Unveiling Etna volcano flank dynamics from new paleoseismological findings along the Fiandaca Fault

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Supplementary material

1. **Historical surface faulting events along the Fiandaca fault system**
2. **Methods: sediment elemental composition**
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1. Historical surface faulting events along the Fiandaca fault system

Table S1: Historical known earthquakes along the Mt. Etna E flank around the Fiandaca Fault with the corresponding fault activated, high uncertainties until the year 1831; SR: surface ruptures evidence; SRL: surface rupture length; the slip amount is referred as heave (h), throw (t) and dextral strike-slip (ss).

d m y	I_{MCS}	I_{EMS}	*Mw*	*Epicentral location*	*SR*	*SRL (km)*	*Faults*	*Slip (cm)*	*References*
28/06/1329	7-8		-	E and S flank	yes	-	-	-	Nicolaus Specialis, 1791
13/07/1766	4-5		-	Acireale but highly felt in Zafferana E.	?	-	-	-	Recupero, 1815
04/1809	HF		-	Acireale, NE and E flank	yes	-	-	-	Ferrara, 1810 and 1818
26/08/1819	4-5		-	Acireale	?	-	-	-	Maravigna, 1819
28/08/1829	F		-	Surroundings of Acireale	?	-	-	-	Alessi, 1829-1835
5 and 9/05/1831	HF		-	Acireale	?	-	-	-	Alessi, 1829-1835
07/01/1875	-	7	3.8	Zerbate		1.5	Fiandaca	-	De Rossi, 1875
08/08/1894	-	8-9	4.6	Mazzasette-Fleri-Pennisi-Zerbate	yes	7-8	Fleri, Fiandaca, Aci Catena	at least 8-15 (t)	Platania & Platania, 1894; Riccò, 1894; Platania, 1915
07/12/1907	-	7	4.0	Fiandaca	yes	2,5	Fiandaca	at least 4 (h)	Platania, 1908
07/05/1914	-	6	3.2	Fiandaca	yes	2	Fiandaca	-	Platania, 1915
03/08/1931	-	6-7	3.5	Fiandaca	yes	-	Fiandaca	-	Cavasino, 1931; Imbò, 1935
27/03/1941	-	6-7	3.5	Fleri	?	-	Fleri	-	Ponte, 1941
19/06/1984	-	7	3.96	Fiandaca	yes	1.6	Fiandaca	2-3 (h) 20 (t) 1 (ss)	Benina et al., 1984; Patanè and Imposa, 1995
25/10/1984	-	8	4.4	Fleri	yes	1.7	Fleri	-	Villari, 1984; Patanè and Imposa, 1995
11/11/1997	-	5-6	3.38	Santa Maria la Stella	yes	0.9	Fiandaca	1.5 (h) 0.3 (t)	Azzaro, 1999; This study
19/04/2005	-	5-6	2.2	C.da Cubisia (Aci Catena)	yes	1	Fiandaca	2-3 (h)	Azzaro et al., 2006

| 25/09/2014 | - | 5-6 | 3.3 | Santa Maria la Stella | yes | 1 | Fiandaca | 1-2 (h) | Azzaro et al., 2020 |
| 26/12/2018 | - | 8 | 4.9 | Fleri-Pennisi-Fiandaca | yes | 8 | Fleri, Fiandaca, Aci Catena | 120 (h) 45 (t) 30 (ss) | Azzaro et al., 2022; Civico et al., 2019; Tringali et al., 2023a |

Table S2: Historical aseismic creep events occurred along the Aci Catena and Aci Platani faults; SRL: Surface Rupture Length.

y	*d*	*m*	*Fault*	*SRL (km)*	*Max Fault Slip (cm)*	*Reference*
1879	5	Aug	Aci Platani (PLA)	4-6	-	Silvestri, 1879
1886	7	Jun	Aci Platani (PLA)	1.5	5	Silvestri, 1893; Platania, 1920
1899	31	Mar	Aci Platani (PLA)	-	-	Platania, 1920; Imbò, 1935
early 1960s	-	-	Aci Catena (CAT)	-	-	Rasà et al., 1996
1980	-	Aug	Aci Catena (CAT)	1.5	-	Rasà et al., 1996
1984	-	Oct	Aci Catena (CAT)	1.5	-	Rasà et al., 1996
1985	-	Apr	Aci Catena (CAT)	1.5	10 (t) - 12 (h)	Rasà et al., 1996
2002	-	Oct-Dec	Aci Catena (CAT)	0.6	-	Tringali, 2023
2018	26	Dec	Aci Platani (PLA)	1.5	4 (h) - 1 (t)	Tringali et al., 2023a
2018	26	Dec	Aci Catena (CAT)	0.6	1-2 (h)	Tringali et al., 2023a
2023	-	mid Apr	Aci Catena (CAT)	2	3 (h)	Tringali, 2023

2. Methods: sediment elemental composition

Sediment samples, named WFIA and EFIA, were collected from the East and West walls of the FIA1 trench in U2 using polyethylene bags, keeping them away from the light and temperature changes. Elemental chemistry composition was determined via highly sensitive analytical Inductively Coupled Plasma-Mass Spectrometry (ICP-MS) technique. Samples were previously dried at 40°C for 12 h and homogenized and pulverized in an agate mill. Subsequently, 250 mg of sample underwent microwave-assisted digestion (ETHOS One, Milestone MLS, USA) using aqua regia (EPA, Method 3051) and HF to dissolve the silica recalcitrant fraction (Pinna et al., 2022). Ultrapure nitric and hydrochloric acid solutions were obtained by sub-boiling distillation of Carlo Erba (Italy) reagents 65% volume solution, using Milestone (USA) duoPUR. The digested solutions were then diluted with ultrapure water (18.2 MΩcm resistivity) and analysed using Rh as internal standard. The results are reported in Table S3 as mg of the extracted element by a unit of volume (kg) of dry sediment.

Table S3: Sediment chemical composition from samples collected in U2.

	Li	Be	Na	Mg	Al	K	Ca	Ti	Cr	Mn	Fe	Ni	Cu	Zn	As	Se	Rb	Sr	Zr	Ag	Cd	Sn	Ba	Pb
																							mg/kg	
WFIA	0,506	0,053	182,041	467,145	2240,924	81,698	560,991	181,538	0,559	35,589	2138,525	0,739	7,114	3,769	0,177	0,097	0,707	20,244	3,780	0,002	0,006	0,020	11,948	0,612
EFIA	0,497	0,053	185,503	442,501	2245,885	79,494	574,049	164,653	0,539	31,078	2118,228	0,543	8,604	3,041	0,151	0,097	0,654	20,747	4,238	0,002	0,004	0,021	12,314	0,513

The highlighted chemical composition shows similar values allowing to confirm that the collected samples are from the same horizon identified in the U2.

3. Geological profiles along the Mt. Etna eastern flank faults

We realized in total 22 geological cross sections numbered and distributed as follows:

− 1 to 13 along the Fiandaca fault, 1 to 6 crosscut the *sd* lava flow, 7 to 13 crosscut the 1329 lava flow (see location in Fig. S1a and S1b respectively).

− 14 to 17 crosscut the *at* lava flow along the Fiandaca, Aci Catena and Aci Platani faults (see location in Fig. S2a).

− 18 crosscut the Valverde formation along the Aci Platani Fault and 3 splays of the Aci Catena Fault (see location in Fig. S2b).

− 19 and 20 along the San Leonardello Fault crosscutting the *mi* and *mg* lava flow (see location in Fig. S3).

− 21 along the Santa Tecla Fault crosscutting the *ay* lava flow (see location in Fig. S3).

− 22 along the Trecastagni Fault crosscutting the *vg* lava flow (see location in Fig. S2).

The geological cross sections are showed in Figs. S4-11.
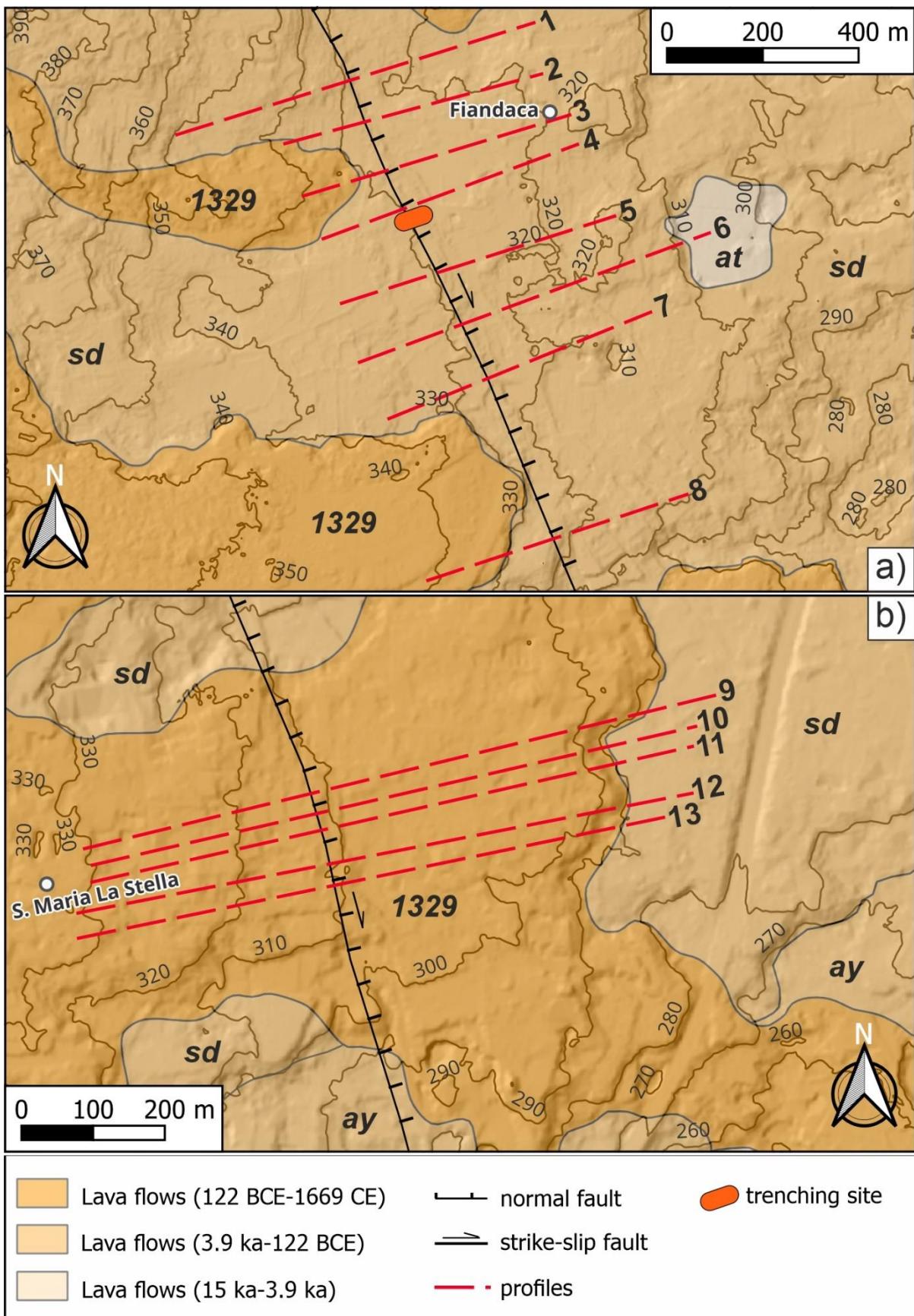
Figure S1: Geological maps with capable faults (modified after Branca et al., 2011; Azzaro et al., 2012; Barreca et al., 2013; ITHACA Working group, 2019) showing profiles along the Fiandaca Fault crossing: a) M. Salto del Cane lava flow (sd); b) 1329 lava flow. Other lava flows: Piano d'Api (ay); Aci Platani (at).
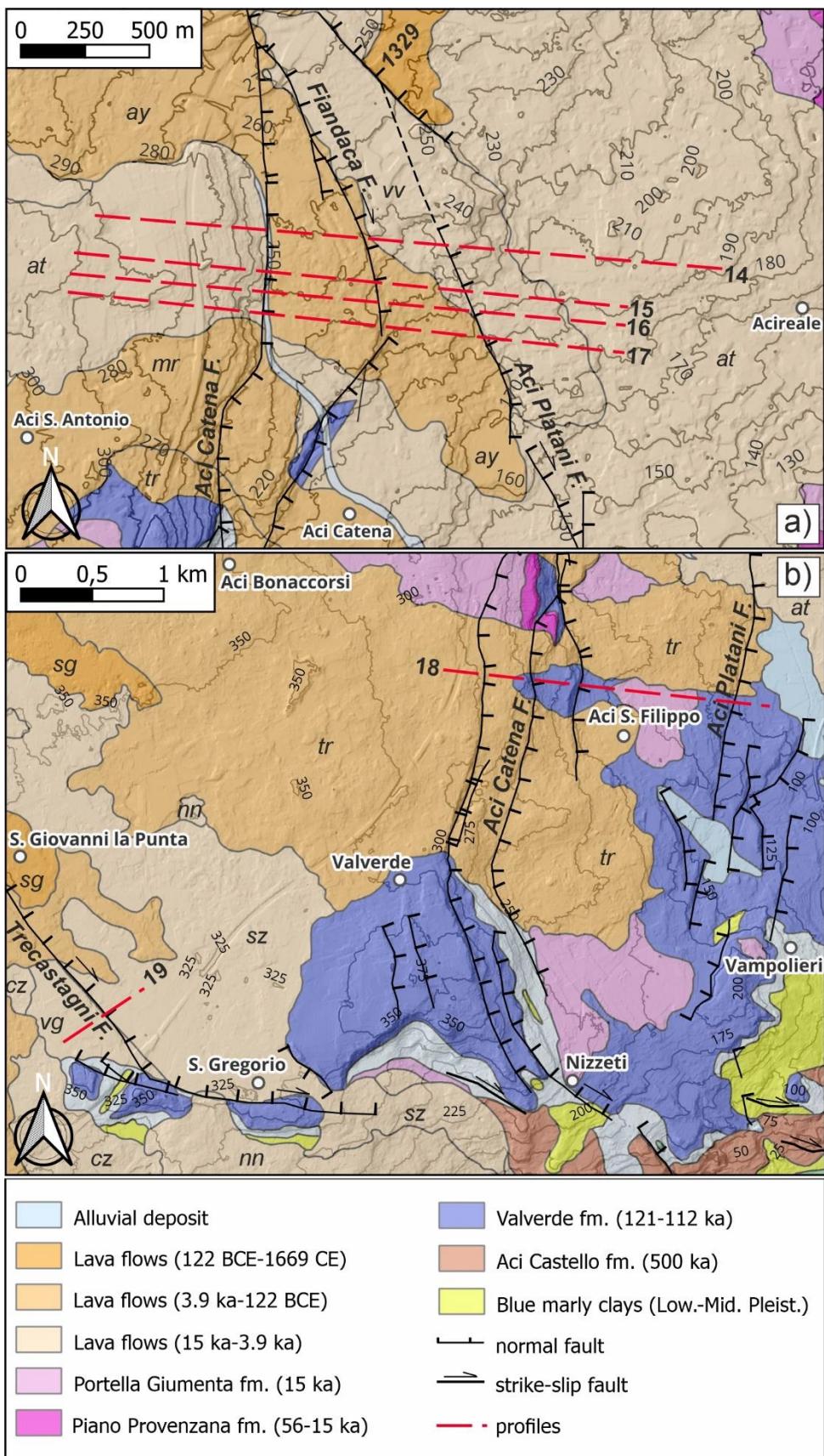
Figure S2: Geological maps with capable faults (modified after Branca et al., 2011; Azzaro et al., 2012; Barreca et al., 2013; ITHACA Working group, 2019) showing profiles along the Aci Catena, Aci Platani (a and b) and Trecastagni (b) faults crossing Mongibello lavas and Valverde formation. Lava flows: Aci Platani (at); Villa Vincenzina (vv); Vigna Grande (Vg); Cannizzaro (Nn); Cezza (Cz); San Gregorio (Sz); Piano d'Api (ay); Trecastagni (tr); M. Serra (mr).
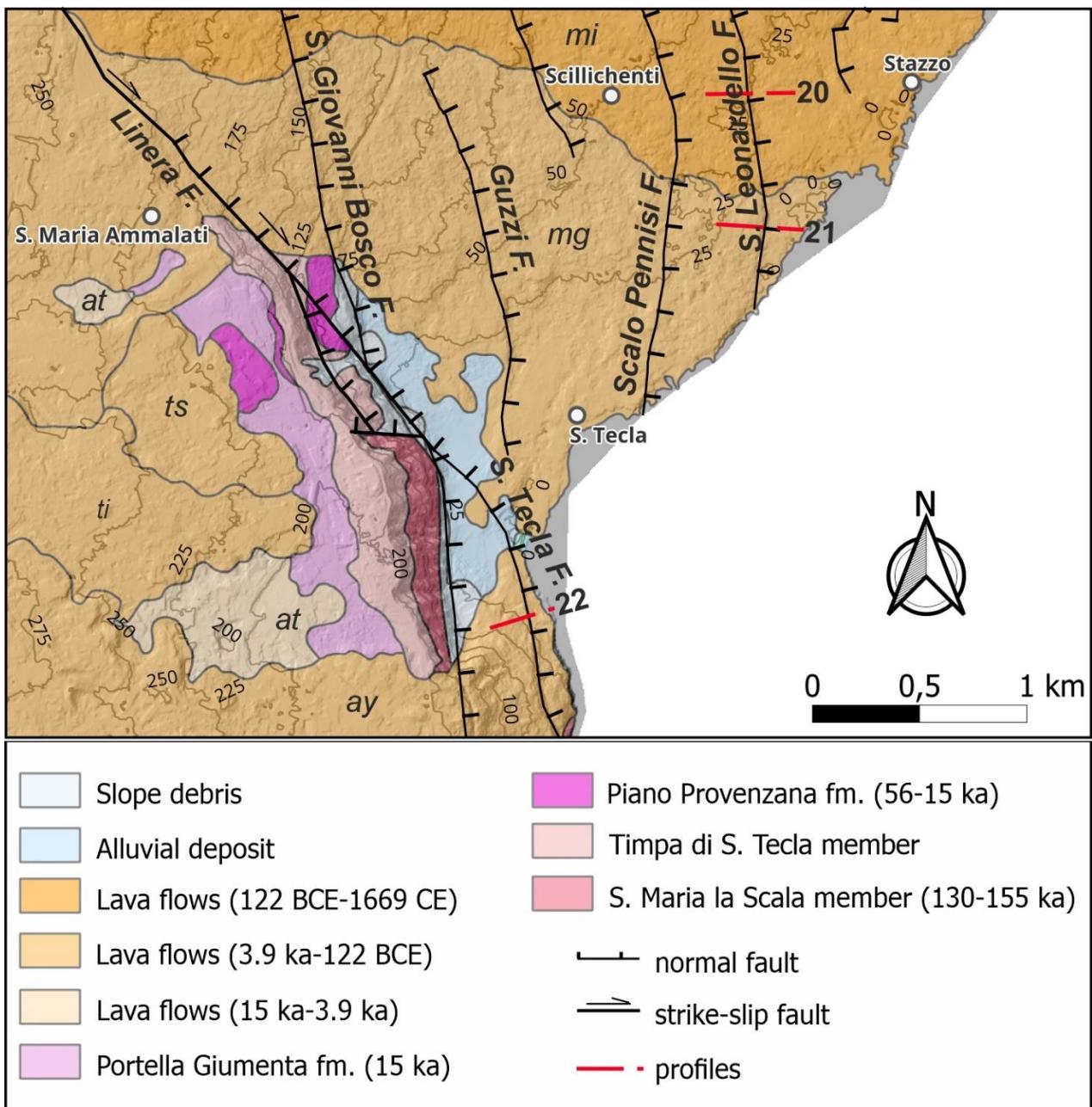
Figure S3: Geological map with capable faults (modified after Branca et al., 2011; Azzaro et al., 2012; Barreca et al., 2013; ITHACA Working group, 2019) showing profiles along the S. Leonardello and S. Tecla faults crossing the M. Ilice (mi), M. Gorna (mg) and Piano d'Api (ay) lava flows. Other lava flows: Aci Platani (at); Castelluccio (ts); Timone (ti).
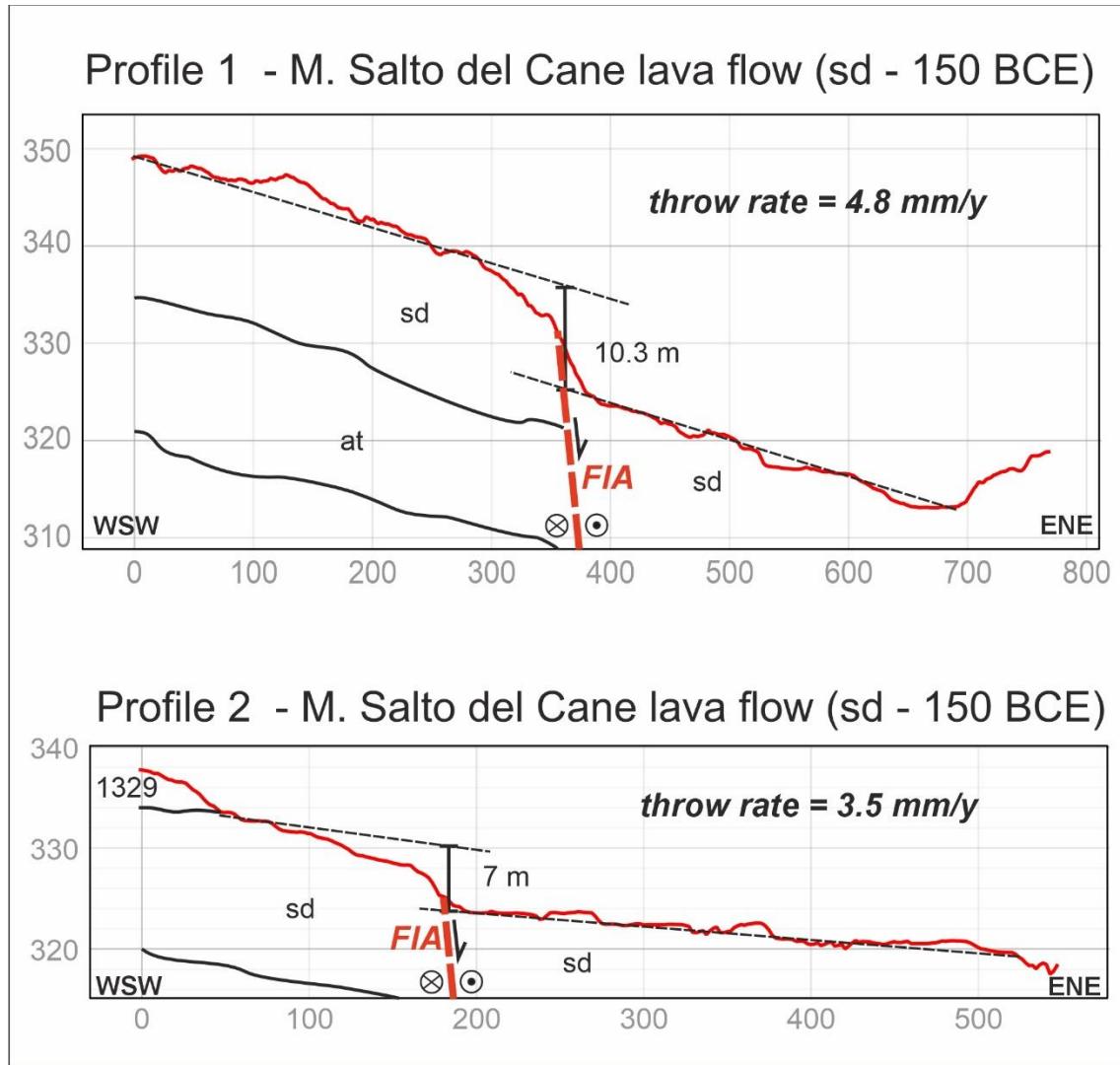
Figure S4: Geological profiles along the Fiandaca Fault (FIA); sd: M. Salto del Cane lava flow, at: Aci Platani lava flow.
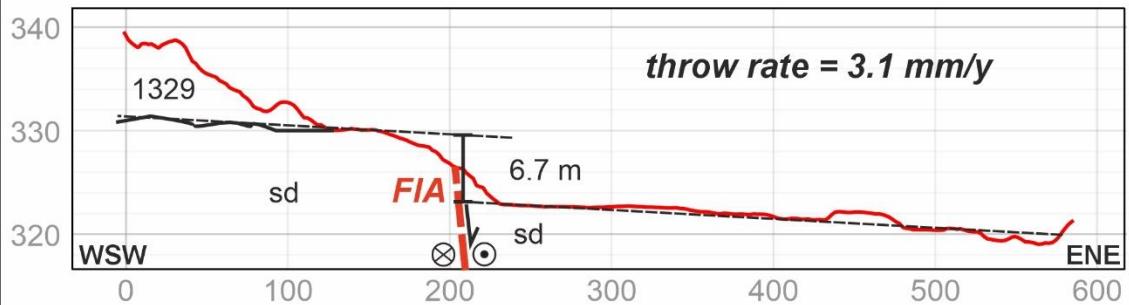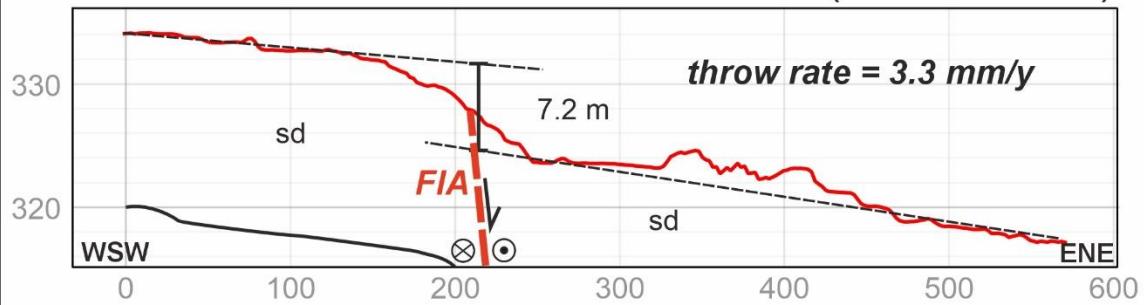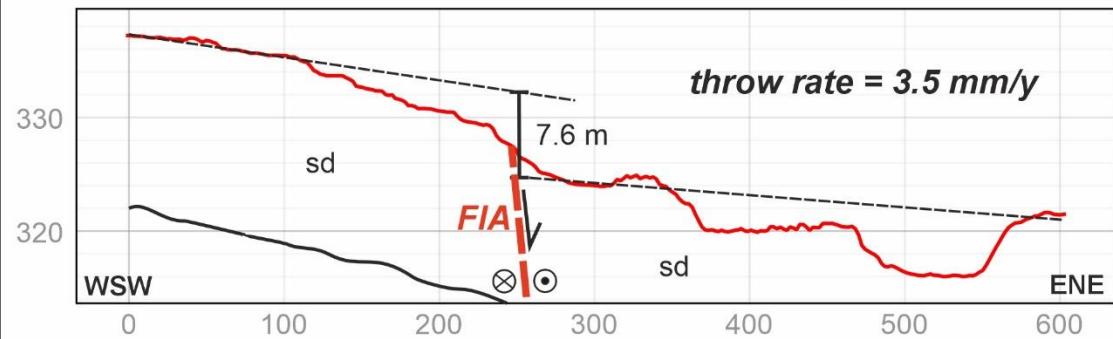
Figure S5: Geological profiles along the Fiandaca Fault (FIA); 1329: 1329 lava flow, sd: M. Salto del Cane lava flow.
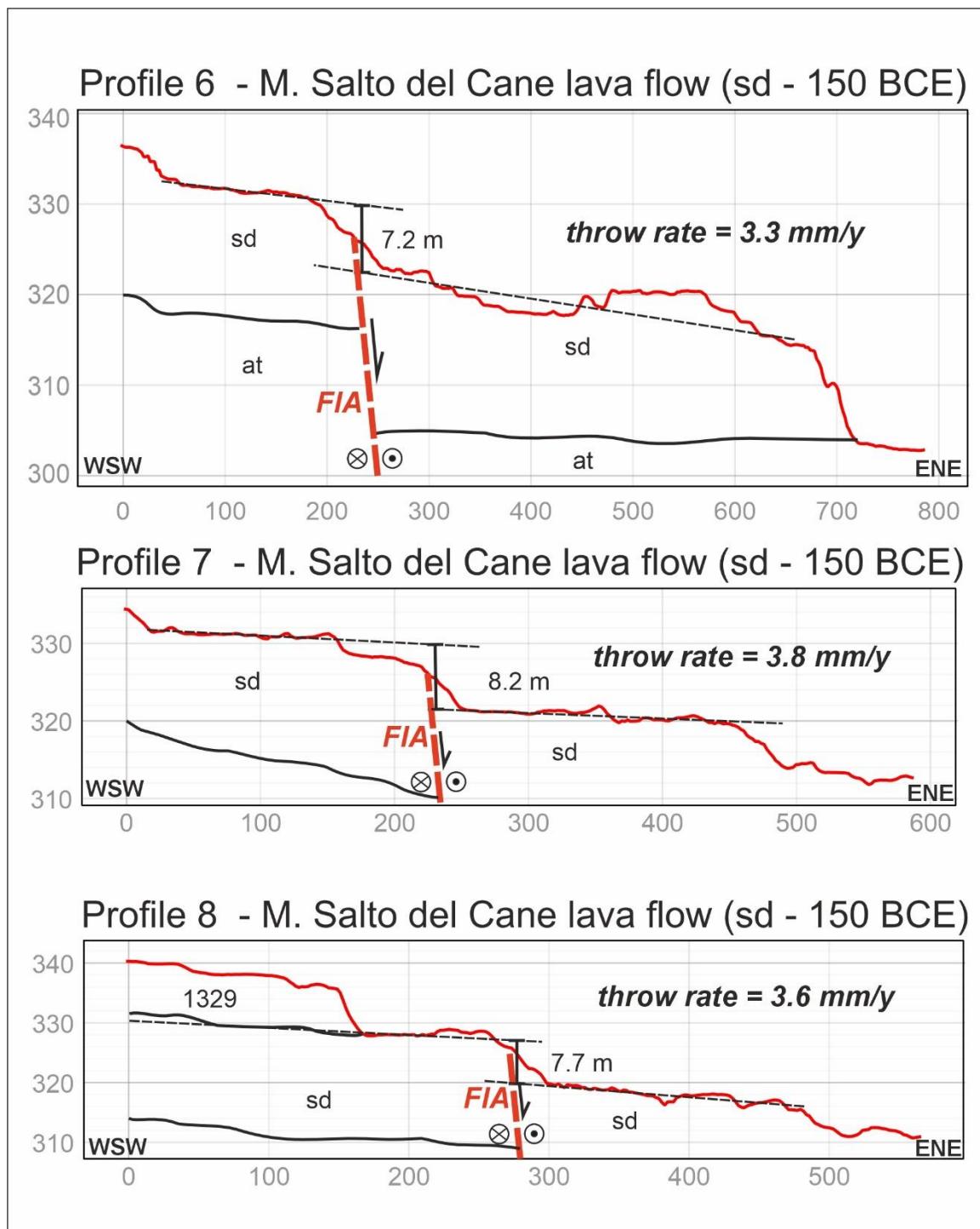
Figure S6: Geological profiles along the Fiandaca Fault (FIA); 1329: 1329 lava flow, sd: M. Salto del Cane lava flow, at: Aci Platani lava flow.
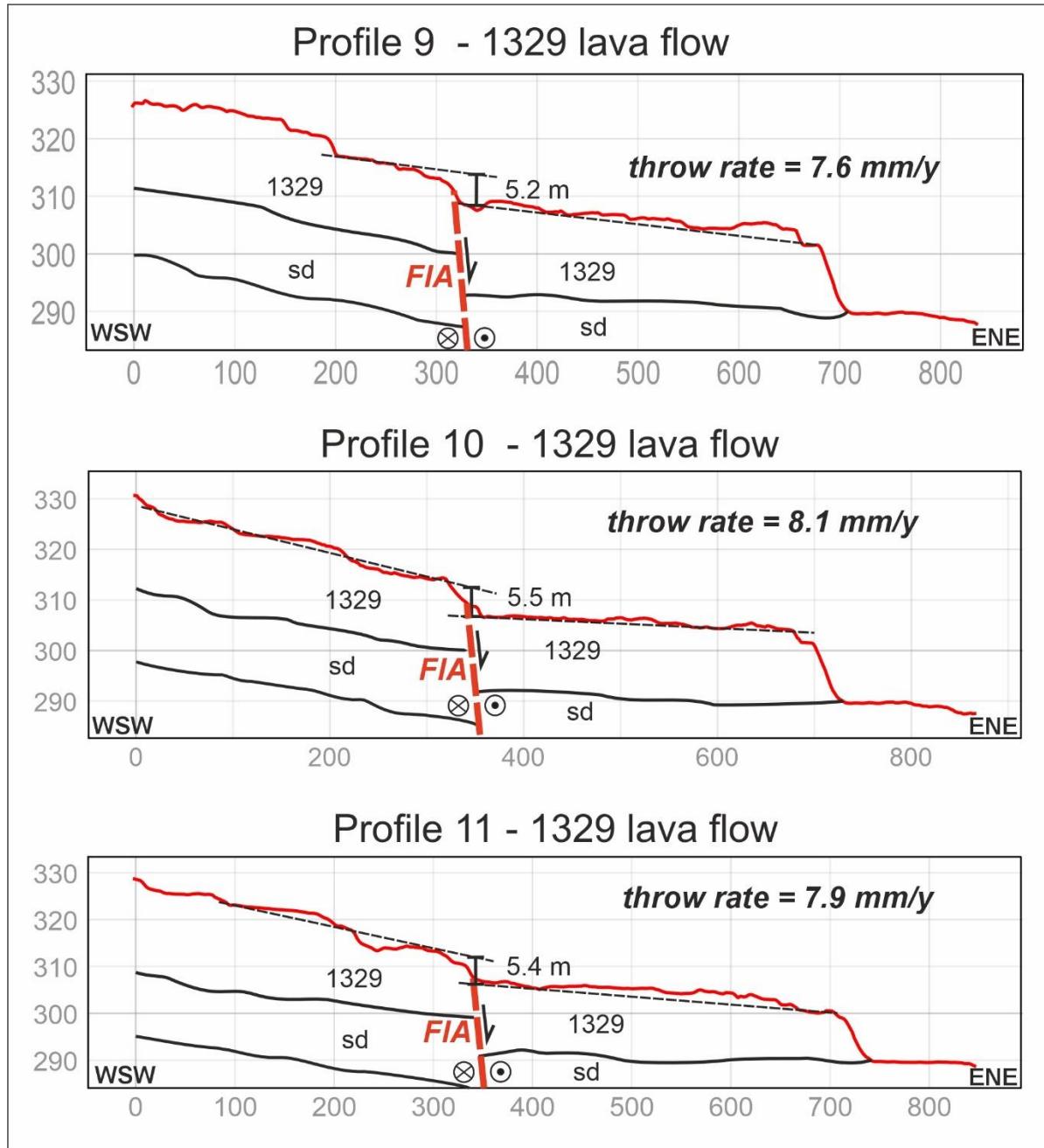
Figure S7: Geological profiles along the Fiandaca Fault (FIA); 1329: 1329 lava flow, sd: M. Salto del Cane lava flow.
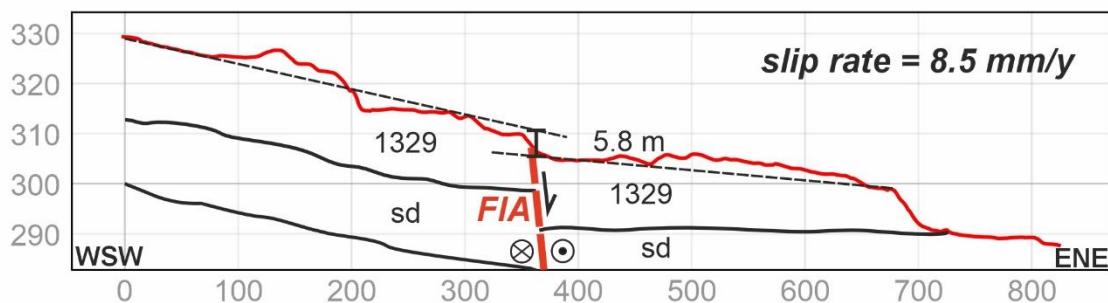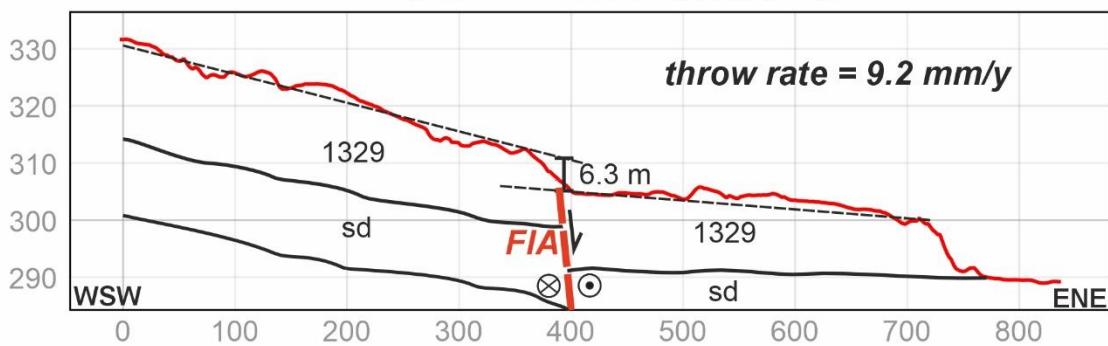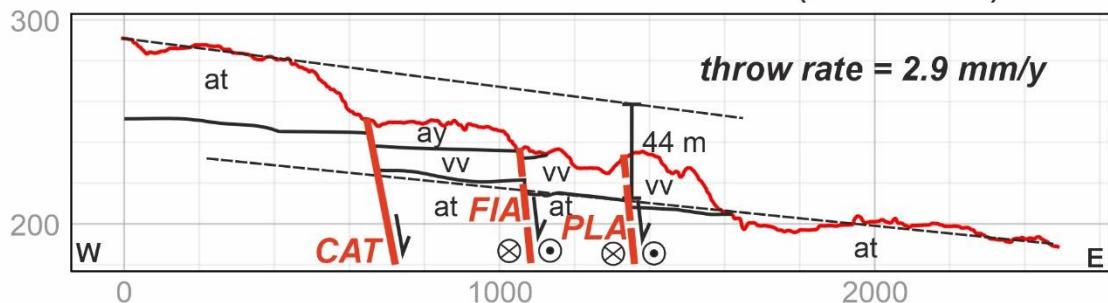
Figure S8: Geological profiles along the Fiandaca (FIA), Aci Catena (CAT) and Aci Platani (PLA) Faults; 1329: 1329 lava flow, sd: M. Salto del Cane lava flow, ay: Piano d'Api lava flow, vv: Villa Vincenzina lava flow, at: Aci Platani lava flow.
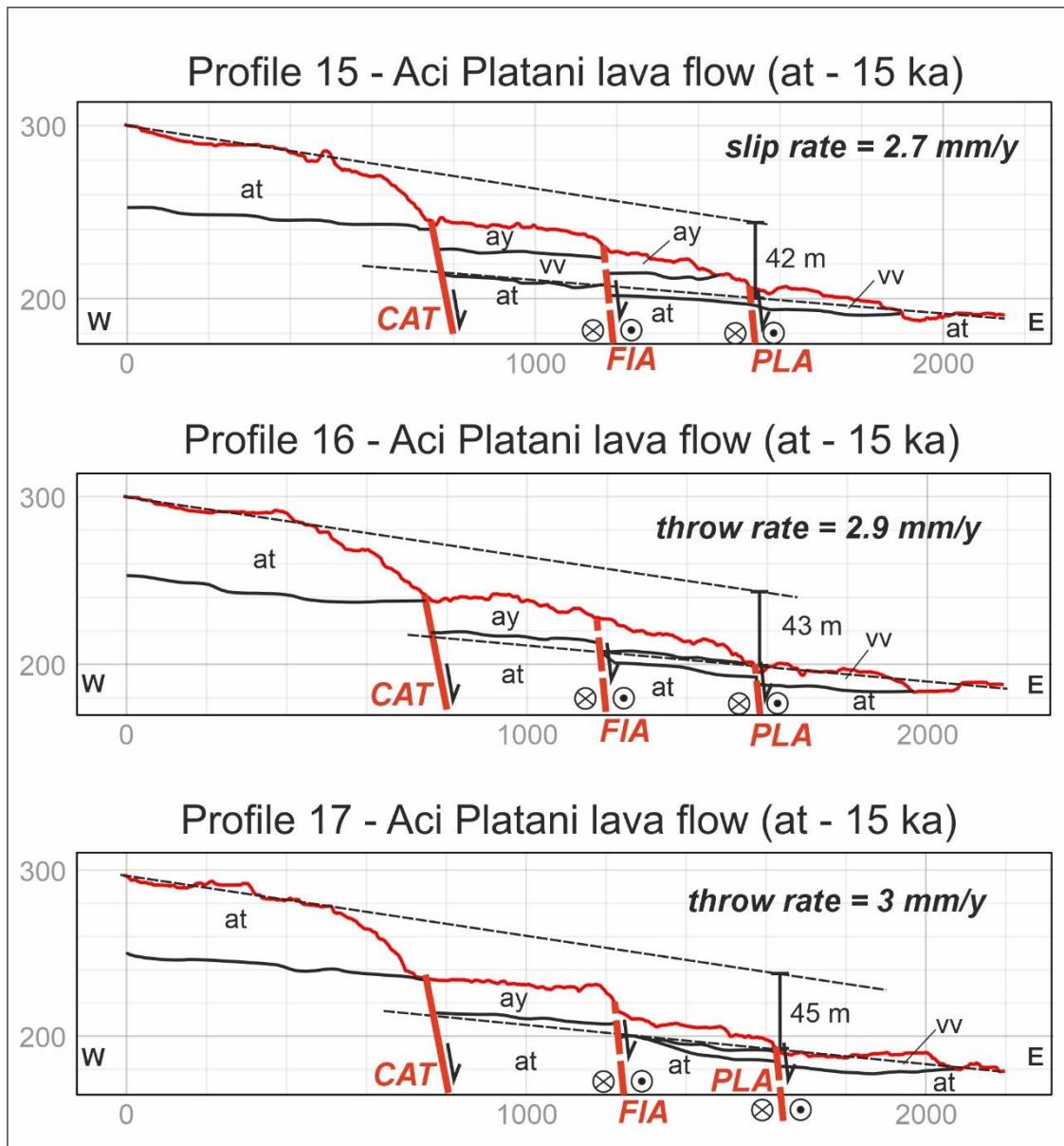
Figure S9: Geological profiles along the Fiandaca (FIA), Aci Catena (CAT) and Aci Platani (PLA) Faults; sd: M. Salto del Cane lava flow, ay: Piano d'Api lava flow, vv: Villa Vincenzina lava flow, at: Aci Platani lava flow.
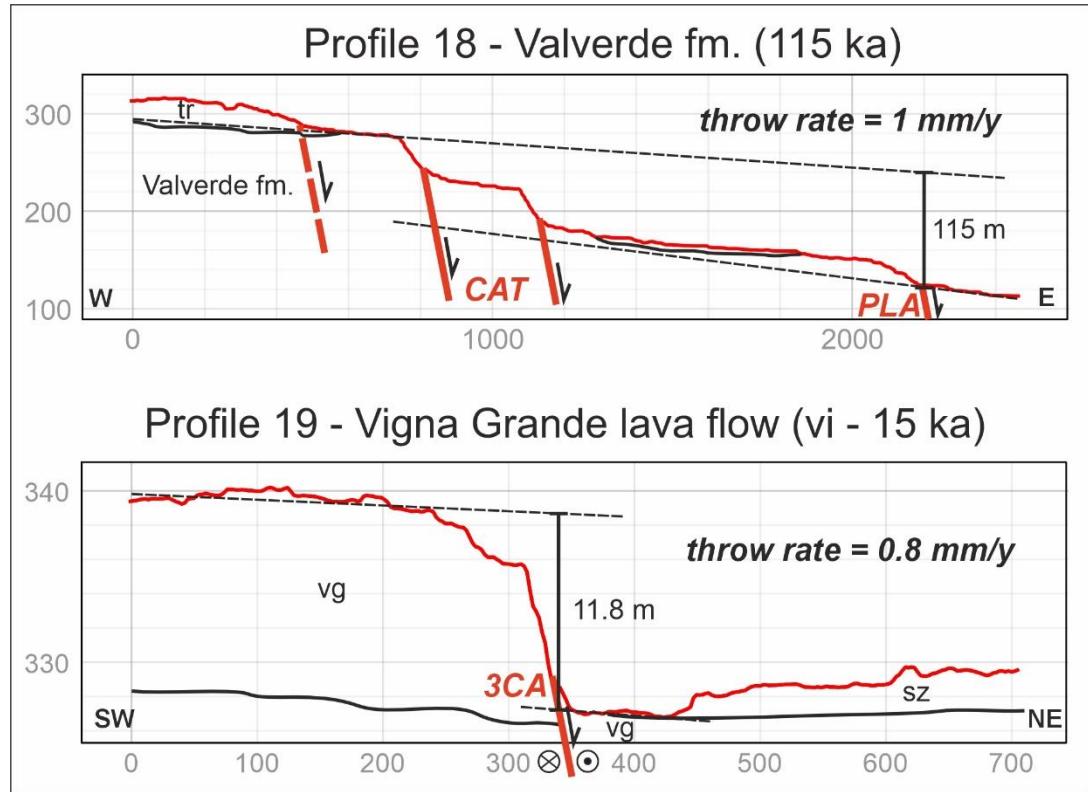
Figure S10: Geological profiles along the Aci Catena (CAT) and Aci Platani (PLA) Faults; tr: Trecastagni lava flow, vg: Vigna Grande lava flow.
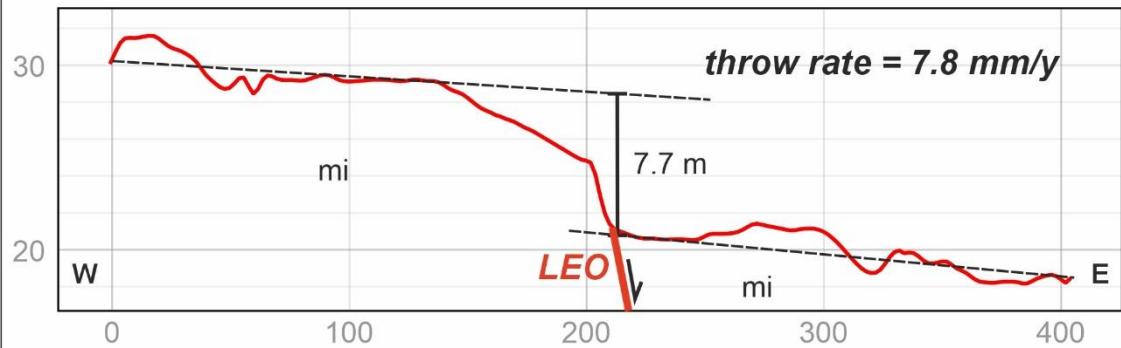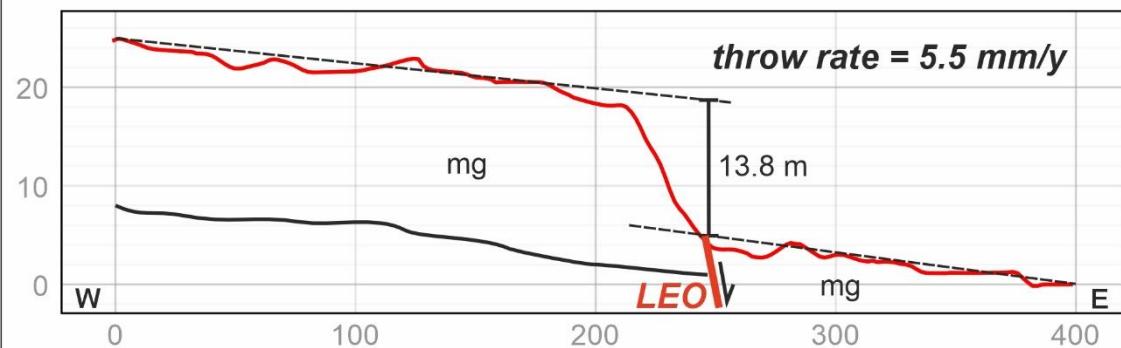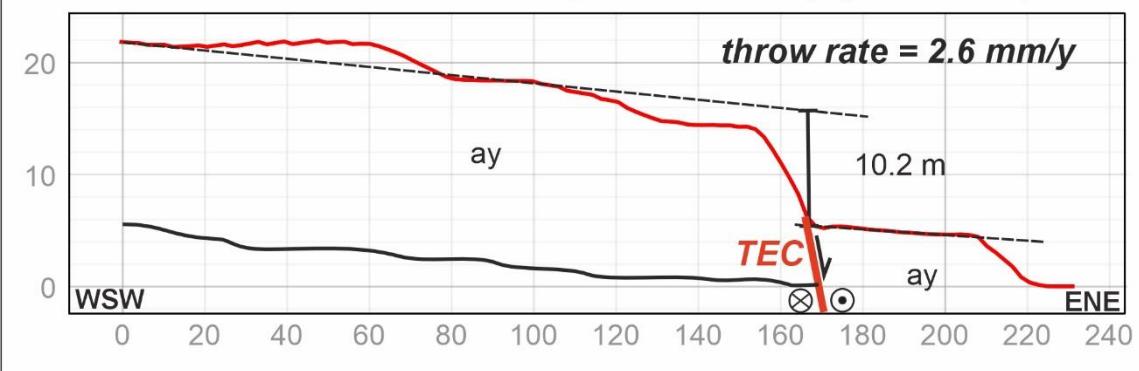
Figure S11: Geological profiles along the San Leonardello (LEO) and Santa Tecla (TEC) Faults; mi: M. Ilice lava flow, mg: M. Gorna lava flow, ay: Piano d'Api lava flow.

4. Historical Etna flank eruptions from 500 BCE to 2018 CE

Table S4: Historical flank eruptions from 500 BCE to 1600 CE (after Branca and Abate, 2019).

	Time	Experiment. dating	Flank	Locality	Rift	Alt. max (m asl)	Alt. min (m asl)	Strike (°)	Length (m)	References
Greek-Roman	396 BCE	~500 BCE	SE	M. Gorna	S	700		150		Branca & Abate, 2019
	420 BCE	420 BCE +370 -320	NW	Cardillo, eruptive fissures E of M. Spagnolo	-	1450		310		Branca & Abate, 2019
	240 BCE	240 BCE +350 -310	W	M. Ruvolo	W	1350		270		Branca & Abate, 2019
	135 BCE	200 BCE ± 200	S	Monpilieri	S	600	550	180		Branca & Abate, 2019
	160 BCE	160 BCE +190 -170	W	M. Minardo	W	1100		250		Branca & Abate, 2019
	126 BCE	150 BCE ± 200	SE	M. Salto del Cane	S	1400		180		Branca & Abate, 2019
		250 CE – 160 BCE	W	Poggio la Caccia	W	1900		270		Branca & Abate, 2019
		250 CE – 160 BCE	W	Bocche Vituddi	W	1000		250		Branca & Abate, 2019
		250 CE – 160 BCE	W	Vipera, eruptive fissures buried	W					Branca & Abate, 2019
		250 CE – 160 BCE	W	Cisterna, eruptive fissures buried	W					Branca & Abate, 2019
		250 CE – 160 BCE	W	Piano delle Ginestre, eruptive fissures buried	W					Branca & Abate, 2019
		250 CE – 160 BCE	W	M. Rifugio Galvarina	W	1900		260		Branca & Abate, 2019
	250 CE	250 ± 100	W	Rif. M. Palestra	W	1950		270		Branca & Abate, 2019
	252 CE	300 ± 100	S	Monpeloso	S	850		180		Branca & Abate, 2019
	350 CE	350 ± 100	W	Albero Bianco, eruptive fissures buried	W					Branca & Abate, 2019
	350 CE	350 ± 50	SE	S. Giovanni la Punta, eruptive fissures buried	S					Branca & Abate, 2019
	450 CE	450 ± 50	W	Bronte, eruptive fissures buried	W					Branca & Abate, 2019
	450 CE	450 ± 40	SE	Piazza S. Alfio, eruptive fissures buried	S					Branca & Abate, 2019

Early Middle Ages	500 CE	500 ± 50	S	Fossa della Nave, eruptive fissures buried by 1983 lava	S	1700	1650			Branca & Abate, 2019
	500 CE	500 ± 50	NE	Due Monti, eruptive fissures buried	ENE					Branca & Abate, 2019
	550 CE	550 ± 50	SE	M. Solfizio	S	1800				Branca & Abate, 2019
	700 CE	700 ± 80	S	Gallinara (Nicolosi), eruptive fissures buried	S					Branca & Abate, 2019
	700 CE	700 ± 50	E, VdB	Primoti (Zafferana N), eruptive fissures buried	-					Branca & Abate, 2019
	700 CE	700 ± 100	NE	Milicucco, eruptive fissures buried	ENE					Branca & Abate, 2019
	850 CE	850 ± 40	SE	Casa Scandurra, eruptive fissures buried	S					Branca & Abate, 2019
	950 CE	950 ± 30	NW	Murazzo Rotto (Alcantara)	-	1550	1450	350-360		Branca & Abate, 2019
	950 CE	950 ± 50	NW	Serra del Monte, eruptive fissures buried	-					Branca & Abate, 2019
	1000 CE	1000 ± 50	NE	M. Rinatu	ENE	1600		20-30		Branca & Abate, 2019
	1000 CE	1000 ± 50	S	M. Sona	S	1250	1170	200		Branca & Abate, 2019
Late Middle Ages	1020 CE	1020 ± 40	NE	Scorciavacca, eruptive fissures buried by 1865 lava	ENE	900	850			Branca & Abate, 2019
	1030 CE	1030 ± 40	SE	M. Ilice, lave tra Pozzillo e Stazzo	S	700		160		Branca & Abate, 2019
	1062 CE	1060 ± 50	W	M. Gallo and M. Testa scoria cones	W	1600	1500	240		Branca & Abate, 2019
	1120 CE	1120 ± 30	W	Galvarina, eruptive fissures buried	W					Branca & Abate, 2019
	1150 CE	1150 ± 30	W	M. Arso ovest	W	1450				Branca & Abate, 2019
	1160 CE	1160 ± 30	S	M.ti Arsi di S. Maria	S	460	360	170	2200	Branca & Abate, 2019
	1180 CE	1180 ± 30	NE	Linguaglossa	NE	1160	1380			Branca & Abate, 2019
	1200 CE	1200 ± 30	W	M. Forno	W	1550		240		Branca & Abate, 2019
	1250 CE	1250 ± 20	S	Casa Costarelli	S	1990	1910	170		Branca & Abate, 2019

	1250 CE	1250 ± 20	S	M. Nero degli Zappini	S	2000	1800	170		Branca & Abate, 2019
	1270 CE	1270 ± 20	SE	Montarello	S	900				Branca & Abate, 2019
	1285 CE	February	E, Vd B	Lava toward the present Macchia	ENE					Branca & Abate, 2019
	1329 CE	28 June–July?	E, Vd B	Rocca Musarra	ENE					Branca & Abate, 2019
	1329 CE	28 June–July?	SE	Monterosso	S					Branca & Abate, 2019
	1350 CE	1350 ± 50	NW	Rifugio M. Maletto, eruptive fissures buried	-					Branca & Abate, 2019
	1381 CE	6 August-?	S	Lava flow to the N of Catania, buried	S					Branca & Abate, 2019
	1408 CE	9–20 November	SE	Lava flow destroyed Pedara, eruptive fissures buried	S					Branca & Abate, 2019
	1444 CE		S	Lava towards Catania, buried	S					Branca & Abate, 2019
	1446 CE	25 Sept.-?	E, Vd B	Lava towards Zafferana, buried	-					Branca & Abate, 2019
	1536	23 March- 10 or 15 April	S	Lava towards Ragalna and Nicolosi	S	1550	1410	170		Branca & Abate, 2019
	1537	10–22 May	S	Lava destroyed Nicolosi, Mompilieri and Massa Annunziata	S	1840	1780			Branca & Abate, 2019
	1566	1 Nov.-?	NE	Eruptive fissures in Selletta Collabaxia, lava in Passopisciaro	NE	2000	1250	40-20		Branca & Abate, 2019
	1579	19 Sept.-?	SE	Lava towards Acireale, buried	-					Branca & Abate, 2019

Table S5: Historical flank eruptions from 1600 to 2018 CE.

Time	Locality	Flank	Rift	Alt. max (m asl)	Alt.e min (m asl)	Strike (°)	Lenght (m)	Tot Volume (10³ m³)	References
					Vents and eruptive fissures				
1607-1608		NE	NE	2600	-	-	-	158	Bencke et al., 2005; Branca & Abate, 2019
1610	Grotta degli Archi	SW	W	2500	2002	239	1245	30	Bencke et al., 2005; Branca & Abate, 2019
1610	Lava flow towards Adrano	SW	W	2275	1700	248-254	3000	91,7	Bencke et al., 2005; Branca & Abate, 2019
1614-1624	Sciara del follone, Monti Deserti, I due Pizzi, Grotta del Gelo, Grotta dei Lamponi	NE	NE	2400	2400	10-20	2400	1071	Bencke et al., 2005; Branca & Abate, 2019
1634-1638	Lava flow to the N of Fleri	S	S	2100	1950	157	1350	203	Bencke et al., 2005; Branca & Abate, 2019
1643	M. Pomiciaro	NE	NE	2100	1275	15	4200	4,1	Behncke et al., 2005; Branca & Abate, 2019
1646-1647	M. Nero, M. Ponte di Ferro	NE	NE	2050	1800	41-48-58	1400	162,5	Behncke et al., 2005; Branca & Abate, 2019
1651	Valle del Bove	E, VdB	ENE	1875	1815	77	540	22,7	Behncke et al., 2005; Branca & Abate, 2019
1651-1653	Lava in Bronte	W	W	2600	1770	282	2190	474,8	Behncke et al., 2005; Branca & Abate, 2019
1669	M. Rossi, lava in Catania	S	S	950	625	152	4140	1247,5	Behncke et al., 2005; Branca & Abate, 2019
1682	Lava in Rocca Musarra	E, VdB	ENE	-	-	-	-	-	Behncke et al., 2005; Branca & Abate, 2019
1689	Eruptive fissures buried, lava toward Macchia	E, VdB	ENE	-	-	-	-	-	Behncke et al., 2005; Branca & Abate, 2019
1702	Lava in Val Calanna	E, VdB	-	2075	1875	123	950	16,9	Behncke et al., 2005
1755	Eruptive fissures near Rocca Musarra, buried	E, VdB	ENE	2000	1750	-	-	4,7	Behncke et al., 2005
1763	M. Mezza Luna and M. Nuovo	W	W	1725	1580	268	1488	21,1	Behncke et al., 2005
1763	La Montagnola	S	S	2560	1925	253-195-184	2400	150	Behncke et al., 2005
1764-1765	Lava covered by younger products	NE	NE	3125	2500	0-15	2670	117,2	Behncke et al., 2005

1766	M. Calcarazzi, Boccarelle di fuoco	S	S	2075	1690	190-142	1907	137,3	Behncke et al., 2005
1780	Spatter cones between M. Nero degli Zappini e M. Vetore	S	S	2360	1850	215	2216	29,3	Behncke et al., 2005
1792-1793	Lava flows inside and outside VdB toward Zafferana, Grotta dei Tre livelli, Grotta Cassone	S	S	2825	1500	155	3648	90,1	Behncke et al., 2005
1802	Eruptive fissures near Rocca Musarra	E, VdB	ENE	1950	1700	132	1198	10,4	Behncke et al., 2005
1809	Bocche del 1809, lava towards Rovittello	NE	NE	3000	1325	22-47-50	10200	38,2	Behncke et al., 2005
1811-1812	M. Simone	E, VdB	ENE	3000	1975	136-90	2454	54,3	Behncke et al., 2005
1819	a "Padeddazza"	E, VdB	S	2850	2375	152	1702	47,9	Behncke et al., 2005
1832	M. Nunziata, lava towards Bronte	W	W	2900	2075	300-285-280	4000	60,7	Behncke et al., 2005
1843	Bocche del 1843, lava south of Bronte, 59 killed by steam explosions at the lava front	W	W	2400	1900	287-281	1290	55,7	Behncke et al., 2005
1852-1853	M. Centenari	E, VdB	-	1950	1700	102-98	1110	134	Behncke et al., 2005
1865	M. Sartorius, lava south of Vena	NE	ENE	1865	1690	70	1500	94,3	Behncke et al., 2005
1874	Two small lava flows	NE	NE	2520	2110	32-25	3000	1,5	Behncke et al., 2005
1879	Biradial eruption, M. Umberto e Margherita	N and SW	NE and S	3000	1945	183-200-225	11500	41,9	Behncke et al., 2005
1883	M. Leone	S	S	1100	1050	208	765	0,2	Behncke et al., 2005
1886	M. Gemmellaro, lava toward Nicolosi	S	S	1525	1320	180-158	1010	42,5	Behncke et al., 2005
1892	M. Silvestri, lava toward Nicolosi	S	S	2045	1800	190-183	1245	130,6	Behncke et al., 2005
1908	Bocche del 1908	E, VdB	S	2800	2275	170	4250	2,2	Behncke et al., 2005; Neri et al., 2011
1910	M. Riccò, lava toward Nicolosi, dry fissures between the Central Crater and La Montagnola	S	S	2900	1900	200	6189	65,2	Behncke et al., 2005; Neri et al., 2011
1911	Complex system of eruptive fissures, lava between Rovittello and Solicchiata	NE	NE	2550	1625	45	4710	57	Behncke et al., 2005; Neri et al., 2011

1918	Small eruption with dry fissures on the upper S and N flank	N	-	3110	2025	-	1779	1,2	Behncke et al., 2005; Neri et al., 2011
1923	M. Corbara, eruptive fissures partially overlapping the 1911, lava destroyed Catena	NE	NE	2500	1800	40	4276	78,5	Behncke et al., 2005; Neri et al., 2011
1928	Fissures along the Ripe della Naca, lava destroyed Mascali	ENE	ENE	2700	1200	70	4885	42,5	Behncke et al., 2005; Neri et al., 2011
1942	Fissures to the W of M. Frumento Supino	S	S	2800	2500	235	2098	1,8	Behncke et al., 2005; Neri et al., 2011
1947	Fissures beteween NE crater and M. Pizzillo, no appreciable seismicity	NE	NE	3050	2200	30	5200	11,9	Behncke et al., 2005; Neri et al., 2011
1949	Biradial eruption, dry fissures crossing the CC and the NEC along the S Rift and the NW flank	NW and S	S	3240	1990	165	3094	10,2	Behncke et al., 2005; Neri et al., 2011
1950-1951	M. Gaetano Platania, lava toward Milo and Zafferana	E, VdB	ENE	2850	2200	80-90	6500	152	Behncke et al., 2005; Neri et al., 2011
1956	Lava from the CC and subterminal fissures in the upper VdB	E, VdB	S	3300	2700	130	156	3,1	Behncke et al., 2005; Neri et al., 2011
1968	Subterminal fissures	E, VdB	-	2600	2600	-	-	1	Behncke et al., 2005; Neri et al., 2011
1971	Fissures in the upper south flank, formation of SEC	E, VdB	S	3050	1800	40-80-170	6159	47,2	Behncke et al., 2005; Neri et al., 2011
1971	Fissures in Serra delle Concazze and VdB, M. Ponte, Grotta di Serracozzo, Lava north of Fornazzo	E, VdB	ENE	3050	1800	40-80-170	6159	47,2	Behncke et al., 2005; Neri et al., 2011
1974	M. De Fiore I, small lava	W	W	1670	1670	270	250	4,4	Behncke et al., 2005; Neri et al., 2011
1974	M. De Fiore II, small lava	W	W	1650	1650	285	250	3,2	Behncke et al., 2005; Neri et al., 2011
1975	Several Hornitos	NE	NE	2625	2625	0	330	6	Behncke et al., 2005; Neri et al., 2011
1975-1977	M. Cumin	N	NE	2980	2900	175	200	35,1	Behncke et al., 2005; Neri et al., 2011

Year	Description								Reference
1978		SEC, E, VdB	S	3000	2600	160	1863	27,5	Behncke et al., 2005; Neri et al., 2011
1978		SEC, E, VdB	S	3050	2350	-	1865	4	Behncke et al., 2005; Neri et al., 2011
1978		SEC, E, VdB	S	3050	1675	110-150	2000	11	Behncke et al., 2005; Neri et al., 2011
1979	Complex fissures system	SEC, E, VdB	ENE	2950	1700	-	-	7,5	Behncke et al., 2005; Neri et al., 2011
1981	Lava toward Randazzo	NW	-	2550	1140	325	8044	21,3	Behncke et al., 2005; Neri et al., 2011
1983		S	S	2680	2250	200	2581	79	Behncke et al., 2005; Neri et al., 2011
1985	Piccolo Rifugio	SEC, S	S	3050	2480	200	1095	30	Behncke et al., 2005; Neri et al., 2011
1985	Eruption preceded by earthquakes and faulting along PER	E, VdB	-	2750	2420	105	1050	0,9	Behncke et al., 2005; Neri et al., 2011
1986-1987	M. Rittman, preceded by earthquakes and faulting along PER	SEC, E, VdB	ENE	3050	2180	75	2575	60	Behncke et al., 2005; Neri et al., 2011
1989	Dry fractures system from the SEC to Piano del Vescovo (6,3 km)	SEC, E, VdB	ENE	2610	2550	35	2100	26,2	Behncke et al., 2005; Neri et al., 2011
1991-1993	Fissures similar to 1989, lava toward Zafferana Etnea	SEC, E, VdB	S	3100	2400	165	2867	235	Behncke et al., 2005; Neri et al., 2011
2001	Valle del Leone, lateral of 2001	SEC, E, VdB	S and ENE	3100	2600	40-70-170	4700	6,5	Behncke et al., 2005; Neri et al., 2011
2001	Piano del Lago crater, eccentric part of 2001, lava in Rifugio Sapienza area	S	S	2570	2100	170-180-210	2100	26,6	Behncke et al., 2005; Neri et al., 2011
2002	Desruption of Piano Provenzana area, lateral part of 2002-2003	NE	NE	3010	1890	20-65	2600	11	Behncke et al., 2005; Neri et al., 2011
2002-2003	Two large cones, lava toward Rifugio Sapienza area, eccentric part of 2002-2003	S	S	2850	2600	0	900	74,5	Behncke et al., 2005; Neri et al., 2011
2004-2005	Eruption without seismic and explosive activity	E, VdB	-	3000	2320	125	1600	40	Behncke et al., 2005; Neri et al., 2011

| 2008-2009 | Eruption inside VdB | E, VdB | - | 3050 | 2620 | 121-138 | 1255 | 74,1 | Bonaccorso et al., 2011; Neri et al., 2011; Behncke et al., 2016 |
| 2018 | SEC, eruptive fissures propagated from the base of SEC toward VdB | E, VdB | S | 3000 | 2400 | 170-120 | 800 | 2,75 | De Novellis et al., 2019; Calvari et al., 2020 |

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