at 10h.40m.).

It is assumed as before that Coimbra is 3m. in error.

	$\Delta$	Az.	P.	O - C.	S.	O - C.	L.	M.
	m. s.	m. s.	m. s.	s.	m. s.	s.	m.	m.
Coimbra	1.7	220	e (3) 19	- 7	i (4) 3	+15	—	4.6
Granada	5.1	148	1 36	+17	—	—	—	—
San Fernando	5.1	173	2 25	?S	(2 25)	+ 5	3.5	3.7
Tortosa	5.7	94	1 30	+ 2	—	—	2.3	2.9
Barcelona	6.8	87	1 45	+ 1	—	—	2.5	3.8
Algiers	9.1	118	2 3	-15	4 3	- 3	4.5	—
Marseilles	9.3	75	e 3 53	?S	(e 3 53)	-17	—	—
Oxford	11.0	19	—	—	—	—	8.3	9.2
Strasbourg	12.5	50	—	—	e 4 35	-57	e 8.1	—
Helwan	32.9	98	5 55	-61	—	—	—	—

The above shock appears to be followed by another at the second epicentre  
4 1/2 minutes later, as before; to facilitate comparison the precise interval,  
4m.30s., has been retained. Coimbra MN = +4.3m.

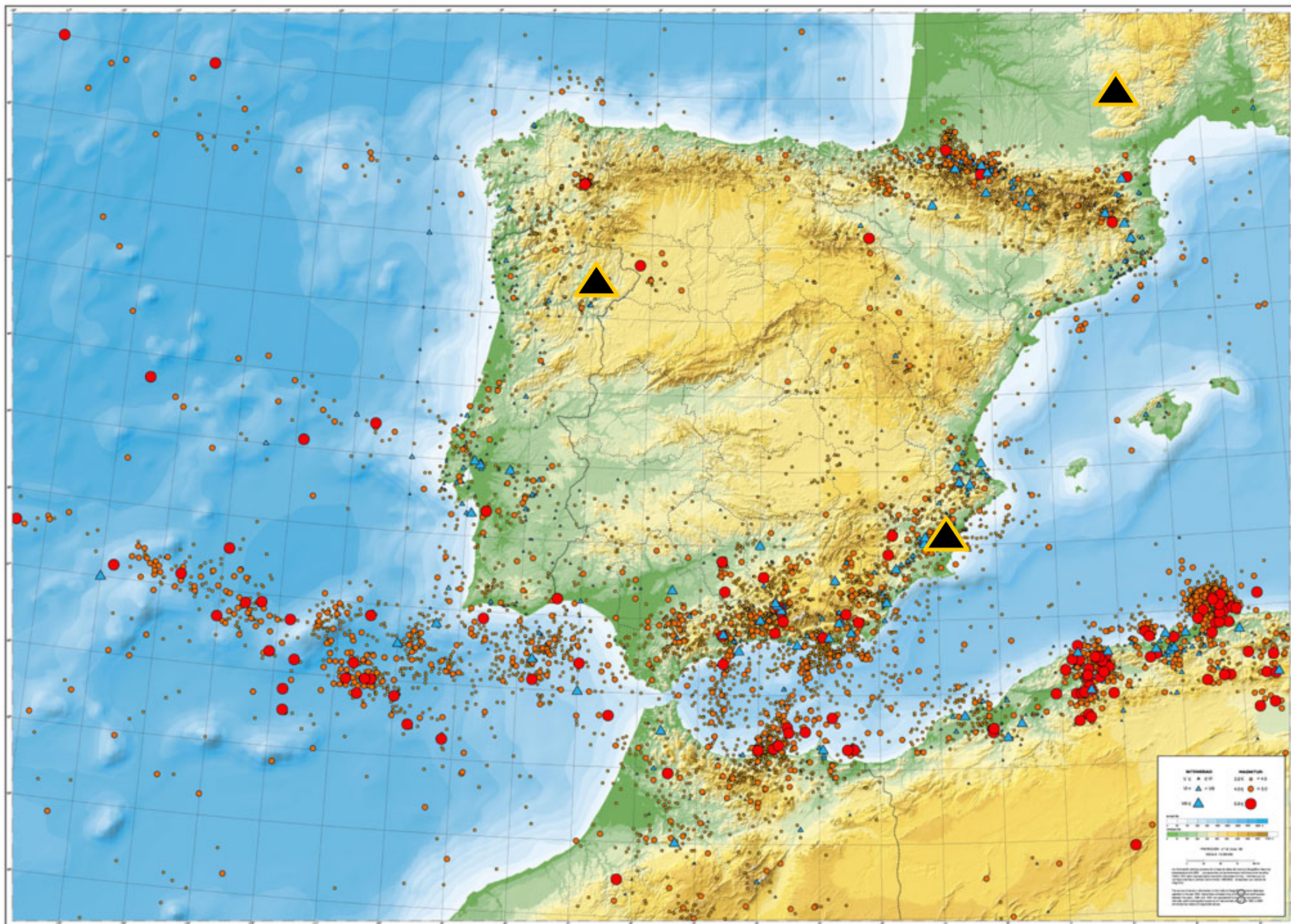
Sept. 10d. 11h. 0m. 35s. Epicentre 44° 0' N. 2° 5' E. (as at 10h.44m.).

	$\Delta$	P.	O - C.	S.	O - C.	L.	M.
	m. s.	m. s.	s.	m. s.	s.	m.	m.
Besancon	4.0	1 23?	+ 21	2 38	+48	3.4	—
Paris	4.9	e 0 51	-25	e 2 18	+ 4	3.4	3.4
Strasbourg	5.8	e 0 5	?	—	—	e 3.5	—
Uccle	6.9	2 1	+16	e 3 11	+ 4	—	—
De Bilt	8.3	—	—	—	—	4.3	4.7
Edinburgh	12.5	5 55	?S	(5 55)	+23	—	7.3

De Bilt gives MN = +6.4m.

# SISMICIDAD DE LA PENÍNSULA IBÉRICA Y ZONAS PRÓXIMAS

## SEISMICITY OF THE IBERIAN PENINSULA AND NEIGHBORING ZONES





# OBSERVAÇÕES METEORÓLOGICAS, MAGNÉTICAS E SÍSMICAS

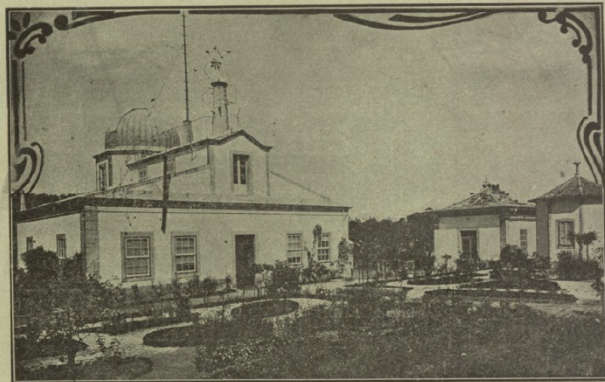
FEITAS NO

OBSERVATÓRIO METEOROLÓGICO DE COÍMBRA

NO ANO DE

1919

VOLUME LVIII



COÍMBRA  
IMPRESA DA UNIVERSIDADE  
1920

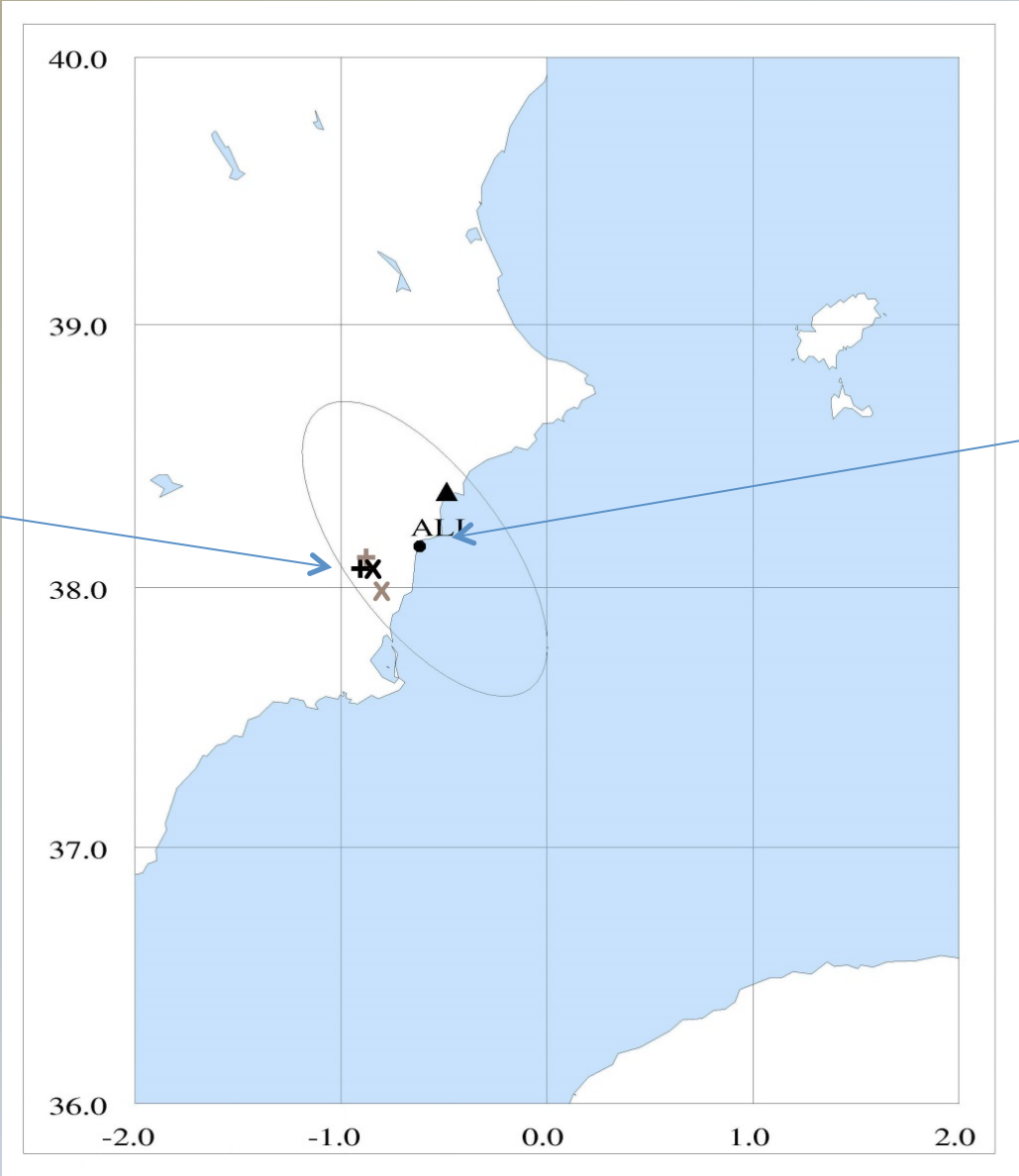
N.º	Data	Fase	Tempo médio de Greenwich	Período	AMPLITUDE		△ km.	Observações		
					A <sub>N</sub>	A <sub>E</sub>				
51	Agosto	22	P	h m s	4	p				
			eLN	22 44 16					4	
			LE	47 6					18	
			F	48						
52	"	25	eL	20 38	16					
			F	58						
53	"	27	ePN?	5 55 42	6-8					
			ePE?	57						
			LE	6 42 58					30-32	
			LN	23					24-26	
			F	25					24	
54	"	29	PN	6 4 37	2-3					
			PE	6 5					3-4	
			SE?	16 25					8-10	
			SN	16 53					41	
			SR <sub>1</sub> N	21 52						
			SR <sub>2</sub> N	26 33						
			L	30 45					30-34	
			MN <sub>1</sub>	51 47					25	12
			ME <sub>1</sub>	58 29					21	13
			ME <sub>2</sub>	7 4 51					20	16
			ME <sub>3</sub>	3 39					20	13
			MN <sub>2</sub>	4 58					20	13
			ME <sub>4</sub>	7 24					20	13
			MN <sub>3</sub>	9 49					20	11
F	8 7									
55	"	31	PE	17 39 53	2					
			ePN	40 21						
			PR <sub>1</sub> N	43 9						
			?PR <sub>2</sub> N	43 49					8	10
			?S	44 55					8	
			MN <sub>1</sub>	45 5					8	11
			MN <sub>2</sub>	46 49					40	9
			MN <sub>3</sub>	50 39					40	8
			?P	51 1					4-8	
			?S	57 50					8-12	
			eL	18 5 46					21-28	
			MN	14 49					20	11
			F	19 41						
56	Setembro	6	ePE?	9 38 8			5250			
			ePN	41						
			iSE	45 26					10	
			L	52 46					23-24	
			MN	53 36					16	5
			ME	58 0					18	9
F	10 33									
57	"	40	ePN	10 43 18	2-3	20		10		
			?S	43 58						
			MN	44 42					5	
			ME	44 28					4	
F	54									

Sismograma muito confuso. Parece a sobreposição de dois tremores.

Região epicentral na bacia do rio Segura. Espanha.

Date	H h m s M. G. T.	$\phi$	$\lambda$	Class	$h$ km	$M$	$I_0$	$r_5$ km	$r$ km	Remarks	References
1919											
July 8	05 53 40*	43.8°N	11.2°E*	B	<i>n</i>	5.0 (2)	V-VI				ISS, Na
July 12	12 04 30*	42.5°N s	7.5°E*	C	<i>n</i>	4.7 (1)				very doubtful	ISS
July 18	07 01 20*	36.0°N s	28.0°E*	C	( <i>n</i> )	5.2 (4)				$M = 5$ (GG), $M = 4.6$ (KJ)	GG, ISS
July 20	00 03 50*	36.0°N s	28.0°E*	C	( <i>n</i> )	4.8 (2)				$M = 4\frac{1}{2}$ ; $I_{\max} = VI$	GG
July 29	19 25.0*	34.8°N	2.3°W	C	<i>n</i>	4.5				$M = 4\frac{1}{2}$ ; 33.3°N, 9.0°W* (ISS)	RS, GS
1) Aug. 3	09 46 —	38 $\frac{1}{4}$ °N s	20°E	B	<i>n</i>	4.6 (3)				$I_{\max} = VI$ ; 31.5°N, 19.5°E* (ISS)	At
Aug. 18	11 24 —	37 $\frac{1}{4}$ °N s	21 $\frac{1}{4}$ °E	C	<i>n</i>	4.5 (1)				$I_{\max} = III$	At
Aug. 19	20 17 20*	35.2°N s	34.7°E*	B	<i>n</i>	5.4 (5)				$M = 5.1$ (KJ)	ISS, KJ
2) Aug. 22	22 36 —	39 $\frac{1}{2}$ °N s	20°E	B	<i>n</i>	5.4 (2)				$I_{\max} = III$ ; 41.0°N, 24.6°E* (ISS), $M = 4\frac{3}{4}$	At
Aug. 24	18 16 18*	36.0°N s	28.0°E*	C	<i>n</i>	5.4 (4)				$M = 5$ , $M = 4.6$ (KJ)	GG, ISS
Aug. 25	21 50 —	38 $\frac{1}{4}$ °N s	22°E	(B)	<i>n</i>	4.3 (1)				$I_{\max} = V$	At, GGK
Aug. 29	06 41 30*	36.2°N s	21.4°E*	C	<i>n</i>	4.3 (1)					ISS
Aug. 31	02 32 48*	34.5°N	41.8°E*	B	<i>n</i>	5.3 (4)				$M = 5.0$ (KJ)	ISS
Sept. 1	21 20 —	38 $\frac{1}{4}$ °N	22°E	C	<i>n</i>	4.4 (1)				$I_{\max} = II$ ; epic. in the sea?	At
Sept. 5	20 37 20*	46.5°N	16.0°E	B	<i>n</i>	4.6 (1)	VI	15		$h' = 11$ km, $h = 8$ km; 47.5°N, 15.8°E* (ISS)	TT, RV
Sept. 10	10 41.7*	38.1°N	0.8°W	A	10	5.2 (4)	VIII	40		$r_8 = 6$ km, $r_7 = 14$ km, $r_6 = 26$ km; $h =$	GS, BS, IO,
	10 40 00*	41.5°N	7.0°W*	C	<i>n</i>					$= 5$ km	ISS
Sept. 10	10 56 05*	38.1°N	0.8°W	B	<i>n</i>	5.1 (3)	(VII)			41.5°N, 7.0°W* (ISS)	GS
Sept. 10	16 57 20*	42.8°N	11.8°E	A	<i>n</i>	5.3 (7)	VIII	35		43.0°N, 12.5°E* (ISS), $h' = 8$ km, $h = 6$ km;	MR, CA,
3) Sept. 16	02 18 37*	46.4°N	10.0°E	C	<i>n</i>	4.3 (1)				$I_0 = VIII$ , $h = 14-16$ km (SGA)	PMM
Sept. 19	17 13 —	39.9°N	1.2°W	B	<i>n</i>	(4.2)	VI			no data in (TT)	ISS
Sept. 20	08 52 48*	44.5°N	11.5°E*	B	<i>n</i>	4.6 (2)	V-VI			$I_0 = V-VI$ (GS); $m = 5.4$ (MU)	BS, MU
Sept. 21	01 30 —	45.8°N	16.0°E	B	<i>n</i>	(4.1)	VI				ISS, PMM
Oct. 5	01 24 —	37°N s	25 $\frac{3}{4}$ °E	C	<i>n</i>	4.8 (1)				$I_{\max} = IV$	TD
Oct. 7	09 13 00*	44.0°N	20.0°E*	C	<i>n</i>	4.6 (2)					At
Oct. 9	17 07 23*	41.0°N	24.6°E*	C	<i>n</i>	4.4 (1)				foreshock?	ISS
Oct. 9	21 38 18*	35.0°N	25 $\frac{3}{4}$ °E	B	<i>n</i>	4.7 (1)	VI			$M = 4\frac{3}{4}$ ; 41.0°N, 24.6°E* (ISS)	GG
Oct. 12	21 47 —	38°N s	20 $\frac{3}{4}$ °E	(B)	<i>n</i>	4.3 (1)					At
Oct. 13	07 54 10*	41.5°N	28.0°E*	C	<i>n</i>	4.5 (1)					ISS





macroseismic

Instrumental

[Event 912925](#) Portugal



Date	Time	Err	RMS	Latitude	Longitude	Smaj	Smin	Az	Depth	Err	Ndef	Nsta	Gap	mdist	Mdist	Qual	Author	OrigID
1919/09/10	10:40:00			41.5000	-7.0000												uk <a href="#">ISS</a>	1960196

(There is some difficulty in separating this shock from that following. Possibly Coimbra observes the latter, though an error of 3 mins. seems more likely, and has been assumed.)

[Event 912926](#) France



Date	Time	Err	RMS	Latitude	Longitude	Smaj	Smin	Az	Depth	Err	Ndef	Nsta	Gap	mdist	Mdist	Qual	Author	OrigID
1919/09/10	10:44:30			44.0000	2.5000												uk <a href="#">ISS</a>	1960197



# ISC 2015 (last week)

DATA\_TYPE EVENT\_CATALOGUE

Reviewed ISC Bulletin

-EVENT-|-----ORIGIN (PRIME HYPOCENTRE)-----|-----MAGNITUDES-----...

EVENTID	AUTHOR	DATE	TIME	LAT	LON	DEPTH	DEPFIX	AUTHOR	TYPE	MAG
<a href="#">912925</a>	<a href="#">ISS</a>	1919-09-10	10:40:00	41.5000	-7.0000	,	,	,	,	,
<a href="#">912926</a>	<a href="#">ISS</a>	1919-09-10	10:44:30	44.0000	2.5000	,	,	,	,	,
<a href="#">912927</a>	<a href="#">ISS</a>	1919-09-10	10:56:05	41.5000	-7.0000	,	,	,	,	,
<a href="#">912928</a>	<a href="#">ISS</a>	1919-09-10	11:00:35	44.0000	2.5000	,	,	,	,	,
<a href="#">912929</a>	<a href="#">ISS</a>	1919-09-10	11:58:30	41.5000	-7.0000	,	,	,	,	,
<a href="#">912930</a>	<a href="#">ISS</a>	1919-09-10	12:03:00	44.0000	2.5000	,	,	,	,	,
<a href="#">912931</a>	<a href="#">ISS</a>	1919-09-10	14:21:50	41.5000	-7.0000	,	,	,	,	,
<a href="#">912932</a>	<a href="#">ISS</a>	1919-09-10	14:26:20	44.0000	2.5000	,	,	,	,	,
<a href="#">912934</a>	<a href="#">ISS</a>	1919-09-11	00:38:00	41.5000	-7.0000	,	,	,	,	,
<a href="#">913011</a>	<a href="#">ISS</a>	1919-11-29	00:25:20	40.8000	0.5000	,	,	,	,	,
<a href="#">913012</a>	<a href="#">ISS</a>	1919-11-29	00:26:30	40.8000	0.5000	,	,	,	,	,

STOP

1919-11-29

Nov. 29d. 0h. 25m. 20s. (I) } Epicentre 40°·8N. 0°·5E. (near Tortosa).  
 0h. 26m. 30s. (II) }

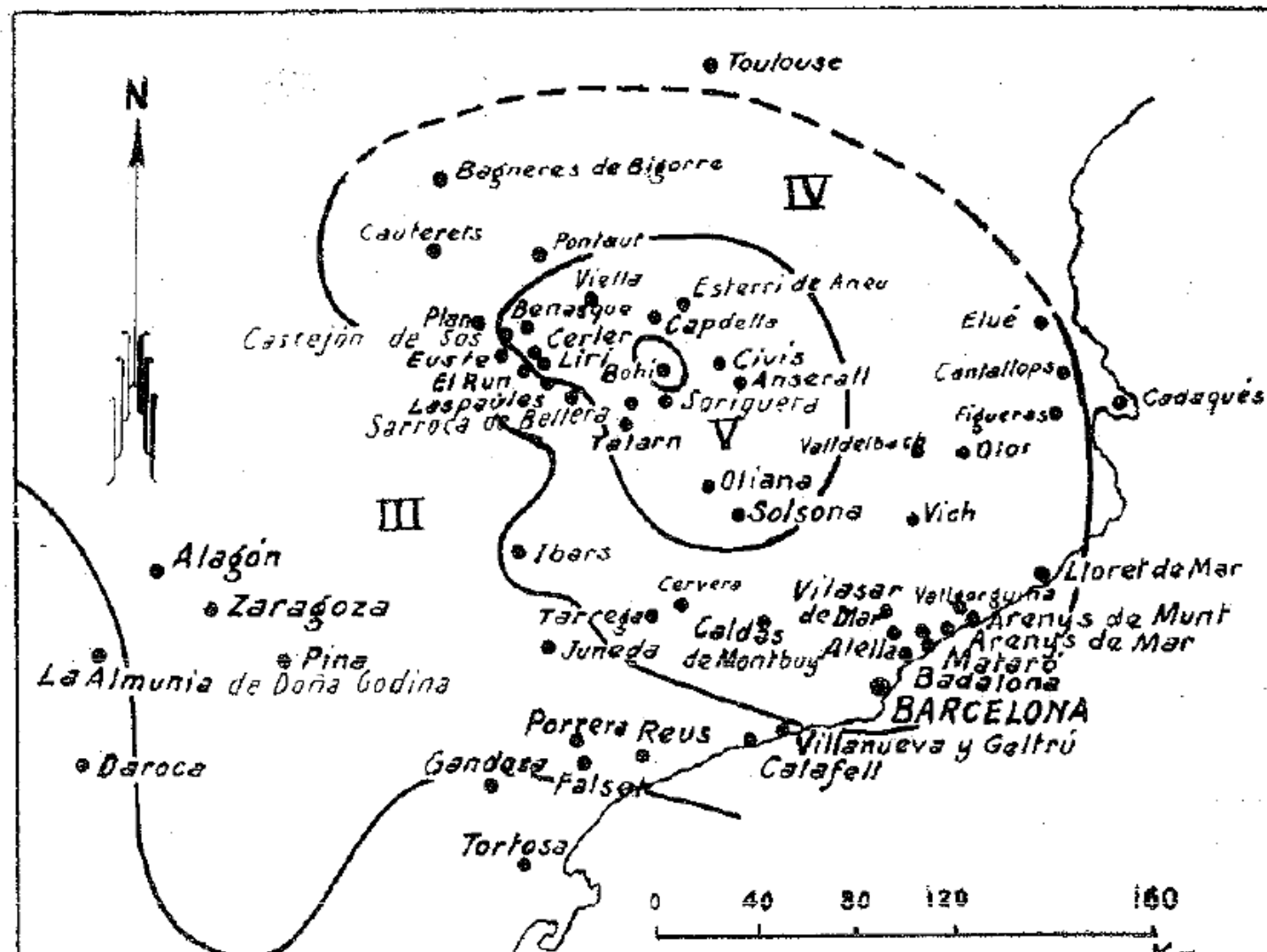
A = +·757, B = +·007, C = +·654; D = +·009, E = -1·000;  
 G = +·654, H = +·006, K = -·757.

There appears to have been two shocks at the times given above.

	$\Delta$	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
I Tortosa	0·0	—	0 30	+30	—	—	0·8	—
I Barcelona	1·4	64	i 0 25	+ 4	i 0 43	+ 4	—	0·8
II	1·4	64	i 0 26	+ 5	—	—	i 1·1	—
I Marseilles	4·4	56	1 12	+ 4	1 51	-10	—	2·0
II Algiers	4·5	152	e 0 49	-21	2 25	+21	3·0	—
I Moncalieri	6·7	49	1 46	+ 4	2 36	-26	3·2	—
II Coimbra	6·8	269	e 1 39	- 5	2 41	- 24	3·5	3·7
I Besancon	7·5	30	1 56	+ 2	3 13	-11	—	—
I Paris	8·1	10	e 1 52	-11	e 3 17	-23	4·0	4·7
I Florence	8·5	66	—	—	—	—	—	4·7
I Zurich z.	8·7	38	e 2 10	- 2	—	—	—	—
I Strasbourg	9·3	31	2 15	- 5	e 4 1	- 9	—	—
I Uccle	10·3	14	e 2 10	-24	—	—	—	—
I De Bilt	11·5	14	—	—	—	—	e 5·1	6·7
I Vienna z.	13·5	51	e 6 40	?L	—	—	(e 6·7)	—
I Hamburg	14·3	24	—	—	—	—	e 5·7	8·3
I Edinburgh	15·2	352	—	—	6 40	+ 3	—	7·9

Additional records: Coimbra gives LN = +3·7m., MN = +3·8m. Paris  
 ME = +3·7m. De Bilt eN = +5m.13s.





5)	Nov. 18	21 54 44*	39.6°N	27.7°E*	B	n	7.0 (10)			destructive in pergamos (AI), $m = 5$ (GS)	ISS, ON
	Nov. 27	— — —	39.2°N	27.6°E	B	n	(4.6)	VI			ON
	Nov. 29	00 25.5*	42.4°N	0.8°E	B	n	4.8 (2)	VII	55	$r_4 = 130$ km; $h' = 21$ km ca, $h = (43)$ km	RP, GS,
		00 25 20*	40.8°N	0.5°E*	C	n		VII		(MU); 42.5°N, 1.5°E (GS); $m = 5.8$ (MU)	ISS

20-XI	<b>Cartuja (Granada).</b> <i>Bifilar. C. ENE.</i> C. A.	iP S M F	22 45 10 22 45 21 22 45 23 22 46,3 0	I C. <sup>a</sup>	15	100	Δg = 60 fd.
21-XI	»	iP S M F	19 58 55 19 59 6 19 59 11 20 1,0 0		25	100	Δg = 100 fd.
23-XI	» » NNW.	iP S M F	23 22 40 23 24 22 23 25 29 23 28,0 0		0,8 mm.	850	
24-XI	»	iP S L M » F	9 53 20 9 54 50 9 55 16 9 55 46 9 56 36 10 0,3 0		4 mm. 4 mm.	830	iP, 0,15 μ con 0,75
»	<b>El Ebro (Tortosa).</b> <i>Vicentini N.</i> C. A.	P S M F	9 54 (?) 9 55 (?) 9 56 30 10 10 30	3	2,80		
»	» » E.	P S M F	9 54 20 9 55 55 9 57 16 10 10 0	3	2,75		
»	» » Z.	P S F	9 54 20 9 55 55 10 10 0				
»	<b>Fabra (Barcelona).</b> <i>Varios.</i>	e ó P F	9 54 20 9 57 5				
25-XI	<b>Cartuja (Granada).</b> <i>Bifilar. C. {</i> NNW. <i>Omori</i> } C. A.	P S L M F	1 37 26 1 39 24 1 39 50 1 43,1 0 2 C. <sup>a</sup> 0	12	10	1100	

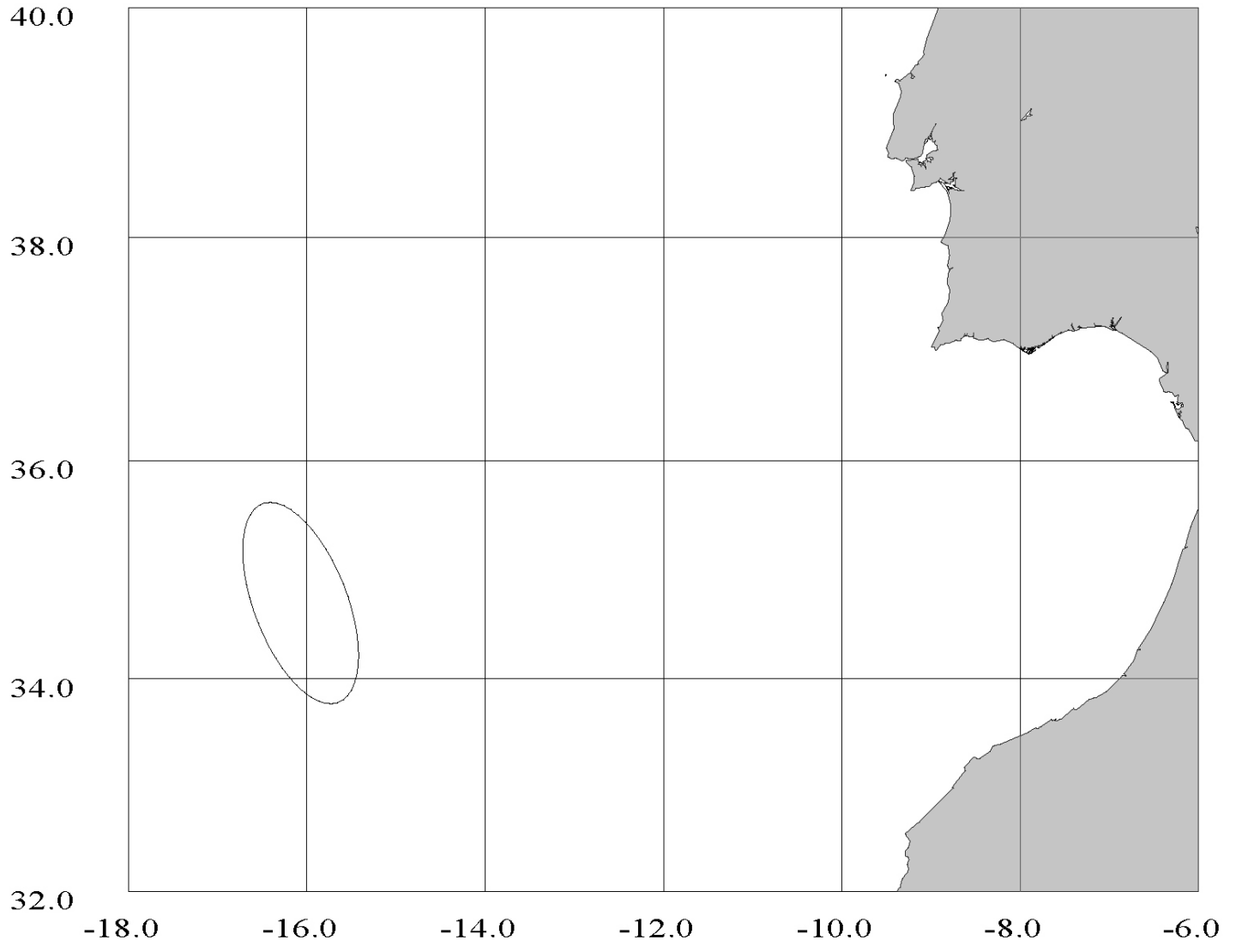
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1910 1125 0134 49.93RQ 34.696 -16.067 17.2S IM 71.32 1
GAP=222 7.16 85.9 67.9 43.1 -0.2243E+04 -0.2929E+03 -0.1407E+04E
ACTION:UP 15-05-26 13:29 OP:cruz STATUS: ID:19101125013449 L I
1910 1125 0134 49.63RQ BUL 1
REGIAO: Madeira Islands, Portugal Regi 393 FE95 3
STAT SP IPHASW D HRMM SECON CODA AMPLIT PERI AZIMU VELO AIN AR TRES W DIS CAZ7
LIS P 0136 24.0 91 -0.1510 762 52
COI P 9 0137 24.0 90 41.48 0 912 46
COI S 0138 48.0 90 -0.4610 912 46
SFS P 4 0138 12.0 90 89.12 0 915 75
PDA P 9 0138 42.0 90 117.7 0 926 294
PDA S 0140 12.0 90 4.19 9 926 294
CRT P 9 0137 26.0 46 7.55 0 1158 73
CRT S 0139 24.0 48 0.6310 1158 73
EBR P 4 0139 46.0 45 92.47 0 1607 60
EBR S 4 0141 44.0 47 49.64 0 1607 60
PAR S 0143 00.0 37 -0.2810 2190 39
STR P 0139 50.0 34 2.0910 2497 45
STR S 4 0144 16.0 36 21.06 0 2497 45
EDI S 4 0144 18.0 30 13.67 0 2558 19
JEN P 0140 18.0 28 -1.6110 2866 42

```

Magnitude (using Abe, 1998), Ms = 5.2





1960-06-04 08:09, 10:56 40.93N 29.38W (Atlantic ridge)

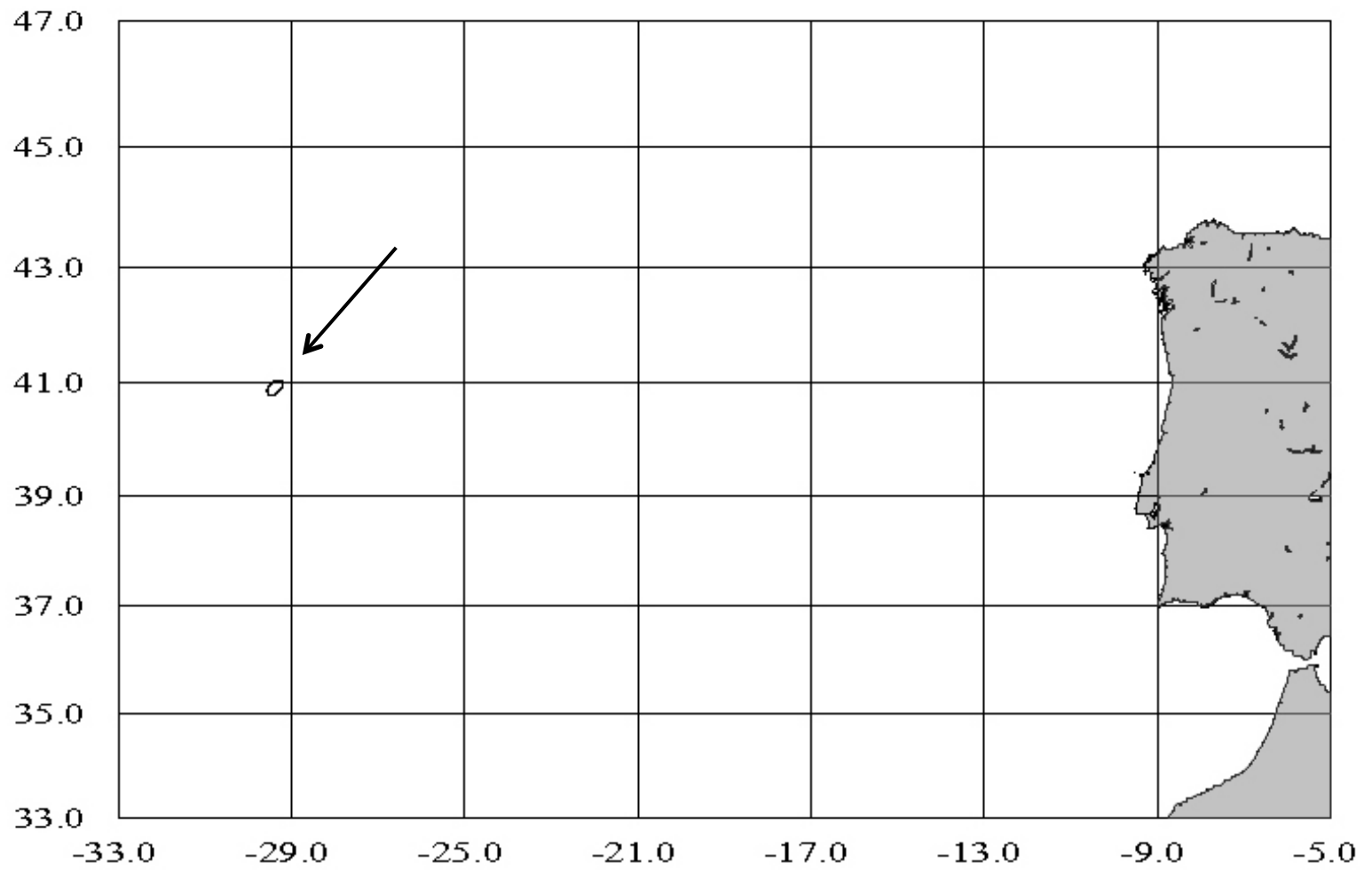
JUNE 4 8.H 9.M 51.S EPICENTRE 40.55 -29.35 DEPTH= 0.KM

A= 0.66419 B=-0.37348 C= 0.64759 D=-0.4901 E=-0.8716  
 G= 0.5645 H=-0.3174 K=-0.7620 HT= -1.9

SE= 3.44

	DELTA DEG.	AZ. DEG.	P			S			*PP		SUPP.	
			M	S	O-C	M	S	O-C	M	S	M	S
ANGRA DO HO.	2.51	138.5	0	42	0	1	15	1				
PONTA DELGDA	4.01	133.5	1	2K	-2	1	48	-4			1	25
LISBON	15.67	90.2	3	40A	-3							
SERRA PILAR	15.72	81.1	3	33K	-11							
TOLEDO	19.32	83.7	4	27	-2	8	25	23			5	58
MALAGA	19.84	93.1	4	37K	2	8	27	14			4	54 PP
RATHFARNHAM	20.16	43.0	4	45A	7							
GRANADA	20.31	91.2									5	58
ALMERIA	21.27	91.3	4	33K	-17	8	50	8			5	9 PP
FOLINIERE	22.02	58.4	4	58	1							





DATA\_TYPE EVENT\_CATALOGUE

Reviewed ISC Bulletin

-EVENT-|-----ORIGIN (PRIME HYPOCENTRE)-----|----MAGNITUDES----...

EVENTID	AUTHOR	DATE	TIME	LAT	LON	DEPTH	DEPFIX	AUTHOR	TYPE	MAG
<a href="#">879349</a>	<a href="#">ALM</a>	1960-06-01	06:18:50.50	38.1500	-1.0700					
<a href="#">879397</a>	<a href="#">ISS</a>	1960-06-04	08:09:51	40.5500	-29.3500	0.0				
<a href="#">879398</a>	<a href="#">BCIS</a>	1960-06-04	08:14:00	39.5000	-30.0000					
<a href="#">879404</a>	<a href="#">ISS</a>	1960-06-04	11:05:15	39.9700	-29.6500	0.0				
<a href="#">879407</a>	<a href="#">BCIS</a>	1960-06-04	19:41:30	36.0000	4.0000					
<a href="#">879415</a>	<a href="#">BCIS</a>	1960-06-06	04:52:48	36.2500	3.7500					
<a href="#">879447</a>	<a href="#">BCIS</a>	1960-06-09	03:33:12	36.2500	4.0000					
<a href="#">879462</a>	<a href="#">ISC</a>	1960-06-09	17:47:44.95	38.1135	-26.3490	15.0	TRUE	<a href="#">ISC</a>	MS	
5.2	<a href="#">ISC</a>	MS_BB	5.2	<a href="#">MOS</a>	M	5.0	<a href="#">MOS</a>	M	5.2	

STOP



VIII. 4 Juin  
 Atlantique, région des Açores, 39° 1/2 N, 30° W.-  
 H=08h.09mn45s. (BCIS)

Angra do Heroismo	ePn	08 10 33	Sn	08 11 06	280	2,5
Ponta Delgada	Pn	53,0	(Sn)	39,2		
Lisboa	P	13 30,7	C		1800	16,2
Toledo	eP	14 18	eS	18 16		
Almeria	eP	24 D	iS	41		
Malaga	iP	29	iS	22	2280	20,5
Rathfarnham	iP	36 C			2350	21,2
Bagnères	ei	48,5	ei	15 13,5		
Folinière	i	48,8				
Tortosa	iP	54	i(S)	19 13		
Kew	iP	56	eL	03	2640	23,8

PnPn

IX. 4 Juin

Atlantique région des Açores.-Réplique du VIII. 4 Juin  
 H=08h.14,0mn (BCIS)

Folinière	iP	08 19 00,9	} S			
Bagnères	e	07,5				
Collm	eP	20 28				
Uppsala	iP	21 00				
Kiruna	iP	07				
Strasbourg	eP	38	e	20 20	3160	28,4
Bensberg	eP	39	e	17 11		
Cartuja	e	42	i	15 49		
Messstetten	eP	45,5				
Heidelberg	e(P)	(46)				
Stuttgart	eP	47	eL(R)	23 ---	3260	29,3

# Conclusions

Catalogues of XX century seismicity (assumed instrumentally recorded) contain:

- fake earthquakes
- (do not contain) missing earthquakes.
- Duplicate earthquakes
- Misslocated earthquakes

Thus, situation of catalogues of instrumental seismicity recorded up to the sixties do not look much better than catalogues of historical macroseismic events.

These (sad) results do not affect, in general to the largest earthquakes; but they put some concern on events with magnitudes around M5 and even M6 and point to the necessity of a throughout review of the ISC files.

However, the amount of work and characteristics of the research points also the suitability to distribute such task at regional levels, ISC acting much more as coordinating and homogenizing unit and steering institution.