

The damaging character of shallow 20th century earthquakes in the Hainaut coal area (Belgium)

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ROYAL OBSERVATORY
OF BELGIUM



SEISMOLOGY
GRAVIMETRY

Supplement:

***Atlas of macroseismic maps of Hainaut earthquakes,
1887-1985 seismic catalogue and sources of macroseismic information***

Overview of seismicity in the Hainaut coal mining area (Belgium)

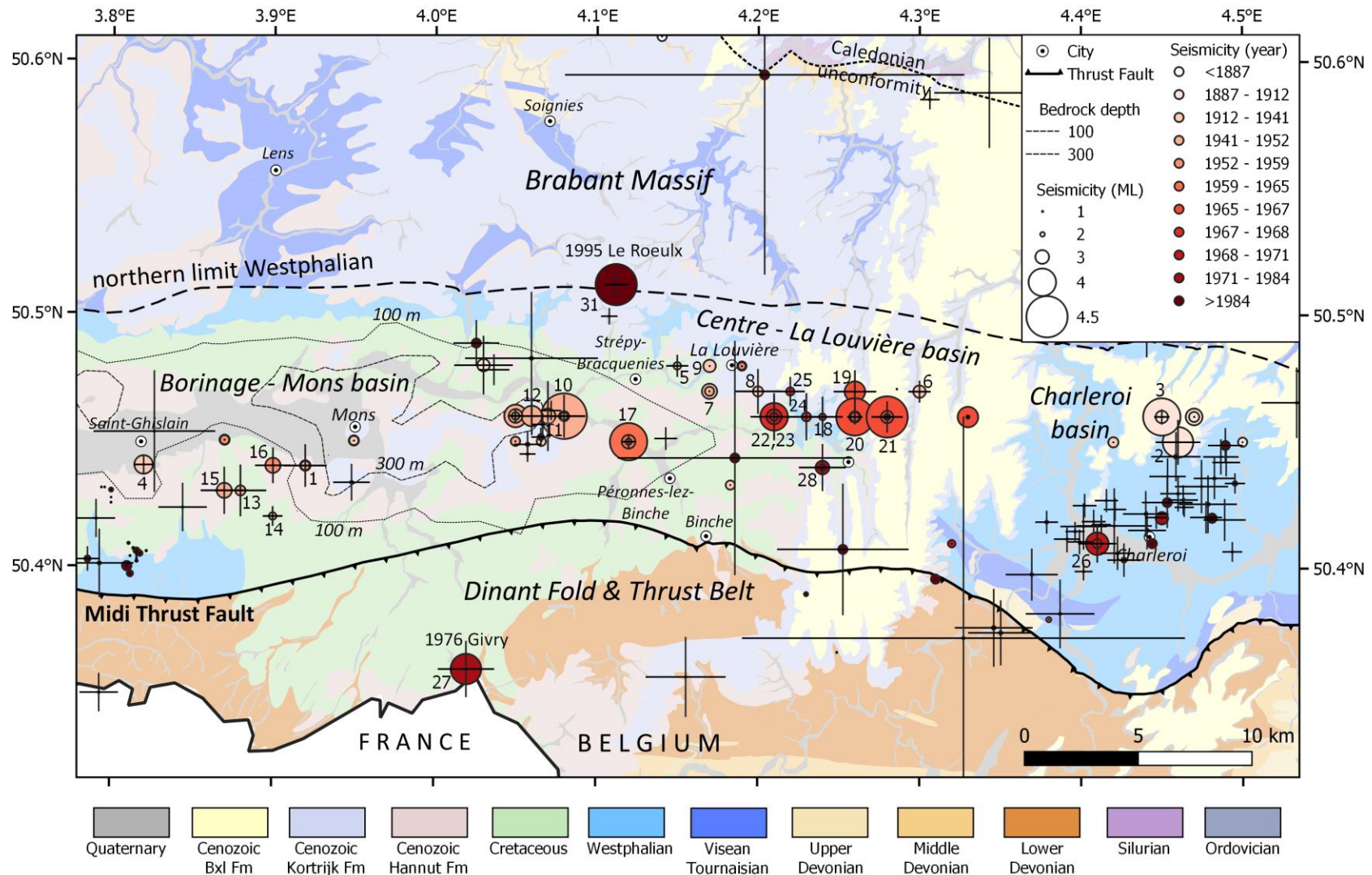


Figure S0: Seismicity in the Hainaut coal mining area up to 2020. Numbers 1 to 28 and 31 refer to macroseismic maps in this Atlas. Epicenters of Nr. 29 (1983 Liège) and 30 (1938 Zulzeke-Nukerke) lie outside the borders of the map but are mapped as well. Geology in background based upon <http://www.onegeology.org/>. Reproduced with the permission of OneGeology. All rights Reserved.

The damaging character of shallow 20th century earthquakes in the Hainaut coal area (Belgium)

1. Catalogue of seismicity in the Hainaut coal mining area (Belgium)

Table S1: Catalogue information of 123 earthquakes that occurred in the Hainaut coal mining area between 1897 and 1983. The full catalogue of 123 events is also provided as a csv file in the Supplement. The text in below explains the header information of the catalogue on the next pages.

MAP:	Number of the macroseismic map in this Atlas.
ID_EARTH:	Earthquake ID in the official catalogue of the Royal Observatory of Belgium.
TIME:	Origin time of earthquakes: (a) For earthquakes not recorded by any seismic station, time corresponds to the time of occurrence indicated in the sources reporting the earthquake (b) For earthquakes recorded by the seismic station in Uccle, time is precise at one second. Time corresponds to the subtraction of an estimated propagation time from the measured P- or S-wave arrival times. (c) For earthquakes recorded by many seismic stations, time corresponds to the origin time estimated in the earthquake location (Camelbeeck, 1993).
LOC METHOD:	Reported epicenters are macroseismic epicenters. This column explains how the epicenters are derived. Geoc. I _{max} (-1): geocenter of the IDPs with I _{max} and I _{max} -1 intensities Geoc. Percept.: geocenter of all the IDPs Single IDP: only one locality clearly reported From main event: same location than a main event [used in aftershock sequences and seismic swarms] Reference to a publication: [see references in the paper] or mentioned in the UCC seismic bulletin [UCC = Uccle seismic station in Belgium]
ERRH:	Uncertainty on the reported epicenter in km. Uncertainty corresponds to the mean value of (i) the weighted I _{max} and I _{max} -1 IDP distribution for large events or (ii) all IDPs for events with few IDPs. For Geoc. I _{max} (-1) events: it corresponds to the mean value of the weighted I _{max} and I _{max} -1 IDPs distribution For some Geoc. Percept. events with several I _{max} IDPs: it corresponds to the geocenter For the Single IDP events for which a specific study determined the perceptibility area: it corresponds to 1/3 of the perceptibility radius
DEPTH:	Focal depths (in km) were determined by fitting IDP bins using the Hainaut intensity attenuation law determined in this paper. Focal depths [inside brackets] are estimated from I _{max} , the maximal observed intensity, and the perceptibility radius (see further).
ERRZ:	Uncertainty (in km) on the reported focal depth derived from fitting the IDPs on the Hainaut intensity attenuation law.
ML:	Local magnitude determined from recordings of Belgian seismic station (Camelbeeck, 1985a, b)
MS:	Surface-wave magnitude determined from recordings of European seismic stations using the Prague formula (Karnik, 1969)
M_{macro}:	Equivalent moment magnitude determined from macroseismic data using the empirical relationships developed in this study (a) For earthquakes estimated deeper than 1 km (type ke): $M_w = 1.744(\pm 0.13) + 0.346(\pm 0.098) \cdot I_{max}$ (b) For superficial earthquakes (type sup): $M_w = 0.948(\pm 0.13) + 2 \cdot \log_{10}(\text{focal depth}) + 0.346(\pm 0.098) \cdot I_{max}$ (c) If the macroseismic information only came from a press source that reports that the event was only felt in one locality (I _{max} : F; Single IDP), M _{macro} is set to 2.8.
M_w:	Moment magnitudes determined from Camelbeeck (1985) using coda waves recorded at the seismic station DOU, corrected from Denieul (2014). [Moment magnitudes] are determined from M _L estimation using the M _L - seismic moment relationship of Camelbeeck (1985), modified by Denieul (2014).
ERRM:	Uncertainty on estimated magnitude: (a) '0.3 M' corresponds to uncertainty on instrumental magnitude (b) '0.4 mac' corresponds to uncertainty on the magnitude estimated from macroseismic data
I_{max}:	Maximal observed intensity
Perc.:	Radius of perceptibility of the seismic event in km. R3: Radius of Intensity III. R4: Radius of Intensity IV
Type:	'sup' corresponds to superficial events (focal depth of less than 1 km) 'ke' corresponds to earthquakes deeper than 1 km
N	Number of intensity data points available for the event

1. Catalogue of seismicity in the Hainaut coal mining area (Belgium)

Table S1: Catalogue information of 123 earthquakes that occurred in the Hainaut coal mining area between 1897 and 1985.

MAP	ID_EARTH	DATE	TIME	REGION	LAT	LON	LOC METHOD	ERRH	DEPTH	ERRZ	ML	MS	Mw_macro	MW	IMAX	PERC.	ERRM	TYPE	IDPs
	430	1887-02-15	00:--:--:--	HAVRE	50.46	4.05	Single IDP	0.1	[0.2]				0.9		4	0.3 R3	0.5 mac	sup	
	431	1887-09-20	06:40:--:--	HAVRE	50.46	4.05	Single IDP	0.5	[0.4]				1.7		4_5	1 R3	0.5 mac	sup	
	432	1887-09-30	09:35:--:--	HAVRE	50.46	4.05	Single IDP	0.5	[0.7]				1.8		3_4	1 R3	0.5 mac	sup	
	433	1887-10-13	21:--:--:--	HAVRE	50.46	4.05	Single IDP	0.1	[0.2]				0.9		4	0.3 R3	0.5 mac	sup	
	434	1887-10-29	21:--:--:--	HAVRE	50.46	4.05	Single IDP	0.5	[0.8]				2.3		4_5	2.2 R3	0.5 mac	sup	
	12875	1887-11-19	23:40:--:--	HAVRE	50.46	4.05	Single IDP	0.5	[0.7]				1.8		3_4	1 R3	0.5 mac	sup	
	12880	1887-11-27	08:30:--:--	HAVRE	50.46	4.05	Single IDP	0.5	[0.4]				1.7		4_5	1 R3	0.5 mac	sup	
	436	1895-04-16	--:--:--:--	OBOURG	50.48	4.03	Geoc. Percept.	2.5	[4.7]	[2.5]			3.3		4_5	8.3 R3	0.6 mac	ke	
	438	1904-04-23	16:30:--:--	FLEURUS	50.48	4.55	Single IDP	1.0	[0.8]				2.1		4	1_2 R3	0.5 mac	sup	
	3534	1904-05-14	05:--:--:--	FLEURUS	50.48	4.55	Single IDP	1.0	[0.8]				2.1		4	1_2 R3	0.5 mac	sup	
	3535	1904-05-31	09:--:--:--	FLEURUS	50.48	4.55	Single IDP	1.0	[0.8]				2.1		4	1_2 R3	0.5 mac	sup	
	447	1911-03-29	00:05:43.--	RANSART	50.46	4.47	From main event				3.6			[3.5]	5_6		0.3 M	ke	
1	449	1911-04-12	16:15:--:--	CUESMES	50.44	3.92	Geoc. I _{max} (-1)	1.8	[2.4]	[1.1]			3.1		4	5.4 R3	0.5 mac	ke	22
2	465	1911-06-01	22:51:58.--	RANSART	50.45	4.46	Geoc. I _{max} (-1)	1.9	4.3	1.8	4.2	3.8		[3.9]	6	13.5 R4	0.3 M	ke	53
3	466	1911-06-03	14:35:54.--	GOSSELIES	50.46	4.45	Geoc. I _{max} (-1)	0.6	[1.4]	[0.7]	4.4			[4.0]	7	7.7 R4	0.3 M	ke	16
	12885	1911-06-06	03:25:--:--	RANSART	50.46	4.47	From main event						3.1		4		0.5 mac	ke	
	467	1911-06-19	20:49:--:--	RANSART	50.46	4.47	From main event						3		3_4		0.5 mac	ke	
	468	1911-07-14	04:--:--:--	GOSSELIES	50.46	4.45	From main event						3.3		4_5		0.6 mac	ke	
	469	1911-07-23	05:--:--:--	RANSART	50.46	4.47	From main event						2.8		F		0.4 mac	sup	
4	476	1920-01-17	03:11:04.--	HORNU	50.44	3.82	Geoc. I _{max} (-1)	0.8	[1.6]	[0.5]	3.7			[3.5]	6	5.3 R3	0.3 M	ke	12
5	488	1931-05-09	12:25:56.--	HOUDENG-AIMERIES	50.48	4.15	Geoc. Percept.	0.9	[0.6]	[0.2]	2.8			[3.0]	4_5	2.5 R3	0.3 M	ke	5
	489	1931-05-28	15:20:--:--	CHAPELLE-LEZ-HERLAIMONT	50.46	4.28	Geoc. Percept.						2.2		4		0.5 mac	sup	
	491	1931-07-14	20:45:--:--	JUMET	50.45	4.42	Geoc. Percept.						3.1		4		0.5 mac	ke	
	496	1933-02-11	21:25:--:--	MONS	50.45	3.95	Single IDP						3.0		3_4		0.5 mac	supp	
	497	1933-03-04	22:--:--:--	MONS	50.45	3.95	Single IDP						3.0		3_4		0.5 mac	ke	
	498	1933-03-05	05:28:10.--	MONS	50.45	3.95	Single IDP						3.1		4		0.5 mac	ke	
	501	1934-11-12	13:--:--:--	CUESMES	50.44	3.92	Single IDP						3.1		5		0.6 mac	ke	
	503	1935-01-14	23:44:--:--	ELOUGES	50.38	3.77	Single IDP						2.8		3		0.4 mac	ke	
6	505	1936-11-05	00:41:44.--	GOUY-LEZ-PIETON	50.47	4.30	Geoc. Percept.	0.9	[2.2]	[0.9]			3.3		4_5	3.4 R4	0.6 mac	ke	5
7	517	1940-01-07	16:28:52.--	LA LOUVIERE	50.47	4.17	Geoc. I _{max} (-1)	0.3	[1.5]	[0.6]			3.5		5	5.6 R3	0.5 mac	ke	17
8	518	1940-01-07	20:32:44.--	LA LOUVIERE	50.47	4.20	Geoc. I _{max} (-1)	1.9					3.1		4	4.4 R3	0.5 mac	ke	7
9	519	1940-01-09	03:42:07.--	LA LOUVIERE	50.48	4.17	Geoc. I _{max} (-1)	0.2	[2.8]	[1.4]			3.3		4_5	7.6 R3	0.5 mac	ke	10
	522	1944-03-11	20:53:14.--	CUESMES	50.44	3.92	Single IDP						3.1		4		0.5 mac	ke	
	523	1944-03-12	00:45:50.--	CUESMES	50.44	3.92	Single IDP						3.1		4		0.5 mac	ke	
	524	1944-03-13	14:23:13.--	CUESMES	50.44	3.92	Single IDP						3.1		4		0.5 mac	ke	
	525	1944-03-14	03:19:22.--	CUESMES	50.44	3.92	Single IDP						3.1		4		0.5 mac	ke	
	526	1944-03-15	10:19:10.--	CUESMES	50.44	3.92	Single IDP						3.1		4		0.5 mac	ke	

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MAP	ID_EARTH	DATE	TIME	REGION	LAT	LON	LOC METHOD	ERRH	DEPTH	ERRZ	ML	MS	Mw_macro	MW	IMAX	PERC.	ERRM	TYPE	N
	527	1944-03-19	01:56:15.--	CUESMES	50.44	3.92	Single IDP						3.1		4		0.5 mac	ke	
	528	1944-03-23	16:21:03.--	CUESMES	50.44	3.92	Single IDP						3.1		4		0.5 mac	ke	
	529	1944-03-29	01:00:41.--	CUESMES	50.44	3.92	Single IDP				3.0			[3.1]	4_5		0.3 M	ke	
	530	1946-03-09	19:38:01.--	HAVRE	50.46	4.05	UCC seismic bulletin				3.6			[3.5]	5		0.3 M	ke	
	531	1948-12-25	12:06:20.--	HAVRE	50.46	4.05	Single IDP				3.5			[3.4]	5		0.3 M	ke	
	532	1948-12-27	16:30:--.--	HAVRE	50.46	4.05	Single IDP						2.8		F		0.4 mac	ke	
	533	1949-04-03	12:27:38.--	HAVRE	50.46	4.05	Single IDP				3.9			[3.7]	6		0.3 M	ke	
10	534	1949-04-03	12:33:40.--	HAVRE-BOUSSOIT	50.46	4.08	Geoc. lmax(-1)	1.8	2.2	0.8	4.6	4.3		[4.1]	7	18.0 R3	0.3 M	ke	134
	535	1949-04-03	12:53:02.--	HAVRE	50.46	4.05	Single IDP				3.0			[3.1]	F		0.3 M	ke	
	536	1949-04-03	13:05:18.--	HAVRE	50.46	4.05	Single IDP						2.8		F		0.4 mac	ke	
	12890	1949-04-03	21:30:--.--	HAVRE	50.46	4.05	Single IDP						2.8		F		0.4 mac	ke	
	12895	1949-04-03	22:30:--.--	HAVRE	50.46	4.05	Single IDP						2.8		F		0.4 mac	ke	
	12900	1949-04-04	03:40:--.--	HAVRE	50.46	4.05	Single IDP						2.8		F		0.4 mac	ke	
	12905	1949-04-06	04:--:--.--	HAVRE	50.46	4.05	Single IDP						2.8		F		0.4 mac	ke	
	537	1949-04-09	21:48:--.--	HAVRE	50.46	4.05	Single IDP						3.1		4		0.5 mac	ke	
11	538	1949-04-14	01:09:14.--	HAVRE-BOUSSOIT	50.46	4.07	Geoc. lmax(-1)	3.0	[3.7]	[1.6]			3.5		5	8.5 R3	0.5 mac	ke	15
12	539	1949-04-14	05:12:21.--	HAVRE	50.46	4.06	Geoc. lmax(-1)	1.6	[2.4]	[1.5]	3.8			[3.6]	6	9.5 R3	0.3 M	ke	21
	12910	1949-04-14	05:40:--.--	HAVRE	50.46	4.05	Single IDP						2.8		F		0.4 mac	ke	
	12915	1949-04-14	13:50:--.--	HAVRE	50.46	4.05	Single IDP						2.8		F		0.4 mac	ke	
	12920	1949-04-14	15:53:--.--	HAVRE	50.46	4.05	Single IDP						2.8		F		0.4 mac	ke	
	12925	1949-04-14	16:15:--.--	HAVRE	50.46	4.05	Single IDP						2.8		F		0.4 mac	ke	
	2425	1949-05-02	16:56:03.--	HAVRE	50.46	4.05	Single IDP						2.8		F		0.4 mac	ke	
	541	1949-05-25	18:59:44.--	HAVRE	50.46	4.05	Single IDP				3.4			[3.4]	4		0.3 M	ke	
	546	1952-04-09	21:35:--.--	LA LOUVIERE	50.47	4.17	Single IDP						3.0		3_4		0.5 mac	ke	
13	547	1952-10-21	21:15:--.--	QUAREGNON	50.43	3.88	Geoc. lmax(-1)	2.2	[2.9]	[1.9]			3.1		4	5.5 R3	0.5 mac	ke	21
14	548	1952-10-22	07:--:--.--	FRAMERIES	50.42	3.90	Geoc. lmax(-1)	0.8	[3.0]	[1.0]			2.8		3	3.5 R3	0.4 mac	ke	11
15	549	1952-10-27	06:11:--.--	QUAREGNON	50.43	3.87	Geoc. lmax(-1)	2.0	3.5	1.2			3.5		5	11.1 R3	0.5 mac	ke	45
	12930	1953-05-21	02:--:--.--	BOUSSOIT	50.46	4.08	Single IDP						3.0		3_4		0.5 mac	sup	
	553	1953-06-11	00:22:21.--	BOUSSOIT	50.46	4.08	Single IDP						3.1		4		0.5 mac	ke	
	12935	1953-06-14	01:25:--.--	BOUSSOIT	50.46	4.08	Single IDP						2.8		3		0.4 mac	ke	
	557	1953-09-15	23:55:--.--	QUAREGNON	50.45	3.87	Single IDP						3.1		5		0.5 mac	ke	
	561	1954-04-05	20:26:43.--	QUAREGNON	50.45	3.87	Single IDP						2.8		F		0.4 mac	ke	
16	562	1954-07-10	17:18:21.--	FLENU	50.44	3.90	Geoc. lmax(-1)	1.5	3.3	1.2			3.5		5	8.8 R3	0.5 mac	ke	44
	12940	1954-07-11	04:--:--.--	QUAREGNON	50.45	3.87	Single IDP						2.8		F		0.4 mac	ke	
	563	1955-02-14	02:10:--.--	BOUSSU	50.43	3.80	Single IDP		[0.5]				1.7		4	1 R3	0.5 mac	sup	
	564	1955-05-12	20:--:--.--	BOUSSU	50.43	3.80	Single IDP						1.4		3		0.4 mac	sup	
	565	1955-05-17	18:--:--.--	BOUSSU	50.43	3.80	Single IDP						1.2		2_3		0.4 mac	sup	

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MAP	ID_EARTH	DATE	TIME	REGION	LAT	LON	LOC METHOD	ERRH	DEPTH	ERRZ	ML	MS	Mw_macro	MW	IMAX	PERC.	ERRM	TYPE	N
	566	1955-05-18	04:50:--.--	BOUSSU	50.43	3.80	Single IDP						1.7		4		0.5 mac	sup	
	570	1956-06-24	04:20:--.--	BOUSSU	50.43	3.80	Single IDP						1.7		4		0.5 mac	sup	
	12945	1956-06-25	02:15:--.--	BOUSSU	50.43	3.80	Single IDP						1.2		2_3		0.4 mac	sup	
	571	1956-07-01	21:55:--.--	BOUSSU	50.43	3.80	Single IDP						1.2		2_3		0.4 mac	sup	
	572	1956-11-14	09:30:--.--	HAVRE	50.46	4.05	Single IDP						2.8		3		0.4 mac	ke	
	573	1957-01-08	16:12:--.--	BOUSSU	50.43	3.80	Single IDP		[0.4]				2.2		6	3 R3	0.6 mac	sup	
	574	1957-01-21	11:00:--.--	MONTIGNIES LE TILLEUL	50.38	4.38	Single IDP		[1.6]				2.4		3	3 R3	0.4 mac	ke	
	576	1957-11-21	15:17:--.--	LA LOUVIERE	50.48	4.19	Single IDP						3.0		3_4	4 R3	0.5 mac	ke	
	13045	1957-11-21	15:41:--.--	LA LOUVIERE	50.48	4.19	Single IDP						2.8		3		0.4 mac	ke	
	577	1958-05-30	14:45:--.--	HAVRE	50.46	4.05	Single IDP		[0.6]				2.6		6	4 R3	0.6 mac	sup	
17	582	1965-12-15	12:07:14.9	STREPY-BRACQUEGNIES	50.45	4.12	Geoc. Imax(-1)	0.5	2.7	0.8	4.4			4.0	7	20.7 R3	0.3 M	ke	99
	583	1965-12-15	13:42:01.5	STREPY-BRACQUEGNIES	50.45	4.12	From main event				2.1			[2.6]	F		0.3 M	ke	
	584	1965-12-15	14:02:14.1	STREPY-BRACQUEGNIES	50.45	4.12	From main event				3.4			3.3	F		0.3 M	ke	
	585	1965-12-15	15:16:36.1	STREPY-BRACQUEGNIES	50.45	4.12	From main event				2.6			[2.9]	F		0.3 M	ke	
18	587	1966-01-16	00:13:18.7	MORLANWELZ-MARIEMONT	50.46	4.24	Geoc. Imax(-1)	1.7	[2.6]	[1.4]	2.7			[2.9]	4	7.2 R3	0.3 M	ke	25
19	588	1966-01-16	06:51:34.5	MORLANWELZ-MARIEMONT	50.47	4.26	Geoc. Imax(-1)	1.8	3.3	1.6	3.8			3.5	5	8.5 R3	0.3 M	ke	41
20	589	1966-01-16	12:32:50.3	MORLANWELZ-MARIEMONT	50.46	4.26	Geoc. Imax(-1)	0.6	2.1	0.9	4.4			4.0	7	24.9 R3	0.3 M	ke	120
	13050	1966-01-17	17:04:21.5	MORLANWELZ-MARIEMONT	50.46	4.26	From main event						2.8		3		0.4 mac	ke	
	13055	1966-01-17	20:28:59.3	MORLANWELZ-MARIEMONT	50.46	4.26	From main event						2.8		3		0.4 mac	ke	
	590	1966-01-24	22:13:20.7	MORLANWELZ-MARIEMONT	50.46	4.26	From main event				2.6			[2.9]	3		0.3 M	ke	
	591	1966-01-26	01:08:44.3	MORLANWELZ-MARIEMONT	50.46	4.26	From main event				2.0			[2.5]	3		0.3 M	ke	
	13060	1966-03-02	06:50:48.--	MORLANWELZ-MARIEMONT	50.46	4.26	From main event				3.0			[3.1]	3		0.3 M	ke	
	592	1966-03-11	04:09:30.3	MORLANWELZ-MARIEMONT	50.46	4.26	From main event				3.2			[3.2]			0.3 M	ke	
	593	1966-03-16	01:21:30.6	MORLANWELZ-MARIEMONT	50.46	4.26	From main event				2.8			[3.0]			0.3 M	ke	
	594	1966-03-17	18:17:08.3	MORLANWELZ-MARIEMONT	50.46	4.26	From main event				2.8			[3.0]			0.3 M	ke	
	595	1966-03-20	00:08:14.7	TRAZEGNIES	50.46	4.33	Camelbeeck (1993)				3.8			3.5			0.3 M	ke	
	596	1966-03-22	00:20:32.5	TRAZEGNIES	50.46	4.33	From main event				2.0			[2.5]			0.3 M	ke	
21	597	1967-03-28	15:49:25.1	CARNIERES	50.46	4.28	Geoc. Imax(-1)	1.3	3.0	1.0	4.5			4.1	7	29.3 R3	0.3 M	ke	143
	598	1967-04-04	11:16:26.2	CARNIERES	50.46	4.28	From main event				2.5			[2.8]			0.3 M	ke	
	599	1967-04-04	18:04:44.1	CARNIERES	50.46	4.28	From main event				3.3			3.3	F		0.3 M	ke	
	600	1967-04-08	13:02:05.8	CARNIERES	50.46	4.28	From main event				2.1			[2.6]			0.3 M	ke	
	601	1967-04-09	04:53:48.6	CARNIERES	50.46	4.28	From main event				2.6			2.9			0.3 M	ke	
	602	1967-04-14	14:27:41.1	CARNIERES	50.46	4.28	From main event				2.1			[2.6]			0.3 M	ke	
22	603	1968-08-12	07:26:41.1	LA LOUVIERE	50.46	4.21	Geoc. Imax(-1)	1.7	2.3	1.0	3.7			3.6	5	6.7 R3	0.3 M	ke	29
	604	1968-08-13	16:17:28.0	LA LOUVIERE	50.46	4.21	From main event				3.6			3.6	4_5		0.3 M	ke	
	605	1968-08-13	16:40:40.9	LA LOUVIERE	50.46	4.21	From main event				2.8			3.0	F		0.3 M	ke	

1. Catalogue of seismicity in the Hainaut coal mining area (Belgium)

Table S1: Catalogue information of 123 earthquakes that occurred in the Hainaut coal mining area between 1897 and 1985 (continuation).

MAP	ID_EARTH	DATE	TIME	REGION	LAT	LON	LOC METHOD	ERRH	DEPTH	ERRZ	ML	MS	Mw_macro	MW	IMAX	PERC.	ERRM	TYPE	N
23	606	1968-08-13	16:57:14.0	LA LOUVIERE	50.46	4.21	Geoc. Imax(-1)	2.0	2.3	0.8	4.1			3.9	6	11.5 R3	0.3 M	ke	59
	13065	1968-08-13	19:21:11.2	LA LOUVIERE	50.46	4.21	From main event				2.8			[3.0]			0.3 M	ke	
24	607	1968-09-23	04:08:12.6	MORLANWELZ-MARIEMONT	50.46	4.23	Geoc. Imax(-1)	2.0	2.8	1.7	3.0			3.2	5	6.2 R3	0.3 M	ke	25
25	608	1968-09-23	05:47:16.0	HAINE-SAINT-PIERRE	50.47	4.22	Geoc. Imax(-1)	1.2	[2.4]	[1.1]	2.9			3.0	4	4.7 R3	0.3 M	ke	25
	611	1970-01-16	23:34:59.1	FONTAINE-L'EVEQUE	50.41	4.32	UCC seismic bulletin				2.8			3.1	F		0.3 M	ke	
26	612	1970-11-03	08:45:59.6	MARCHIENNE-AU-PONT	50.41	4.41	Geoc. Imax(-1)	1.6	2.3	1.0	3.9			3.6	5	9.8 R3	0.3 M	ke	31
	613	1970-11-03	12:07:33.4	MARCHIENNE-AU-PONT	50.41	4.41	From main event				3.0			3.1	F		0.3 M	ke	
	614	1970-12-20	13:48:34.1	LA LOUVIERE	50.46	4.21	Ahorner (1972)				3.5			3.3	F		0.3 M	ke	
27	627	1976-10-24	20:33:28.2	GIVRY	50.36	4.02	Geoc. Imax(-1)	2.4	5.5	1.7	4.2			[3.9]	6	16.0 R3	0.3 M	ke	95
28	641	1982-09-14	19:24:34.7	CARNIERES	50.44	4.24	Geoc. Imax(-1)	2.0	[3.5]	[1.6]	3.4			[3.4]	4	6.9 R3	0.3 M	ke	18
	642	1982-09-14	19:29:09.5	CARNIERES	50.44	4.24	From main event				2.6			[2.9]	F		0.3 M	ke	
	648	1983-08-04	07:08:26.3	CHARLEROI	50.42	4.45	Geoc. Percept.				3.2			[3.2]	4		0.3 M	ke	
	649	1983-08-09	01:32:36.8	CHARLEROI	50.42	4.45	Geoc. Percept.				3.3			[3.3]	4		0.3 M	ke	

2. Overview of Hainaut coal mining seismicity intensity data (BE)

Table S2: Summary table of EMS-98 intensity data of the 28 Hainaut coal mining earthquakes mapped in this Atlas.
IDP: Intensity Data Point; **F:** Felt; **Inq:** official ROB inquiry; *event used for constructing the Hainaut intensity attenuation model.

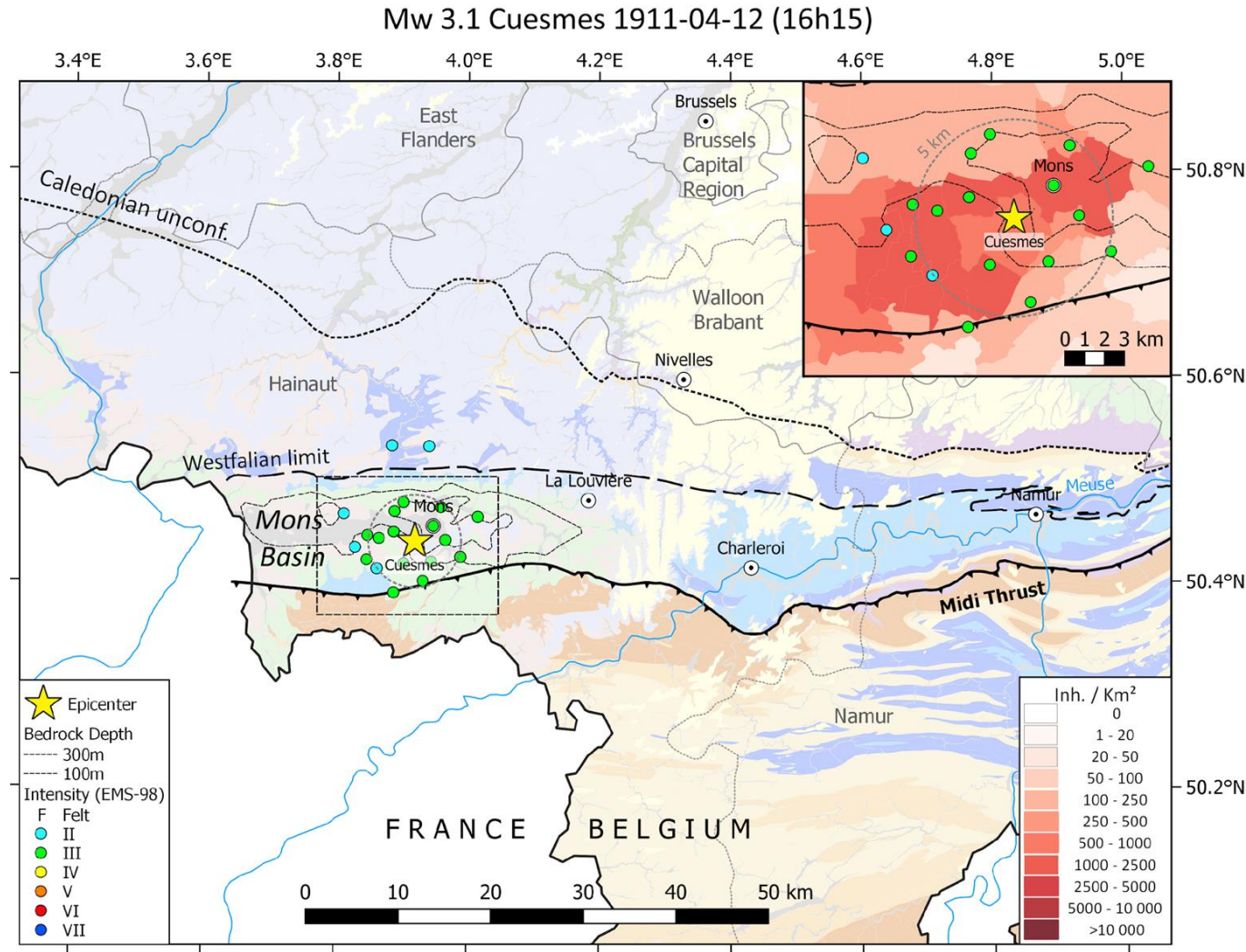
Map	id_earth	Date	Intensity (EMS-98)											Total IDPs	
			F	II	II-III	III	III-IV	IV	IV-V	V	V-VI	VI	VI-VII		VII
S1	449	1911-04-12		2	3	14	2	1							22
S2	465*	1911-06-01				2		31		14	2	4			53
S3	466	1911-06-03	11					2		1		1		1	16
S4	476	1920-01-17	9							1		2			12
S5	488	1931-05-09	4						1						5
S6	505	1936-11-05							5						5
S7	517	1940-01-07			2	6	5	3		1					17
S8	518	1940-01-07	7												7
S9	519	1940-01-09	5			2		2	1						10
S10	534 ^{Inq,*}	1949-04-03		24	3	36	1	32	8	13	6	7	2	2	134
S11	538	1949-04-14	7					6		2					15
S12	539	1949-04-14	12						2	3	2	2			21
S13	547 ^{Inq}	1952-10-21		2	1	12	2	4							21
S14	548 ^{Inq}	1952-10-22		1	1	7	1	1							11
S15	549 ^{Inq}	1952-10-27		6		13	4	12	2	8					45
S16	562 ^{Inq,*}	1954-07-10		11		7	1	9	2	12	2				44
S17	582 ^{Inq,*}	1965-12-15		23		30	6	17		19		2		2	99
S18	587 ^{Inq}	1966-01-16		3	1	13	4	2	2						25
S19	588 ^{Inq,*}	1966-01-16		15	1	8	2	12	1	2					41
S20	589 ^{Inq,*}	1966-01-16		37		42	2	22	1	12		3		1	120
S21	597 ^{Inq,*}	1967-03-28		40		56	3	22	1	10		9		2	143
S22	603 ^{Inq,*}	1968-08-12		6		2	1	12		8					29
S23	606 ^{Inq,*}	1968-08-13		18		9		10		17	1	4			59
S24	607 ^{Inq,*}	1968-09-23		10			4	9	1	1					25
S25	608 ^{Inq}	1968-09-23		13		5	2	5							25
S26	612 ^{Inq,*}	1970-11-03		6		9	3	5		8					31
S27	627 ^{Inq}	1976-10-24		24		24	1	33	1	10		2			95
S28	641 ^{Inq}	1982-09-14		1	1	8	1	7							18
Total Intensity			55	242	13	305	45	259	28	142	13	36	2	8	1148

The damaging character of shallow 20th century earthquakes in the Hainaut coal area (Belgium)

Mw 3.1 Cuesmes 1911-04-12 (16h15)

Figure S1

Right) Macroseismic map of the 12 April 1911 Mw=3.1 earthquake at Cuesmes south of Mons (nr 1 in Table S1). Maximal intensity = IV. Intensity data available in Table S2 in this Atlas.

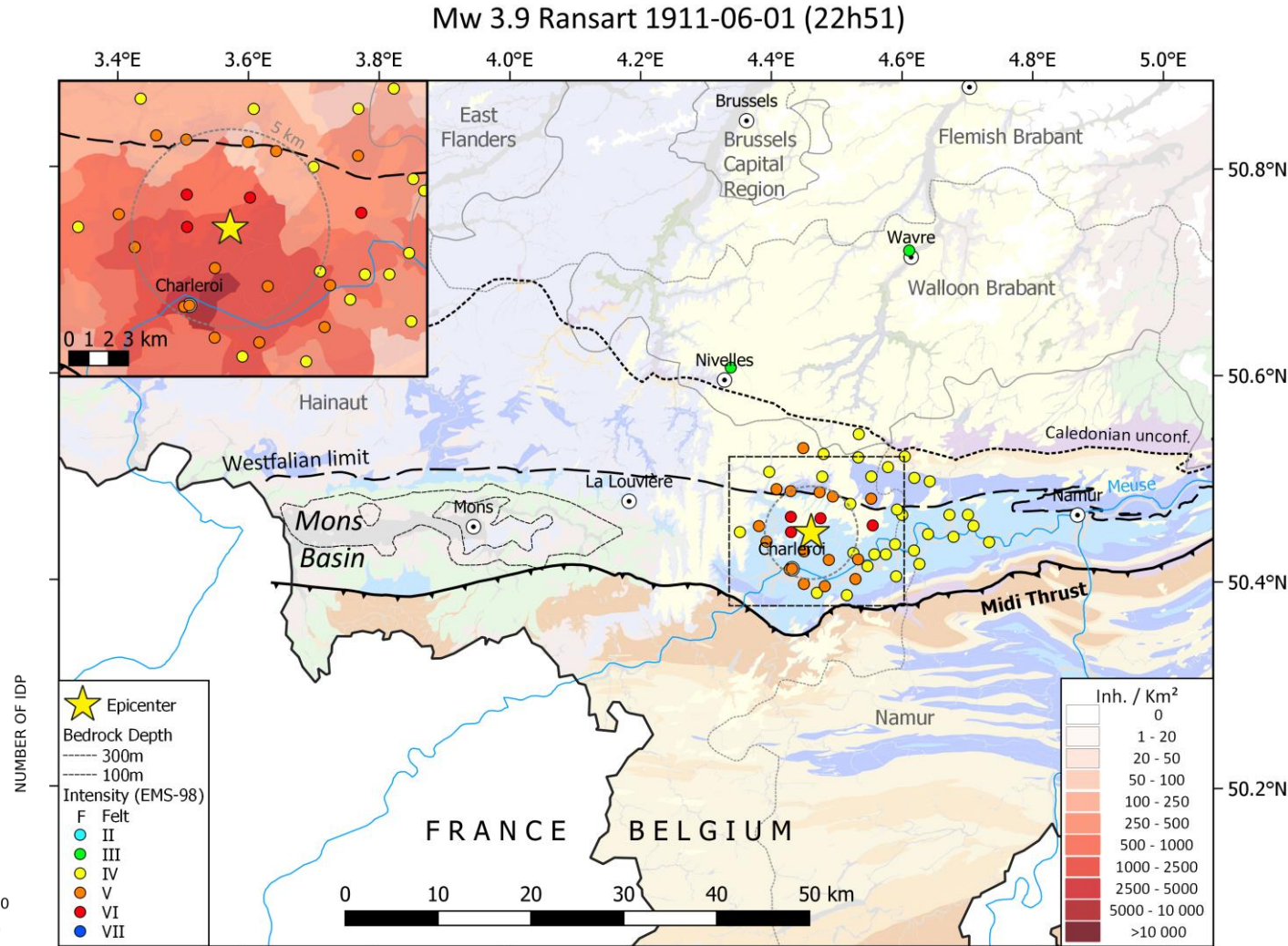
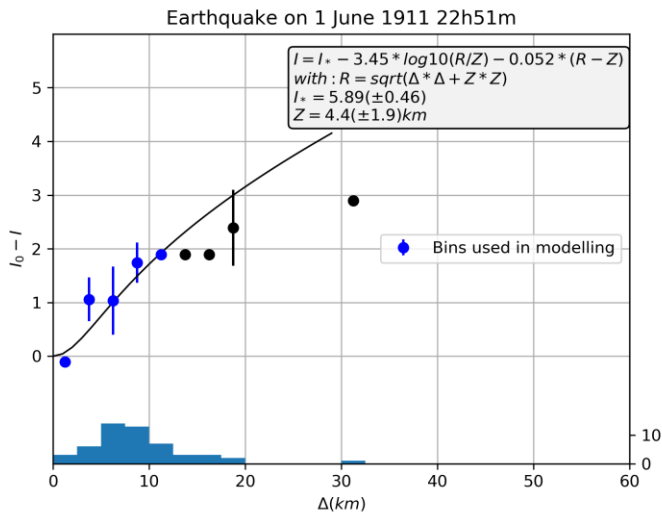


Mw 3.9 Ransart 1911-06-01 (22h51)

Figure S2

Right) Macroseismic map of the 1 June 1911 Mw=3.9 ($M_L=4.2$) earthquake at Ransart (nr 2 in Table S1). Maximal intensity = IV. Intensity data available in Table S2 in this Atlas.

Below) Intensity attenuation expressed as mean intensity change relative to I_0 (blue dots) calculated for bins of 2.5 km (histogram). Blue dots are used in the attenuation modelling. Vertical blue bars show intensity standard deviation for each distance bin. Modelled epicentral intensity strength (I_0) and focal depth (Z) for the event are indicated in the legend.

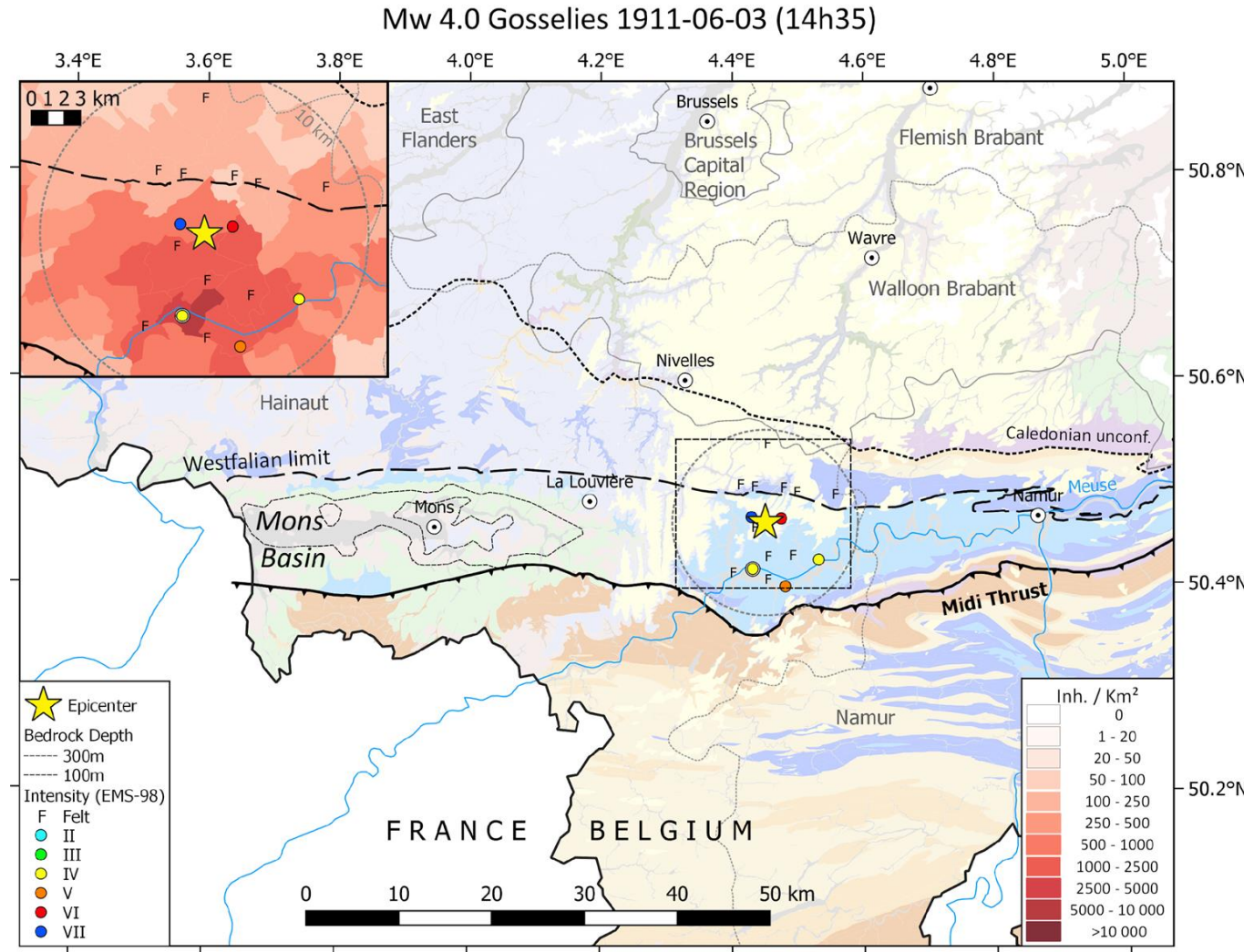


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Mw 4.0 Gosselies 1911-06-03 (14h35)

Figure S3

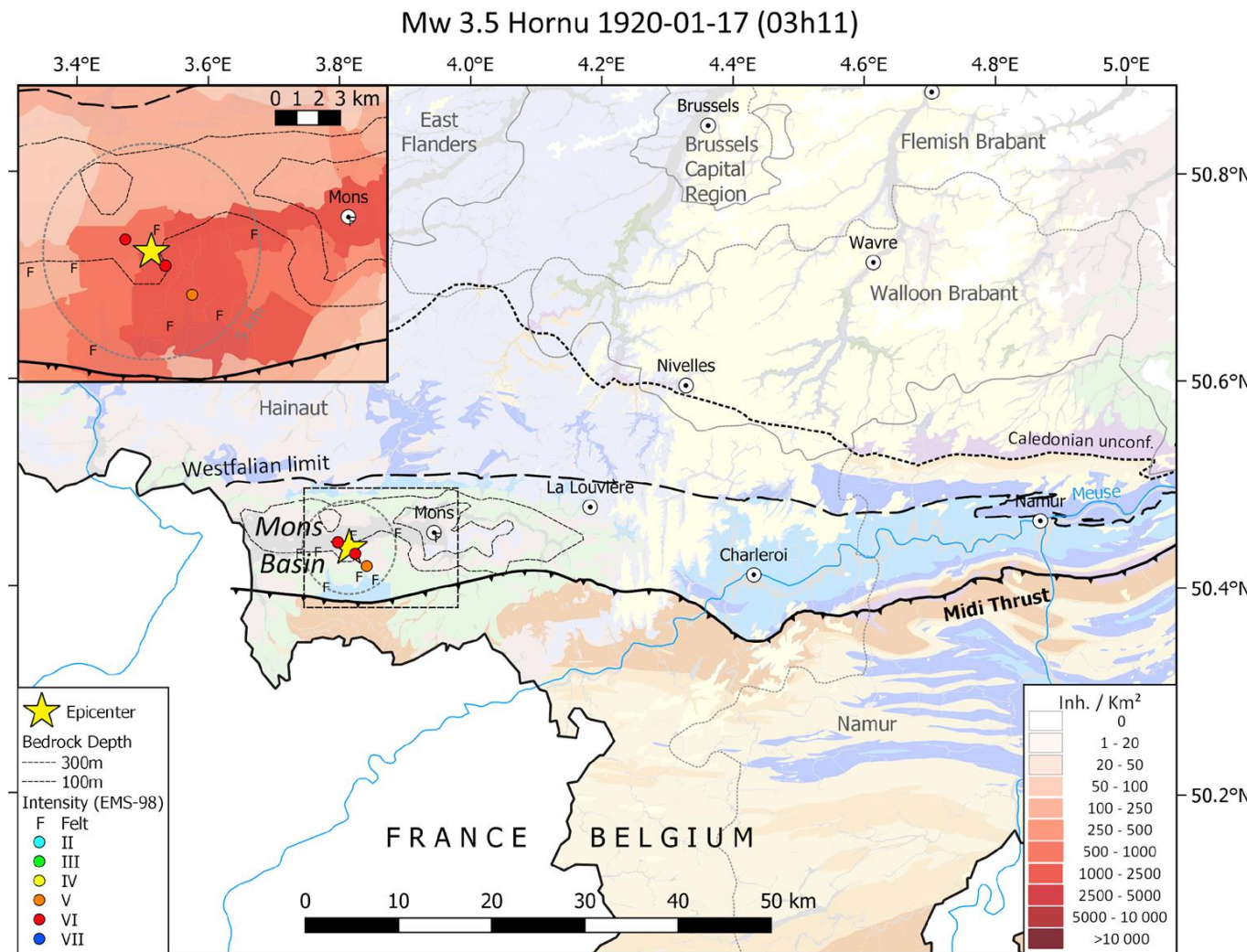
Right) Macroseismic map of the 3 June 1911 Mw=3.9 ($M_L=4.4$) Gosselies earthquake (nr 3 in Table S1). Maximal intensity = VII. Intensity data available in Table S2 in this Atlas.



Mw 3.5 Hornu 1920-01-17 (03h11)

Figure S4

Right) Macroseismic map of the 17 January 1920 Mw=3.5 ($M_L=3.7$) earthquake in the Borinage near Hornu (nr 4 in Table S1). Maximal intensity = VI. Intensity data available in Table S2 in this Atlas.

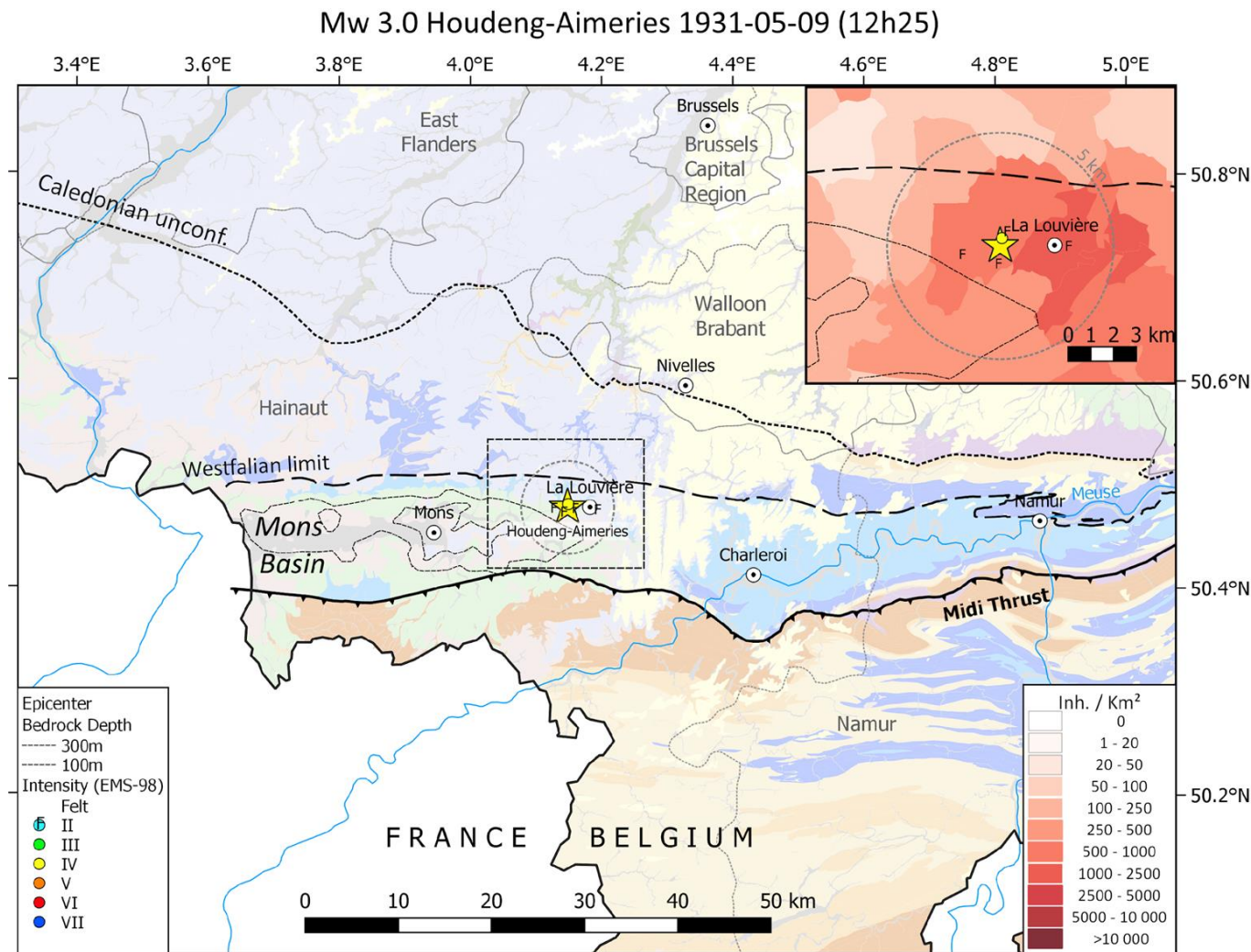


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Mw 3.0 Houdeng-Aimeries 1931-05-09 (12h25)

Figure S5

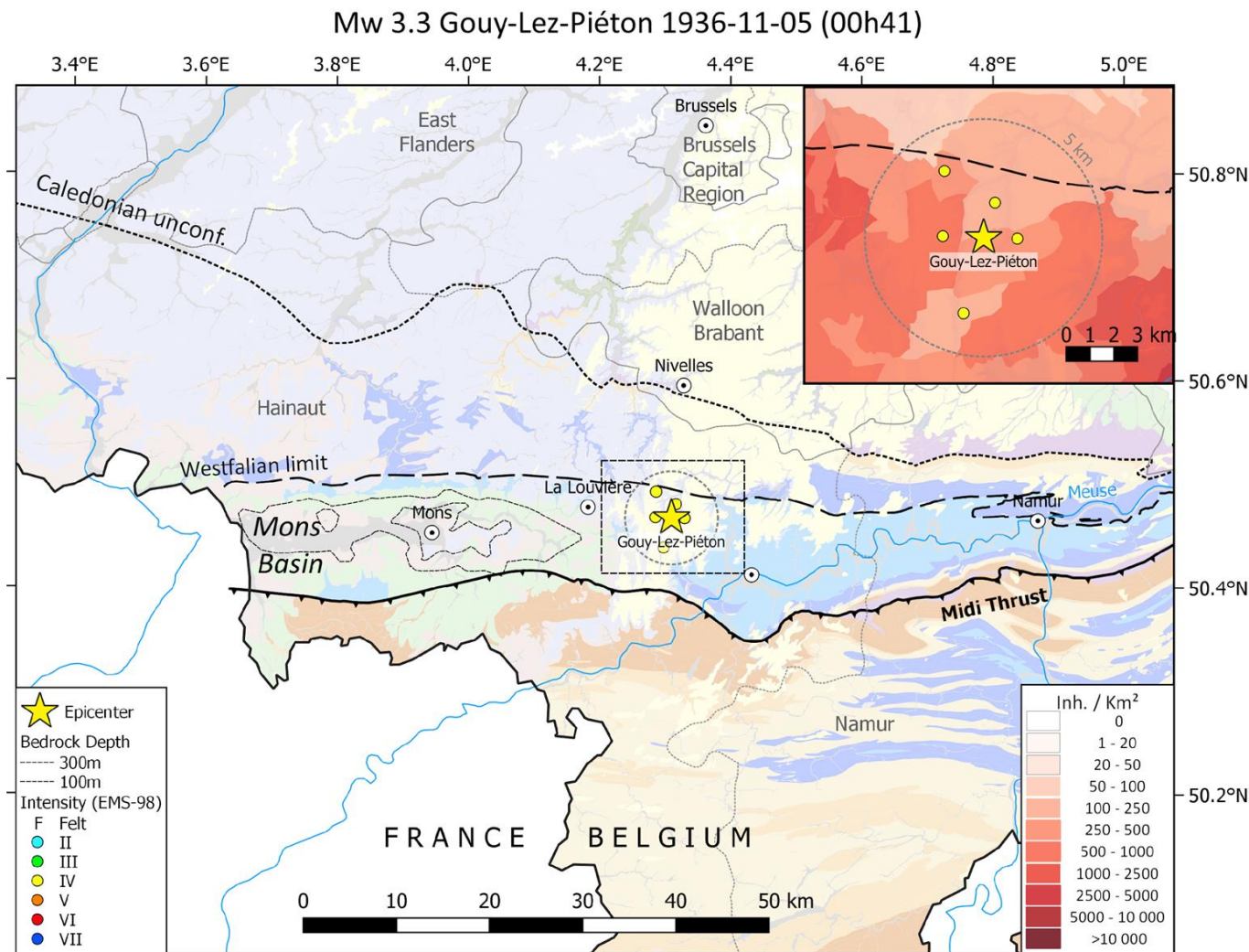
Right) Macroseismic map of the 9 May 1931 Mw=3.0 ($M_L=2.8$) earthquake east of La Louvière (nr 5 in Table S1). Maximal intensity = IV to V. Intensity data available in Table S2 in this Atlas.



Mw 3.3 Gouy-Lez-Piéton 1936-11-05 (00h41)

Figure S6

Right) Macroseismic map of the 5 November 1936 Mw=3.3 earthquake near Gouy-Lez-Piéton (nr 6 in Table S1). Maximal intensity = IV to V. Intensity data available in Table S2 in this Atlas.

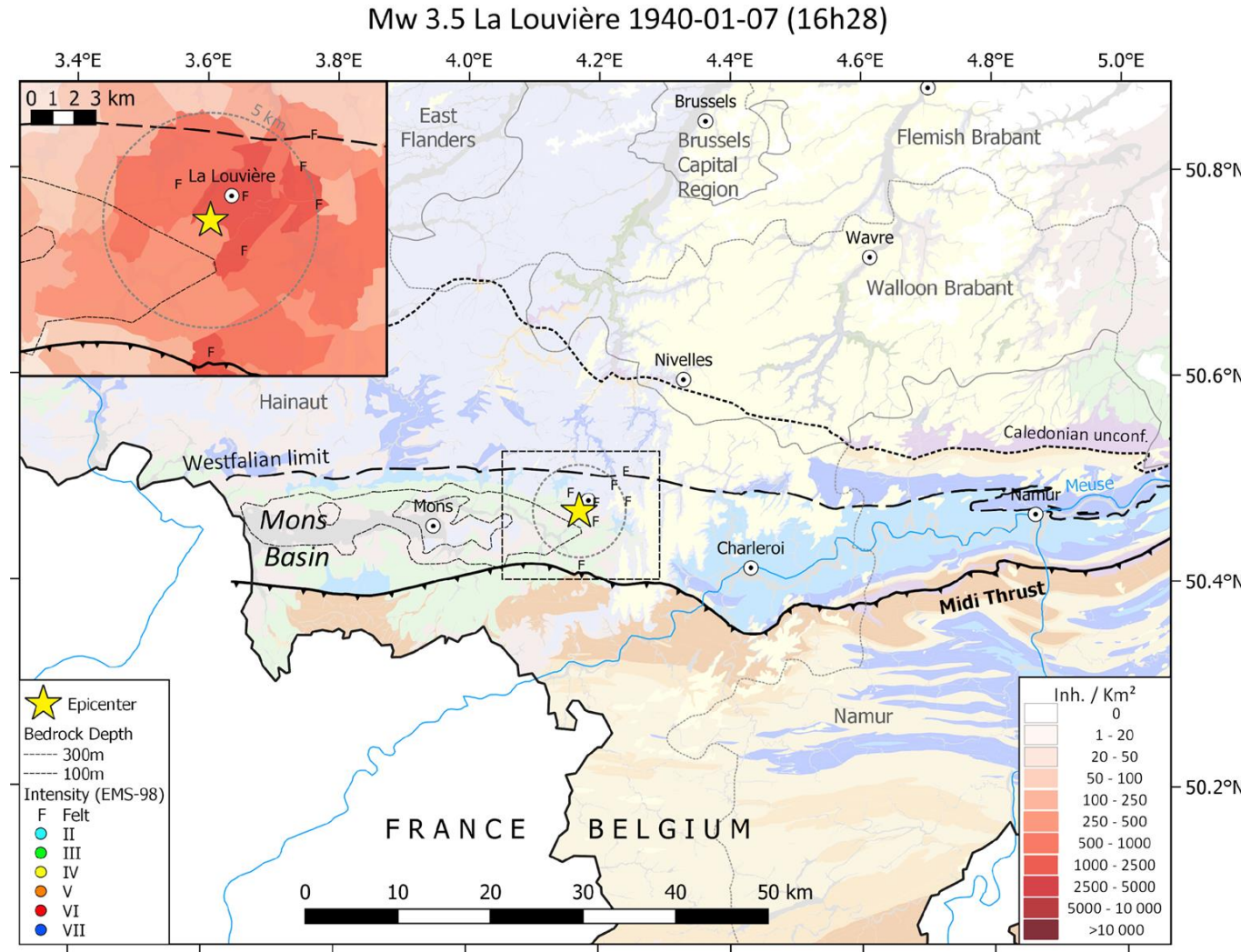


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Mw 3.5 La Louvière 1940-01-07 (16h28)

Figure S7

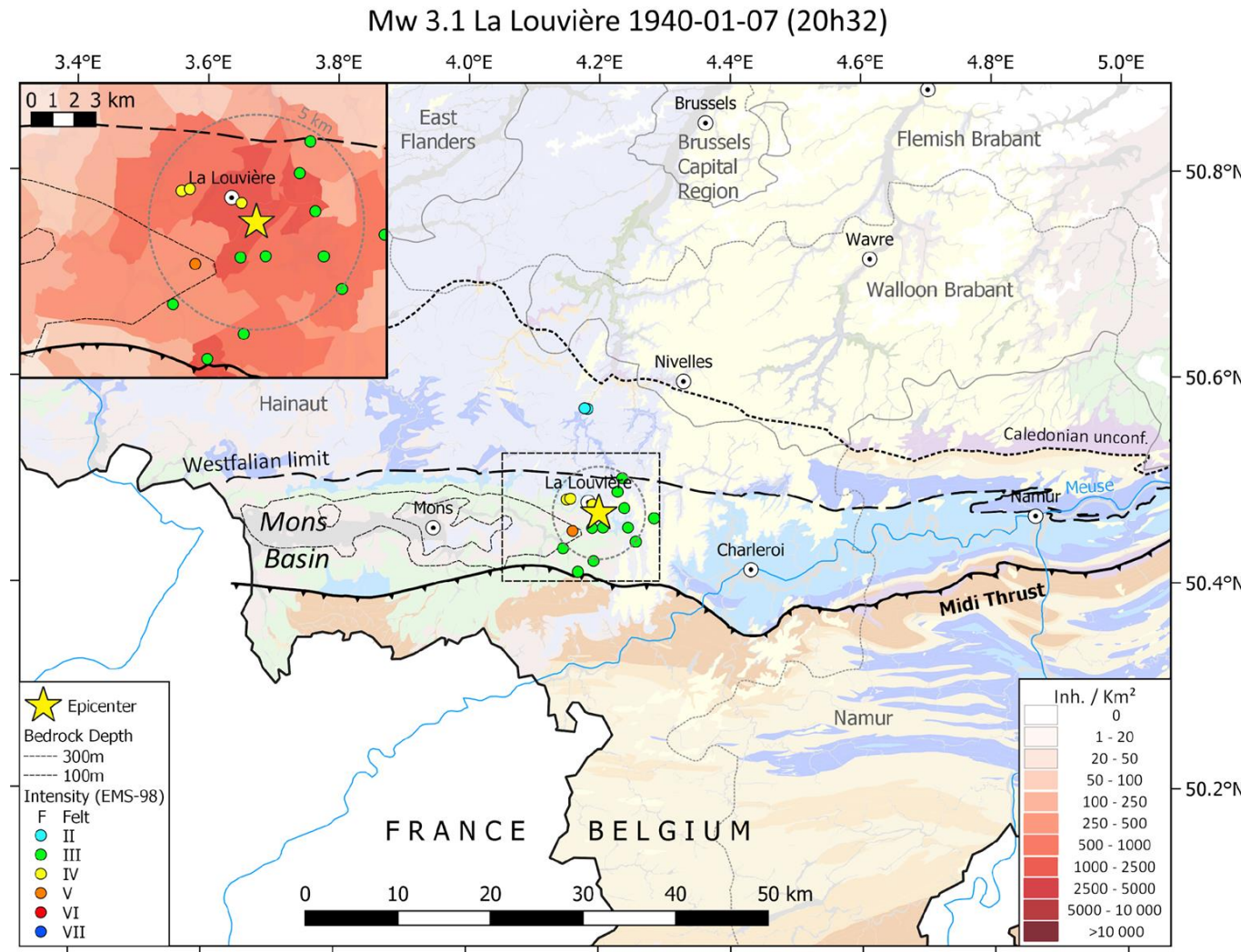
Right) Macroseismic map of the 7 January 1940 Mw=3.5 earthquake at 16h28 in La Louvière (nr 7 in Table S1). Maximal intensity = V. Intensity data available in Table S2 in this Atlas.



Mw 3.1 La Louvière 1940-01-07 (20h32)

Figure S8

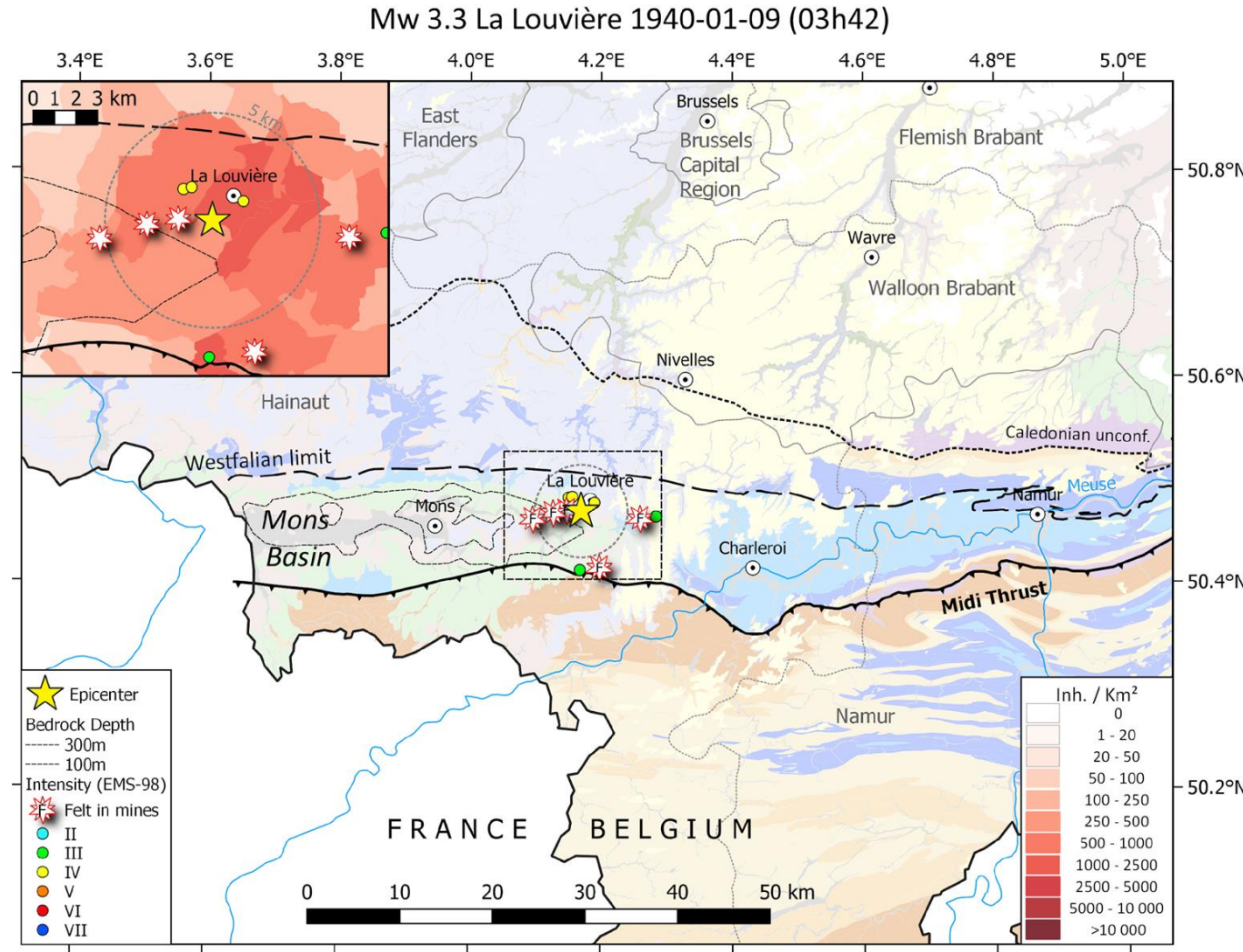
Right) Macroseismic map of the 7 January 1940 Mw=3.5 earthquake at 20h32 in La Louvière (nr 8 in Table S1). Maximal intensity = IV. Intensity data available in Table S2 in this Atlas.



Mw 3.1 La Louvière 1940-01-09 (03h42)

Figure S9

Right) Macroseismic map of the 9 January 1940 Mw=3.1 earthquake in La Louvière (nr 9 in Table S1). According to newspapers, this event was locally felt in the mines. Maximal intensity = V. Intensity data available in Table S2 in this Atlas.

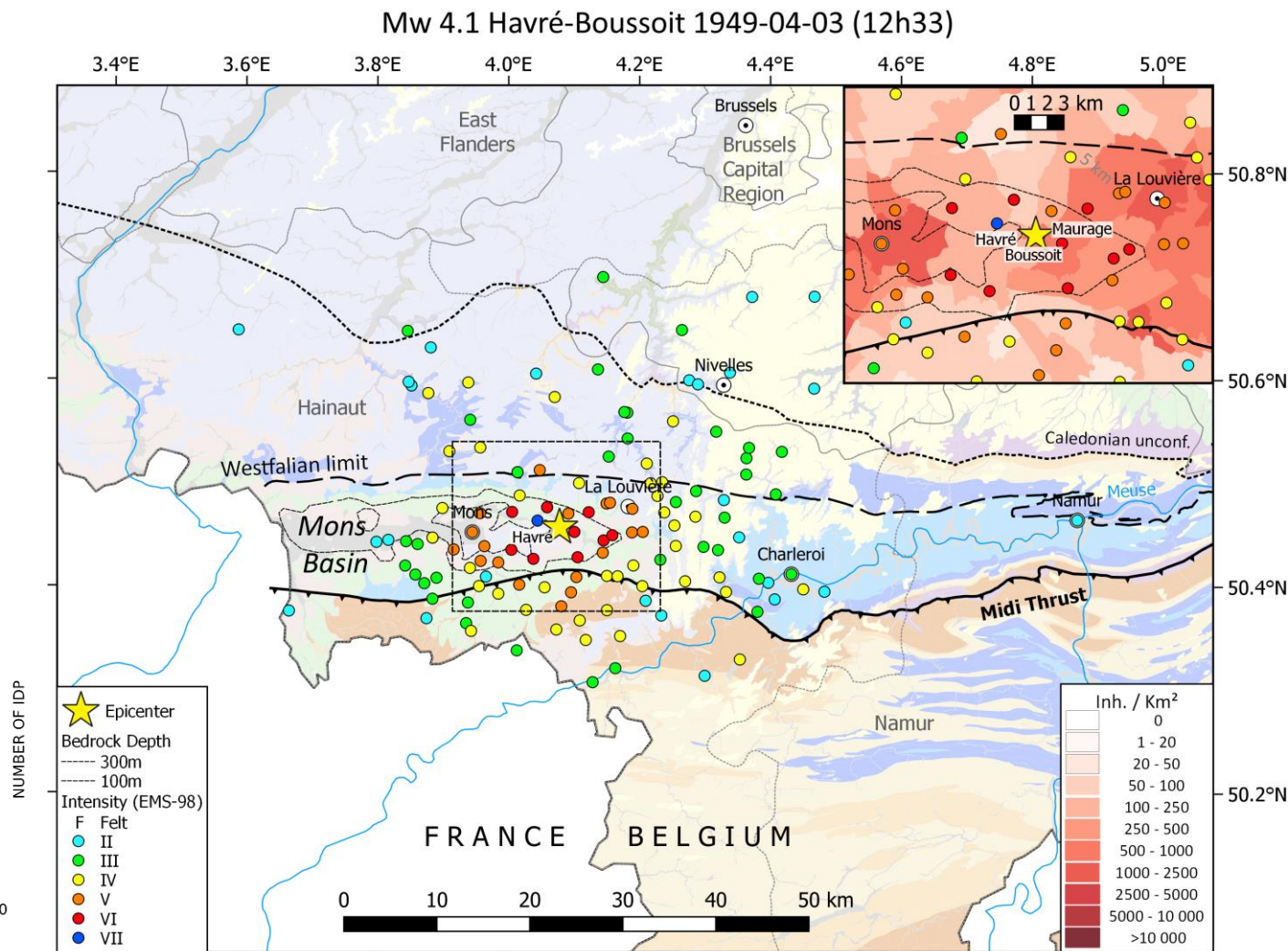
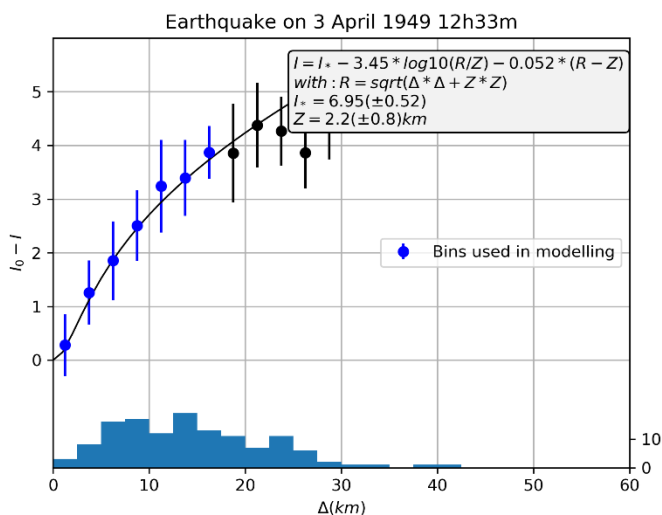


Mw 4.1 Havré-Boussoit 1949-04-03 (12h33)

Figure S10

Right) Macroseismic map of the 3 April 1949 Mw=4.1 ($M_L=4.6$) earthquake near Havré and Boussoit (nr 10 in Table S1). Maximal intensity = VII. Intensity data available in Table S2 in this Atlas.

Below) Intensity attenuation expressed as mean intensity change relative to I_0 (blue dots) calculated for bins of 2.5 km (histogram). Blue dots are used in the attenuation modelling. Vertical blue bars show intensity standard deviation for each distance bin. Modelled epicentral intensity strength (I_0) and focal depth (Z) for the event are indicated in the legend.

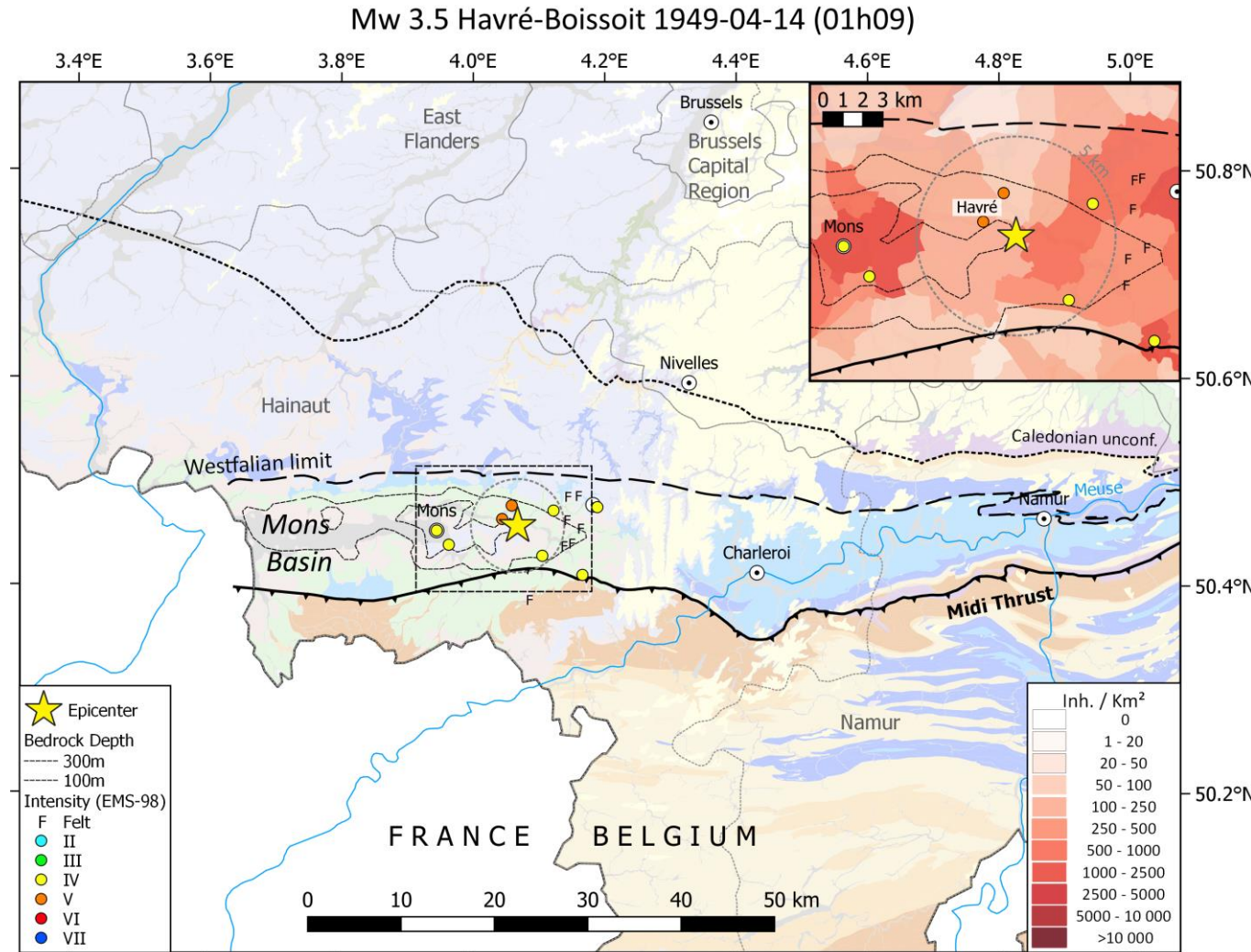


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Mw 3.5 Havré-Boussoit 1949-04-14 (01h09)

Figure S11

Right) Macroseismic map of the 14 April 1949 Mw=3.5 earthquake at 01h09 near Havré and Boussoit (nr 11 in Table S1). Maximal intensity = V. Intensity data available in Table S2 in this Atlas.

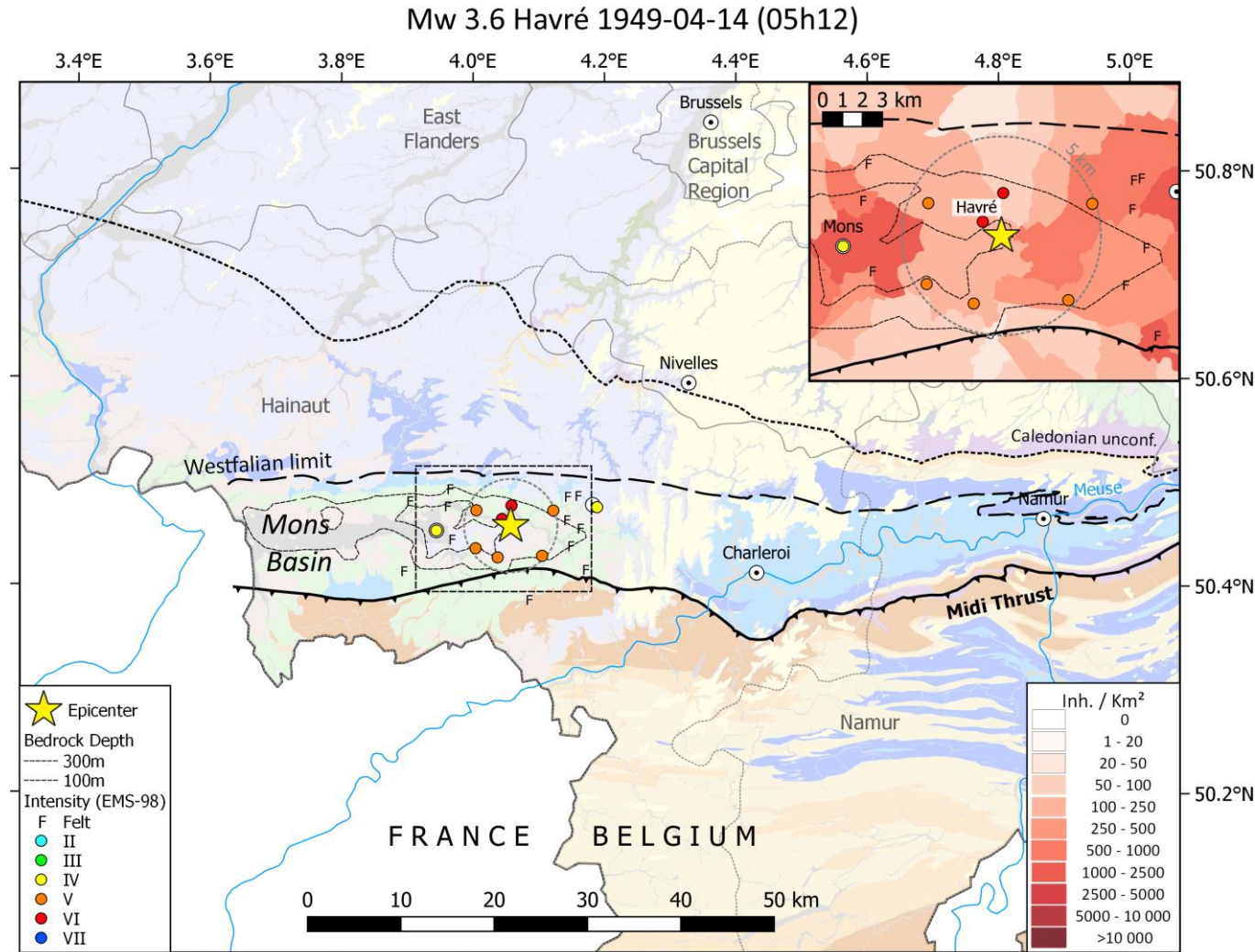


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Mw 3.6 Havré 1949-04-14 (05h12)

Figure S12

Right) Macroseismic map of the 14 April 1949 at 05h12 Mw=3.6 ($M_L=3.8$) earthquake near Havré (nr 12 in Table S1). Maximal intensity = VI. Intensity data available in Table S2 in this Atlas.

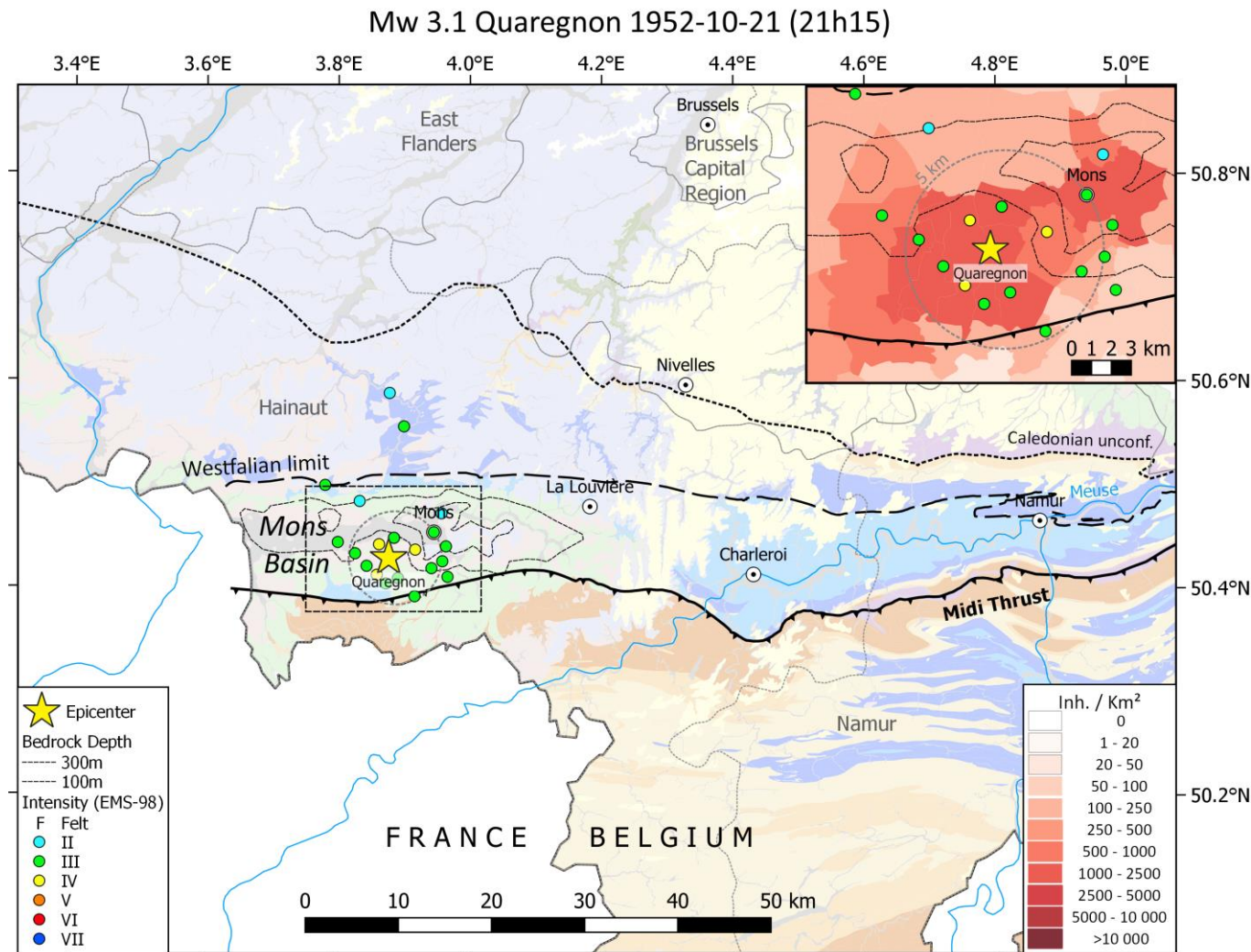


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Mw 3.1 Quaregnon 1952-10-21 (21h15)

Figure S13

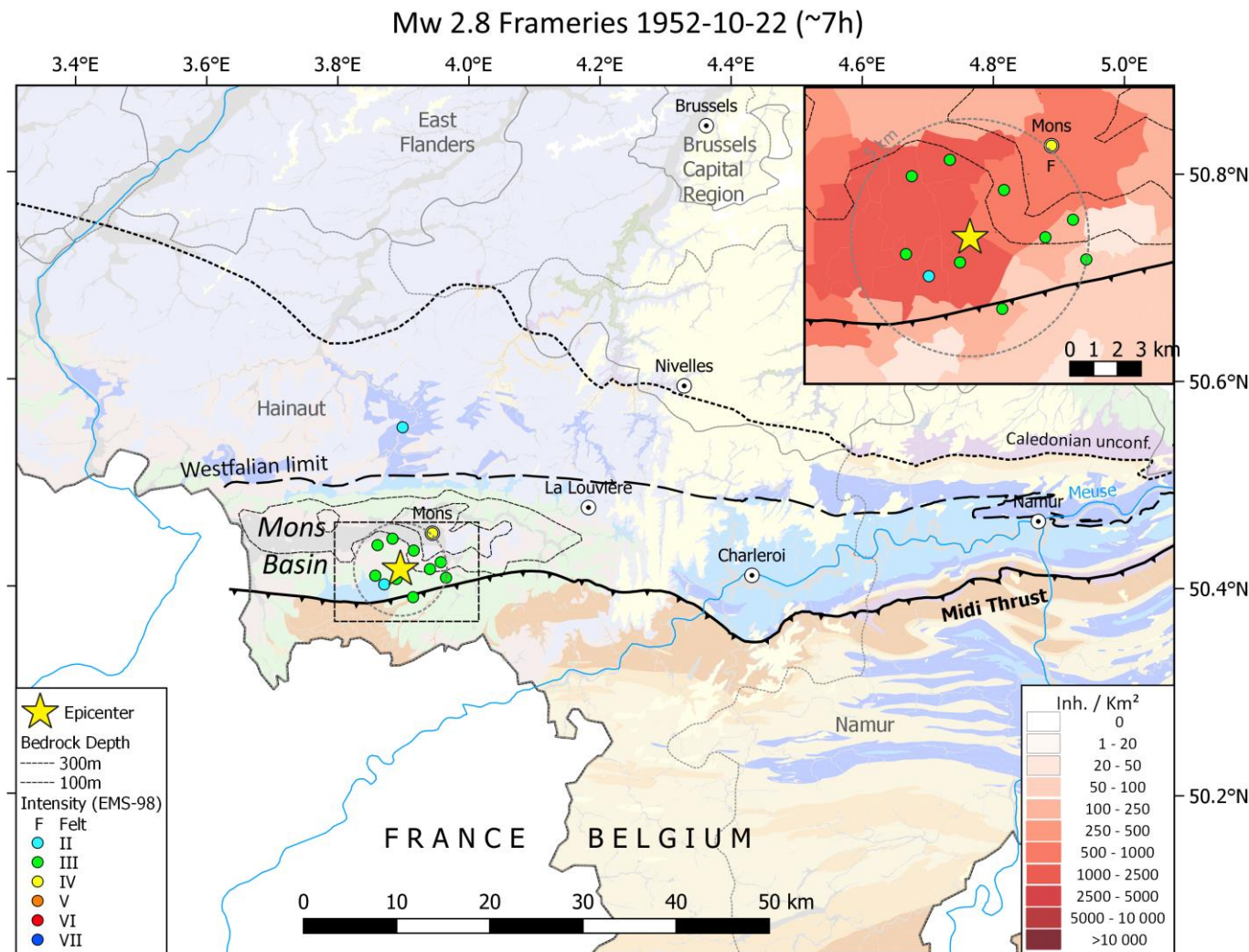
Right) Macroseismic map of the 21 October 1952 21h15 Mw=3.1 earthquake in the Borinage (nr 13 in Table S1). Maximal intensity = IV. Intensity data available in Table S2 in this Atlas.



Mw 2.8 Frameries 1952-10-22 (~7h)

Figure S14

Right) Macroseismic map of the 22 October 1952 at ~7h Mw=2.8 earthquake in the Borinage (nr 14 in Table S1). Maximal intensity = III. Intensity data available in Table S2 in this Atlas.

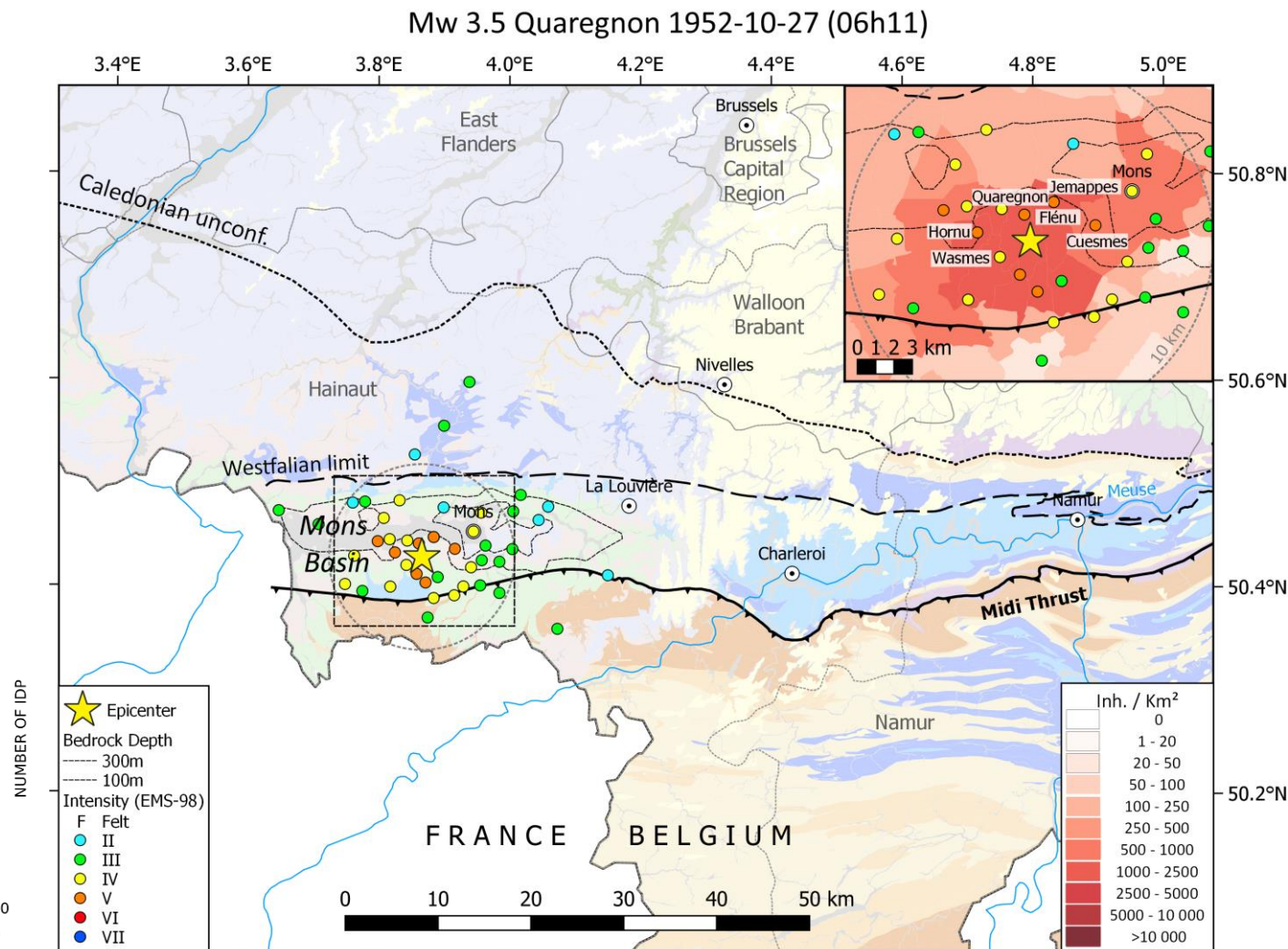
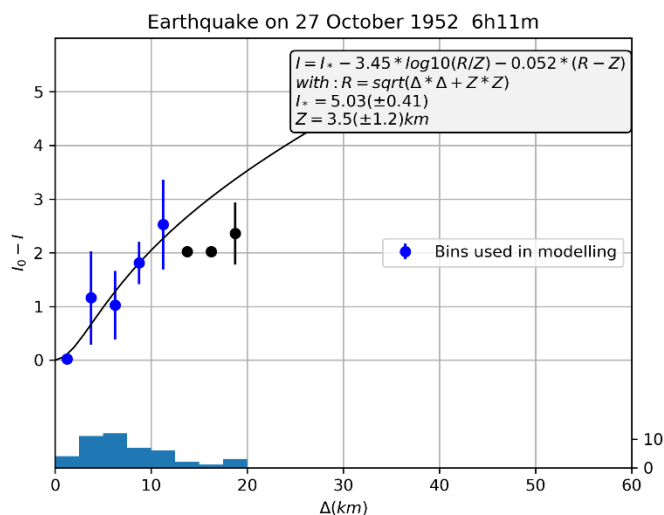


Mw 3.5 Quaregnon 1952-10-27 (06h11)

Figure S15

Right) Macroseismic map of the 27 October 1952 6h11 Mw=3.5 earthquake in the Borinage (nr 15 in Table S1). Maximal intensity = V. Intensity data available in Table S2 in this Atlas.

Below) Intensity attenuation expressed as mean intensity change relative to I_0 (blue dots) calculated for bins of 2.5 km (histogram). Blue dots are used in the attenuation modelling. Vertical blue bars show intensity standard deviation for each distance bin. Modelled epicentral intensity strength (I_0) and focal depth (Z) for the event are indicated in the legend.



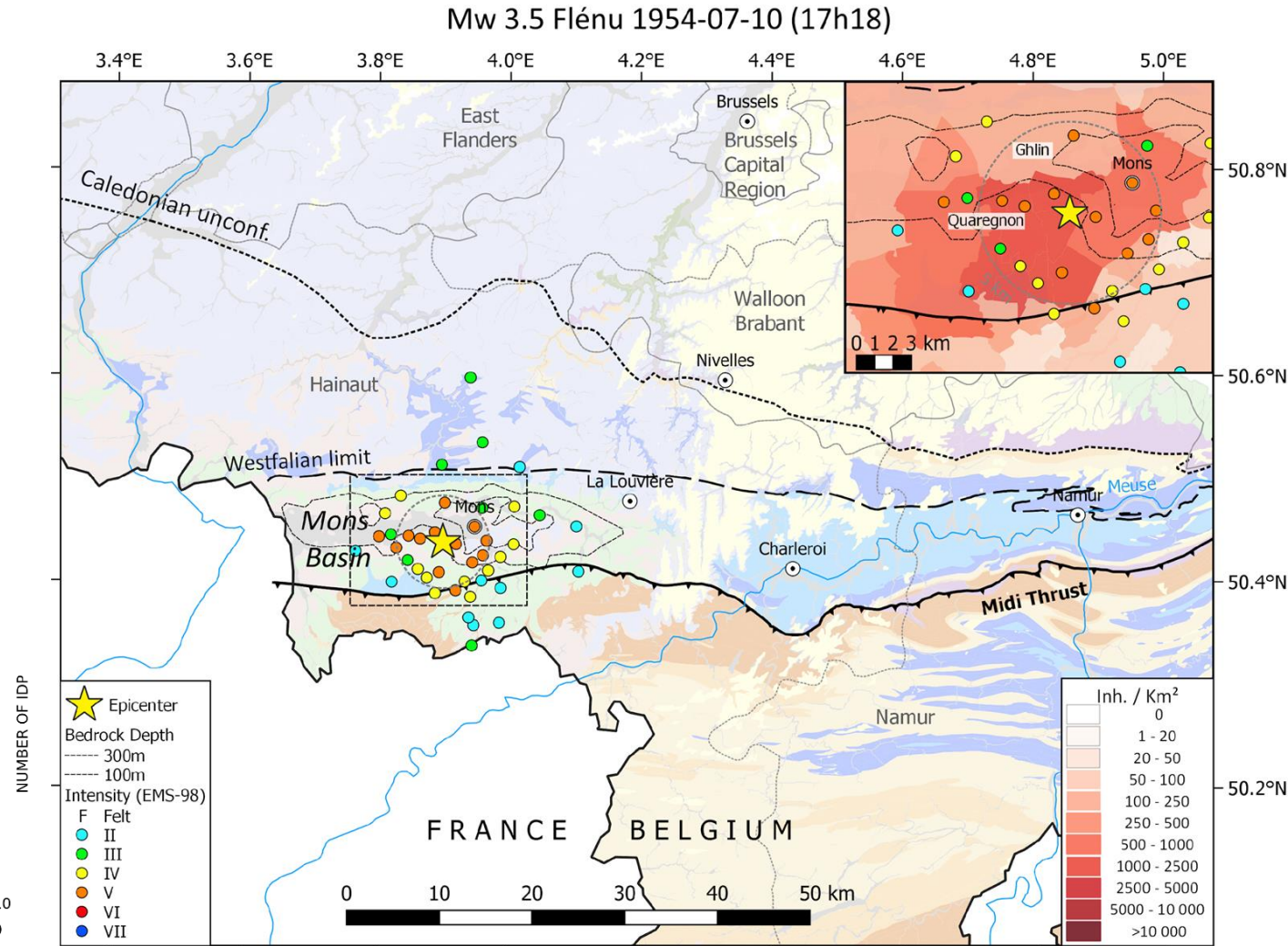
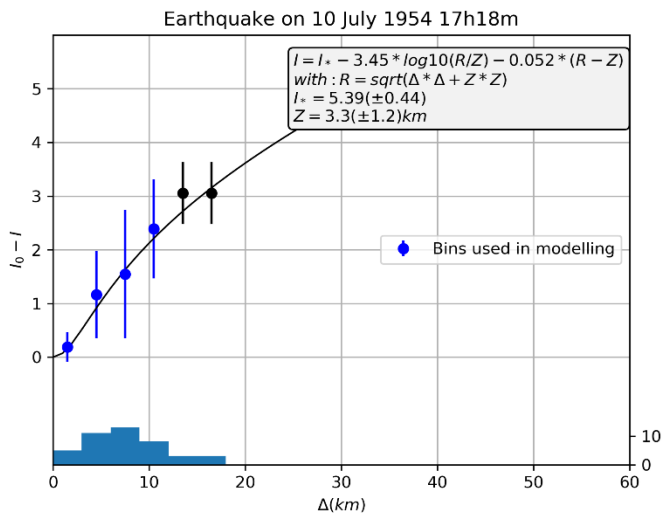
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Mw 3.5 Flénu 1954-07-10 (17h18)

Figure S16

Right) Macroseismic map of the 1954 Mw=3.5 earthquake in the Borinage (nr 16 in Table S1). Maximal intensity = V. Intensity data available in Table S2 in this Atlas.

Below) Intensity attenuation expressed as mean intensity change relative to I_0 (blue dots) calculated for bins of 2.5 km (histogram). Blue dots are used in the attenuation modelling. Vertical blue bars show intensity standard deviation for each distance bin. Modelled epicentral intensity strength (I_0) and focal depth (Z) for the event are indicated in the legend.



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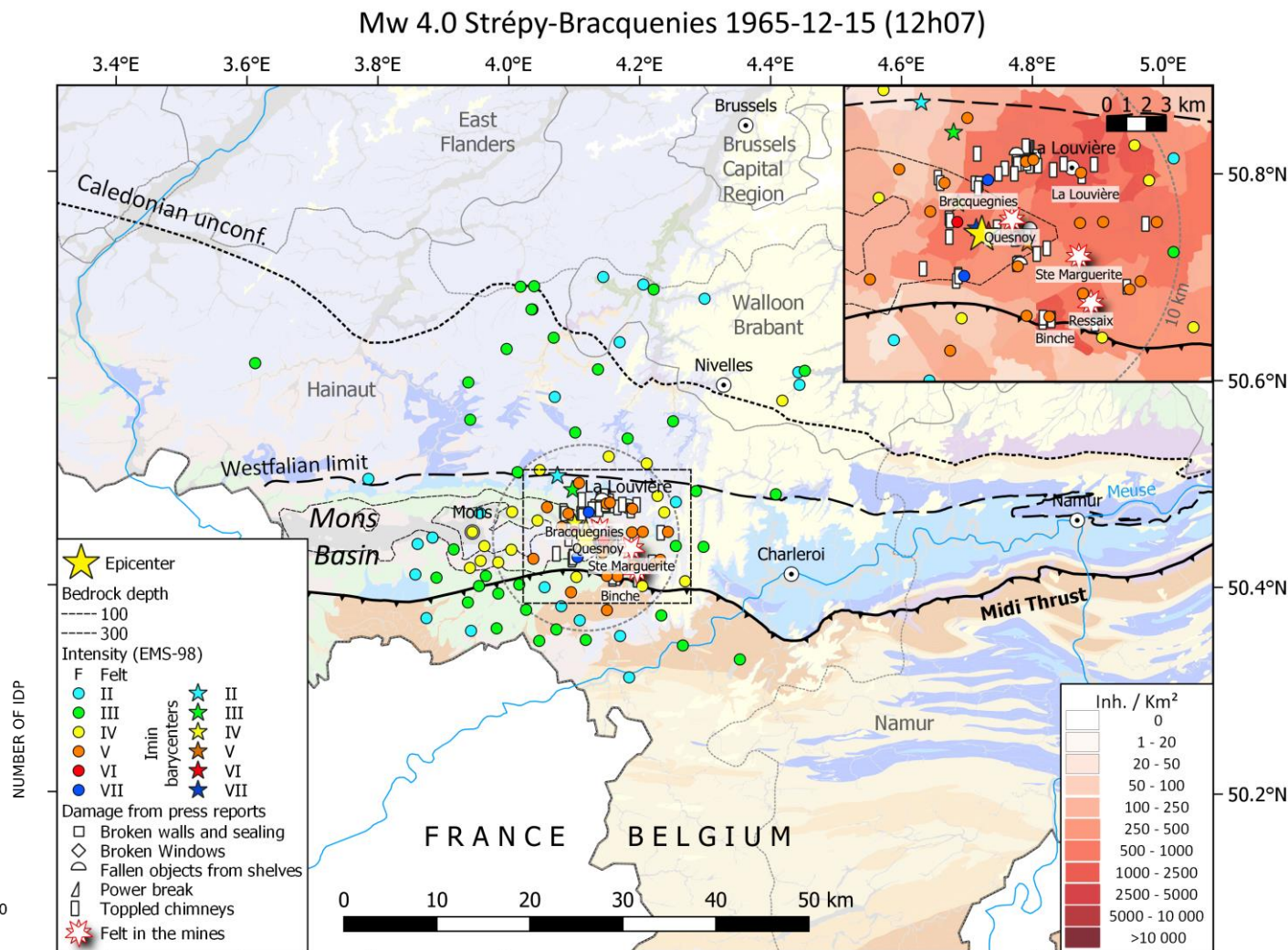
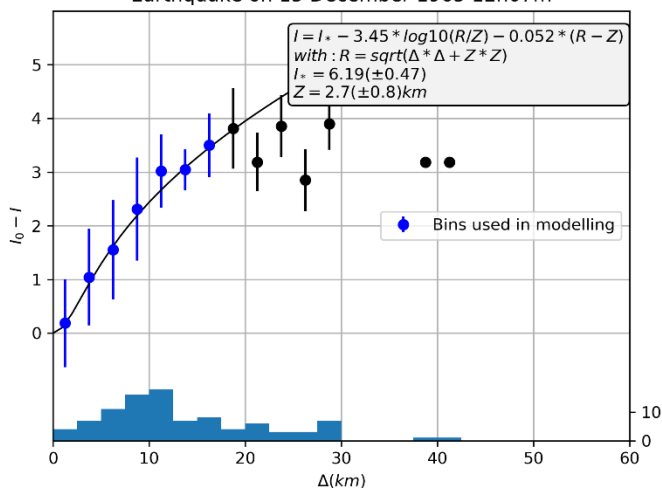
Mw 4.0 Strépy-Bracquengnies 1965-12-15 (12h07)

Figure S17

Right) Macroseismic map of the damaging 1965 Mw=4.0 ($M_L=4.4$) Strépy-Bracquengnies earthquake (nr 17 in Table S1). Maximal intensity = VII. The inset shows localities where damage has been reported in press reports with population density as background. Intensity data available in Table S2 in this Atlas.

Below) Intensity attenuation expressed as mean intensity change relative to I_0 (blue dots) calculated for bins of 2.5 km (histogram). Blue dots are used in the attenuation modelling. Vertical blue bars show intensity standard deviation for each distance bin. Modelled epicentral intensity strength (I_0) and focal depth (Z) for the event are indicated in the legend.

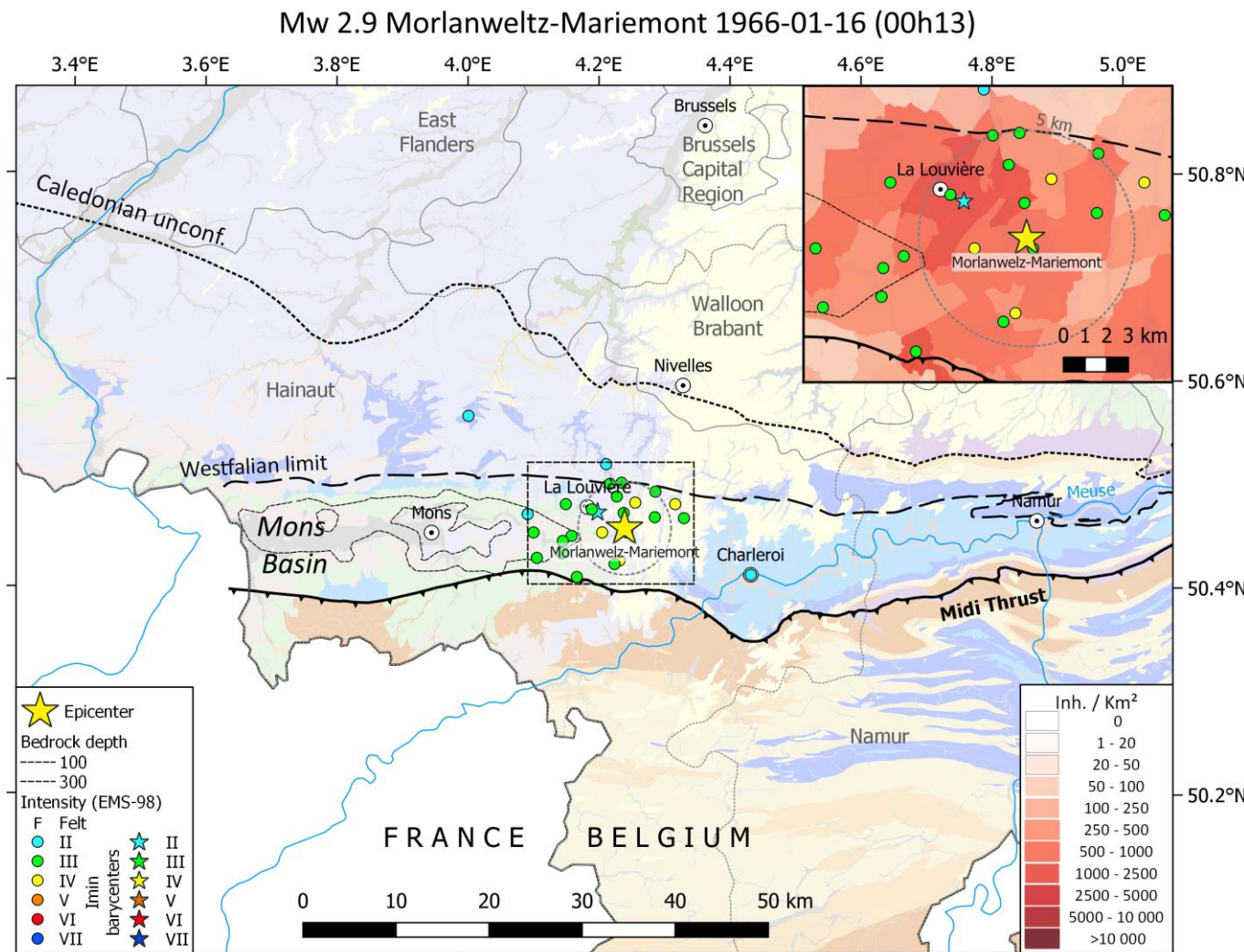
Earthquake on 15 December 1965 12h07m



Mw 2.9 Morlanwelz-Mariemont 1966-01-16 (00h13)

Figure S18

Right) Macroseismic map of the 1966 Mw=2.9 ($M_L=2.7$) Morlanwelz-Mariemont earthquake (nr 18 in Table 1). Maximal intensity = III. Intensity data available in Table S2 in this Atlas.

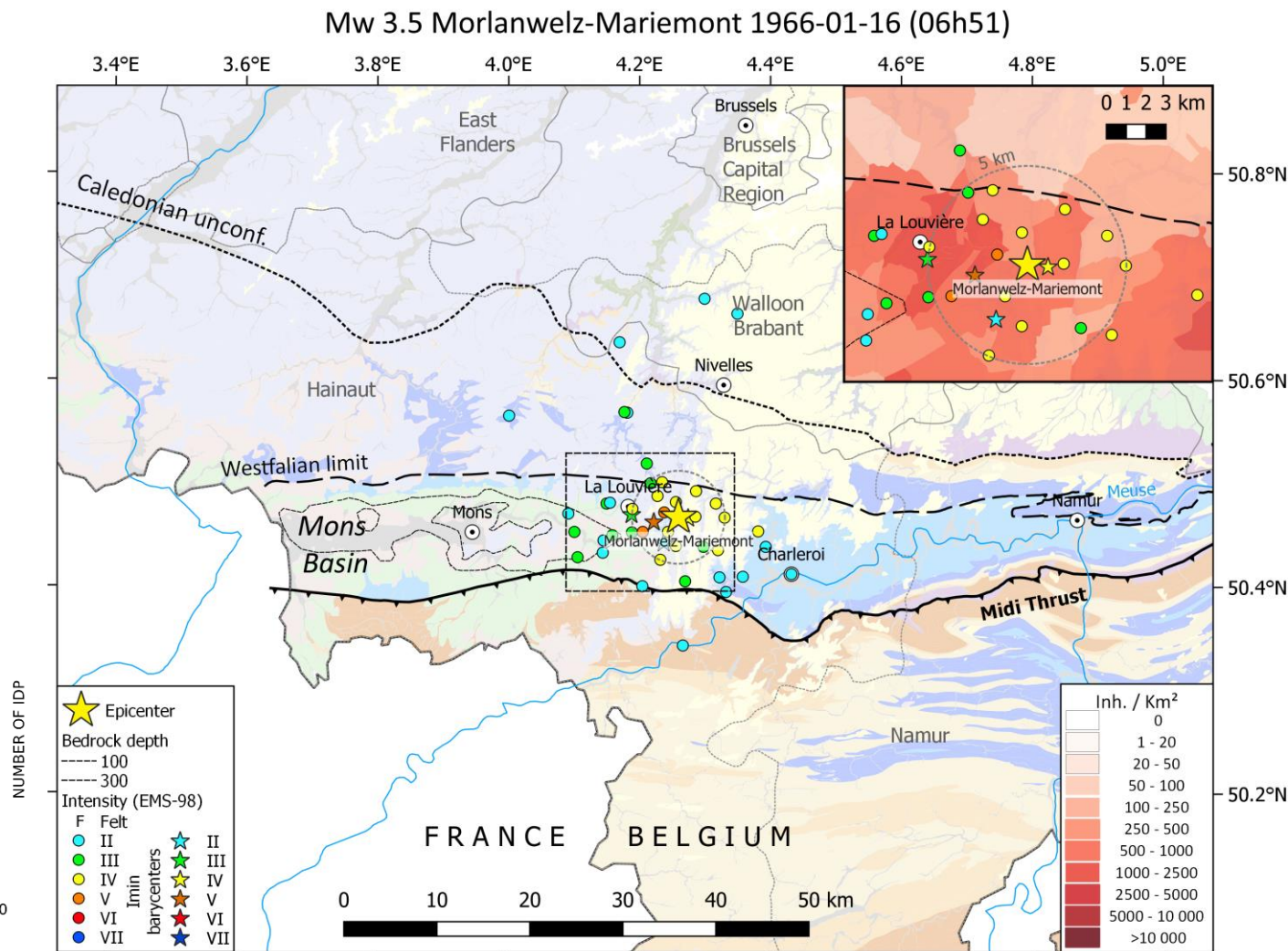
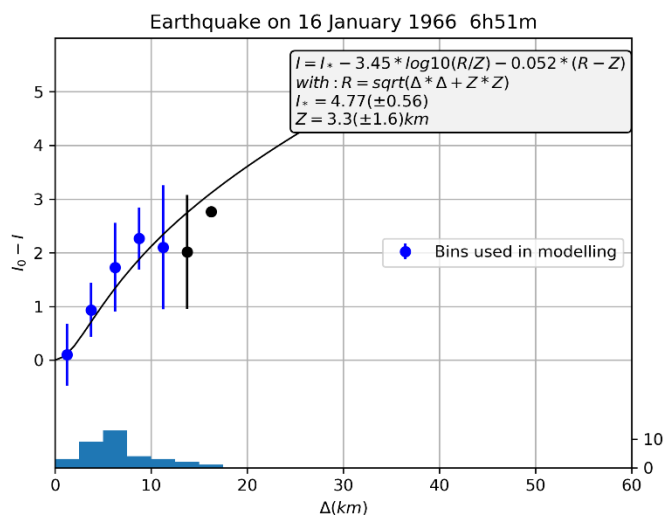


Mw 3.5 Morlanwelz-Mariemont 1966-01-16 (06h51)

Figure S19

Right) Macroseismic map of the 1966 Mw=3.5 ($M_L=3.8$) Morlanwelz-Mariemont earthquake (nr 19 in Table S1). Maximal intensity = V. Intensity data available in Table S2 in this Atlas.

Below) Intensity attenuation expressed as mean intensity change relative to I_0 (blue dots) calculated for bins of 2.5 km (histogram). Blue dots are used in the attenuation modelling. Vertical blue bars show intensity standard deviation for each distance bin. Modelled epicentral intensity strength (I_0) and focal depth (Z) for the event are indicated in the legend.

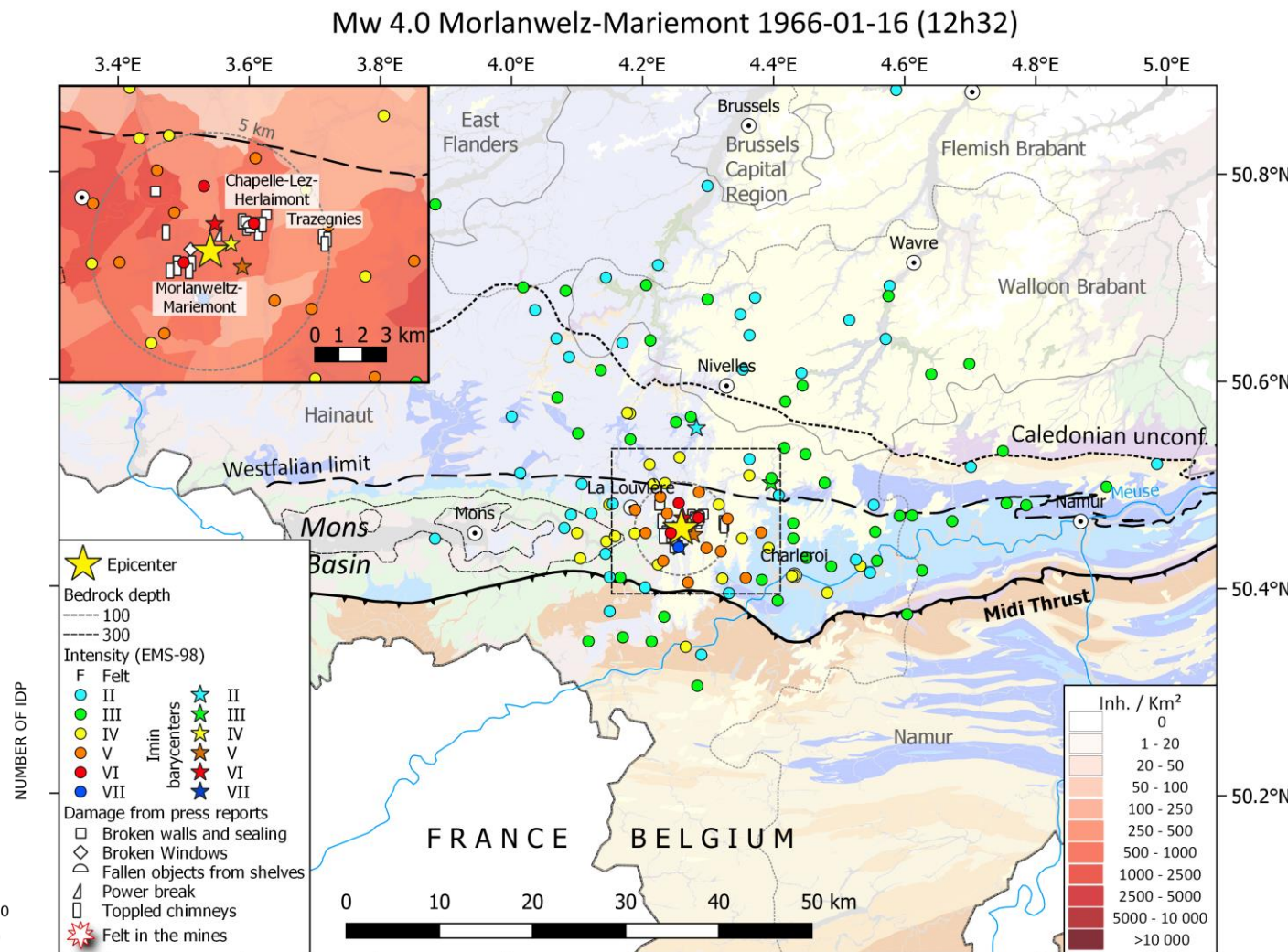
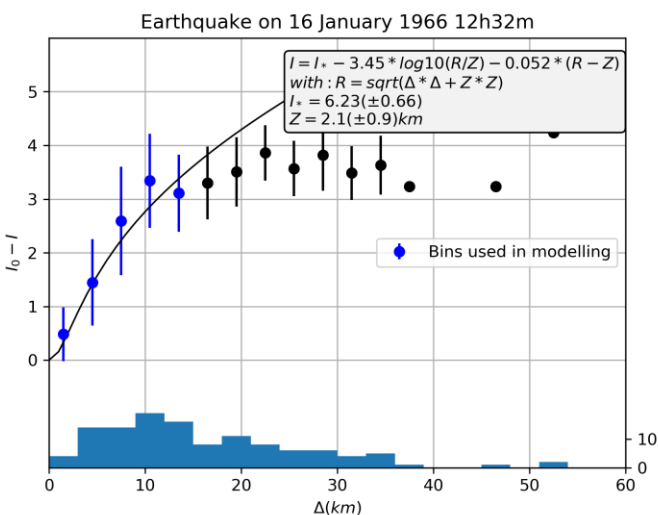


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Mw 4.0 Morlanwelz-Mariemont 1966-01-16 (12h32)

Figure S20

Right) Macroseismic map of the 1966 Mw=4.0 ($M_L=4.4$) Morlanwelz-Mariemont earthquake (nr 20 in Table S1). Maximal intensity = VII. The inset shows localities where damage has been reported in press reports. Intensity data available in Table S2 in this Atlas.

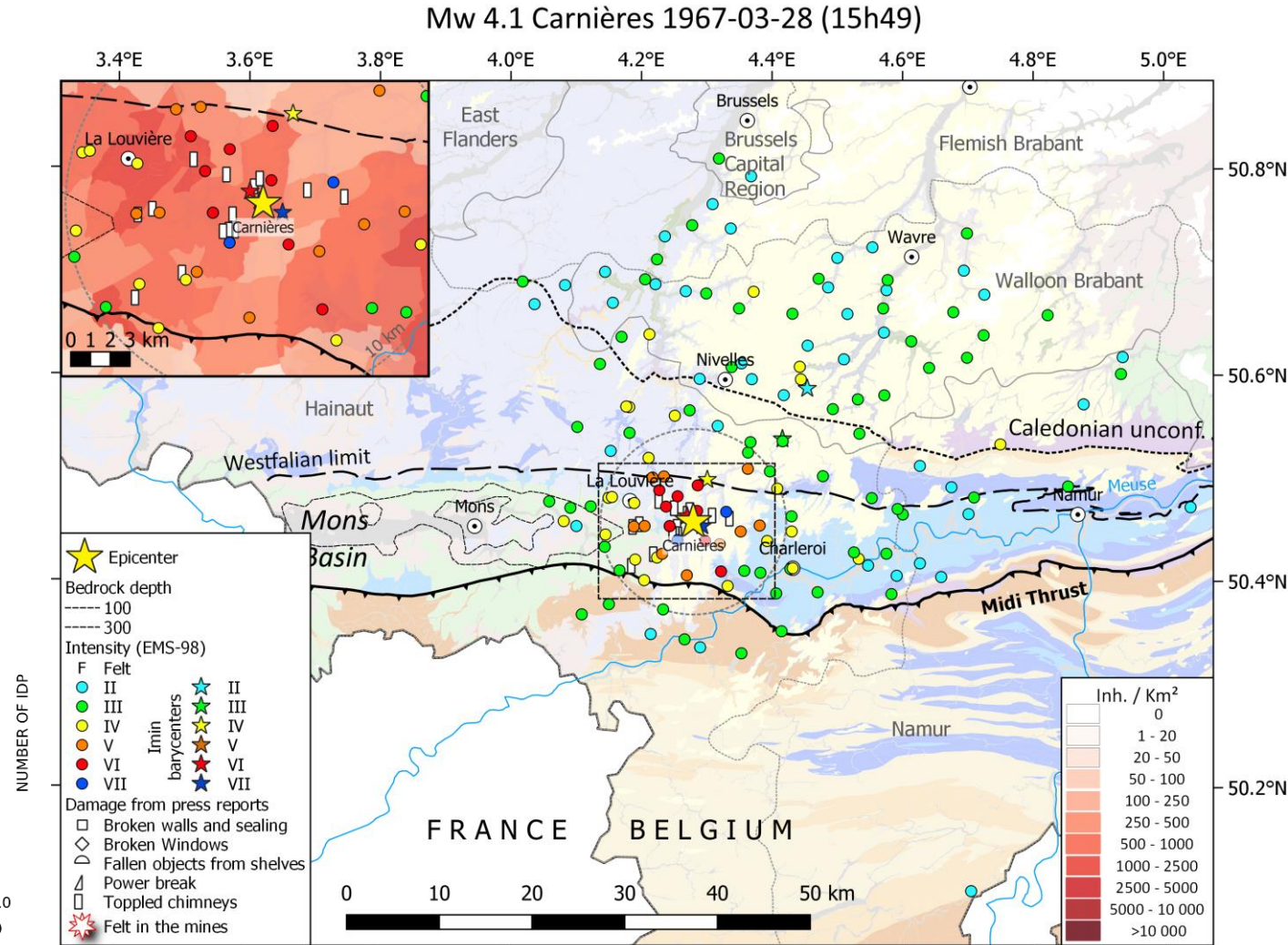
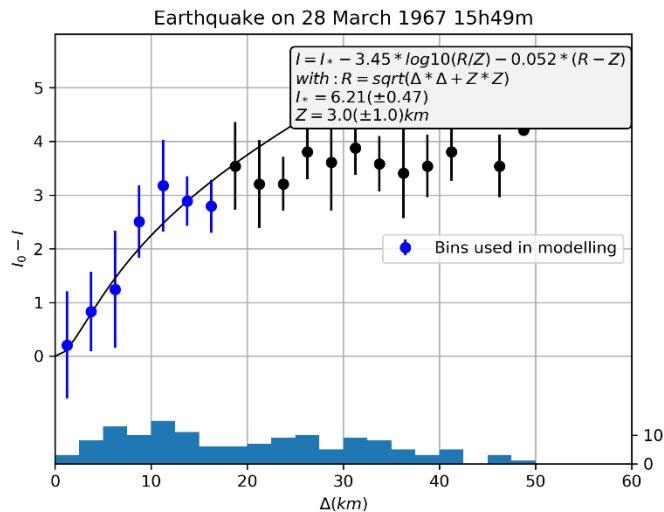


Mw 4.1 Carnières 1967-03-28 (15h49)

Figure S21

Right) Macroseismic map of the 1967 Mw=4.1 ($M_L=4.5$) Carnières earthquake (nr 21 in Table S1). Maximal intensity = VII. This event has been felt more northwards within the borders of the Brabant Massif, than southwards in the Ardennes, which results in a northwards shift of the lower intensity (Imin IV, III and II) barycenters. The inset shows localities where damage has been reported in press reports. Intensity data available in Table S2 in this Atlas.

Below) expressed as mean intensity change relative to I_0 (blue dots) calculated for bins of 2.5 km (histogram).

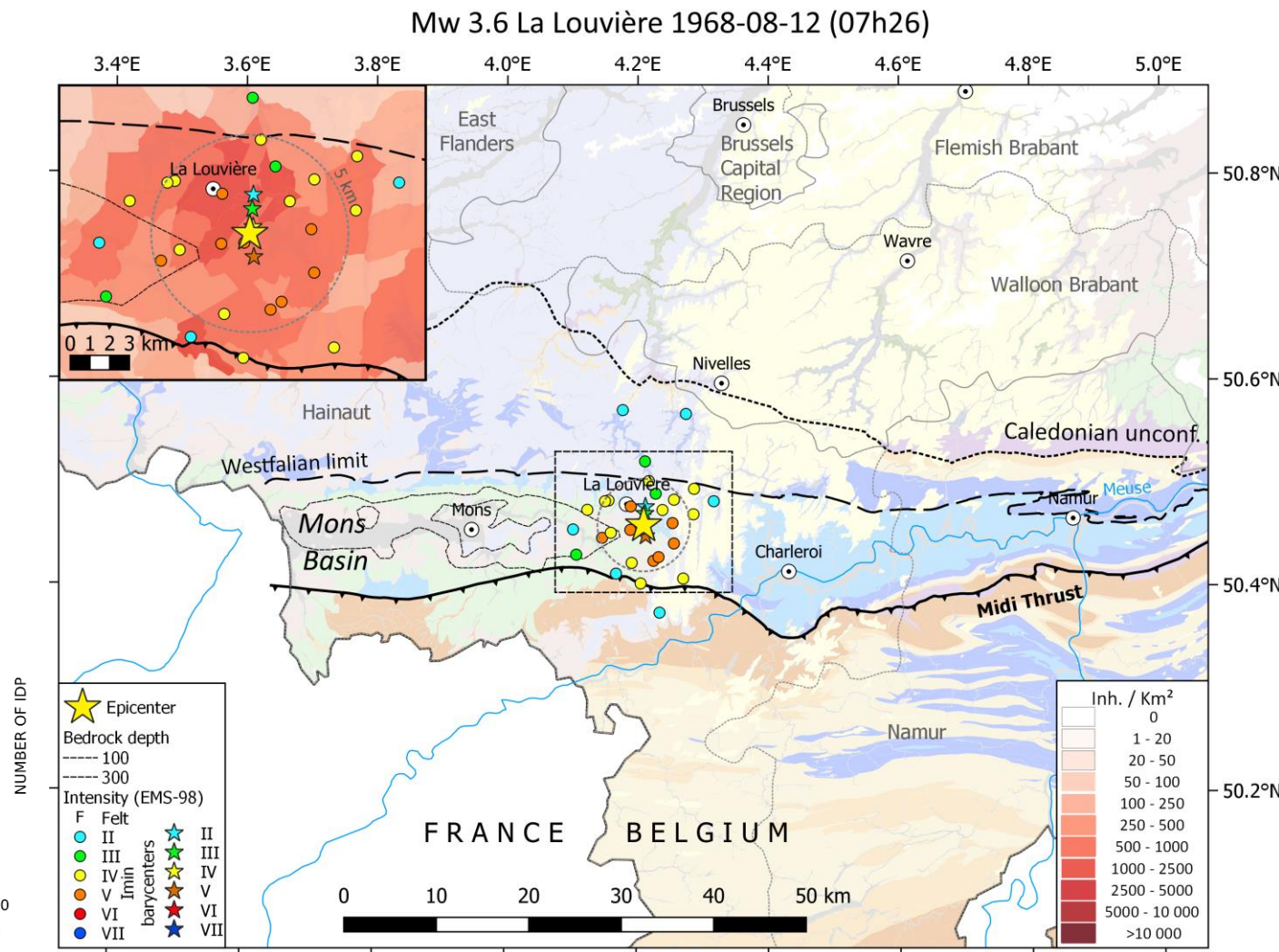
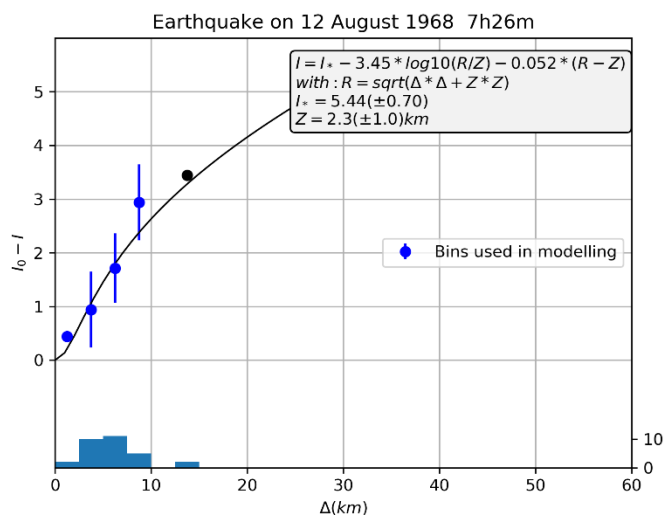


Mw 3.6 La Louvière 1968-08-12 (07h26)

Figure S22

Right) Macroseismic map of the 12 August 1968 Mw=3.6 ($M_L=3.7$) earthquake near La Louvière (nr 22 in Table S1). Maximal intensity = VII. Intensity data available in Table S2 in this Atlas.

Below) Intensity attenuation expressed as mean intensity change relative to I_0 (blue dots) calculated for bins of 2.5 km (histogram). Blue dots are used in the attenuation modelling. Vertical blue bars show intensity standard deviation for each distance bin. Modelled epicentral intensity strength (I_0) and focal depth (Z) for the event are indicated in the legend.



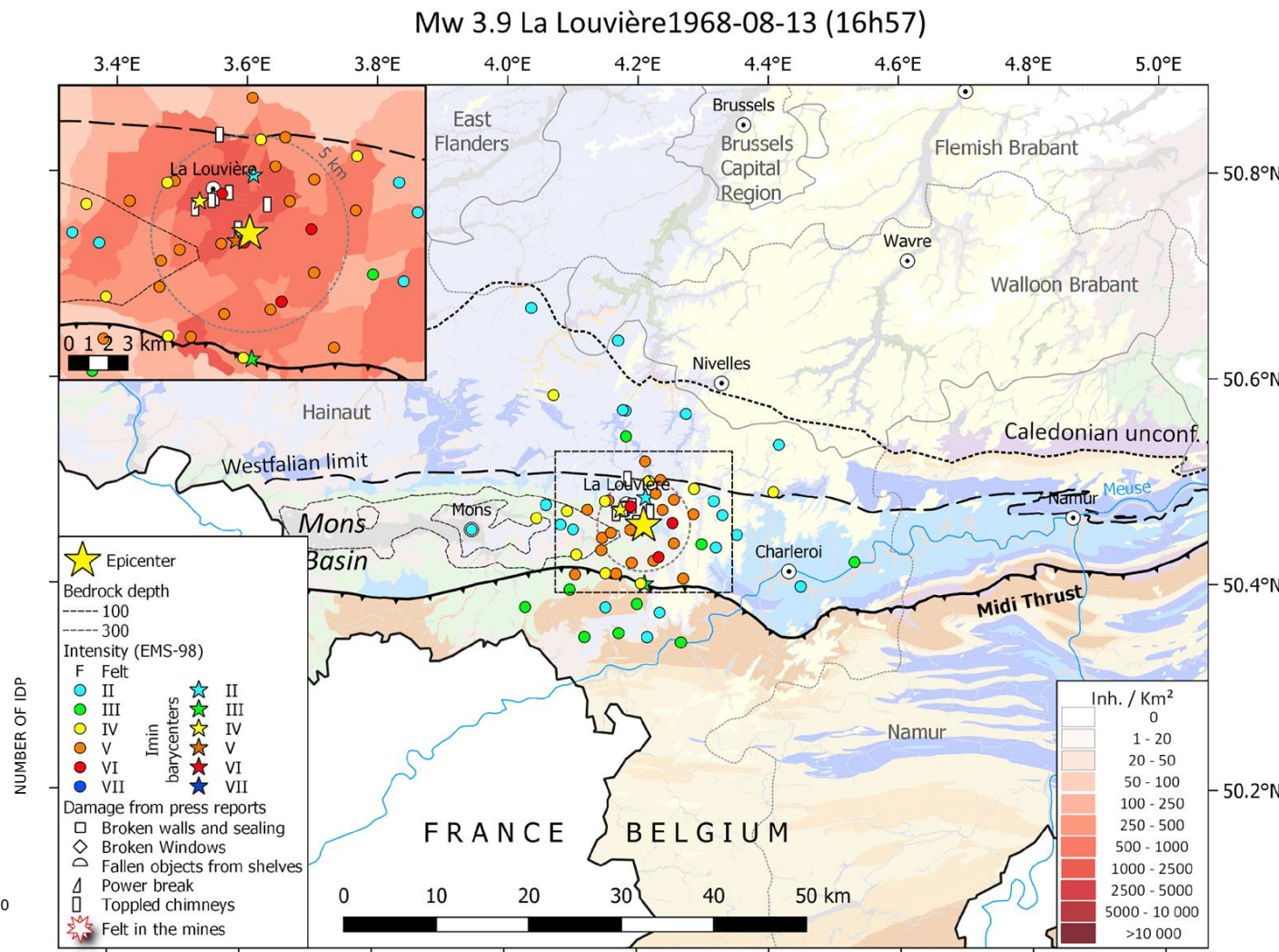
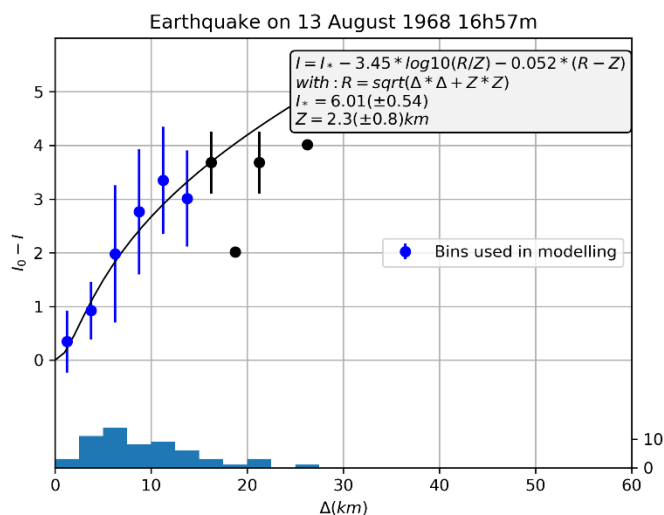
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Mw 3.9 La Louvière 1968-08-13 (16h57)

Figure S23

Right) Macroseismic map of the damaging 13 August 1968 16h53 Mw=3.9 ($M_L=4.1$) earthquake near La Louvière (nr 23 in Table S1). Maximal intensity = VII. The inset shows localities where damage has been reported in press reports. Intensity data available in Table S2 in this Atlas.

Below) Intensity attenuation expressed as mean intensity change relative to I_0 (blue dots) calculated for bins of 2.5 km (histogram). Blue dots are used in the attenuation modelling. Vertical blue bars show intensity standard deviation for each distance bin. Modelled epicentral intensity strength (I_0) and focal depth (Z) for the event are indicated in the legend.



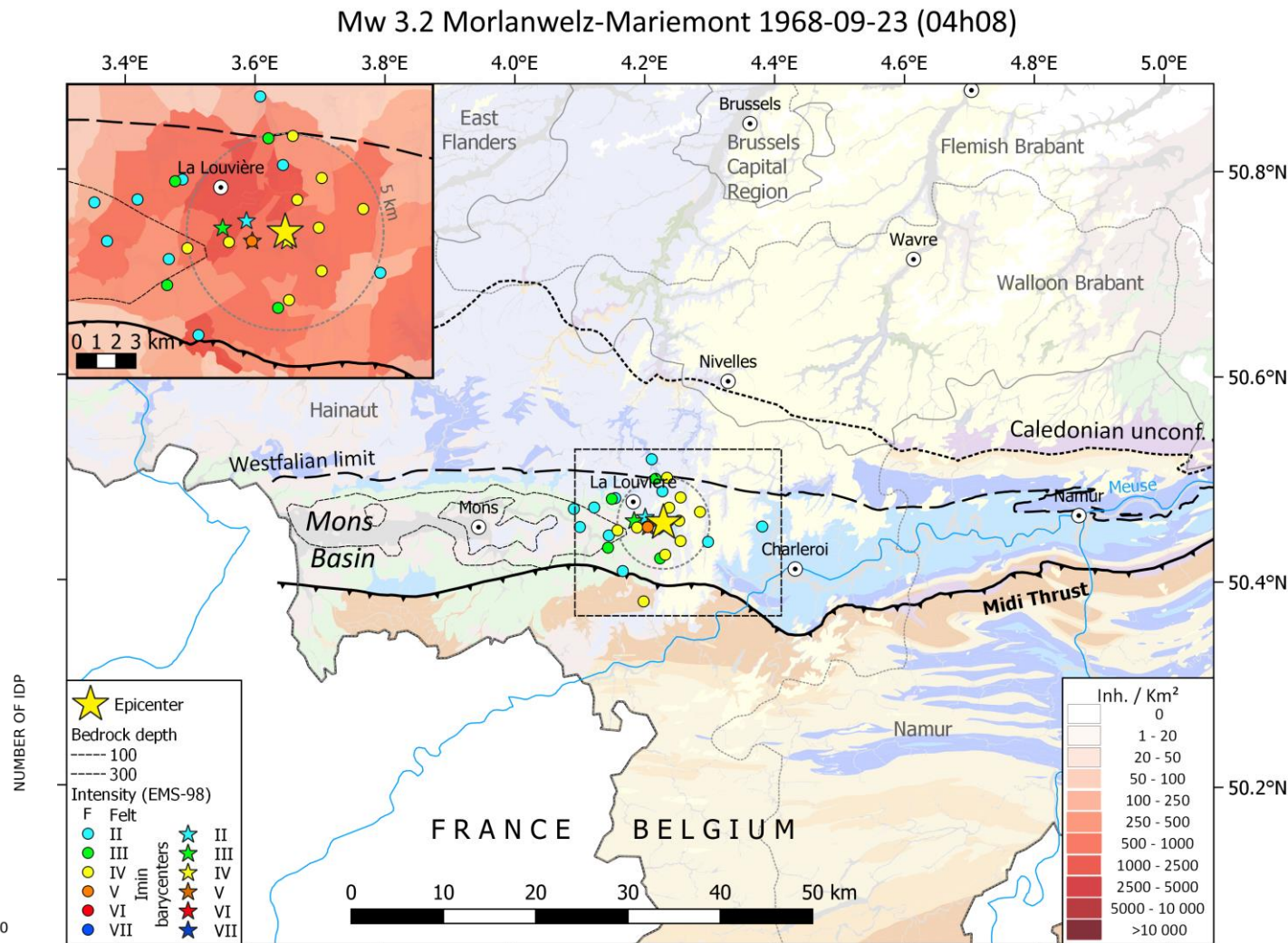
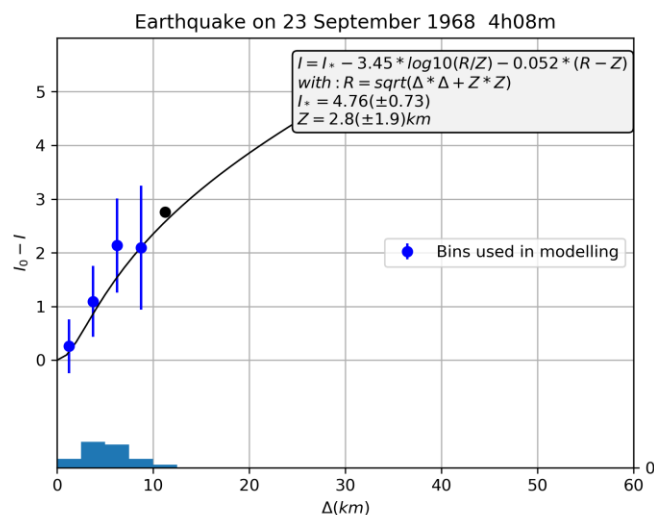
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Mw 3.2 Morlanwelz-Mariemont 1968-09-23 (04h08)

Figure S24

Right) Macroseismic map of the damaging 23 September 1968 04h08 Mw=3.2 ($M_L=3.0$) earthquake near Morlanwelz-Mariemont (nr 24 in Table S1). Maximal intensity = IV. Intensity data available in Table S2 in this Atlas.

Below) Intensity attenuation expressed as mean intensity change relative to I_0 (blue dots) calculated for bins of 2.5 km (histogram). Blue dots are used in the attenuation modelling. Vertical blue bars show intensity standard deviation for each distance bin. Modelled epicentral strength (I_0) and focal depth (Z) for the event are indicated in the legend.

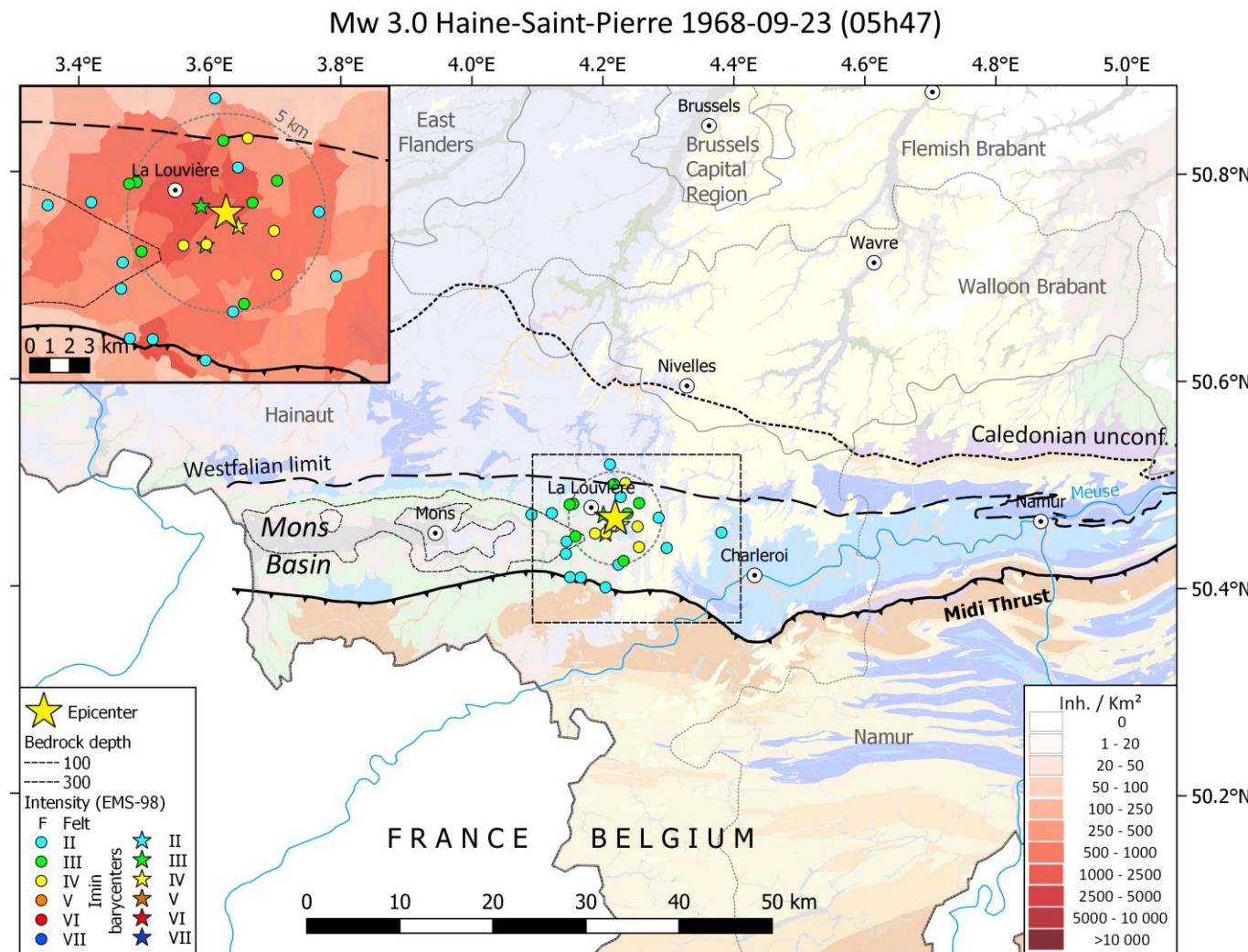


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Mw 3.0 Haine-Saint-Pierre 1968-09-23 (05h47)

Figure S25

Right) Macroseismic map of the damaging 23 September 1968 05h47 Mw=3.0 ($M_L=2.9$) earthquake near Haine-Saint-Pierre (nr 25 in Table S1). Maximal intensity = IV. Intensity data available in Table S2 in this Atlas.

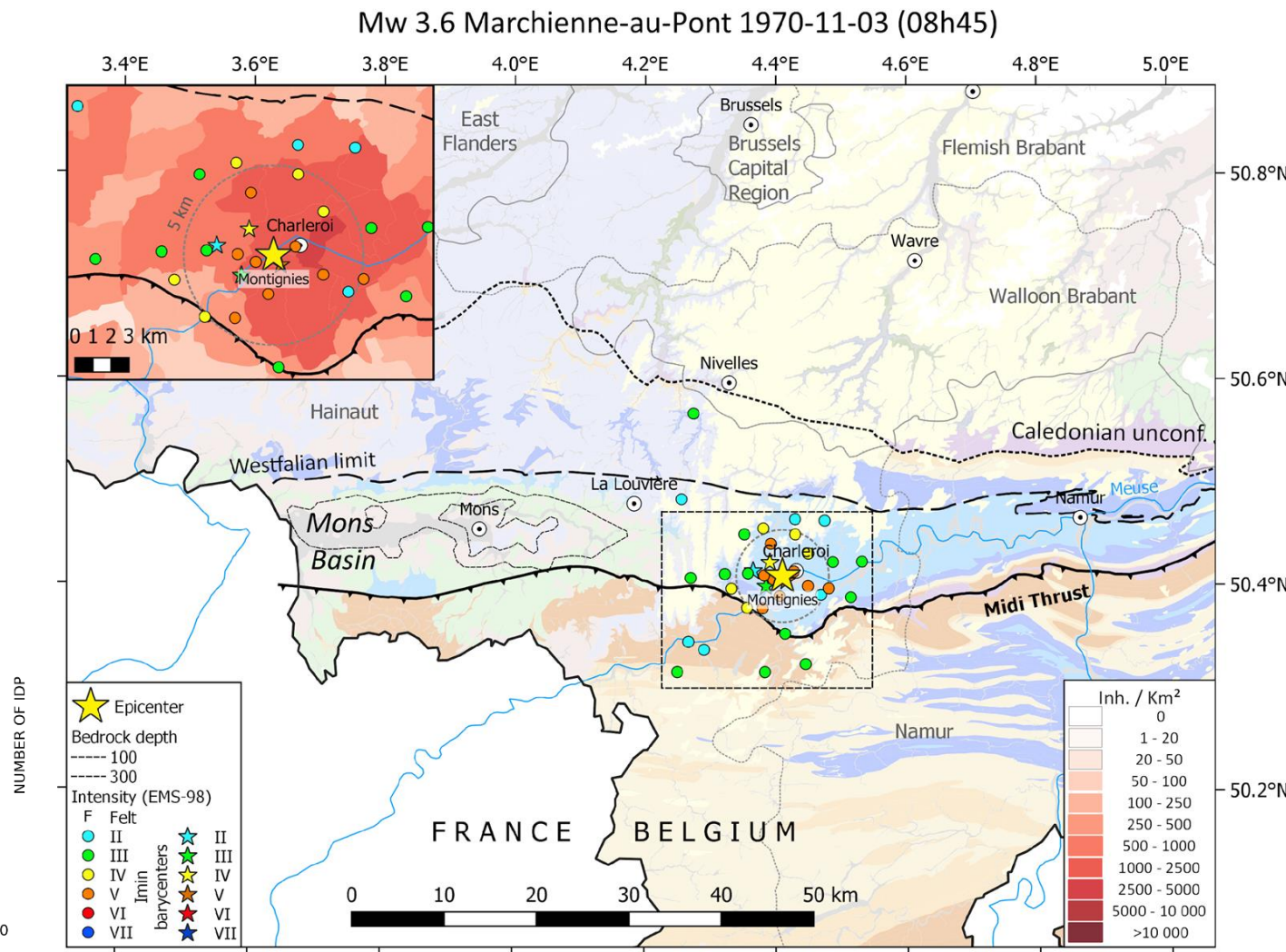
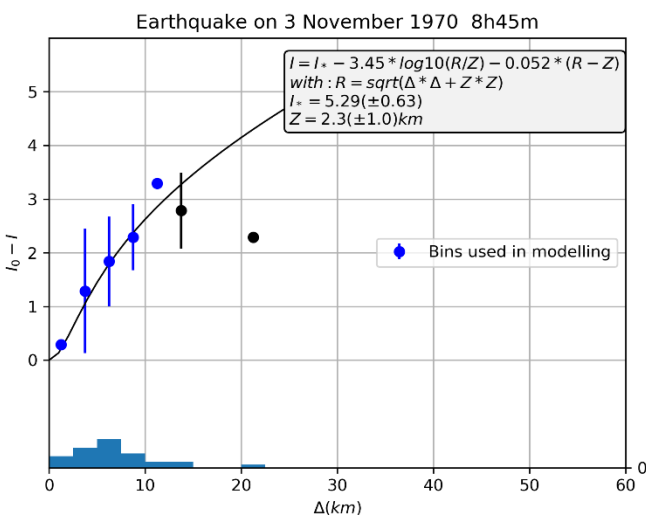


Mw 3.6 Marchienne-au-Pont 1970-11-03 (08h45)

Figure S26

Right) Macroseismic map of the damaging 3 November 1970 Mw=3.6 ($M_L=3.9$) earthquake south of Charleroi (nr 26 in Table S1). Maximal intensity = V. Intensity data available in Table S2 in this Atlas.

Below) Intensity attenuation expressed as mean intensity change relative to I_0 (blue dots) calculated for bins of 2.5 km (histogram). Blue dots are used in the attenuation modelling. Vertical blue bars show intensity standard deviation for each distance bin. Modelled epicentral intensity strength (I_0) and focal depth (Z) for the event are indicated in the legend.



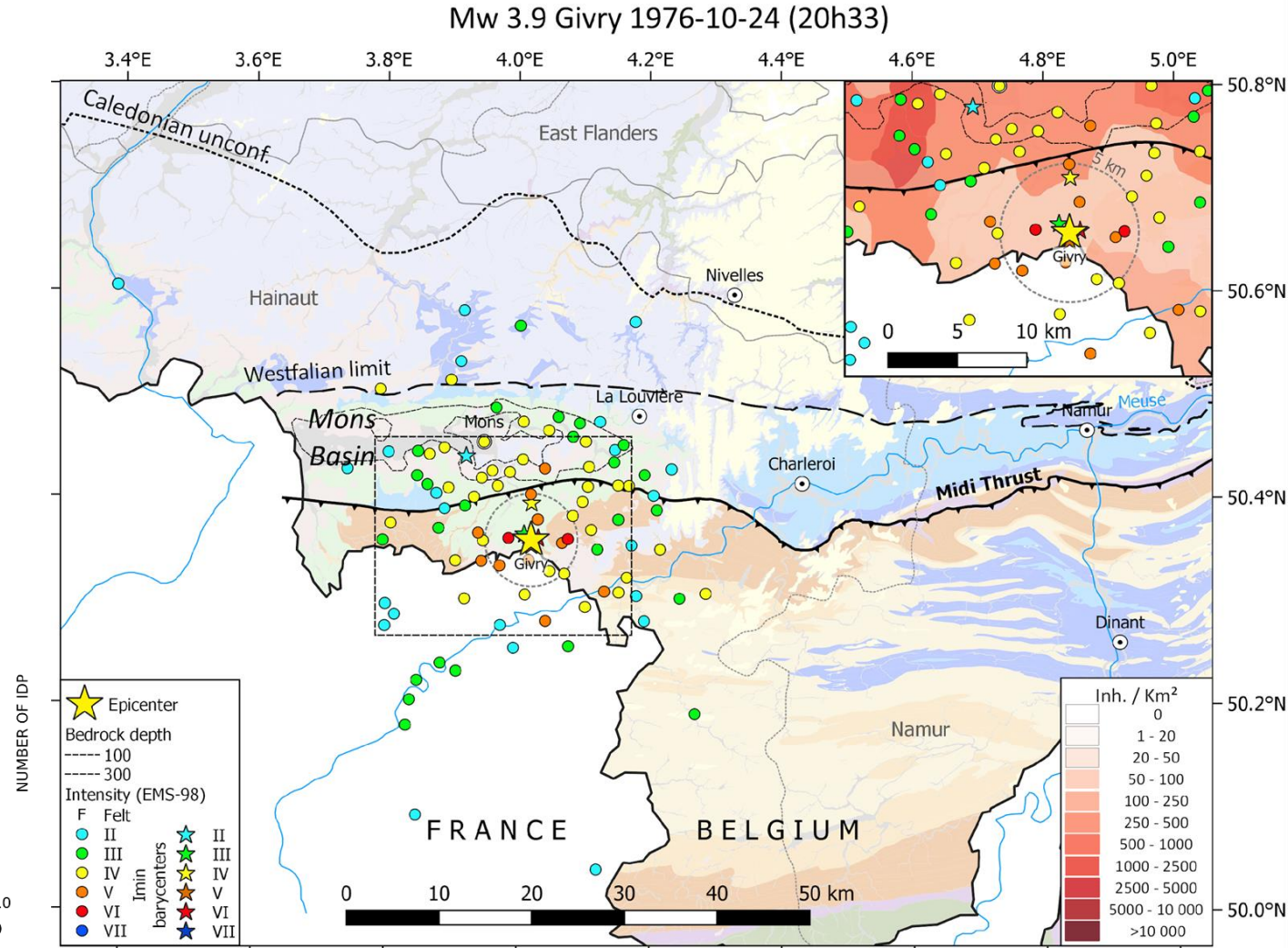
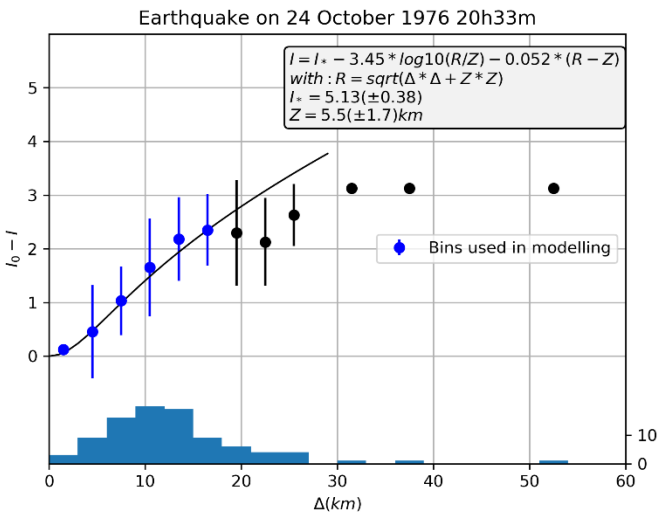
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Mw 3.9 Givry 1976-10-24 (20h33)

Figure S27

Right) Macroseismic map of the 1976 Mw=3.9 ($M_L=4.2$) Givry earthquake (nr 27 in Table S1). Because this event has been felt within the Hainaut coal mine area, intensity values are used for modelling. Maximal intensity = VI. Intensity data available in Table S2 in this Atlas.

Below) Intensity attenuation expressed as mean intensity change relative to I_0 (blue dots) calculated for bins of 2.5 km (histogram). Blue dots are used in the attenuation modelling. Vertical blue bars show intensity standard deviation for each distance bin. Modelled epicentral intensity strength (I_0) and focal depth (Z) for the event are indicated in the legend.

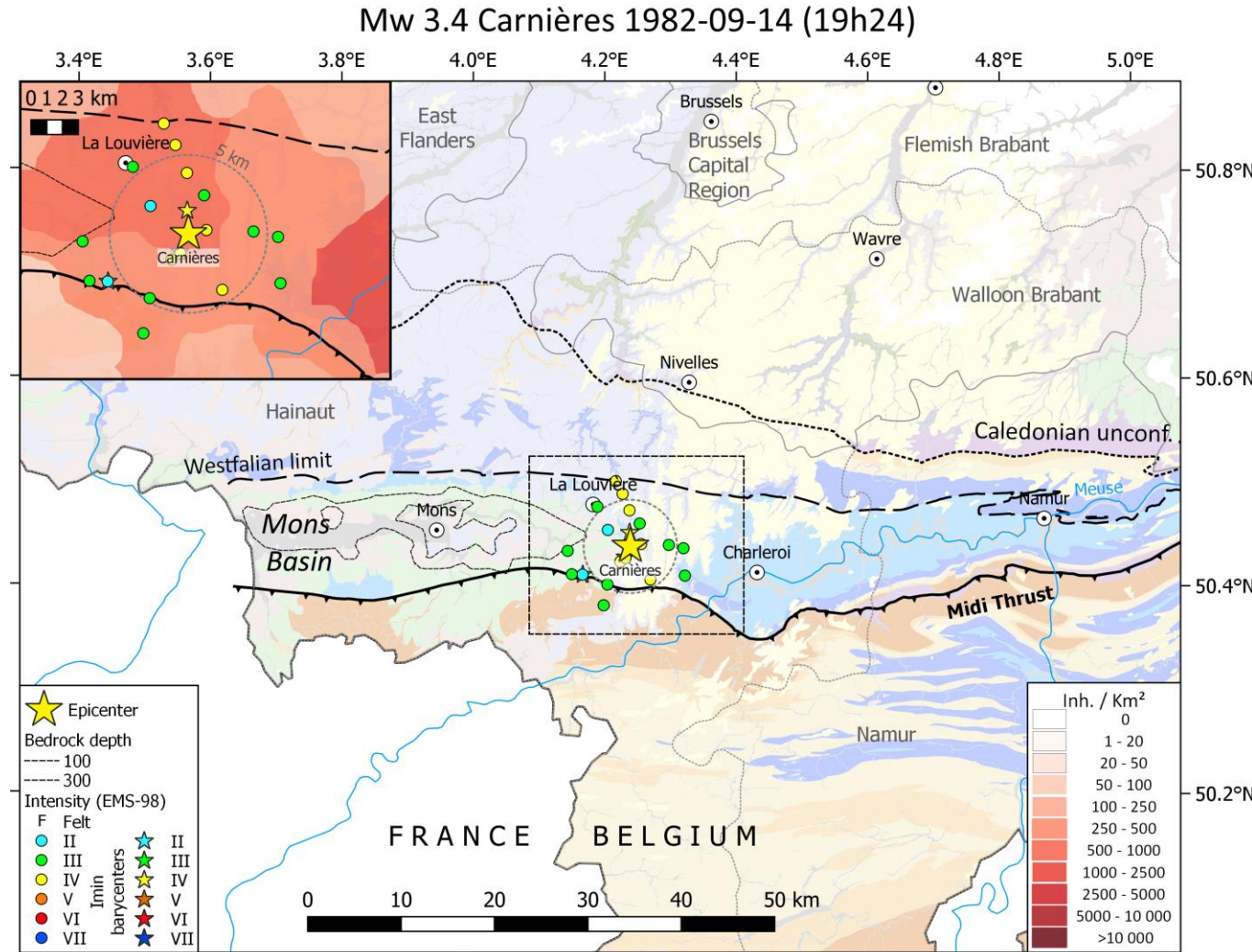


Geology in background based upon <http://www.onegeology.org/>. Reproduced with the permission of OneGeology. All rights Reserved.

Mw 3.4 Carnières 1982-09-14 (19h24)

Figure S28

Right) Macroseismic map of the 14 September 1982 Mw=3.4 ($M_L=3.4$) earthquake in Carnières (nr 28 in Table S1). Maximal intensity = IV. Intensity data available in Table S2 in this Atlas.

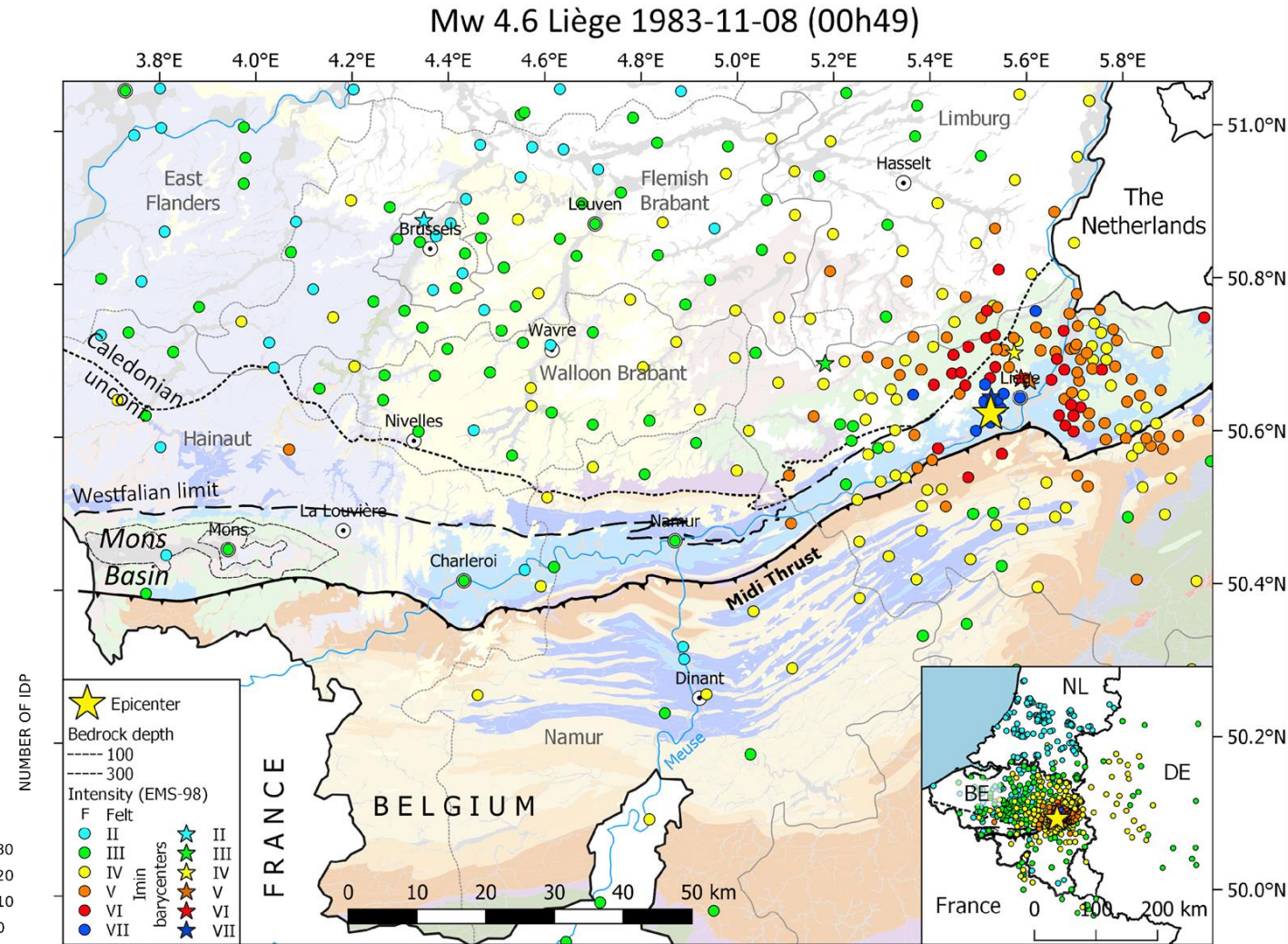
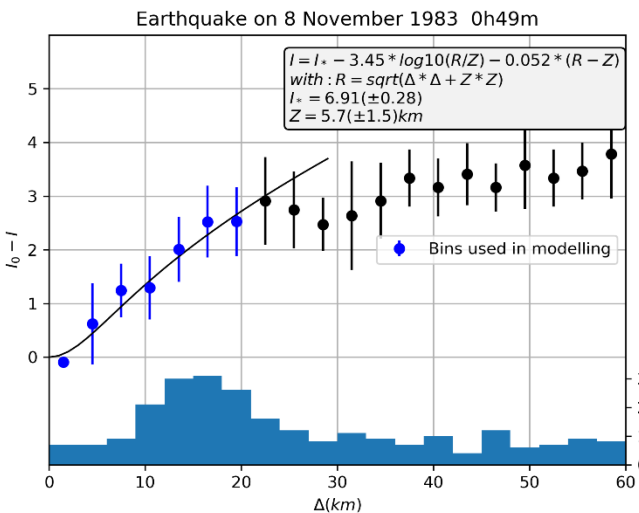


Mw 4.6 Liège 1983-11-08 (00h49)

Figure S29

Right) Macroseismic map of the locally strongly damaging 8 November 1983 Mw=4.6 ($M_L=5.0$) earthquake in Liège felt across the whole coal basin. Maximal intensity = VII. Intensity data available in Camelbeeck *et al.* 2021. *Journal of Seismology*.

Below) Intensity attenuation expressed as mean intensity change relative to I_0 (blue dots) calculated for bins of 2.5 km (histogram). Blue dots are used in the attenuation modelling. Vertical blue bars show intensity standard deviation for each distance bin. Modelled epicentral intensity strength (I_0) and focal depth (Z) for the event are indicated in the legend.



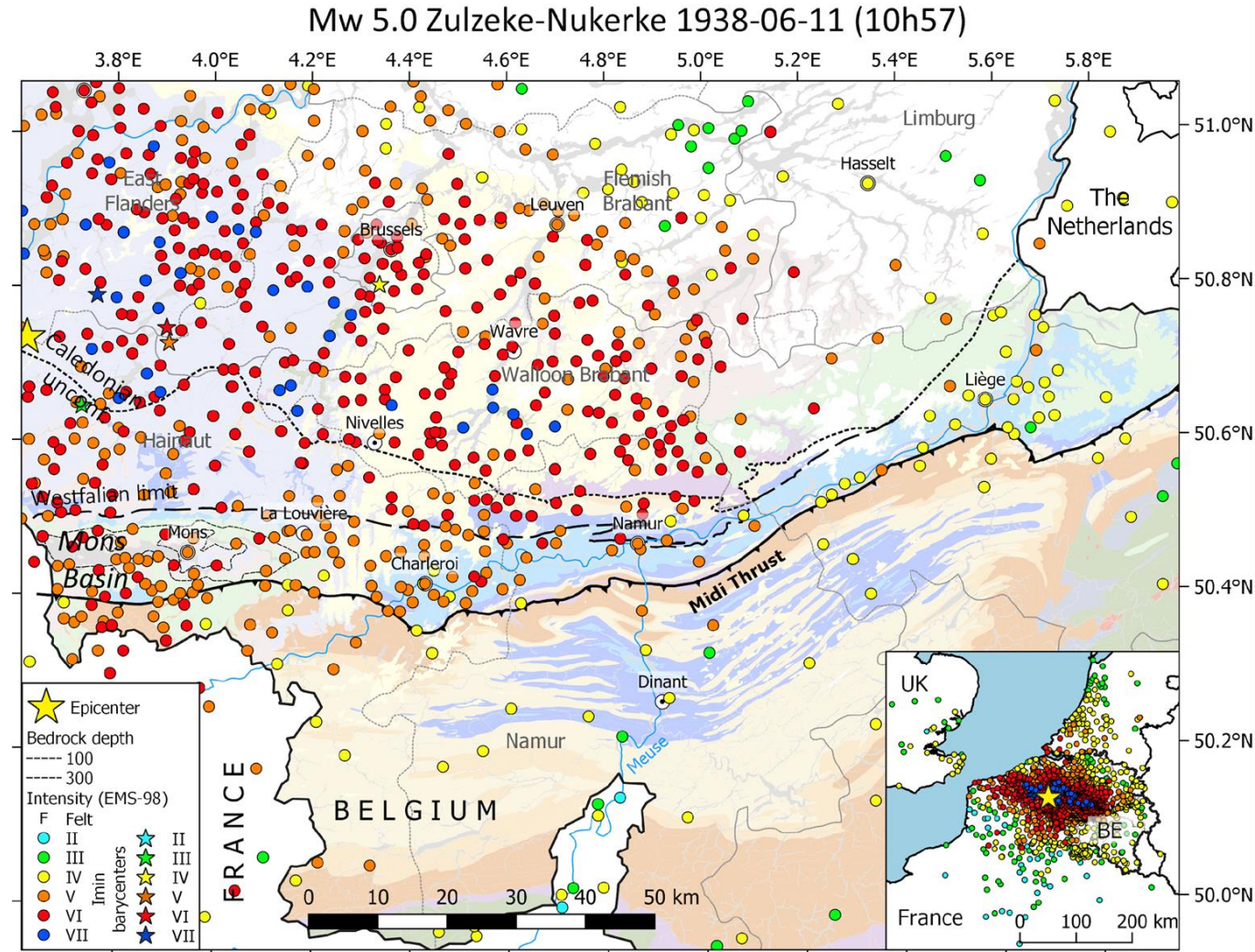
Geology in background based upon <http://www.onegeology.org/>. Reproduced with the permission of OneGeology. All rights Reserved.

Mw 5.0 Zulzeke-Nukerke 1938-06-11 (10h57)

Figure S30

Right) Macroseismic map of the strongly damaging 11 June 1938 $M_L=5.6$ earthquake in Zulzeke-Nukerke in the Brabant Massif, felt widely in whole NW Europe. This event was locally caused damage in in the whole coal basin. Maximal intensity = VII.

Intensity data of this earthquake available in Camelbeeck et al. 2021. *The 23 February 1828 Belgian earthquake: a destructive moderate event typical of the seismic activity in Western Europe.* [Journal of Seismology](#) [DOI](#)

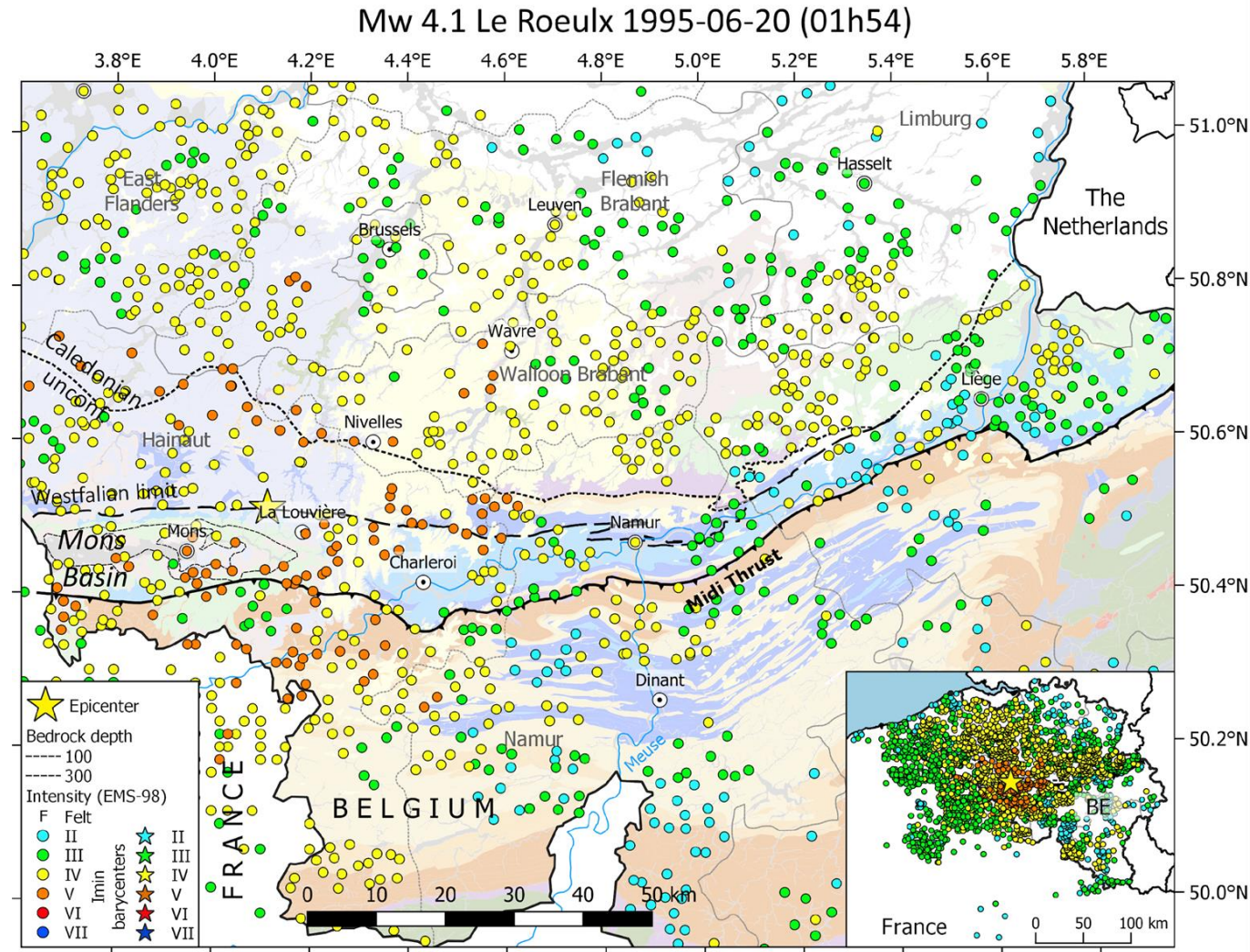


Geology in background based upon <http://www.onegeology.org/>. Reproduced with the permission of OneGeology. All rights Reserved.

Mw 4.1 Le Roeulx 1995-06-20 (01h54)

Figure S31

Right) Macroseismic map of the slightly damaging 20 June 1995 $M_L=4.5$ earthquake in Le Roeulx, felt across whole Belgium and in northern France. This event was also perceived in the whole coal basin. Maximal intensity = V.



3. Sources of macroseismic information on the Hainaut Earthquakes

(records, scientific papers, bulletins, macroseismic inquiries and press papers)

2. The official survey of the Royal Observatory of Belgium

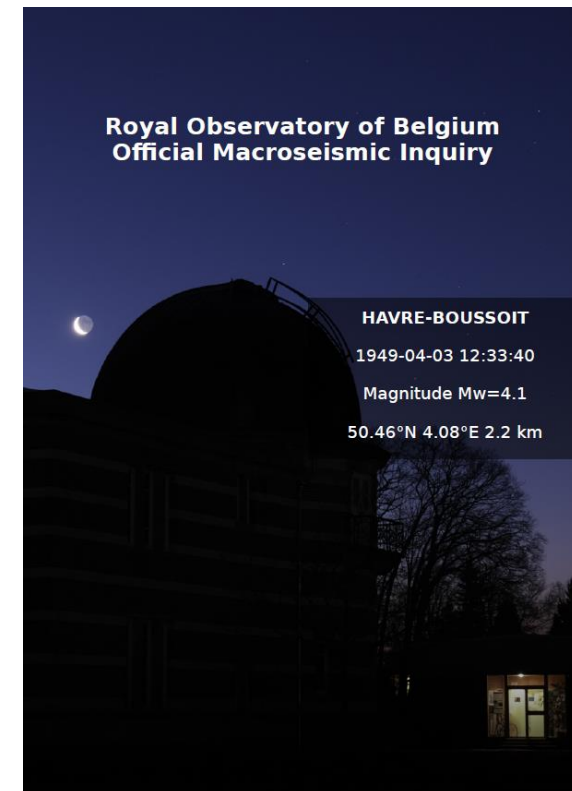
Macroseismic surveys are an indispensable tool to map earthquake's effects and have the purpose to understand their importance in function of magnitude, epicentral distance, focal depth, local geological conditions and other factors (Cecic and Musson, 2004). Since 1932, the ROB has organised a macroseismic survey whenever an earthquake is felt in Belgium. To ensure collecting information on the entire macroseismic field, surveys had to span a sufficiently large territory. For the Hainaut earthquakes, the surveys consisted of sending questionnaires to the burgomasters of Belgian communes up to 50 km from the observed macroseismic epicentres. In the case of damaging earthquakes, the survey is an important document because the Belgian authorities and insurance companies consider it to decide if damage repairing costs can be reimbursed.

Between 3 April 1949 and 9 August 1983, 19 earthquakes in the Hainaut coal area were the subject of an official ROB inquiry and 17 events are usable for intensity evaluation (*inq* in Table 1). The questionnaire form changed once after the 3 April 1949 earthquake, simplifying some of the questions. The ROB questionnaire contains specific questions from which the shaking effects on the population and the damage inventory could be summarised. The answers to different survey questions that were sent back from the burgomasters to the ROB, allowed evaluating the intensity in each locality in the EMS-98 macroseismic scale (Grünthal et al., 1998) and establishing a macroseismic map of the earthquakes (see this Atlas). In the Supplement, for each of these 17 earthquakes, an inquiry book is provided that presents an English translation of each ROB questionnaire for each locality. For each locality, the minimum (*I*_{min}) and maximum intensity (*I*_{max}) is noted on each form. The books are complemented with intensity data derived from letters sent to the ROB, from received telephone calls and intensity values determined from press reports

Gathering intensities per commune through official forms provided convincing results because municipalities in Belgium were small (mean area size of only 19 km²) and numerous (2359 communes), and returned documents that most of the time were filled in by wardens who were at that time still in close contact with the population. In 1977, however, a big community fusion took place, in which Belgium changed from 2359 to 596 communities (with mean area size of 82 km²).

After this fusion, macroseismic surveys of more recent earthquakes, such as the 14 Septembre 1982 Carnières and, 4 and 9 August 1983 Charleroi earthquakes, hence lost the quality and resolution they once had: on the one hand because these earthquakes were only slightly felt and, on the other hand, because new communities cover a too large area to be represented by only one intensity value

Example of the ROB official survey. These books are provided in the Supplement for 17 events.



3. Sources of information on the Hainaut Earthquakes (records, scientific papers, bulletins, macroseismic inquiries and press papers)

3. Press reports

At the end of the 19th century and beginning of the 20th century, local and regional press reports were a very important source of earthquake information and provided a wide news coverage, even for relatively weak events. Press reports from that time are hence very beneficial documents for seismologists to summarise an earthquake's impact (Alexandre et al., 2007; Camelbeeck et al., 2021). Although past scientific studies on individual earthquakes already included this information, press reports remain a unique source to build the intensity dataset for many events, including the damaging 3 June 1911 earthquake and foreshocks and aftershocks associated with the largest earthquakes. Therefore we did specific research in newspapers covering the Hainaut coal area for all the damaging earthquakes reported in the catalogue. As only a few copies of newspapers have been kept in the ROB seismological archives, we consulted the collections of the record-office of La Louvière and the scanned press archives of the State Archives of Belgium State Archives of Belgium (2021) to extend our information about the earthquake activity in Hainaut.

The list of consulted newspapers is presented in the following pages of this Atlas. Newspaper images shown are free of copyright according to <https://www.kbr.be/en/digitisation/digital-collections-what-about-copyrights/>

La région de Charleroi a été secouée par un tremblement de terre pendant la nuit de mercredi à jeudi.

La région de Charleroi bouge.
Dans toutes les communes situées au nord et à l'est de Charleroi, comme à Charleroi même d'ailleurs, les habitants ont ressenti, dans la nuit de jeudi à vendredi, une violente secousse qui, partout, a causé une forte panique.
Dans le fond des charbonnages, les ouvriers ont cru un moment à un accident.
Dans plusieurs maisons, les lits ont été fortement secoués et les portes, ébranlées avec vigueur, ont fait croire à une invasion de cambrioleurs.
A Marcinelle, Gilly, Gosselies, Heppignies, Viesvilles, Montignies, Châtelet, etc., les habitants se sauvèrent à la rue, dès la première secousse. Quelques minutes après, une nouvelle secousse se faisait sentir, plus faible que la première, mais accompagnée d'un grondement violent.
Enfin, vers minuit, on a perçu un troisième mouvement, extrêmement faible d'ailleurs.
C'est à Ransart que les dégâts sont les plus importants; une cinquantaine de cheminées ont été renversées; plusieurs toitures sont endommagées et de nombreuses maisons lézardées. Un train qui stationnait a été enlevé des rails.
Les régions du sud et de l'ouest n'ont absolument rien senti.
Inutile de dire que ce phénomène a causé une émotion profonde et fait l'objet de toutes les conversations.

Le Journal de Bruxelles - 3 June 1911 – on the 1 June 1911 earthquake (id 465). Scan from the State Archives of Belgium.

Un nouveau tremblement de terre

Maisons lézardées. — Cheminées renversées. — Panique

Décidément est-ce que nous serions à la veille de perdre la tranquillité que nous étions accoutumés de trouver sur notre sol ? C'est à le croire.
Un nouveau tremblement de terre s'est produit hier après-midi, à 2 heures 40, et la secousse, unique, a été extraordinairement violente.
A Charleroi, plusieurs personnes ont perçu le mouvement sismique qui a provoqué par ailleurs de grands dégâts.
A Ransart, chaussée de Gilly, la maison Lemaitre a été toute lézardée. Une bonne partie de la toiture a été démolie.
La maison voisine a eu également à souffrir de la secousse. Une quinzaine de cheminées ont été renversées.
L'une d'elles a failli écraser un ouvrier ardoisier qui travaillait à la réfection d'un toit.
A Gosselies, il n'y a presque plus une cheminée debout. Les rues sont jonchées de débris, et on doit se féliciter de ce qu'aucun passant n'ait été blessé.
Quantité de maisons sont lézardées. Les vitres brisées ne se comptent plus. Les dégâts produits par le tremblement de terre se constatent principalement du côté du quartier de la gare.
Une véritable panique s'est emparée des habitants en présence du phénomène.
Les enfants des écoles furent licenciés.
A Montigny-sur-Sambre, à 2 h. 20, la secousse s'est également fait sentir d'une façon très nette. Des meubles, des cadres ont été déplacés.
A l'Observatoire d'Uccle, les appareils sismographiques se sont très bien comportés et ils ont enregistré ces deux tremblements de terre, mais nos populations doivent se rassurer. Dans notre pays la croûte terrestre n'est pas disposée au déchirement des régions volcaniques.
Ces tremblements de terre doivent être considérés comme des faits de minime importance.

La Gazette de Charleroi – 4 June 1911 – on the 3 June 1911 earthquake (id 466). Scan from the State Archives of Belgium.

3. Sources of macroseismic information on the Hainaut Earthquakes (records, scientific papers, bulletins, macroseismic inquiries and press papers)

4. Other sources of information

Additional information comes from letters of individuals or small reports addressed by the collieries companies to the ROB at the time of the mining exploitation (Somville, 1936). The ROB also organised field missions after some earthquakes, providing reports of the observations. This was the case for the 3 April 1949 (Charlier, 1951) and 10 July 1954 events.



Field picture taken by ROB researchers when visiting 3 April 1949 epicentral area. Photo is a property of the Royal Observatory of Belgium.



Field picture taken by ROB researchers when visiting 3 April 1949 epicentral area. Photo is a property of the Royal Observatory of Belgium.

4. Sources on the Hainaut Earthquakes

(records, scientific papers, bulletins, macroseismic inquiries and press papers)

ID_EARTH	DATE	TIME	REGION	SOURCE
430	1887-02-15	00:--:--	HAVRE	de Munck, E. (1887). Les tremblements de terre de Havré. <i>Bull. de la Soc. belge de géol., de pal. et d'hydrol.</i> , t. 1, 1887, 177-184.
431	1887-09-20	06:40:--	HAVRE	de Munck, E. (1887). Les tremblements de terre de Havré. <i>Bull. de la Soc. belge de géol., de pal. et d'hydrol.</i> , t. 1, 1887, 177-184.
432	1887-09-30	09:35:--	HAVRE	de Munck, E. (1887). Les tremblements de terre de Havré. <i>Bull. de la Soc. belge de géol., de pal. et d'hydrol.</i> , t. 1, 1887, 177-184.
433	1887-10-13	21:--:--	HAVRE	de Munck, E. (1887). Les tremblements de terre de Havré. <i>Bull. de la Soc. belge de géol., de pal. et d'hydrol.</i> , t. 1, 1887, 177-184.
434	1887-10-29	21:--:--	HAVRE	de Munck, E. (1887). Les tremblements de terre de Havré. <i>Bull. de la Soc. belge de géol., de pal. et d'hydrol.</i> , t. 1, 1887, 177-184.
12875	1887-11-19	23:40:--	HAVRE	de Munck, E. (1887). Les tremblements de terre de Havré. <i>Bull. de la Soc. belge de géol., de pal. et d'hydrol.</i> , t. 1, 1887, 177-184.
12880	1887-11-27	08:30:--	HAVRE	de Munck, E. (1887). Les tremblements de terre de Havré. <i>Bull. de la Soc. belge de géol., de pal. et d'hydrol.</i> , t. 1, 1887, 177-184.
436	1895-04-16	--:--:--	OBOURG	de Munck (1995). Lettres adressée à la Soc. belge de géol., de pal. et d'hydrol., publiée dans le <i>Bull. de la Société</i> , t. 1, 1885, 63-66. Le Patriote: 1895/04/18
438	1904-04-23	16:30:--	FLEURUS	Ciel et Terre, 25, 1 mars 1904-16 février 1905, p. 115. Le Patriote: 1904/04/25 La Métropole: 1904/04/25
3534	1904-05-14	05:--:--	FLEURUS	Ciel et Terre, 25, 1 mars 1904-16 février 1905, p. 165. Le Patriote: 19/05/1904/05/19 Gazette de Charleroi: 1904/05/15 Journal de Charleroi: 1904/05/15
3535	1904-05-31	09:--:--	FLEURUS	Ciel et Terre, 25, 1 mars 1904-16 février 1905, p. 165.
447	1911-03-29	00:05:43.--	RANSART	Uccle station seismic bulletin Cambier, R. (1911). Les tremblements de terre de Ransart (Mars, Juin, Juillet 1911). <i>Annales de la Société géologique de Belgique</i> , 39, B98-B104. Le Petit Bleu du Matin: 1911/04/01 Le Peuple: 1911/04/01 Journal de Charleroi: 1911/03/31 Journal de Bruxelles: 1911/03/31
	1911-04-01	02:21:08.--	RANSART (DOUBTFUL)	Uccle station seismic bulletin [The event appears as stronger as the previous one, but is not mentioned by any newspaper]
449	1911-04-12	16:15:--	CUESMES	Cornet, J. (1911). Le tremblement de terre de Mons (12 avril 1911). <i>Annales de la Société géologique de Belgique</i> , 39, B89-B97. Le Peuple: 1911/04/14 and 1904/04/15 Le Petit Bleu du Matin: 1911/04/14 Gazette de Charleroi: 1911/04/13
465	1911-06-01	22:51:58.--	RANSART	Uccle station seismic bulletin Cambier, R. (1911). Les tremblements de terre de Ransart (Mars, Juin, Juillet 1911). <i>Annales de la Société géologique de Belgique</i> , 39, B98-B104. Somville, O. (1936). Les tremblements de terre en Belgique. Edt Imprimerie Duculot (Gembloux). <i>Observatoire Royal de Belgique</i> , 24 pages. La Meuse: 1911/06/03 Journal de Charleroi: 1911/06/01 and 1911/06/03 La Dernière Heure: 1911/06/03 Le Peuple: 1911/06/03 Journal de Bruxelles: 1911/06/03 Courrier de l'Escaut: 1911/06/04 Le Patriote: 1911/06/03
466	1911-06-03	14:35:54.--	GOSSELIES	Uccle station seismic bulletin Cambier, R. (1911). Les tremblements de terre de Ransart (Mars, Juin, Juillet 1911). <i>Annales de la Société géologique de Belgique</i> , 39, B98-B104. Journal de Charleroi: 1911/06/04 and 1911/06/07 Gazette de Charleroi: 1911/06/04 La Dernière Heure: 1911/06/04 Journal de Bruxelles: 1911/06/05

4. Sources on the Hainaut Earthquakes (records, scientific papers, bulletins, macroseismic inquiries and press papers)

ID_EARTH	DATE	TIME	REGION	SOURCE
12885	1911-06-06	03:25:--.--	RANSART	Le Patriote: 1911/06/18 La Meuse: 1911/06/16 Courrier de l'Escaut: 1911/06/17
467	1911-06-19	20:49:--.--	RANSART	Cambier, R. (1911). Les tremblements de terre de Ransart (Mars, Juin, Juillet 1911). <i>Annales de la Société géologique de Belgique</i> , 39, B98-B104. Gazette de Charleroi: 20/06/1911
468	1911-07-14	04:--:--.--	GOSSELIES	Cambier, R. (1911). Les tremblements de terre de Ransart (Mars, Juin, Juillet 1911). <i>Annales de la Société géologique de Belgique</i> , 39, B98-B104.
469	1911-07-23	05:--:--.--	RANSART	Cambier, R. (1911). Les tremblements de terre de Ransart (Mars, Juin, Juillet 1911). <i>Annales de la Société géologique de Belgique</i> , 39, B98-B104.
476	1920-01-17	03:11:04.--	HORNU	UCC seismic bulletin Capiou, H. (1920). Secousse sismique ressentie le 15 janvier dans le Borinage. <i>Annales de la Société géologique de Belgique</i> , 43, B173-B174. Somville, O. (1936). Les tremblements de terre en Belgique. Edt Imprimerie Duculot (Gembloux). <i>Observatoire Royal de Belgique</i> , 24 pages. La Dernière Heure: 1920/01/18 Le Courrier de l'Escaut: 1920/01/18 Le Peuple: 1920/01/18
488	1931-05-09	12:25:56.--	HOUDENG-AIMERIES	UCC seismic bulletin Somville, O. (1936). Les tremblements de terre en Belgique. Edt Imprimerie Duculot (Gembloux). <i>Observatoire Royal de Belgique</i> , 24 pages. Gazette de Charleroi: 1931/05/10 La Libre Belgique: 1931/05/11
489	1931-05-28	15:20:--.--	CHAPELLE-LEZ-HERLAIMONT	Somville, O. (1936). Les tremblements de terre en Belgique. Edt Imprimerie Duculot (Gembloux). <i>Observatoire Royal de Belgique</i> , 24 pages.
491	1931-07-14	20:45:--.--	JUMET	Somville, O. (1936). Les tremblements de terre en Belgique. Edt Imprimerie Duculot (Gembloux). <i>Observatoire Royal de Belgique</i> , 24 pages.
496	1933-02-11	21:25:--.--	MONS	Somville, O. (1936). Les tremblements de terre en Belgique. Edt Imprimerie Duculot (Gembloux). <i>Observatoire Royal de Belgique</i> , 24 pages.
497	1933-03-04	22:--:--.--	MONS	Somville, O. (1936). Les tremblements de terre en Belgique. Edt Imprimerie Duculot (Gembloux). <i>Observatoire Royal de Belgique</i> , 24 pages. Gazette de Charleroi: 1933/03/06 La Meuse: 1933/03/06 Vers L'Avenir: 1933/03/08
498	1933-03-05	05:28:10.--	MONS	UCC seismic bulletin Somville, O. (1936). Les tremblements de terre en Belgique. Edt Imprimerie Duculot (Gembloux). <i>Observatoire Royal de Belgique</i> , 24 pages. Gazette de Charleroi: 1933/03/06 La Meuse: 1933/03/06 Vers L'Avenir: 1933/03/08
501	1934-11-12	13:--:--.--	CUESMES	Somville, O. (1936). Les tremblements de terre en Belgique. Edt Imprimerie Duculot (Gembloux). <i>Observatoire Royal de Belgique</i> , 24 pages.
503	1935-01-14	23:44:--.--	ELOUGES	Somville, O. (1936). Les tremblements de terre en Belgique. Edt Imprimerie Duculot (Gembloux). <i>Observatoire Royal de Belgique</i> , 24 pages.
505	1936-11-05	00:41:44.--	GOUY-LEZ-PIETON	UCC seismic bulletin Somville, O. (1936). Les tremblements de terre en Belgique. Edt Imprimerie Duculot (Gembloux). <i>Observatoire Royal de Belgique</i> , 24 pages. Le Peuple: 1936/11/07 Le Soir: 1936/11/10 L'Indépendance Belge: 1936/11/07 Charlier, Ch. (1951). Etude systématique des tremblements de terre belges récents (1900-1950) – IV ^e partie. « La sismicité de la Belgique ». <i>Publications du Service Séismologique et Gravimétrique de l'Observatoire Royale de Belgique, Série S, n°10, pp 60.</i>
517	1940-01-07	16:28:52.--	LA LOUVIERE	UCC seismic bulletin La Cité Nouvelle: 1940/01/08 La Gazette de Charleroi: 1940/01/09 La Dernière Heure: 1940/01/08 Le Bien Public: 1940/01/08 Le Courrier de l'Escaut: 1940/01/08

4. Sources on the Hainaut Earthquakes

(records, scientific papers, bulletins, macroseismic inquiries and press papers)

ID_EARTH	DATE	TIME	REGION	SOURCE
518	1940-01-07	20:32:44.--	LA LOUVIERE	UCC seismic bulletin La Cité Nouvelle: 1940/01/08 La Gazette de Charleroi: 1940/01/09 La Dernière Heure: 1940/01/08
519	1940-01-09	03:42:07.--	LA LOUVIERE	UCC seismic bulletin La Dernière Heure: 1940/01/10 La Libre Belgique: 1940/01/10 Le XXème Siècle: 1940/01/10
522	1944-03-11	20:53:14.--	CUESMES	UCC seismic bulletin
523	1944-03-12	00:45:50.--	CUESMES	Charlier, Ch. (1944). Secousses séismiques ressenties en Belgique (Hainaut) en mars 1944. <i>Ciel et Terre</i> , 60, n° 4-5-6, p 1053.
524	1944-03-13	14:23:13.--	CUESMES	UCC seismic bulletin Charlier, Ch. (1944). Secousses séismiques ressenties en Belgique (Hainaut) en mars 1944. <i>Ciel et Terre</i> , 60, n° 4-5-6, p 1053.
525	1944-03-14	03:19:22.--	CUESMES	UCC seismic bulletin
526	1944-03-15	10:19:10.--	CUESMES	Charlier, Ch. (1944). Secousses séismiques ressenties en Belgique (Hainaut) en mars 1944. <i>Ciel et Terre</i> , 60, n° 4-5-6, p 1053.
527	1944-03-19	01:56:15.--	CUESMES	UCC seismic bulletin
528	1944-03-23	16:21:03.--	CUESMES	Charlier, Ch. (1944). Secousses séismiques ressenties en Belgique (Hainaut) en mars 1944 (suite). <i>Ciel et Terre</i> , 60, n° 7-8-9, p 1053-11850.
529	1944-03-29	01:00:41.--	CUESMES	UCC seismic bulletin
530	1946-03-09	19:38:01.--	HAVRE	UCC seismic bulletin
531	1948-12-25	12:06:20.--	HAVRE	recorded at the Uccle seismic station La Nation Belge: 1948/12/29 La Dernière Heure: 1948/12/29 Le Soir: 1948/12/29
532	1948-12-27	16:30:--.--	HAVRE	Le Soir: 1948/12/29
533	1949-04-03	12:27:38.--	HAVRE	recorded at the Uccle seismic station L'Indépendance: 1949/04/04 La Libre Belgique: 1949/04/04 Le Rappel: 1949/04/03 La Nouvelle Gazette (Edition du Centre): 1949/04/04 Le Soir: 1949/04/05 Le Peuple: 1949/04/05
534	1949-04-03	12:33:40.--	HAVRE-BOUSSOIT	recorded at the Uccle seismic station Official macroseismic survey of the Royal Observatory of Belgium Report of the field inquiry done by the ROB (unpublished document of 1949) Charlier, C. (1949). Les séismes de la vallée de la Haine. Publication provisoire, série S, <i>Observatoire Royal de Belgique</i> , pp 39. Marlière, R. (1951). Les tremblements de terre d'avril-mai 1949 dans la région de Mons. <i>Bull. de la Soc. belge de Géol., de Pal. et d'Hydrol.</i> , 60, 17-27. L'Indépendance: 1949/04/04-05-06 La Libre Belgique: 1949/04/04-05

4. Sources on the Hainaut Earthquakes

(records, scientific papers, bulletins, macroseismic inquiries and press papers)

ID_EARTH	DATE	TIME	REGION	SOURCE
535	1949-04-03	12:53:02.--	HAVRE	Le Rappel: 1949/04/03
				La Dernière Heure: 1949/04/04
				La Nouvelle Gazette (Edition du Centre): 1949/04/04
				Le Soir: 1949/04/05
				Le Peuple: 1949/04/05
				recorded at the Uccle seismic station
				L'Indépendance: 1949/04/04
536	1949-04-03	13:05:18.--	HAVRE	La Libre Belgique: 1949/04/04
				Le Rappel: 1949/04/03
				La Nouvelle Gazette (Edition du Centre): 1949/04/04
				Le Peuple: 1949/04/05
				recorded at the Uccle seismic station
				La Libre Belgique: 1949/04/04
				Le Rappel: 1949/04/03
12890	1949-04-03	21:30:--.--	HAVRE	La Nouvelle Gazette (Edition du Centre): 1949/04/04
12915	1949-04-03	22:30:--.--	HAVRE	L'Indépendance: 1949/04/05
12920	1949-04-04	03:40:--.--	HAVRE	L'Indépendance: 1949/04/05
12925	1949-04-06	04:--:--.--	HAVRE	L'Avenir du Luxembourg: 1949/04/08
537	1949-04-09	21:48:--.--	HAVRE	Vers L'Avenir: 1949/04/08
				Marlière, R. (1951). Les tremblements de terre d'avril-mai 1949 dans la région de Mons. <i>Bull. de la Soc. belge de Géol., de Pal. et d'Hydrol.</i> , 60, 17-27.
				Journal de Charleroi: 1949/04/15
538	1949-04-14	01:09:14.--	HAVRE-BOUSSOIT	Le Soir: 1949/04/27
				recorded at the Uccle seismic station
				Marlière, R. (1951). Les tremblements de terre d'avril-mai 1949 dans la région de Mons. <i>Bull. de la Soc. belge de Géol., de Pal. et d'Hydrol.</i> , 60, 17-27.
				Le Courrier de l'Escaut: 1949/04/16
				La Dernière Heure: 1949/04/16
				La Libre Belgique: 1949/04/15
				Journal de Charleroi: 1949/04/15
539	1949-04-14	05:12:21.--	HAVRE	L'Indépendance: 1949/04/15
				recorded at the Uccle seismic station
				Marlière, R. (1951). Les tremblements de terre d'avril-mai 1949 dans la région de Mons. <i>Bull. de la Soc. belge de Géol., de Pal. et d'Hydrol.</i> , 60, 17-27.
				Le Courrier de l'Escaut: 1949/04/16
				La Dernière Heure: 1949/04/16
				La Libre Belgique: 1949/04/15
				Journal de Charleroi: 1949/04/15
12910	1949-04-14	05:40:--.--	HAVRE	L'Indépendance: 1949/04/15
12915	1949-04-14	13:50:--.--	HAVRE	Journal de Charleroi: 1949/04/15
12920	1949-04-14	15:53:--.--	HAVRE	L'Indépendance: 1949/04/15
12925	1949-04-14	16:15:--.--	HAVRE	L'Indépendance: 1949/04/15
				Marlière, R. (1951). Les tremblements de terre d'avril-mai 1949 dans la région de Mons. <i>Bull. de la Soc. belge de Géol., de Pal. et d'Hydrol.</i> , 60, 17-27.
				L'Indépendance: 1949/04/15
				La Dernière Heure: 1949/04/16

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(records, scientific papers, bulletins, macroseismic inquiries and press papers)

ID_EARTH	DATE	TIME	REGION	SOURCE
2425	1949-05-02	16:56:03.--	HAVRE	recorded at the Uccle seismic station Marlière, R. (1951). Les tremblements de terre d'avril-mai 1949 dans la région de Mons. <i>Bull. de la Soc. belge de Géol., de Pal. et d'Hydrol.</i> , 60, 17-27. Le Soir: 1949/05/04
541	1949-05-25	18:59:44.--	HAVRE	recorded at the Uccle seismic station L'Indépendance: 1949/05/26
546	1952-04-09	21:35:--.--	LA LOUVIERE	Le Soir: 1952/04/11
547	1952-10-21	21:15:--.--	QUAREGNON	Official macroseismic survey of the Royal Observatory of Belgium Le Drapeau Rouge: 1952/10/23 Le Soir: 1952/10/24 Le Rappel: 1952/10/23
548	1952-10-22	07:--:--.--	FRAMERIES	Official macroseismic survey of the Royal Observatory of Belgium Le Drapeau Rouge: 1952/10/23 Le Soir: 1952/10/24 Le Rappel: 1952/10/23
549	1952-10-27	06:11:--.--	QUAREGNON	Official macroseismic survey of the Royal Observatory of Belgium Le Drapeau Rouge: 1952/10/28 Le Soir: 1952/10/28 Le Rappel: 1952/10/28
12930	1953-05-21	02:--:--.--	BOUSSOIT	Letter of the town secretary to the Royal Observatory of Belgium (16 June 1953)
553	1953-06-11	00:22:21.--	BOUSSOIT	UCC seismic bulletin Letter of the town secretary to the Royal Observatory of Belgium (16 June 1953)
12935	1953-06-14	01:25:--.--	BOUSSOIT	Letter of the town secretary to the Royal Observatory of Belgium (16 June 1953)
557	1953-09-15	23:55:--.--	QUAREGNON	Official macroseismic survey of the Royal Observatory of Belgium [only the locality of Quaregnon]
561	1954-04-05	20:26:43.--	QUAREGNON	UCC seismic bulletin Belgian report to International Union of Geodesy and Geophysics [period 1954-1956]
562	1954-07-10	17:18:21.--	FLENU	UCC seismic bulletin Belgian report to International Union of Geodesy and Geophysics [period 1954-1956] Official macroseismic survey of the Royal Observatory of Belgium Le Soir: 1954/07/12
12940	1954-07-11	04:--:--.--	QUAREGNON	Le Soir: 1954/07/12
563	1955-02-14	02:10:--.--	BOUSSU	Belgian report to International Union of Geodesy and Geophysics [period 1954-1956] Official macroseismic survey of the Royal Observatory of Belgium [Only the locality of Boussu]
564	1955-05-12	20:--:--.--	BOUSSU	Belgian report to International Union of Geodesy and Geophysics [period 1954-1956] Official macroseismic survey of the Royal Observatory of Belgium [Only the locality of Boussu]
565	1955-05-17	18:--:--.--	BOUSSU	Belgian report to International Union of Geodesy and Geophysics [period 1954-1956] Official macroseismic survey of the Royal Observatory of Belgium [Only the locality of Boussu]
566	1955-05-18	04:50:--.--	BOUSSU	Belgian report to International Union of Geodesy and Geophysics [period 1954-1956] Official macroseismic survey of the Royal Observatory of Belgium [Only the locality of Boussu]
570	1956-06-24	04:20:--.--	BOUSSU	Letter of a correspondent living in Boussu (3 July 1956) Belgian report to International Union of Geodesy and Geophysics [period 1954-1956]
12945	1956-06-25	02:15:--.--	BOUSSU	Letter of a correspondent living in Boussu (3 July 1956) Belgian report to International Union of Geodesy and Geophysics [period 1954-1956]

4. Sources on the Hainaut Earthquakes

(records, scientific papers, bulletins, macroseismic inquiries and press papers)

ID_EARTH	DATE	TIME	REGION	SOURCE
571	1956-07-01	21:55:--	BOUSSU	Letter of a correspondent living in Boussu (3 July 1956)
573	1957-01-08	16:12:--	BOUSSU	Belgian report to International Union of Geodesy and Geophysics [period 1957-1960]
574	1957-01-21	11:00:--	MONTIGNIES LE TILLEUL	Belgian report to International Union of Geodesy and Geophysics [period 1957-1960]
576	1957-11-21	15:17:--	LA LOUVIERE	Belgian report to International Union of Geodesy and Geophysics [period 1957-1960] Le Soir: 1957/11/22
13045	1957-11-21	15:41:--	LA LOUVIERE	Le Soir: 1957/11/22
577	1958-05-30	14:45:--	HAVRE	Belgian report to International Union of Geodesy and Geophysics [period 1954-1956]
582	1965-12-15	12:07:14.9	STREPY-BRACQUEGNIES	seismic bulletin of UCC, DOU and WRM Official macroseismic survey of the Royal Observatory of Belgium Van Gils, J.-M. (1966). Les séismes des 15 et 21 décembre 1965 et du 16 janvier 1966. <i>Ciel et Terre</i> , 82, 243-267. Ahorner, L. (1972). Erdbebenchronik für die Rheinlande 1964-70. Decheniana, 125, Heft ½, 259-283. L'Indépendance (Edition du Centre): 1965/12/16 La Dernière Heure: 1965/12/16 La Libre Belgique: 1965/12/16 La Meuse - La Lanterne: 1965/12/16 La Nouvelle Gazette (Edition du Centre): 1965/12/16 Le Peuple: 965/12/16-17
583	1965-12-15	13:42:01.5	STREPY-BRACQUEGNIES	seismic bulletin of UCC, DOU and WRM Van Gils, J.-M. (1966). Les séismes des 15 et 21 décembre 1965 et du 16 janvier 1966. <i>Ciel et Terre</i> , 82, 243-267. La Nouvelle Gazette (Edition du Centre): 1965/12/16
584	1965-12-15	14:02:14.1	STREPY-BRACQUEGNIES	seismic bulletin of UCC, DOU and WRM Van Gils, J.-M. (1966). Les séismes des 15 et 21 décembre 1965 et du 16 janvier 1966. <i>Ciel et Terre</i> , 82, 243-267. La Meuse - La Lanterne: 1965/12/16 La Nouvelle Gazette (Edition du Centre): 1965/12/16 Le Peuple: 965/12/16
585	1965-12-15	15:16:36.1	STREPY-BRACQUEGNIES	seismic bulletin of UCC, DOU and WRM Van Gils, J.-M. (1966). Les séismes des 15 et 21 décembre 1965 et du 16 janvier 1966. <i>Ciel et Terre</i> , 82, 243-267. La Nouvelle Gazette (Edition du Centre): 1965/12/16
587	1966-01-16	00:13:18.7	MORLANWELZ-MARIEMONT	seismic bulletin of UCC and DOU Official macroseismic survey of the Royal Observatory of Belgium Van Gils, J.-M. (1966). Les séismes des 15 et 21 décembre 1965 et du 16 janvier 1966. <i>Ciel et Terre</i> , 82, 243-267. Ahorner, L. (1972). Erdbebenchronik für die Rheinlande 1964-70. Decheniana, 125, Heft ½, 259-283. La Cité: 1966/01/17 La Dernière Heure: 1966/01/17 La Libre Belgique: 1966/01/17 La Nouvelle Gazette (Edition du Centre):1966/01/17 Le Peuple: 1966/01/17 L'Indépendance (Edition du Centre):1966/01/17 Le Rappel: 1966/01/17 Le Soir: 1966/01/17

4. Sources on the Hainaut Earthquakes

(records, scientific papers, bulletins, macroseismic inquiries and press papers)

ID_EARTH	DATE	TIME	REGION	SOURCE
588	1966-01-16	06:51:34.5	MORLANWELZ-MARIEMONT	seismic bulletin of UCC and DOU Official macroseismic survey of the Royal Observatory of Belgium Van Gils, J.-M. (1966). Les séismes des 15 et 21 décembre 1965 et du 16 janvier 1966. <i>Ciel et Terre</i> , 82, 243-267. Ahorner, L. (1972). Erdbebenchronik für die Rheinlande 1964-70. Decheniana, 125, Heft ½, 259-283. La Cité: 1966/01/17 La Dernière Heure: 1966/01/17 La Libre Belgique: 1966/01/17 La Nouvelle Gazette (Edition du Centre):1966/01/17 Le Peuple: 1966/01/17 L'Indépendance (Edition du Centre):1966/01/17 Le Rappel: 1966/01/17 Le Soir: 1966/01/17
589	1966-01-16	12:32:50.3	MORLANWELZ-MARIEMONT	seismic bulletin of UCC and DOU Official macroseismic survey of the Royal Observatory of Belgium Van Gils, J.-M. (1966). Les séismes des 15 et 21 décembre 1965 et du 16 janvier 1966. <i>Ciel et Terre</i> , 82, 243-267. Ahorner, L. (1972). Erdbebenchronik für die Rheinlande 1964-70. Decheniana, 125, Heft ½, 259-283. La Cité: 1966/01/17 La Dernière Heure: 1966/01/17 La Libre Belgique: 1966/01/17 La Nouvelle Gazette (Edition du Centre):1966/01/17 Le Peuple: 1966/01/17 L'Indépendance (Edition du Centre):1966/01/17 Le Rappel: 1966/01/17 Le Soir: 1966/01/17
13050	1966-01-17	17:04:21.5	MORLANWELZ-MARIEMONT	seismic bulletin of UCC and DOU Van Gils, J.-M. (1966). Les séismes des 15 et 21 décembre 1965 et du 16 janvier 1966. <i>Ciel et Terre</i> , 82, 243-267. L'Indépendance: 1966/01/18
13055	1966-01-17	20:28:59.3	MORLANWELZ-MARIEMONT	seismic bulletin of UCC and DOU Van Gils, J.-M. (1966). Les séismes des 15 et 21 décembre 1965 et du 16 janvier 1966. <i>Ciel et Terre</i> , 82, 243-267. L'Indépendance: 1966/01/18
590	1966-01-24	22:13:20.7	MORLANWELZ-MARIEMONT	seismic bulletin of UCC and DOU Van Gils, J.-M. (1966). Les séismes des 15 et 21 décembre 1965 et du 16 janvier 1966. <i>Ciel et Terre</i> , 82, 243-267. Ahorner, L. (1972). Erdbebenchronik für die Rheinlande 1964-70. Decheniana, 125, Heft ½, 259-283.
591	1966-01-26	01:08:44.3	MORLANWELZ-MARIEMONT	Van Gils, J.-M. (1966). Les séismes des 15 et 21 décembre 1965 et du 16 janvier 1966. <i>Ciel et Terre</i> , 82, 243-267.
13060	1966-03-02	06:50:48.--	MORLANWELZ-MARIEMONT	seismic bulletin of UCC and DOU Van Gils, J.-M. (1966). Les séismes des 15 et 21 décembre 1965 et du 16 janvier 1966. <i>Ciel et Terre</i> , 82, 243-267. Ahorner, L. (1972). Erdbebenchronik für die Rheinlande 1964-70. Decheniana, 125, Heft ½, 259-283.
592	1966-03-11	04:09:30.3	MORLANWELZ-MARIEMONT	seismic bulletin of UCC, DOU and WRM Van Gils, J.-M. (1966). Les séismes des 15 et 21 décembre 1965 et du 16 janvier 1966. <i>Ciel et Terre</i> , 82, 243-267.
593	1966-03-16	01:21:30.6	MORLANWELZ-MARIEMONT	seismic bulletin of UCC, DOU and WRM
594	1966-03-17	18:17:08.3	MORLANWELZ-MARIEMONT	seismic bulletin of UCC and DOU
595	1966-03-20	00:08:14.7	TRAZEGNIES	seismic bulletin of UCC, DOU and WRM
596	1966-03-22	00:20:32.5	TRAZEGNIES	seismic bulletin of UCC and DOU

4. Sources on the Hainaut Earthquakes

(records, scientific papers, bulletins, macroseismic inquiries and press papers)

ID_EARTH	DATE	TIME	REGION	SOURCE
597	1967-03-28	15:49:25.1	CARNIERES	seismic bulletin of UCC, DOU, WRM and LUX Official macroseismic survey of the Royal Observatory of Belgium Ahorner, L. (1972). Erdbebenchronik für die Rheinlande 1964-70. Decheniana, 125, Heft ½, 259-283. La Nouvelle Gazette: 1967/03/29
598	1967-04-04	11:16:26.2	CARNIERES	seismic bulletin of UCC and DOU
599	1967-04-04	18:04:44.1	CARNIERES	seismic bulletin of UCC and DOU La Nouvelle Gazette: 1967/04/05
600	1967-04-08	13:02:05.8	CARNIERES	seismic bulletin of UCC and DOU
601	1967-04-09	04:53:48.6	CARNIERES	seismic bulletin of UCC and DOU
602	1967-04-14	14:27:41.1	CARNIERES	seismic bulletin of UCC and DOU
603	1968-08-12	07:26:41.1	LA LOUVIERE	seismic bulletin of UCC, DOU and LUX Official macroseismic survey of the Royal Observatory of Belgium Ahorner, L. (1972). Erdbebenchronik für die Rheinlande 1964-70. Decheniana, 125, Heft ½, 259-283. L'Indépendance (Edition du Centre): 1968/08/13 Le Peuple: 1968/08/13
604	1968-08-13	16:17:28.0	LA LOUVIERE	seismic bulletin of UCC, DOU and LUX L'Indépendance (Edition du Centre): 1968/08/14-15 La Nouvelle Gazette: 1968/08/16
605	1968-08-13	16:40:40.9	LA LOUVIERE	seismic bulletin of UCC, DOU and LUX Ahorner, L. (1972). Erdbebenchronik für die Rheinlande 1964-70. Decheniana, 125, Heft ½, 259-283.
606	1968-08-13	16:57:14.0	LA LOUVIERE	seismic bulletin of UCC, DOU and LUX Official macroseismic survey of the Royal Observatory of Belgium Ahorner, L. (1972). Erdbebenchronik für die Rheinlande 1964-70. Decheniana, 125, Heft ½, 259-283. L'Indépendance (Edition du Centre): 1968/08/14-15-16-19 La Nouvelle Gazette: 1968/08/14-15-16-20-21 Lettre du service incendie de la ville de La Louvière pour le bourgmestre de La Louvière, 20/08/1968 Facture du 13/12/1968 de l'entreprise de bâtiments Charles Yernaux à la Louvière
13065	1968-08-13	19:21:11.2	LA LOUVIERE	seismic bulletin of UCC, DOU and LUX
607	1968-09-23	04:08:12.6	MORLANWELZ-MARIEMONT	seismic bulletin of UCC, DOU, WRM and LUX Official macroseismic survey of the Royal Observatory of Belgium Ahorner, L. (1972). Erdbebenchronik für die Rheinlande 1964-70. Decheniana, 125, Heft ½, 259-283.
608	1968-09-23	05:47:16.0	HAINÉ-SAINT-PIERRE	seismic bulletin of UCC, DOU, WRM and LUX Official macroseismic survey of the Royal Observatory of Belgium
611	1970-01-16	23:34:59.1	FONTAINE-L'EVEQUE	seismic bulletin of stations UCC, DOU, WRM, LUX and GIP Ahorner, L. (1972). Erdbebenchronik für die Rheinlande 1964-70. Decheniana, 125, Heft ½, 259-283.
612	1970-11-03	08:45:59.6	MARCHIENNE-AU-PONT	seismic bulletin of stations UCC, DOU and LUX Official macroseismic survey of the Royal Observatory of Belgium
613	1970-11-03	12:07:33.4	MARCHIENNE-AU-PONT	seismic bulletin of stations UCC and DOU seismic bulletin of stations UCC, DOU and LUX
614	1970-12-20	13:48:34.1	LA LOUVIERE	seismic bulletin of stations UCC and DOU
627	1976-10-24	20:33:28.2	GIVRY	seismic bulletin of stations UCC and DOU Official macroseismic survey of the Royal Observatory of Belgium

4. Sources on the Hainaut Earthquakes

(records, scientific papers, bulletins, macroseismic inquiries and press papers)

ID_EARTH	DATE	TIME	REGION	SOURCE
641	1982-09-14	19:24:34.7	CARNIERES	seismic bulletin of stations UCC, DOU and MEM Official macroseismic survey of the Royal Observatory of Belgium
642	1982-09-14	19:29:09.5	CARNIERES	seismic bulletin of stations UCC, DOU and MEM
648	1983-08-04	07:08:26.3	CHARLEROI	seismic bulletin of stations UCC, DOU and MEM Official macroseismic survey of the Royal Observatory of Belgium
649	1983-08-09	01:32:36.8	CHARLEROI	seismic bulletin of stations UCC, DOU and MEM Official macroseismic survey of the Royal Observatory of Belgium