Appendix A. Supplementary data to:

‘Seismic sources and stress transfer interaction among axial normal faults and external thrust fronts in the Northern Apennines (Italy):
A working hypothesis based on the 1916-1920 time-space cluster of earthquakes’

Marco Bonini[1, *], Giacomo Corti[1], Dario Delle Donne[2], Federico Sani[3],
Luigi Piccardi[1], Gianfranco Vannucci[4], Riccardo Genco[3], Luca Martelli[5], Maurizio Ripepe[3]

[1]CNR, Consiglio Nazionale delle Ricerche, Istituto di Geoscienze e Georisorse, UOS Firenze, Via G. La Pira, 4, 50121 Firenze, Italy
[2]Dipartimento di Scienze della Terra e del Mare (DiSTeM), Università degli Studi di Palermo, Via Archirafi, 36, 90123 Palermo, Italy
[3]Dipartimento di Scienze della Terra, Università degli Studi di Firenze, Via G. La Pira, 4, 50121 Firenze, Italy
[4]INGV, Istituto Nazionale di Geofisica e Vulcanologia, Via D. Creti, 12, 40128 Bologna, Italy
[5]Regione Emilia-Romagna, Servizio Geologico, Sismico e dei Suoli, Viale A. Silvani 4/3, 40122 Bologna, Italy

Figures S1-S2

Tables S1-S6

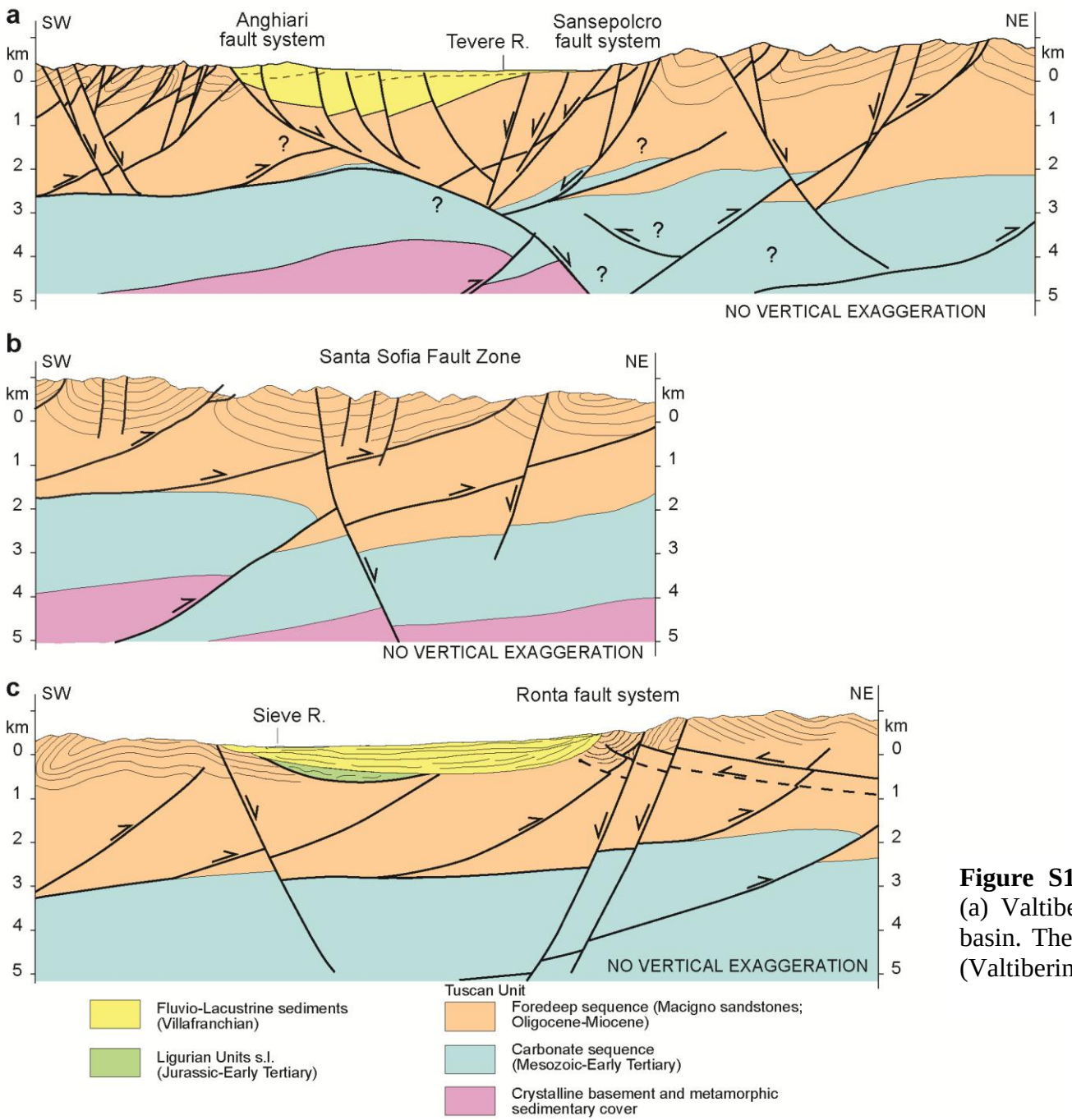

Figure S1. Schematic geological cross sections through the (a) Valtiberina basin, (b) Romagna, and (c) the Mugello basin. The trace of the cross-sections is indicated in Fig.3 (Valtiberina), Fig. 4a (Romagna), and Fig. 5a (Mugello).

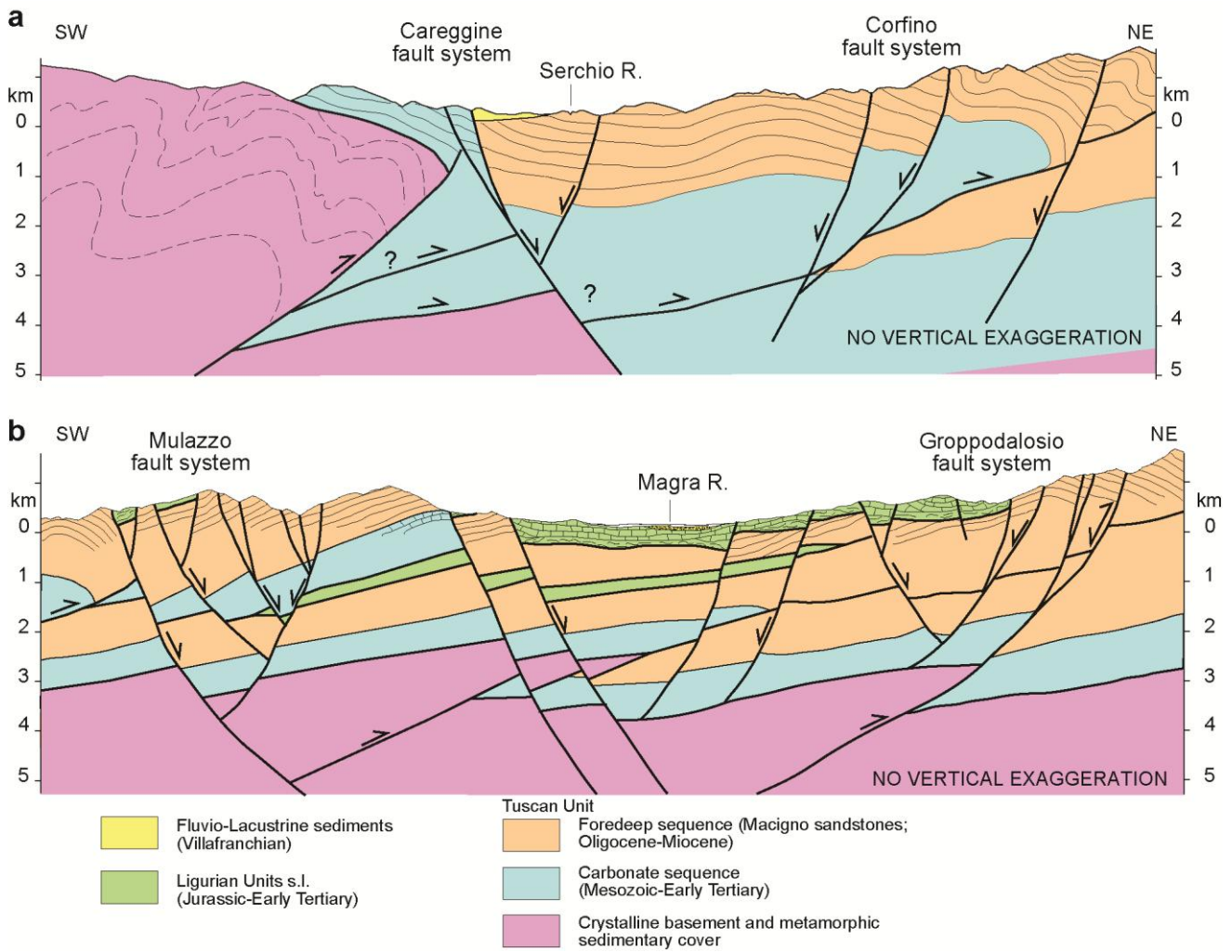

Figure S2. Schematic geological cross sections through the (a) Garfagnana basin, and (b) the Lunigiana basin (modified from Bernini and Papani, 2002). The trace of the cross-sections is indicated in Fig.7.

Table S1. Main parameters of the focal mechanisms available from EMMA database (Vannucci and Gasperini, 2003; 2004; Vannucci et al., 2010; unpublished updated of the dataset) and Moment Tensor on-line catalogs for the area between the Pede-Apennine thrust and the external thrusts, in the south-eastern Po Plain (Figs. 2-4; for acronyms, see 'Data and resource of Tables S1, S2 and S3'). H/C= Hypocenter and Centroid; Original Magnitude (type) and value (val) are indicated. When possible magnitudes are made equivalent to Mw according with Gasperini et al., 2012, 2013a, 2013b, Lolli et al., 2014, 2015). Pr=Preferred (*) or not preferred (-) solution is indicated. Ref.Acr.=acronym of the reference (see Data and resource of Tables S1, S2 and S3, with acronyms).

Date	Time	Lon	Lat	Dep	Nodal Plane1			Nodal Plane2			PAxis		TAxis		Mag		Pr	FM	Ref.Acr.
		(H/C) deg	(H/C) deg	(H/C) km	Strike deg	Dip deg	Rake deg	Strike deg	Dip deg	Rake deg	Trend deg	Plunge deg	Trend deg	Plunge deg	Type	Val			
1980-10-28	9:43	11.75	44.155	18	24.4	55.4	57.2	253	46.2	128.1	137	5	237	63	M	3.9	*		
1982-9-18	21:59	11.615	44.19	9	138.9	65.9	137.3	249.5	51.7	31.3	197.2	8.6	98	46.6	M	3.5	*		EVA_1993 (EMMA)
1989-12-10	3:15	11.848	44.155	16.2	223.7	37	-8.1	320.1	85.2	-126.8	197.3	38.6	79.5	30.3	M	3.7	*		
1989-11-4	3:3	12.1	44.1333	7.9	259.5	90	29.3	169.5	60.7	180	30	20	129	20	Md	3.1	*		
1989-11-4	3:14	12.1	44.1333	5.9	144.4	85.1	-170.8	53.6	80.8	-5	9	10	279	3	Md	3.3	*		
1990-1-26	11:30	12.45	43.6167	6	48.9	20.6	39.7	281.1	77	106.1	358	30	211	55	Md	3.3	*		
1990-5-8	22:33	12.1167	43.6333	1.6	4.2	45.4	-50.2	134.4	56.8	-122.9	350	62	247	6	Md	3.7	*		
1990-11-24	18:43	11.7333	44.0333	9.4	174.8	35	-59.4	319	60.4	-109.6	190	68	63	13	Md	3.2	*		
1991-1-14	17:55	12.0333	43.8333	9.6	124.4	54.9	100.5	286.6	36.4	75.5	207	9	69	77	Md	3	*		
1991-10-26	2:25	12.15	44.1167	11.2	119	45	90	299	45	90	29	0	180	90	Md	3.2	*		
1991-10-30	14:48	12.1333	44.1167	7.8	74.2	79.7	19.5	340.6	70.8	169.1	206	6	299	21	Md	3	*		
1991-12-15	22:32	13.0667	43.6333	9.3	103.4	30.4	59.1	318.2	64.2	106.8	36	17	258	66	Md	3.4	*		
1992-2-20	17:10	11.9333	44.2333	6.7	54.8	75.1	-49.2	161.4	42.9	-157.8	4	44	116	19	Md	3.1	*		
1992-2-24	14:56	12.2	44.0333	0.7	259.5	90	29.3	169.5	60.7	180	30	20	129	20	Md	3.2	*		
1992-4-3	21:23	12.0167	44.4167	14.1	254.1	79.9	39	156	51.7	167.1	19	18	123	34	Md	3.5	*		
1992-4-12	8:19	12.6667	43.65	3.5	9.5	35.1	0	279.5	90	125.1	340	35	219	35	Md	3.1	*		
1992-5-10	19:23	12.1667	44.1	1	74.5	84.7	69.7	330.5	21	165.1	182	36	324	46	Md	3.1	*		FRE_1997 (EMMA)
1992-5-27	18:13	11.5167	44.1333	9.1	94.3	75.3	100.3	238.6	17.9	55.7	176	29	18	58	Md	3.5	*		
1992-7-2	19:43	11.5167	44.3333	2.6	84.7	25.3	120.3	231.9	68.3	76.6	332	22	120	64	Md	3.3	*		
1992-8-29	22:18	11.9167	43.9667	18.6	4.9	35.7	170.1	103	84.2	54.7	221	30	341	40	Md	3.2	*		
1992-10-23	22:36	11.9333	43.9667	17.3	359.6	75.4	-150.5	261.5	61.5	-16.7	224	31	128	9	Md	2.9	*		
1992-12-31	11:19	11.9167	44.0167	19.8	24.4	40.7	-169.9	286.7	83.5	-49.8	232	38	346	27	Md	3.5	*		
1993-1-17	10:51	12.2167	43.5667	12.4	73.8	40.4	-120.3	291.3	56	-66.8	252	69	5	8	Md	4	*		
1993-3-11	22:35	12.0833	44.0833	9	334.8	15.1	60.4	185.2	76.9	97.6	269	31	105	57	Md	2.9	*		
1993-3-11	22:38	12.1	44.1667	5.9	144.6	30.5	159.9	252	80	61.1	5	29	132	47	Md	3	*		
1993-4-6	22:55	12.6	43.6	28	59.9	65	-29.6	163.4	63.4	-151.8	21	38	112	1	Md	3.2	*		
1993-10-15	2:43	12.1667	44.1167	9.1	114.2	35.1	29.5	359.3	73.5	121.4	66	22	305	51	Md	3.4	*		
1993-10-15	3:0	12.1667	44.1167	3.2	9.3	84.7	-150.9	276.3	61	-6.1	237	24	139	16	Md	3	*		
1993-10-15	23:52	12.15	44.05	9.7	14.7	51	160.3	117.4	74.9	40.7	241	15	344	39	Md	2.8	*		
1993-11-5	1:58	12.2833	44.2	10.3	4.5	45.2	180	94.5	90	44.8	220	30	329	30	Md	3.2	*		
1993-11-5	2:1	12.1667	44.1167	8.2	113.9	49.7	59.2	336.6	49.1	121.1	225	0	317	67	Md	3.4	*		

1993-11-7	23:21	12.25	44.1833	13	104.2	75.1	49.2	357.6	42.9	157.8	223	19	335	44	Md	3.7	*		
1993-11-8	3:59	12.15	44.0667	8.6	134.3	55.7	40.4	18.6	57.7	138.1	77	1	345	51	Md	3.2	*		
1993-11-9	13:46	12.1667	44.0667	11.6	129.5	45.3	39.9	9.1	62.9	127.8	73	10	328	55	Md	3.6	*		
1993-11-9	13:52	12.1667	44.1333	14.4	159.6	54.9	79.5	357.4	36.4	104.5	257	9	35	77	Md	3.2	*		
1993-11-9	19:8	12.1667	44.1333	9.6	340.1	35.1	111	134.9	57.5	75.8	235	11	9	73	Md	3.1	*		
1993-11-12	1:42	12.15	44.1333	9.2	94.3	51	19.7	351.6	74.9	139.3	48	15	305	39	Md	2.8	*		
1993-11-13	9:23	12.1667	44.15	15	204.6	59.7	-49.3	324.9	49.1	-138.2	168	55	267	6	Md	2.7	*		
1993-11-13	12:49	12.15	44.1167	4.5	94.3	84.7	29.1	1.3	61	173.9	224	16	322	24	Md	2.6	*		
1993-11-13	16:11	12.1667	44.1333	9.6	184.5	79.9	120.3	291.2	31.7	19.4	251	28	125	46	Md	3.1	*		
1993-11-14	8:43	12.15	44.15	13.2	94.3	84.7	29.1	1.3	61	173.9	224	16	322	24	Md	2.9	*		
1993-11-28	10:41	12.8167	43.7667	26	19.5	35.1	0	109.5	90	-125.1	350	35	229	35	Md	3.3	*		
1993-12-5	15:10	12.1333	44.0333	6.3	79.3	70.2	38.9	334	53.8	155.2	203	10	303	41	Md	3.2	*		
1994-2-2	10:12	12.1333	44.0333	8	144	45.3	78.7	339.8	45.8	101.2	62	0	328	82	Md	3.6	*		
1994-4-8	22:20	12.15	44.0667	5.7	89.5	80.1	30.1	353.8	60.4	168.6	218	13	316	28	Md	2.6	*		
1994-4-30	6:3	12.3167	43.4167	9.6	59.8	85	-120.4	321.2	30.8	-9.9	301	42	175	33	Md	3.1	*		
1994-7-5	10:20	12.1333	44.1	1	149.8	74.8	39.2	47.7	52.4	160.6	274	14	16	38	Md	3.3	*		
1994-7-11	21:31	12.1667	44.1167	2.5	279.6	85.1	-9.2	10.4	80.8	-175	235	10	325	3	Md	2.7	*		
1994-7-11	21:57	12.15	44.1333	7.6	115	55	20	13.2	73.7	143.3	67.8	12	328.5	37.1	Md	2.8	*		
1994-7-19	18:43	12.25	44.1667	8.5	114.5	50.1	-9.8	210.9	82.5	-139.7	81	33	336	21	Md	3	*		
1994-7-20	17:41	12.1667	44.1167	3.2	34.2	65.7	169.6	128.5	80.6	24.7	259	10	354	24	Md	2.8	*		
1994-7-21	1:11	12.1667	44.1167	2.6	154.8	49.7	79.8	350.4	41.3	101.8	252	4	12	81	Md	2.9	*		
1994-7-22	4:8	12.1667	44.1	2.1	89.7	54.9	49.7	325.6	51.4	132.6	207	2	300	58	Md	3.1	*		
1994-7-22	10:25	12.2167	44.15	5.7	299.8	75.9	10.1	207.3	80.2	165.7	254	3	163	17	Md	3.2	*		
1994-7-27	20:27	12.15	44.1	5	84.5	50.1	-9.8	180.9	82.5	-139.7	51	33	306	21	Md	3.2	*		
1994-7-30	3:16	11.6167	44.1	7.8	134.7	70.2	141.1	240	53.8	24.8	191	10	91	41	Md	3.5	*		
1995-5-30	3:36	12.65	43.4333	2	94.6	59.7	-49.3	214.9	49.1	-138.2	58	55	157	6	Md	3.8	*		
1995-5-30	5:39	12.7	43.4	4	99.5	65.7	-20.3	198.2	71.6	-154.2	60	31	328	4	Md	3.8	*		
1995-5-30	11:2	12.0333	44.15	7.5	84.9	79.9	-39	183	51.7	-167.1	36	34	140	18	Md	3	*		
1995-5-30	22:11	12.7333	43.4167	6.6	115	40	-10	212.7	83.6	-129.6	87.6	38.4	333.2	27.6	Md	3.2	*		
1995-10-13	19:3	12.6333	43.4	24.9	79.8	79.7	160.5	173.4	70.8	10.9	128	6	35	21	Md	3.2	*		
1995-12-26	6:15	12.05	44.0667	11.3	309.1	79.9	39	211	51.7	167.1	74	18	178	34	Md	2.9	*		
1995-12-27	19:59	12.1167	44.1833	12.5	109.2	25	79.7	300.6	65.4	94.8	27	20	220	69	Md	3	*		
1995-12-27	23:44	12.0667	44.1333	7.4	14.9	69.8	-110.1	241.5	28.2	-47	256	60	120	22	Md	3.5	*		
1995-12-28	1:24	12.0667	44.1167	4.5	84.1	60.1	39.6	331.7	56.5	143.3	207	2	300	48	Md	3.1	*		
1972-2-4	2:42	13.44	43.72	25	216.2	66.7	-147.5	112	60.4	-27.1	76	39	343	4	M	4.5	*		
1972-2-4	9:18	13.37	43.73	25	319.1	84	48.4	222.4	41.9	171	81	27	193	37	M	4.3	*		
1972-2-4	17:19	13.36	43.72	2	225.3	63	-164.9	128.3	76.6	-27.8	84	29	179	9	M	4	*		GAS_1985 (EMMA)
1972-2-5	1:26	13.4	43.72	17	246	35.3	-167	145.3	82.5	-55.4	88	42	208	29	M	4.3	*		
1972-2-6	1:34	13.43	43.71	30	212.2	81	-143.3	115.5	53.8	-11.2	80	32	339	18	M	4.3	*		
1972-6-14	18:55	13.47	43.69	3	34.6	70.9	-170.5	301.5	81	-19.3	257	20	349	7	M	4.5	*		

2005-11-8	21:10	12.25	44.15	15	282	61	71	137.4	34.2	120.4	25.7	14	154	68.1	Mw	3.6	*		LIH_2007 (EMMA)
1990-8-27	99:99	13.177	44.02	5	115	50	0	25	90	140	77.5	27	332.5	27	Md	3.9	*		
1991-11-22	20:0	12.062	43.842	5.9	165	60	-70	308.9	35.5	-120.6	115.8	68.3	240.6	12.8	Md	3	*		
1996-6-28	99:99	12.995	43.769	27.5	155	40	110	309.6	52.8	74	50.9	6.6	167.7	75.6	Md	3.4	*		
2000-2-22	99:99	12.083	43.79	8	265	65	-120	138.8	38.3	-43	132.2	58.6	16.5	14.8	Md	3	*		SAN_2003 (EMMA)
2000-6-25	99:99	13.147	43.886	5	130	90	-50	220	40	-180	72.7	32.8	187.3	32.8	Md	3.5	*		
2000-6-27	99:99	13.2	43.883	5	115	85	40	20.8	50.2	173.5	241.1	23	345.8	31	Md	3.4	*		
2000-12-27	99:99	12.245	43.678	5	115	30	-80	283.5	60.5	-95.7	178.8	73.9	17.7	15.3	Md	3.2	*		
1930-10-30	7:13	13.331	43.659	8	148	36	139	273	68	61	23.99	17.42	143.68	57.64	Mw	5.8			VAN_2015 (EMMA)
1978-12-5	15:39	11.99 12.07	44.46 44.29	35 15	350	41	0	260	90	131	317	32	203	33	Mw	4.61	*		RCMT (PON_2006)
1987-7-5	13:12	12.23 12.09	43.78 43.76	11 15	298	43	-83	108	48	-97	317	84	202	2	Mw	4.44	*		
1997-10-2	19:38	12.14 11.95	43.64 43.66	10 10	158	41	-58	298	56	-115	155	68	45	8	Mw	4.42	*		
1999-1-25	22:45	11.92 12.37	44.02 43.91	33 35.3	91	66	17	354	75	155	44	6	311	29	Mw	4.36	*		
2000-5-2	8:48	12.02 12.25	44.24 44.2	10 22.3	304	41	81	136	50	98	221	4	94	83	Mw	4.19	*		
2000-5-5	20:42	13.19 13.38	44.01 44.11	10 18.3	97	35	62	310	60	108	27	13	258	69	Mw	4.01	*		
2000-5-6	22:7	11.97 12.25	44.14 44.19	10 24.5	287	33	64	137	61	106	216	14	81	70	Mw	4.14	*		
2000-5-8	12:30	11.9 11.34	44.3 44.31	10 27.6	326	33	85	152	57	93	240	12	73	77	Mw	4.63	*		RCMT (PON_2002)
2000-5-9	17:51	12 11.86	44.2 44.18	10 23.1	308	31	96	121	59	87	214	14	21	76	Mw	4.26	*		
2000-5-10	16:52	11.9 11.96	44.3 44.29	10 21	309	43	97	120	47	84	214	2	326	85	Mw	4.83	*		
2000-5-11	11:57	11.91 12.1	44.34 44.33	10 19.5	303	46	117	86	50	64	194	2	290	71	Mw	4.19	*		
2000-5-12	11:26	11.95 11.98	44.35 44.31	10 22.9	282	43	85	108	47	94	195	2	72	86	Mw	4.36	*		
2000-8-1	2:34	12.34 12.44	43.98 43.89	10 18.5	212	28	42	84	72	112	158	24	23	58	Mw	4.31	*		
2001-11-26	0:56	12.1 11.89	43.6 43.67	10 10	358	21	-72	158	70	-97	58	64	254	25	Mw	4.69	*		RCMT (PON_2004)
2002-2-21	14:36	12.05 11.86	43.76 43.87	7 10	313	35	-86	128	55	-93	26	79	220	10	Mw	4.09	*		
2003-1-26	19:57	11.96 11.98	43.88 43.89	6 10	140	41	-101	336	50	-80	300	81	59	4	Mw	4.67	*		
2003-1-26	20:15	11.95 11.76	43.88 43.93	7 10	291	37	-130	158	62	-64	111	63	229	13	Mw	4.53	*		RCMT (PON_2007)
2003-12-7	10:20	12.18 11.95	44.16 44.22	9 16.6	284	45	71	130	48	108	208	2	111	77	Mw	4.19	*		
2006-4-10	19:3	13.49 13.65	43.4 43.41	33 21.3	89	71	-169	355	80	-20	311	21	43	6	Mw	4.05	*		
2006-4-16	21:15	11.81 11.94	44.02 43.79	10 35	295	34	91	114	56	89	205	11	21	79	Mw	4.46	*		RCMT (PON_2011)

2006-10-21	7:4	13 12.99	43.65 43.61	36 24.4	34	60	12	298	80	150	349	13	252	28	Mw	4.21	*		
2009-4-5	20:20	11.98 12.01	44.33 44.24	10 26.9	257	37	55	118	60	113	191	12	72	66	Mw	4.73	*		
2009-9-20	3:50	13.44 13.41	43.44 43.47	18 32.6	19	84	-5	110	85	-174	334	8	244	0	Mw	4.63	*		
2010-4-15	1:47	12.44 12.44	43.49 43.56	2 10	144	21	-57	288	72	-102	180	61	28	26	Mw	4.07	*		
2010-9-5	7:7	12.17 12.11	44.11 44.36	15 22.2	200	43	125	336	56	62	86	7	192	66	Mw	4.02	*		
2010-10-13	22:43	12.37 12.37	44.14 44.14	35.2 23.3	17	65	22	278	70	153	328	4	236	33	Mw	4.06	*		
2011-5-24	22:3	12.03 12.03	43.86 43.86	5 8	266	48	-133	140	57	-53	106	59	205	5	Mw	4.14	*		
2011-7-12	6:53	11.86 11.86	43.92 43.92	8 8.8	81	29	-136	311	70	-68	252	59	25	22	Mw	4.33	*		QRCMT
2011-7-12	7:15	11.85 11.85	43.92 43.92	8 8.5	120	23	-83	292	67	-93	196	68	25	22	Mw	4.31	*		
2011-7-12	19:20	11.86 11.86	43.93 43.93	15 10	128	20	-87	305	70	-91	213	65	36	25	Mw	4.11	*		
2012-6-6	4:8	12.26 12.26	44.45 44.45	10 25.4	28	66	-10	122	81	-156	347	23	253	10	Mw	4.33	*		
2013-7-21	1:32	13.67 13.77	43.5 43.51	15 10	92	48	27	343	70	135	42	13	299	45	Mw	5.09	*		
2013-7-21	3:7	13.71 13.71	43.52 43.52	15 10	261	67	25	161	67	154	211	0	121	34	Mw	4.07	*		
2013-8-22	6:44	13.8 13.72	43.58 43.53	15 10	155	39	102	320	52	81	56	7	189	80	Mw	4.39	*		
2000-4-19	20:6	11.97 11.97	44.078 44.078	24 24	332.2	31.4	136.1	101.6	68.9	66.3	209.3	20.4	337.9	59.2	Mw	3.65	*		
2000-5-7	0:44	11.962 11.962	44.337 44.337	12 12	333.2	33	122.4	116.1	62.6	70.8	220	15.5	350.2	66.7	Mw	4.6	*		
2001-11-26	12:34	12.032 12.032	43.586 43.586	6 6	340.7	31.3	-96.4	168.1	58.9	-86.1	89.2	75.8	255.3	13.8	Mw	3.83	*		
2002-4-30	21:24	11.57 11.57	44.139 44.139	4 4	145.5	31.5	-62.6	294.2	62.4	-105.7	172.6	68.6	35.7	16	Mw	3.78	*		ETHZ
2003-1-26	20:1	11.95 11.95	43.887 43.887	4 4	292.8	48.8	-123.7	158.2	51.2	-57.7	133.1	65.3	225.9	1.3	Mw	4.22	*		
2004-2-12	9:13	12.579 12.579	44.484 44.484	21 21	180.1	67.4	-19	277.6	72.5	-156.2	139.9	29	48	3.4	Mw	3.73	*		
2005-7-15	15:17	12.117 12.117	44.207 44.207	18 18	338.2	47.2	129.5	107.7	55.5	55.5	221.4	4.6	320	61.7	Mw	4.33	*		
2010-4-17	1:21	12.418	43.479	8.4 5	137.5	18.2	-74.8	301.5	72.4	-95	204	62.3	35.5	27.3	Mw	3.03	*		
2011-4-24	7:19	12.196	43.586	8.4 7	112.5	55.3	-151.4	5.3	66.8	-38.3	324.6	42.9	61.3	7.2	Mw	3.5	*		
2011-5-4	19:46	12.658	43.768	37.4 39	279.6	36.8	82	109.6	53.7	96	195.4	8.5	45.3	80.2	Mw	3.48	*		
2011-7-11	15:1	11.863	43.921	7.4 3	129	42.9	-62.8	274	52.7	-113	125.4	71.1	20.1	5.2	Mw	3.67	*		TDMT
2011-7-12	21:27	11.869	43.938	8.4 5	133.6	24.5	-54	275	70.4	-105	162.3	61.7	16.6	24	Mw	3.63	*		
2013-4-20	7:57	12.2892	43.4568	6.7 2	135.4	44.4	-69.4	287.6	49.1	-109	130.5	75.5	31	2.4	Mw	3.6	*		

2013-5-8	0:52	12.2968	43.4485	8.85	144.7	44.8	-53.7	278.8	55.4	-120.4	132.1	64.6	29.8	5.7	Mw	3.8	*		
2013-7-11	4:32	12.0575	43.8227	8.56	332.9	41.8	-78.8	138	49.2	-99.8	351.6	81.7	234.9	3.8	Mw	4.21	*		
2013-8-26	22:9	12.5438	43.366	8.66	320.4	24.6	-89.2	139.6	65.4	-90.4	48.8	69.6	229.8	20.4	Mw	3.96	*		
2013-12-18	10:58	12.5297	43.3808	8.95	345.9	34.4	-71.3	143.6	57.6	-102.4	19.9	74.1	242.5	11.8	Mw	3.94	*		
2013-12-22	10:6	12.5188	43.3828	8.35	151.1	38.4	-84.5	324.2	51.8	-94.3	210.4	82.4	57.2	6.8	Mw	4.09	*		
2013-12-27	19:43	12.5233	43.3893	7.33	329.4	34.6	-67	122.1	58.5	-105.1	355.4	72.1	223	12.3	Mw	3.67	*		
2014-1-7	15:51	12.5133	43.3712	5.42	146.6	25.6	-107	345.3	65.6	-82	270.8	68.5	69.3	20.2	Mw	3.56	*		
2014-3-18	21:21	12.5462	43.3677	7.25	348.7	39.8	-48.1	119.3	61.5	-119.1	342.9	61.7	229.9	11.9	Mw	3.43	*		
2014-4-19	21:27	12.5335	43.3467	8.45	122.7	25.4	-125.3	340.9	69.6	-74.7	274.7	62.4	59.1	23.1	Mw	3.87	*		
2014-4-29	22:26	12.9892	43.9908	33.97	117.9	21.5	76.3	312.6	69.1	95.4	38.5	23.9	231.8	65.5	Mw	3.66	*		
2014-10-3	3:24	12.3427	43.5782	9.55	169.7	38.7	-15.5	271.9	80.4	-127.7	146.2	42	30.5	25.7	Mw	3.62	*		
2014-10-17	2:38	11.9333	43.7698	14.114	177.3	65.2	10.9	82.7	80.1	154.8	132.2	10.1	37.5	24.7	Mw	3.65	*		
2014-12-21	15:51	12.1323	43.5342	8.55	131.1	43.5	-99.9	324.6	47.3	-80.8	302.5	83	48.1	1.9	Mw	3.82	*		
2001-11-26	0:57	12.5	43.6	18	8	53	-43	127	56	-134	340	54.2	246.8	2.3	Mw	4.68	-		BER_2004 (EMMA)
2000-4-19	20:6	11.95	44.35	24 24	102	69	66	333.2	31.5	136.7	209.9	20.5	338.1	58.9	Mw	4.68	-		
2000-5-2	8:48	12.02	44.24	12 12	98	64	61	329.7	38.2	134.8	208.7	14.2	324.8	60	Mw	3.7	-		BRA_2002 (EMMA)
2000-5-8	12:29	11.96	44.34	15 15	109	69	79	317.5	23.6	116.4	207.4	23.2	0.8	64.3	Mw	4.1	-		
2000-5-10	16:52	12	44.32	12 12	105	65	71	324.2	31	124.9	209	17.9	342.3	64.8	Mw	4.8	-		
1980-10-28	9:43	11.75	44.155	18	24.4	55.4	57.2	253	46.2	128.1	137	5	237	63	Mw	4.9	-		EVA_1992 (EMMA)
1982-9-18	21:59	11.615	44.19	9	138.9	65.9	137.3	249.5	51.7	31.3	197.2	8.6	98	46.6	M	3.9	-		
1989-12-10	3:15	11.848	44.155	16.2	223.7	37	-8.1	320.1	85.2	-126.8	197.3	38.6	79.5	30.3	M	3.5	-		
1991-11-22	20:0	12.0333	43.8833	17.7	154.5	90	99.7	244.5	9.7	0	235	44	74	44	M	3.7	-		FRE_1997 (EMMA)
1978-12-5	15:39	11.99	44.41	18	100.2	58.9	-124.3	333	45	-46.9	317	60	214	8	Md	3	-		GAS_1985 (EMMA)
2005-7-15	15:17	12.11	44.21	17	298	39	69	144.3	54	106.2	222.8	7.7	103	74.8	M	4.6	-		LIH_2007 (EMMA)
2006-4-16	21:14	11.92	44.09	25	288	33	84	115.1	57.2	93.9	202.3	12.1	37.9	77.4	Mw	4.1	-		
2000-5-5	99:99	13.192	44.014	5	195	25	30	77.4	77.8	112	149.7	29.4	13	52.2	Mw	4.5	-		SAN_2003 (EMMA)
2000-8-1	99:99	12.318	43.929	5	160	70	130	272.2	44	29.5	221.9	15.5	113.5	48.7	Md	4.1	-		
2000-5-10	16:52	12 12	44.31 44.31	10 15	55	39	83	245	51	96	331	6	190	82	Md	4.2	-		GCMT

2013-7-21	1:32	13.67 13.68	43.5 43.48	8.4 12	119	38	76	316	53	100	39	8	266	79	Mw	5.11	-	
2000-5-2	8:48	11.94 11.94	44.34 44.34	12 12	329.3	38	134.3	98.2	63.9	61.4	208.7	14.2	325.1	60.3	Mw	4.05	-	
2000-5-6	22:7	11.967 11.9670	44.143 44.1430	12 12	331	38.5	135.7	98.3	64.3	60.4	209.5	14.3	325	59.4	Mw	4.05	-	
2000-5-8	12:29	11.996 11.996	44.208 44.208	15 15	317.9	24.2	116.8	109	68.5	78.6	207.7	22.7	359.8	64.7	Mw	4.74	-	
2000-5-9	17:51	12.001 12.001	44.316 44.316	15 15	314.1	20.4	113.4	109.4	71.4	81.6	205.9	25.9	6.4	62.7	Mw	4.21	-	
2000-5-10	16:52	12 120	44.2 44.2	12 12	325	30.9	125.3	105.5	65.2	70.9	209.5	18.1	342.9	64.6	Mw	4.85	-	
2000-5-11	11:57	11.912 11.912	44.34 44.34	12 12	297.8	21.1	121.7	84.2	72.2	78.6	183.3	26.3	337.3	61.2	Mw	4.15	-	
2000-5-12	11:26	11.955 11.955	44.354 44.354	15 15	298.8	31.2	112.9	92.5	61.5	76.8	192.2	15.5	333.6	70.4	Mw	4.25	-	ETHZ
2000-8-1	2:34	12.343 12.343	43.981 43.981	12 12	215.8	44.1	51.6	83.6	57	121.1	152.1	7	47.9	63.3	Mw	4.27	-	
2001-11-26	0:56	12.069 12.0690	43.603 43.603	6 6	351.1	30.8	-79.2	158.6	59.8	-96.4	51.7	74.4	253.2	14.6	Mw	4.6	-	
2002-2-21	14:36	12.046 12.046	43.761 43.761	9 9	137.7	45.6	-67.4	287	48.7	-111.4	127.6	74	32	1.6	Mw	4.12	-	
2003-1-26	19:57	11.96 11.96	43.883 43.883	4 4	306.7	39.9	-124.3	168.3	58.1	-64.8	127.4	66.5	240.5	9.7	Mw	4.69	-	
2003-1-26	20:15	11.954 11.954	43.875 43.875	4 4	136.4	37.6	-77.9	301.3	53.3	-99.1	174.6	79.2	37.8	7.9	Mw	4.5	-	
2003-12-7	10:20	12.18 12.18	44.162 44.162	12 12	305.4	35.8	99.6	113.7	54.8	83.2	208.6	9.5	357.6	78.9	Mw	4.21	-	
2006-4-10	19:3	13.488	43.396	33.9 39	94	62.9	-154.1	351.6	67.1	-29.6	311.6	36.6	43.6	2.7	Mw	4.12	-	
2006-4-16	21:15	11.798	43.957	27 28	312	37.6	119	97	57.7	69.5	201.6	10.5	321.6	69.6	Mw	4.48	-	
2009-4-5	20:20	11.913	44.23	24.5 28	267	45.1	64.4	121.2	50.3	113.4	194.8	2.8	96.3	72	Mw	4.67	-	
2009-9-20	3:50	13.418	43.399	37.8 39	18	85	-6	108	84	-175	333.2	7.8	63.3	0.7	Mw	4.71	-	
2010-4-15	1:47	12.425	43.468	8.1 5	144.5	30.2	-74.5	306.8	61	-98.8	195.6	72.5	43.2	15.6	Mw	3.83	-	
2010-9-5	7:7	12.156	44.126	23.5 20	121	41.2	78.5	316.1	49.8	99.9	39.1	4.3	279.4	81.3	Mw	3.95	-	
2010-10-13	22:43	12.383	44.205	26.5 31	4.6	40.1	-11.3	103.3	82.7	-129.6	337.8	39	223.6	26.8	Mw	4.17	-	TDMT
2011-7-12	6:53	11.855	43.927	7.6 5	110.1	43	-84.3	282.2	47.2	-95.3	134.2	85.6	16	2.1	Mw	4.32	-	
2011-7-12	7:15	11.856	43.934	8.2 3	119.4	36.7	-73.1	278.7	55.1	-102.2	149.5	76.3	17.4	9.3	Mw	4.1	-	
2011-7-12	19:20	11.85	43.931	8 3	97.7	25.7	-100	288.8	64.7	-85.2	208.6	69.9	15.2	19.6	Mw	3.83	-	
2012-6-6	4:8	12.3537	44.4343	25.6 20	19.5	39.8	0.7	289	89.6	129.8	346.5	32.6	231.8	33.3	Mw	4.19	-	
2013-7-21	1:32	13.6683	43.5012	8.4 10	260	66.6	-20	358.3	71.7	-155.3	220.3	30.2	128.3	3.4	Mw	5.11	-	
2013-8-22	6:44	13.8037	43.5828	7.9 5	311.5	45.1	83.7	140.4	45.3	96.3	225.9	0.1	135	85.5	Mw	4.4	-	

Table S2. Main parameters of the focal mechanisms available from EMMA database (Vannucci and Gasperini, 2003; 2004; Vannucci et al., 2010; unpublished updated of the dataset) and Moment Tensor on-line catalogs for the Mugello sector (Fig. 5; for acronyms, see 'Data and resource of Tables S1, S2 and S3'). H/C= Hypocenter and Centroid; Original Magnitude (type) and value (val) are indicated. When possible magnitudes are made equivalent to Mw according with Gasperini et al., 2012, 2013a, 2013b, Lolli et al., 2014, 2015). Pr=Preferred (*) or not preferred (-) solution is indicated. Ref.Acr.=acronym of the reference (see Data and resource of Tables S1, S2 and S3, with acronyms).

Date	Time	Lon	Lat	Dep	Nodal Plane 1			Nodal Plane 2			P Axis		T Axis		Mag		Pr	FM	Ref. Acr.
		(H/C) deg	(H/C) deg	(H/C) km	Strike deg	Dip deg	Rake deg	Strike deg	Dip deg	Rake deg	Trend deg	Plunge deg	Trend deg	Plunge deg	Type	Val			
1981-7-10	16:11	11.114	44.097	10	175.0	45.0	-90.3	355.0	48.0	-89.8	270.0	88.0	85.0	0.0	M	3.8	*		EVA_1992 (EMMA)
1981-8-11	17:16	11.239	44.148	10	11.1	10.2	41.6	240.0	83.3	97.6	323.1	37.8	158.6	51.2	M	3.5	*		
1992-5-27	18:13	11.5167	44.1333	9.1	94.3	75.3	100.3	238.6	17.9	55.7	176.0	29.0	18.0	58.0	Md	3.5	*		FRE_1997 (EMMA)
1992-5-27	18:18	11.45	44.15	1.8	119.4	85.2	130.9	214.8	41.1	7.3	178.0	28.0	64.0	36.0	Md	3.4	*		
2008-3-1	7:43	11.31 11.13	44.09 44.06	10 10	130.0	46.0	-63.0	274.0	50.0	-115.0	118.0	71.0	21.0	2.0	Mw	4.72	*		QRCMT
2008-3-1	8:43	11.22 11.25	44.06 44.21	5 8	154.0	46.0	-39.0	273.0	63.0	-129.0	134.0	54.0	30.0	10.0	Mw	4.3	*		
2002-4-30	21:24	11.57	44.139	4	145.5	31.5	-62.6	294.2	62.4	-105.7	172.6	68.6	35.7	16.0	Mw	3.78	*		ETHZ
2008-3-1	10:43	11.203	44.054	6 9	347.2	36.7	-46.9	117.7	64.1	-117.0	346.0	61.1	227.1	14.9	Mw	4.05	*		TDMT
2009-9-14	20:4	11.275	44.025	7 6	122.0	45.0	-90.0	303.0	45.0	-90.0	194.0	90.0	212.0	0.0	Mw	4.4	*		
2015-1-23	6:51	11.1357	44.1293	9.7 6	303.6	29.6	-93.0	127.0	60.4	-88.3	41.5	74.5	215.7	15.4	Mw	4.46	*		
1981-7-10	16:11	11.114	44.097	10	175.0	45.0	-90.3	355.0	48.0	-89.8	270.0	88.0	85.0	0.0	M	3.8	-		EVA_1993 (EMMA)
2008-3-1	7:43	11.25 11.29	44.06 44.01	3.8 12	94.0	47.0	-125.0	320.0	53.0	-59.0	290.0	65.0	28.0	3.0	Mw	4.76	-		GCMT
2008-3-1	7:43	11.253	44.063	3.8 12	116.4	37.6	-92.6	299.7	52.5	-88.0	220.6	82.4	28.3	7.4	Mw	4.69	-		TDMT
2008-3-1	8:43	11.227	44.046	5.2 12	311.8	40.9	-65.7	100.9	53.4	-109.6	316.5	73.0	204.8	6.5	Mw	4.24	-		

Table S3. Main parameters of the focal mechanisms available from EMMA database (Vannucci and Gasperini, 2003; 2004; Vannucci et al., 2010; unpublished updated of the dataset) and Moment Tensor on-line catalogs for the Garfagnana-Lunigiana sector (Fig. 7; for acronyms, see 'Data and resource of Tables S1, S2 and S3'). H/C= Hypocenter and Centroid; Original Magnitude (type) and value (val) are indicated. When possible magnitudes are made equivalent to Mw according with Gasperini et al., 2012, 2013a, 2013b, Lolli et al., 2014, 2015). Pr=Preferred (*) or not preferred (-) solution is indicated. Ref.Acr.=acronym of the reference (see Data and resource of Tables S1, S2 and S3, with acronyms).

Date	Time	Lon	Lat	Dep	Nodal Plane 1			Nodal Plane 2			P Axis		T Axis		Mag		Pr	FM	Ref. Acr.
		(H/C) deg	(H/C) deg	(H/C) km	Strike deg	Dip deg	Rake deg	Strike deg	Dip deg	Rake deg	Trend deg	Plunge deg	Trend deg	Plunge deg	Type	Val			
1990-6-19		10.0467	43.9067	2	243.7	54.3	-51.9	10.3	50.3	-130.7	213.9	59.8	307.8	2.2	M	2.5	*		AUG_1990 (EMMA)
1939-10-15	15:5	10.203	44.233	27	185.8	25.6	-118.5	36.8	67.7	-77.1	328.7	65.0	117.1	21.7	M	4.9	*		
1969-1-6	22:3	10.596	44.217	5	350.2	75.3	-126.7	241.4	39.2	-23.7	222.2	46.7	107.3	21.7	M	4	*		
1980-10-1	16:36	10.183	44.17	7	298.4	71.8	46.8	190.0	46.1	154.3	58.0	15.0	166.0	45.0	M	3.3	*		
1982-7-26	15:7	10.785	44.159	29	296.2	41.5	-58.4	76.8	55.7	-114.9	295.0	68.0	184.0	7.0	M	4.3	*		
1982-10-8	9:14	9.906	44.403	30	74.0	35.3	148.8	190.4	72.6	58.8	303.5	21.4	63.7	52.1	M	3.7	*		
1987-2-10	21:20	10.284	44.261	9.6	140.2	73.5	-36.8	242.2	54.9	-159.7	94.0	37.0	196.0	11.0	M	4.3	*		EVA_1993 (EMMA)
1988-2-8	11:24	10.606	44.175	15	20.5	75.7	-126.0	271.7	38.3	-23.5	253.2	46.8	137.2	22.3	M	4.3	*		
1988-2-8	14:8	10.523	44.17	8.8	125.8	59.3	-58.1	255.2	43.1	-131.6	85.0	61.0	194.0	8.0	M	3.9	*		
1988-8-30	17:16	10.352	44.316	10.5	256.4	34.9	-44.9	25.6	66.2	-116.3	256.9	60.0	134.8	17.1	M	4.1	*		
1989-12-2	5:44	9.948	44.376	6	24.4	66.0	-62.6	152.5	35.8	-136.0	334.2	59.4	94.5	16.6	M	2.4	*		
1990-4-25	4:26	10.534	44.186	12	54.3	72.6	43.1	308.7	49.3	156.8	176.0	14.0	281.0	42.0	M	2	*		
1990-9-17	5:56	10.086	44.255	68	117.8	56.0	133.7	238.2	53.2	44.4	179.0	1.0	85.0	55.0	M	3	*		
1991-12-8	12:25	10.5167	44.3667	5.6	58.5	20.7	-171.0	320.1	86.8	-69.5	250.0	44.0	32.0	38.0	Md	3.6	*		
1992-4-17	11:59	10.8333	44.3167	23.1	24.5	50.1	-170.2	288.1	82.5	-40.3	238.0	33.0	343.0	21.0	Md	3.8	*		
1992-6-14	5:38	10.3167	44.35	2.1	14.8	35.4	-40.0	139.2	68.1	-118.6	11.0	57.0	250.0	18.0	Md	3.6	*		FRE_1997 (EMMA)
1992-6-14	6:5	10.3	44.4	5	54.8	25.0	-79.7	223.4	65.4	-94.8	124.0	69.0	317.0	20.0	Md	3.4	*		
1994-4-13	9:38	10.5	44.4167	18.1	294.5	45.3	-140.1	174.1	62.9	-52.2	133.0	55.0	238.0	10.0	Md	2.9	*		
1994-6-12	9:7	10.75	44.0833	11.1	43.9	45.8	-170.6	307.3	83.3	-44.6	255.0	35.0	4.0	24.0	Md	3	*		
1980-6-7	18:35	10.72 10.56	44.09 43.9	16 15	334.0	23.0	-50.0	112.0	72.0	-105.0	0.0	60.0	214.0	26.0	Mw	4.64	*		RCMT (PON_2006)
1986-10-1	19:53	10.19 10.11	44.34 44.23	28 16.8	135.0	43.0	-91.0	316.0	47.0	-90.0	235.0	88.0	45.0	2.0	Mw	4.47	*		

1995-8-24	17:27	10.76 10.77	44.13 44.12	34 18.5	117.0	47.0	-111.0	327.0	47.0	-69.0	312.0	75.0	42.0	0.0	Mw	4.45	*		
1995-10-10	6:54	10.01 10.19	44.18 44.1	10 17.9	89.0	68.0	178.0	180.0	88.0	22.0	312.0	14.0	47.0	17.0	Mw	4.82	*		
1997-12-24	17:53	10.55 10.52	44.09 44.19	10 19.2	95.0	49.0	-132.0	329.0	56.0	-53.0	297.0	60.0	33.0	4.0	Mw	4.33	*		RCMT (PON_2002)
2000-10-3	1:12	10.8 10.4	44.27 44.33	10 10	317.0	24.0	-105.0	153.0	67.0	-83.0	76.0	68.0	238.0	21.0	Mw	4.24	*		
2002-6-8	20:13	10.64 10.6	44.34 44.57	10 35.1	301.0	45.0	116.0	86.0	51.0	66.0	193.0	3.0	293.0	71.0	Mw	4.21	*		RCMT (PON_2004)
2002-6-18	22:23	10.8 10.44	44.44 44.34	33 35	293.0	44.0	103.0	95.0	48.0	78.0	194.0	2.0	297.0	81.0	Mw	4.32	*		
2013-1-25	14:48	10.45 10.59	44.17 44.21	15 12	251.0	65.0	-159.0	152.0	71.0	-27.0	110.0	32.0	203.0	4.0	Mw	5.04	*		
2013-6-21	10:33	10.14 10.16	44.15 44.18	15 11.1	256.0	39.0	-120.0	112.0	57.0	-68.0	70.0	69.0	187.0	10.0	Mw	5.34	*		
2013-6-23	15:1	10.21 10.21	44.18 44.18	15 10	271.0	36.0	-94.0	95.0	54.0	-87.0	17.0	81.0	183.0	9.0	Mw	4.59	*		QRCMT
2013-6-30	14:40	10.2 10.2	44.17 44.17	15 10	250.0	39.0	-123.0	110.0	58.0	-66.0	67.0	67.0	183.0	10.0	Mw	4.72	*		
2002-7-5	9:45	10.731	44.427	45	103.2	41.2	57.2	323.7	56.4	115.3	35.9	8.1	286.0	67.5	Mw	3.73	*		ETHZ
2013-6-19	10:51	10.6868	44.4028	27.3 26	103.3	37.8	82.6	292.6	52.6	95.7	18.6	7.4	230.2	81.3	Mw	3.7	*		
2013-6-21	12:12	10.1483	44.1588	10 6	69.9	28.0	-132.2	295.7	69.6	-70.3	234.6	60.5	10.8	22.2	Mw	4.18	*		
2013-6-21	12:19	10.1198	44.1682	4.4 8	105.3	30.7	-111.2	309.6	61.6	-77.9	246.4	70.8	30.7	15.8	Mw	3.85	*		
2013-6-21	13:58	10.1585	44.1607	9.6 7	123.0	37.7	-30.7	238.2	71.8	-123.6	109.5	51.3	352.8	19.8	Mw	3.82	*		
2013-6-21	14:23	10.1437	44.1548	8 5	242.2	46.8	-134.6	117.4	58.7	-53.2	81.2	58.3	182.2	6.7	Mw	3.73	*		
2013-6-23	13:13	10.1857	44.1508	9.7 4	100.8	55.5	-35.5	212.8	61.5	-139.8	69.5	47.6	335.5	3.6	Mw	3.71	*		TDMT
2013-6-30	18:18	10.2073	44.178	9.5 5	109.2	43.4	-48.7	238.8	59.0	-122.0	97.1	61.5	351.0	8.6	Mw	3.73	*		
2013-7-8	23:31	10.1815	44.1517	6.7 2	96.7	40.0	-70.5	251.9	52.7	-105.6	110.2	76.0	352.9	6.5	Mw	3.55	*		
2013-8-14	22:18	10.1952	44.1663	6.5 5	111.1	43.7	-45.0	237.0	60.8	-124.0	96.9	58.9	350.7	9.6	Mw	3.69	*		
2014-9-7	10:45	10.677	44.127	15.45 15	86.4	52.2	-152.5	338.7	68.6	-41.2	296.2	43.7	36.0	10.1	Mw	4.26	*		
2014-9-7	10:45	10.6637	44.1125	12.3 15	91.6	22.0	-139.6	323.3	75.9	-72.9	255.0	55.8	39.5	28.9	Mw	4.28	*		
1990-4-25		10.5367	44.1933	12	91.0	49.9	57.9	315.3	49.6	122.3	23.0	0.0	294.0	66.0	M	2.4	-		AUG_1990 (EMMA)
1939-10-15	15:5	10.2	44.2333	26	325.0	77.6	-153.0	228.8	63.7	-13.9	188.0	28.0	96.0	10.0	M	4.8	-		EVA_1978 (EMMA)
1980-6-7	18:35	10.597	44.031	5	5.0	50.0	0.0	275.0	90.0	140.0	327.5	27.0	222.5	27.0	M	4.3	-		EVA_1993 (EMMA)
1986-10-1	19:53	10.22	44.33	9.5	216.6	64.4	-40.5	326.8	54.2	-147.7	177.0	46.0	274.0	6.0	M	4.4	-		
1980-6-7	18:35	10.597	44.031	5	5.0	50.0	0.0	275.0	90.0	140.0	327.5	27.0	222.5	27.0	M	4.3	-		EVA_1992

1980-6-7	18:35	10.66	44.08	5	44.6	80.6	26.0	310.0	64.3	169.5	175.0	11.0	270.0	25.0	M	4	-		(EMMA)
1980-10-1	16:36	10.183	44.17	7	298.4	71.8	46.8	190.0	46.1	154.3	58.0	15.0	166.0	45.0	M	3.3	-		
1982-7-26	15:7	10.785	44.159	29	296.2	41.5	-58.4	76.8	55.7	-114.9	295.0	68.0	184.0	7.0	M	4.3	-		
1986-10-1	19:53	10.22	44.33	9.5	216.6	64.4	-40.5	326.8	54.2	-147.7	177.0	46.0	274.0	6.0	M	4.4	-		
1987-2-10	21:20	10.284	44.261	9.6	140.2	73.5	-36.8	242.2	54.9	-159.7	94.0	37.0	196.0	11.0	M	4.3	-		
1988-2-8	11:24	10.606	44.175	15	20.5	75.7	-126.0	271.7	38.3	-23.5	253.2	46.8	137.2	22.3	M	4.3	-		
1988-2-8	14:8	10.523	44.17	8.8	125.8	59.3	-58.1	255.2	43.1	-131.6	85.0	61.0	194.0	8.0	M	3.9	-		
1988-8-30	17:16	10.352	44.316	10.5	256.4	34.9	-44.9	25.6	66.2	-116.3	256.9	60.0	134.8	17.1	M	4.1	-		
1990-9-17	5:56	10.086	44.255	68	117.8	56.0	133.7	238.2	53.2	44.4	179.0	1.0	85.0	55.0	M	3	-		
1990-9-17	5:56	10.085	44.254	72	125.6	66.4	146.2	230.7	59.4	27.8	180.0	4.0	85.0	40.0	M	3	-		
1995-8-24	17:27	10.7667	44.1333	9.6	69.5	80.1	-149.9	333.8	60.4	-11.4	296.0	28.0	198.0	13.0	Md	4.1	-		
1995-10-10	6:54	10.1667	44.1333	2	79.1	80.2	170.0	170.9	80.2	10.0	305.0	0.0	35.0	14.0	Md	4.8	-		FRE_1997 (EMMA)
1995-12-31	21:29	10.55	44.3333	8.9	154.4	56.0	-169.8	58.6	81.5	-34.5	11.0	30.0	111.0	17.0	Md	4	-		
1939-10-15	15:5	10.203	44.233	27	175.3	26.0	-127.3	35.6	69.6	-73.5	331.0	62.0	113.0	23.0	M	4.9	-		GAS_1985 (EMMA)
1969-1-6	22:3	10.8	44.14	33	68.0	71.7	-106.7	291.7	24.6	-49.0	314.0	60.0	171.0	25.0	M	4.1	-		
2013-1-25	14:48	10.45 10.49	44.17 44.17	15 22.2	246.0	72.0	-167.0	152.0	78.0	-18.0	109.0	21.0	200.0	4.0	Mw	5	-		
2013-6-21	10:33	10.14 10.17	44.15 44.1	5.1 12	272.0	33.0	-99.0	102.0	57.0	-84.0	31.0	77.0	188.0	12.0	Mw	5.32	-		GCMT
2013-6-30	14:40	10.15 10.05	44.13 44.08	10.2 13.8	265.0	36.0	-110.0	109.0	56.0	-76.0	59.0	74.0	189.0	10.0	Mw	4.77	-		
2000-10-3	1:12	10.802	44.272	6	310.2	40.3	-111.9	158.0	53.1	-72.4	121.0	74.5	235.6	6.6	Mw	4.24	-		
2002-6-8	20:13	10.696	44.36	33	295.0	40.5	102.9	98.3	50.7	79.2	195.9	5.1	317.3	80.2	Mw	4.28	-		ETHZ
2002-6-18	22:23	10.802	44.438	42	290.6	38.8	104.5	92.2	52.7	78.6	190.3	7.0	317.7	78.5	Mw	4.32	-		
2013-1-25	14:48	10.4543	44.1683	15.5 18	144.5	75.6	-8.1	236.6	82.2	-165.4	101.2	15.8	9.9	4.6	Mw	4.99	-		
2013-6-21	10:33	10.135	44.1528	5.1 5	250.9	47.4	-116.1	106.8	48.6	-64.4	87.1	71.1	179.0	0.7	Mw	5.26	-		TDMT
2013-6-23	15:1	10.2108	44.1762	9.5 6	101.2	40.7	-54.9	238.3	57.8	-116.3	98.1	66.0	346.8	9.2	Mw	4.57	-		
2013-6-30	14:40	10.2047	44.171	9.8 5	98.8	42.5	-72.9	256.1	49.8	-105.1	104.5	77.9	356.7	3.7	Mw	4.71	-		

Data and resources of Tables S1, S2 and S3

Augliera P., Pastore S., Tomaselli A., 1990. Sismicità della Lunigiana-Garfagnana: Primi risultati di una rete mobile. Atti GNGTS, 9° Conv., Roma, 221-232. (AUG_1990)

Bernardi F., Braunmiller J., Kradolfer U. Giardini D. 2004. Automatic regional moment tensor inversion in the European-Mediterranean region. Geophysical Journal International 157, 703-716, doi: 10.1111/j.1365-246X.2004.02215x (BER_2004b)

Braunmiller J., Kradolfer U., Baer M. Giardini D. 2002. Regional moment tensor determination in the European-Mediterranean area - initial results. Tectonophysics 356, 5 -22 (ETHZ)

Earthquake mechanisms of the Mediterranean Area (EMMA), http://ibogfs.df.unibo.it/user2/paolo/www/ATLAS/pages/EMMA_description.htm.

European-Mediterranean Regional Centroid Moment Tensor (RCMT) catalog of INGV from 1997 to 2010. http://www.bo.ingv.it/RCMT/ (last access on May 2015)

Eva E., Solarino S., 1992. Alcune Considerazioni sulla Sismotettonica dell'Appennino Nord-Occidentale Ricavate dall'analisi dei Meccanismi Focali. Studi Geol. Camerti, Spec. 2, Append. Crop 1-1a, 75-83. (EVA_1992)

Eva E., Pastore S., 1993. Revisione dei Meccanismi Focali dell'Appennino Settentrionale Atti GNGTS, 12° Conv., Roma, 147-159. (EVA_1993)

Eva C., Giglia G., Graziano F., Merlanti F., 1978. Seismicity and its Relation with Surface Structures in the North-Western Apennines. Boll. Geof. Teor. Appl., XX, 79, 263-277. (EVA_1978)

Frepoli, A., Amato A., 1997. Contemporaneous Extension and Compression in the Northern Apennines from Earthquake Fault-Plane Solutions. Geophysical Journal International 129, 368-388. (FRE_1997).

Gasparini C., Iannaccone G., Scarpa, R. 1985. Fault-Plane Solutions and Seismicity of the Italian Peninsula. Tectonophysics 117, 59-78. (GAS_1985)

Global Centroid Moment Tensor catalog (GCMT) from 1976 to 2014, available at: http://www.globalcmt.org/CMTfiles.html (last accessed on May 2015).

Li H., Michelini A., Zhu L., Bernardi F., Spada M. 2007. Crustal Velocity Structure in Italy from Analysis of Regional Seismic Waveforms. Bulletin of the Seismological Society of America 97, 6, 2024-2039, doi: 10.1785/0120070071. (LIH_2007)

Pondrelli S., Morelli A., Ekström G., Mazza S., Boschi E., Dziewonski A.M. 2002. European-Mediterranean regional centroid-moment tensors: 1997-2000. Physics of the Earth and Planetary Interiors 130, 71-101. (PON_2002)

Pondrelli S., Morelli A., Ekstrom G. 2004. European-Mediterranean Regional Centroid Moment Tensor catalog: solutions for years 2001 and 2002. Physics of the Earth and Planetary Interiors 145, 127-147. (PON_2004)

Pondrelli, S., Salimbeni S., Ekström G., Morelli A., Gasperini P., Vannucci G. 2006. The Italian CMT dataset from 1977 to the present: An extended view of the seismotectonics of this region, Physics of the Earth and Planetary Interiors 159, 286–303, doi 10.1016/j.pepi.2006.07.008. (PON_2006)

Pondrelli S., Salimbeni S., Morelli A., Ekström G., Postpischl L., Vannucci G., Boschi E. 2011. European-Mediterranean Regional Centroid Moment Tensor Catalog: solutions for 2005-2008. Physics of the Earth and Planetary Interiors 185, 74-81, 10.1016/j.pepi.2011.01.007. (PON_2011)

Quick Regional Moment Tensors of INGV. http://autorcmt.bo.ingv.it/quicks.html (last access on May 2015) (QRCMT).

Santini S. 2003. A note on Northern Marche seismicity: new focal mechanisms and seismological evidence. Annals of Geophysics 46, 4, 725-731. (SAN_2003)

Scognamiglio L., Tinti E., Michelini A. 2009. Real-Time Determination of Seismic Moment Tensor for the Italian Region. Bulletin of the Seismological Society of America 99, 4, 2223-2242, doi: 10.1785/0120080104 (TDMT).

Time Domain Moment Tensor (TDMT) catalog of INGV available at: http://cnt.rm.ingv.it/tdmt.html (last access on May 2015).

Vannoli, P., Vannucci G., Bernardi F., Palombo B., Ferrari G. 2015. The source of the 30 October 1930, Mw 5.8, Senigallia (central Italy) earthquake: a convergent solution from instrumental, macroseismic and geological data. Bulletin of the Seismological Society of America 105, 1548–1561; doi: 10.1785/0120140263.

References

Gasperini P., Lolli B., Vannucci G., Boschi E. 2012. A comparison of moment magnitude estimates for the European–Mediterranean and Italian regions. Geophysical Journal International 190, 1733–1745, doi: 10.1111/j.1365-246X.2012.05575.x

Gasperini P., Lolli, B., Vannucci G., 2013a. Empirical Calibration of Local Magnitude Data Sets Versus Moment Magnitude in Italy. Bulletin of the Seismological Society of America 103, 4, 2227-2246, doi: 10.1785/0120120356.

Gasperini P., Lolli B., Vannucci G., 2013b. Body wave magnitude mb is a good proxy of moment magnitude Mw for small earthquakes (mb<4.5-5.0). Seism. Res. Lett., 84, 6, 932-937, doi: 10.1785/0220130105.

Lolli B., Gasperini P., Vannucci G., 2014. Empirical conversion between teleseismic magnitudes (Mb and Ms) and moment magnitude (Mw) at the Global, Euro-Mediterranean and Italian scale. Geophysical Journal International 199, 805–828, doi: 10.1093/gji/ggu264.

Lolli B., Gasperini P., Mele F. M. Vannucci G., 2015. Recalibration of the distance correction term for local magnitude (ML) computations in Italy. Seismol. Res. Lett., SRL-D-15-00020R2 accepted.

Vannucci G., Gasperini P., 2003. A database of revised fault plane solutions for Italy and surrounding regions. Computers & Geosciences 29, 903-909.

Vannucci G., Gasperini P., 2004. The new release of the database of earthquake mechanisms of the Mediterranean area (EMMA Version 2). Annals of Geophysics 47, 307-334.

Vannucci G., Imprescia P., Gasperini P., 2010. Deliverable n. 2 of the UR2.05 in the INGV-DPC S1 project (2007-2009). INGV-DPC Internal report and database.

Table S4. Seismic source parameters of the main earthquakes of the time-space cluster of seismic events that hit the Northern Apennines in the period 1916-1920. The list also includes: (i) selected moderate earthquakes (Mw≥5±0.25) that struck the study region in the period 1900-1915, before the onset of the 1916-1920 seismic cluster, (ii) the large Avezzano earthquake of 1915, and (iii) the moderate events of Lunigiana in 1921 (see also Fig. 1). The Coulomb stress changes (ΔCFF) are calculated at the lower and upper boundaries of a seismogenic layer defined by an upper boundary D^1, fixed at 4.5 km depth (based on Solarino. 2005), and a lower boundary D^2 calculated from the 75% of seismicity cutoff (e.g., Chiarabba et al., 2005). Fault parameters (including depth) for the more external thrust faults are taken from DISS Working Group (2015). The cumulative Coulomb stress changes (ΔCFF_{cum}) for a given earthquake are reported as a range of minimum and maximum values obtained from equation (3) using the mean and standard deviation associated with each source-receiver pair.

Earthquake	date	Mw	Lat N	Long E	Causative fault					ΔCFF (bar)																	Cumulative ΔCFF_{cum} (bar)
					strike (deg)	dip (deg)	rake (deg)	depth (km)																				
								D^1	D^2																			
Garfagnana	1902 03 05	4.96[a]	44.093[a]	10.463[a]	320[c]	60[c]	-95	4.5[c]	10.5[c]	Source																	
Garfagnana	1902 08 04	5.14[a]	44.200[a]	10.200[a]	320[c]	60[c]	-95	4.5[c]	10.3[c]		Source																	
Lunigiana	1903 07 27	5.25[a]	44.329[a]	9.953[a]	330[c]	60[c]	-100[c]	4.5[c]	10.0[c]			Source																
Reggiano	1904 02 25	5.05[a]	44.490[a]	10.640[a]	115[c]	35[c]	90[c]	4.5[c]	28.6[c]				Source															
Frignano	1904 06 10	5.03[a]	44.200[a]	10.842[a]	uncertain source																							
Pistoia	1904 11 17	5.15[a]	43.964[a]	10.820[a]	uncertain source																							
Po Plain	1909 01 13	5.53[a]	44.579[a]	11.688[a]	115[c]	30[c]	90[c]	4.5[c]	10.0[c]					Source														
Murlo	1909 08 25	5.37[a]	43.150[a]	11.403[a]	uncertain source																							
Romagna	1911 02 19	5.28[a]	44.117[a]	12.075[a]	120[c]	35[c]	90[c]	4.5[c]	17.5[c]						Source													
Romagna	1911 03 20	5.29[a]	44.133[a]	12.100[a]	120[c]	35[c]	90[c]	4.5[c]	17.5[c]							Source												
Rimini	1911 03 26	5.00[a]	44.061[a]	12.507[a]	132[b]	30[b]	90[b]	3.0[b]	6.0[b]								Source											
Chianti	1911 09 13	5.19[a]	43.436[a]	11.343[a]	uncertain source																							
Val Lamone	1913 07 21	4.78[a]	44.041[a]	11.762[a]	uncertain source																							
Val Taro	1913 11 25	4.84[a]	44.551[a]	10.195[a]	98[a]	35[a]	90[a]	4.5[c]	27.0[c]									Source										
Garfagnana	1914 10 27	5.76[a]	43.911[a]	10.598[a]	125[c]	60[c]	-90[c]	4.5[c]	8.9[c]										Source									
Avezzano	1915 01 13	7.00[a]	41.961[b]	13.606[b]	135[b]	60[b]	-90[b]	–	10.0[c]											Source								
Reggio E.	1915 10 10	5.02[a]	44.732[a]	10.469[a]	110[c]	30[c]	90[c]	4.5[c]	15.9[c]												Source							
Rimini	1916 05 17	5.95[a]	44.092[b]	12.659[b]	132[b]	30[b]	90[b]	3.0[b]	7.0[b]								-0.01±0.008			-0.001±0		Source						-0.019/-0.003
Rimini	1916 08 16	6.14[a]	44.039[b]	12.741[b]	132[b]	30[b]	90[b]	3.0[b]	7.0[b]								0.001±0.001			-0.001±0		1.084±0.481	Source					0.602/1.566
Adriatico	1916 08 16	5.50[a]	44.039[e]	12.741[e]	132[e]	30[e]	90[e]	3.0[b]	7.0[b]											-0.001±0		1.056±0.512		Source				0.543/1.566
Adriatico[d] (4 events)	1916 08 15/16	5.40[a]	44.039[d]	12.741[d]	132[d]	30[d]	90[d]	3.0[b]	7.0[b]											-0.001±0		1.056±0.512			Source			–
Valtiberina	1917 04 26	5.89[a]	43.479[b]	12.177[b]	315[b]	50[c]	-85[c]	4.5[c]	8.7[c]					–	–	–	0.001±0			0.005±0		0.012±0.001	0.030±0.004	0.003±0	0.008±0	Source		0.054/0.064
Romagna	1918 11 10	5.88[a]	43.917[a]	11.933[a]	310[c]	65[c]	-95[c]	4.5[c]	10.0[c]					–	0.015±0.01	0.014±0.007	0.001±0.001			0.003±0		0.009±0.002	0.007±0.004	0.001±0	0.002±0.002	0.007±0.001	Source	0.041/0.077
Mugello	1919 06 29	6.29[a]	43.957[a]	11.482[a]	118[c]	65[c]	-85[c]	5.5[c]	14.7[c]					0.004±0.001	–	0.001±0.001	–		0.002±0.001	0.002±0	–	0.001±0.001	–	–	–	0.002±0.001	0.012±0.004	Source		0.015/0.033
Garfagnana	1920 09 06	5.13[a]	44.250[a]	10.283[a]	244[e]	52[e]	-84[e]	4.5[c]	10.7[c]	0.001±0.001	0.003±0.002	-0.005±0.003	-0.001±0.001	–	–			–	0.001±0.001	–	0.001±0.001	–	–	–	–	–	–	0.003±0.001	Source		-0.005/0.011
Garfagnana	1920 09 07	6.48[a]	44.179[b]	10.315[b]	320[c]	60[c]	-95[c]	6.5[c]	10.2[c]	0.005±0.001	0.010±0.001	0.002±0	0.002±0.001	–				0.001±0.001	0.008±0.001	0.001±0	–	–	–	–	–	–	–	0.003±0	0.008±0.020	Source	0.015/0.065
Lunigiana	1921 05 07	4.73[a]	44.369[b]	9.908[b]	330[c]	60[c]	-100[c]	4.5[c]	10.0[c]	–	–	0.255±0.192	–	–				–	0.001±0	0.001±0	0.001±0	–	–	–	–	–	–	0.001±0	-0.002±0.001	0.122±0.024	0.163/0.596
Lunigiana	1921 11 29	4.63[a]	44.376[a]	9.987[a]	135[c]	60[c]	-105[c]	4.5[c]	10.0[c]	–	0.001±0.001	0.158±0.377	–	–				–	0.001±0	0.001±0	0.001±0	–	–	–	–	–	–	0.001±0	-0.001±0.001	0.148±0.04	-0.103/0.724

[a]CPTI11 catalogue (Rovida et al., 2011; http://emidius.mi.ingv.it/CPTI11/)
[b]DISS Working Group, 2015 (version 3.2.0; http://diss.rm.ingv.it/diss/)
[c]this study
[d]group of four earthquakes with Mw≈5.4 assumed with the same hypocentral position as the Mw≈6.1 main shock
[e]source parameters assumed from Stramondo et al. (2014)

Table S5. Earthquakes (period 1920-1950) that hit the external sectors of the Northern Apennines and Po Plain after the major extensional ruptures of 1917-1920 in the axial zone (macroseismic data from Rovida et al., 2011). The seismicity is calculated over the area indicated in Fig. 12a. The cumulative Coulomb stress changes (ΔCFF_{cum}) imparted by axial normal faults and/or external thrusts (in red text) on the inferred receiver faults are reported. The ΔCFF_{cum} for a given earthquake is reported as a range of minimum and maximum values obtained from equation (3) using the mean and standard deviation associated with each source-receiver pair.

	Earthquake	Mw	Lat N	Long E	Causative fault					ΔCFF (bar)												Cumulative ΔCFF_{cum} imparted by axial normal faults	Cumulative ΔCFF_{cum} imparted by thrust faults
					strike (deg)	dip (deg)	rake (deg)	depth (km) D[1]	depth (km) D[2]														
Avezzano	1915 01 13	7.00[a]	41.961[b]	13.606[b]	135[b]	60[b]	-90[b]	-	10.0[c]	Source													
Rimini	1916 05 17	5.95[a]	44.092[b]	12.659[b]	132[b]	30[b]	90[b]	3.0[b]	7.0[b]		Source												
Rimini	1916 08 16	6.14[a]	44.039[b]	12.741[b]	132[b]	30[b]	90[b]	3.0[b]	7.0[b]			Source											
Adriatico	1916 08 16	5.50[a]	44.039[e]	12.741[e]	132[e]	30[e]	90[e]	3.0[b]	7.0[b]				Source										
Adriatico[d] (4 events)	1916 08 16/15	5.40[a]	44.039[d]	12.741[d]	132[e]	30[e]	90[e]	3.0[b]	7.0[b]					Source									
Valtiberina	1917 04 26	5.89[a]	43.479[b]	12.177[b]	315[b]	50[c]	-85[b, c]	4.5[c]	8.7[c]						source								
Romagna	1918 11 10	5.88[a]	43.917[a]	11.933[a]	310[c]	70[c]	-95[b, c]	4.5[c]	10.0[c]							source							
Mugello	1919 06 29	6.29[a]	43.957[a]	11.482[a]	118[c]	65[c]	-85[b, c]	5.5[c]	14.7[c]								source						
Garfagnana	1920 09 07	6.48[a]	44.179[b]	10.315[b]	320[c]	60[c]	-95[b, c]	6.5[c]	10.2[c]									source					
Modigliana	1920 06 08	4.49[a]	44.100[a]	11.800[a]	110[c]	35[c]	90[c]	4.5[c]	24.8[c]						-0.001±0	-0.020±0.012	0.005±0.063	–				-0.090 /0.059	
Ferrarese	1922 05 24	4.34	44.821	11.408	110[c]	30[c]	90[c]	4.5[c]	9.5[c]							–	0.006±0.001	0.007±0.001				0.013/0.013	
Adriatico	1922 10 11	4.50[a]	43.700[a]	13.450[a]	122[c]	30[c]	90[c]	3[b]	6.5[b]						–	–	–	–				–	
Formigine	1923 06 28	4.88	44.595[a]	10.799[a]	107[c]	30[c]	90[c]	4.5[c]	15.1[c]	0.000	–	–	–	–	–	–	-0.001±0.002	0.038±0.005				0.03/0.044	
Mondolfo	1924 01 02	5.36[a]	43.751[b]	13.096[b]	122[b]	30[b]	90[b]	3.0[b]	7.5[b]	0.000	0.003±0.001	0.011±0.003	0.001±0	0.004±0	0.002±0.001	–	-0.001±0	–	source			-0.001/0.001	0.016/0.022
Adriatico	1928 05 30	4.88	43.724	13.063	122[c]	30[c]	90[c]	3.0[b]	7.5[b]		0.004±0.001	0.013±0.003	0.001±0	0.004±0	0.002±0.001	–	-0.001±0	–	-1.392±2.079				-3.453/ 0.712
Carpi	1928 06 13	4.78	44.797	10.872	80[c]	30[c]	90[c]	4.5[c]	10.0[c]		–	–	–	–	–	–	0.002±0	0.011±0.001	–			0.012/0.013	
Apiro	1929 01 22	4.72[a]	43.383[a]	13.150[a]	120[b]	20[b]	90[b]	4.5[c]	10.0[c]		–	–	–	–	0.001±0	–	–	–	–			0.001/0.001	
Bologna	1929 04 10	5.03	44.447[a]	11.385[a]	110[c]	35	90[c]	2.0[b]	8.0[b]	0.000	–	0.001±0.001	–	–	-0.001±0.001	-0.001±0	0.021±0.005	0.004±0.001	–			0.018/0.030	0.001/0.001
Bologna	1929 04 12	5.10	44.500[a]	11.333[a]	98[c]	35[b]	90[c]	2.0[b]	8.0[b]	0.000	–	–	–	–	–	-0.001±0.001	0.019±0.003	0.002±0.001	–			0.016/0.024	
Bologna	1929 04 20	5.34	44.477[b]	11.157[b]	98[b]	35[b]	90[b]	2.0[b]	8.0[b]	0.000	–	–	–	–	–	–	0.005±0.002	0.005±0.001	–	source		0.006/0.012	
Senigallia	1930 10 30	5.81[a]	43.643[b]	13.260[b]	142[b]	30[b]	90[b]	3.0[b]	7.5[b]	-0.002	0.002±0.001	0.004±0.001	–	–	0.001±0	–	–	–	0.004±0.001	–	source	0.001/0.001	0.007/0.012
Ferrarese	1931 03 27	4.81	44.821	11.764	110[c]	30[c]	90[c]	4.5[c]	10.0[c]	–	–	–	–	–	–	–	0.009±0.001	0.003±0	–	–	–	0.012/0.013	
Faentino	1931 04 05	4.80	44.194	11.710	105[c]	30[c]	90[c]	4.5[c]	24.8[c]	-0.001	0.001±0	0.001±0.001	–	–	-0.001±0.001	-0.004±0.003	0.063±0.113	-0.002±0.001	–	–	–	-0.061/0.174	0.002/0.003
C. S.Pietro	1931 04 11	5.10	44.417	11.600	110[c]	30[c]	90[c]	4.5[c]	10.0[c]	-0.001	0.001±0.001	0.001±0	–	–	–	-0.001±0.001	0.050±0.007	0.001±0.001	–	0.001±0.001	–	0.042/0.058	0.002/0.004
Mondolfo	1931 06 25	4.51	43.800	13.100	122[c]	30[c]	90[c]	3.0[b]	7.5[b]		0.004±0.001	0.012±0.005	–	–	0.001±0	–	-0.001±0	–	-0.125±0.754	–	0.012±0.01	–	-0.861/0.667
Vignola	1934 09 18	4.57	44.495	11.012	98[c]	30[c]	90[c]	4.5[c]	27.9[c]		–	–	–	–	–	–	-0.003±0.001	0.010±0.005	–	0.004±0.018	–	0.001/ 0.013	-0.015/0.022
Faentino	1935 06 05	5.16	44.260	11.876	120[c]	30[c]	90[c]	4.5[c]	7.8[c]	-0.001	0.002±0	0.002±0.001	–	–	–	-0.005±0.003	0.061±0.007	–	–	–	–	0.046/ 0.066	0.004/0.005
Adriatico	1937 02 26	4.43	43.900	13.100	122[c]	30[c]	90[c]	3.0[b]	7.5[b]		0.005±0.001	0.017±0.009	0.002±0.001	0.005±0.002	0.002±0	–	-0.001±0	–	-0.015±0.017	–	0.008±0.003	0.001/0.001	-0.011/0.054
Mondolfo	1937 11 22	4.43	43.833	13.083	122[c]	30[c]	90[c]	3.0[b]	7.5[b]		0.004±0.001	0.01±0.005	0.002±0.001	0.004±0	0.002±0	–	-0.001±0	–	0.008±0.101	–	0.009±0.004	0.001/0.001	-0.073/0.151
Modenese	1937 12 10	5.17	44.334	10.834	105[c]	30[c]	90[c]	4.5[c]	26.6[c]						–	–	-0.005±0.002	0.011±0.017	–	0.001±0.001	–	-0.013/0.026	0.001/0.002
Noceto	1940 05 01	5.15	44.800	10.183	125[c]	30[c]	90[c]	4.5[c]	10.0[c]						–	–	-0.001±0	-0.009±0.001	–	–	–	-0.011/-0.009	
Urbania	1940 10 10	4.72[a]	43.700[a]	12.500[a]	130[b]	30[b]	90[b]	4.5[c]	19.1[c]		-0.003±0.012	-0.027±0.051	-0.002±0.004	-0.004±0.003	0.025±0.014	-0.001±0.001	-0.002±0	–	–	–	0.002±0.001	0.008/0.037	-0.105/0.037
Adriatico	1949 12 06	4.50[a]	43.700[a]	13.400[a]	122[c]	30[c]	90[c]	3.0[b]	6.5[b]						–	–	–	–	0.003±0.001	–	-0.225±0.167		-0.391/-0.054

[a]CPTI11 catalogue (Rovida et al., 2011; http://emidius.mi.ingv.it/CPTI11/)
[b]DISS Working Group, 2015 (http://diss.rm.ingv.it/diss/)
[c]this study
[d]group of four earthquakes with Mw≈5.4 assumed with the same hypocentral position as the Mw≈6.1 main shock

Table S6. Earthquakes that hit the axial zone of the Northern Apennines during the period from 07 September 1920 (the day of the Mw≈6.5 earthquake) to 1950 (macroseismic data from Rovida et al., 2011). The seismicity is calculated over the area indicated in Fig. 12a). The cumulative Coulomb stress changes (ΔCFF_{cum}) imparted by the 1917-1920 major extensional ruptures on the inferred receiver normal faults are reported. The ΔCFF_{cum} for a given earthquake is reported as a range of minimum and maximum values obtained from equation (3) using the mean and standard deviation associated with each source-receiver pair. Owing to the uncertain hypocentral localization, static stress changes are not calculated when the seismic events fall along the boundary between positive and negative lobes of Coulomb stress changes (see Fig.11a).

Locality	Earthquake	Mw	Lat N	Long E	Inferred receiver fault					1917 (Mw≈5.9) Valtiberina source	1918 (Mw≈5.9) Romagna source	1919 (Mw≈6.3) Mugello source	1920 (Mw≈6.5) Garfagnana source	Cumulative ΔCFF_{cum} (bar)
					strike (deg)	ΔCFF (bar)	rake (deg)	depth (km)		ΔCFF (bar)	ΔCFF (bar)	ΔCFF (bar)	ΔCFF (bar)	
								D^1	D^2					
Garfagnana	1920 09 07	4.96[a]	44.250[a]	10.283[a]	135[c]	60[c]	-90[c]	4.5[c]	10.7[c]	–	–	0.003±0.001	–[d]	–[d]
Garfagnana	1920 09 07	4.68[a]	44.250[a]	10.283[a]	135[c]	60[c]	-90[c]	4.5[c]	10.7[c]	–	–	0.003±0.001	–[d]	–[d]
Garfagnana	1920 09 07	4.73[a]	44.317[a]	10.283[a]	320[c]	60[c]	-90[c]	4.5[c]	13.7[c]	–	–	0.002±0	0.735±0.408	0.329/1.145
Garfagnana	1920 12 27	4.76[a]	44.250[a]	10.283[a]	135[c]	60[c]	-90[c]	4.5[c]	10.7[c]	–	–	0.003±0.001	–[d]	–[d]
Castiglione	1921 04 05	4.72[a]	43.300[a]	12.500[a]	130[b]	20[b]	-90[b]	4.5[c]	9.0[c]	0.014±0.005	0.001±0	0.001±0	–	0.011/ 0.021
Lunigiana	1921 05 07	4.73[a]	44.369[b]	9.908[b]	330[c]	60[c]	-100[c]	4.5[c]	10.0[c]	–	–	0.001±0	0.120±0.022	0.099/ 0.144
Lunigiana	1921 11 29	4.63[a]	44.376[c]	9.987[c]	135[c]	60[c]	-105[c]	4.5[c]	10.0[c]	–	–	0.001±0	0.142±0.032	0.111/ 0.174
Pievepelago	1922 08 02	4.68[a]	44.200[a]	10.700[a]	305[c]	60[c]	-90[c]	4.5[c]	16.2[c]	–	0.001±0.001	0.006±0.002	-0.043±0.094	-0.133/0.059
Fanano	1924 06 12	4.86[a]	44.167[a]	10.733[a]	305[c]	60[c]	-90[c]	4.5[c]	14.8[c]	–	0.001±0	0.007±0.002	–[d]	–[d]
Frassinoro	1925 03 15	4.52[a]	44.282[a]	10.286[a]	125[c]	60[c]	-90[c]	4.5[c]	10.7[c]	–	–	0.002±0.001	1.650±2.676	-1.026/4.329
Bagnone	1926 11 18	4.51[a]	44.300[a]	10.000[a]	135[c]	60[c]	-105[c]	4.5[c]	10.0[c]	–	–	0.001±0	0.251±0.083	0.169/0.335
Bedonia	1927 10 28	4.88[a]	44.520[a]	9.590[a]	300[c]	60[c]	-90[c]	4.5[c]	10.9[c]	–	–	0.001±0	0.015±0.002	0.018/0.014
Cervarezza	1927 11 20	4.68[a]	44.400[a]	10.400[a]	305[c]	60[c]	-90[c]	4.5[c]	23.9[c]	–	–	0.002±0.001	-0.078±0.205	-0.281/0.13
Mt. Leto	1927 11 30	4.72[a]	43.400[a]	12.500[a]	130[c]	60[c]	-90[c]	4.5[c]	8.6[c]	0.035±0.006	0.002±0	0.002±0.001	0.001±0	0.034/0.047
Varese L.	1928 02 21	4.39[a]	44.440[a]	9.611[a]	300[c]	60[c]	-90[c]	4.5[c]	11.3[c]	–	–	0.001±0	0.023±0.002	0.022/0.026
Val di Taro	1928 07 20	4.46[a]	44.508[a]	9.587[a]	300[c]	60[c]	-90[c]	4.5[c]	10.9[c]	–	–	0.001±0	0.016±0.001	0.015/0.018
Fivizzano	1928 08 03	4.51[a]	44.200[a]	10.200[a]	320[c]	60[c]	-95[c]	4.5[c]	10.3[c]	–	–	0.002±0	–[d]	–[d]
Mugello	1929 07 18	5.02[a]	43.988[a]	11.507[a]	118[c]	65[c]	-85[c]	4.5[c]	9.5[c]	0.002±0	0.015±0.002	-0.882±5.304	0.006±0	-6.165/4.448
Fiumalbo	1930 05 24	4.81[a]	44.136[a]	10.724[a]	320[c]	60[c]	-90[c]	4.5[c]	14.8[c]	–	0.001±0.001	0.004±0.003	0.023±0.074	-0.049/0.1049
Fivizzano	1931 01 25	4.68[a]	44.250[a]	10.100[a]	135[c]	60[c]	-105[c]	4.5[c]	10.1[c]	–	–	0.001±0.001	0.288±0.198	0.082/0.488
Mugello	1931 09 05	4.80[a]	44.057[a]	11.367[a]	293[c]	75[c]	-90[c]	4.5[c]	12.5[c]	0.001±0	0.004±0.001	0.110±0.099	0.008±0	0.023/ 0.222
Mugello	1931 12 15	4.85[a]	44.070[a]	11.494[a]	300[c]	60[c]	-90[c]	4.5[c]	11.0[c]	0.002±0.001	0.008±0.002	-1.529±1.797	0.006±0.001	-3.313/0.286
Val di Taro	1934 06 13	4.99[a]	44.438[a]	9.725[a]	300[c]	60[c]	-90[c]	4.5[c]	11.1[c]	–	–	0.001±0	0.03±0.0032	0.028/ 0.034
Pavullo	1937 12 10	5.17[a]	44.334[a]	10.834[a]	300[c]	60[c]	-90[c]	4.5[c]	26.0[c]	–	–	0.008±0.003	-0.077±0.029	-0.101/-0.037
Mugello	1939 02 11	5.01[a]	44.002[a]	11.431[a]	118[c]	65[c]	-85[c]	4.5[c]	11.0[c]	0.001±0.000	0.01±0.001	-6.254±10.453	0.007±0	-16.69/4.219
Garfagnana	1939 10 15	5.08[a]	44.119[a]	10.255[a]	320[c]	60[c]	-90[c]	4.5[c]	10.2[c]	–	–	0.003±0	-5.03±4.770	-9.797/ -0.257
Versilia	1939 10 31	4.99[a]	44.233[a]	10.200[a]	320[c]	60[c]	-90[c]	4.5[c]	10.3[c]	–	–	0.002±0	–[d]	–[d]
Corniglio	1940 01 24	5.03[a]	44.467[a]	10.100[a]	310[c]	60[c]	-90[c]	4.5[c]	23.8[c]	–	–	0.001±0	0.094±0.017	0.078/ 0.112
Valtiberina	1948 06 13	5.05[a]	43.598[a]	12.127[a]	130[c]	50[c]	-90[c]	4.5[c]	9.6[c]	0.178±0.043	0.013±0.001	0.008±0.001	0.002±0	0.155/0.246
Firenzuola	1949 03 09	4.76[a]	44.100[a]	11.383[a]	310[c]	60[c]	-90[c]	4.5[c]	18.7[c]	0.001±0	0.005±0.002	0.232±0.11	0.004±0.001	0.129/ 0.355

[a]CPTI11 catalogue (Rovida et al., 2011; http://emidius.mi.ingv.it/CPTI11/)
[b]DISS Working Group, 2010 (http://diss.rm.ingv.it/diss/)
[c]this study
[d]ΔCFF not calculated because the seismic event lies along the boundary between positive and negative lobes of Coulomb stress changes