This supplementary material accompanies the article:

Rodríguez, F., Coldwell, B., Martín-Lorenzo, A., Andronico, D., Bonadonna, C., Del Bello, E., Pistolesi, M., Taddeucci, J., Biass, S., Romero, J. E., Voloschina, M., Scarlato, P., Hernández, W., D'Auria, L. and Pérez, N. M. (2024) "Towards rapid integrated data acquisition and management during a volcanic crisis: the 2021 Tajogaite eruption of Cumbre Vieja (La Palma, Canary Islands)", *Volcanica*, 7(2), pp. 891–905. doi: 10.30909/vol.07.02.891905.

Rodríguez et al. (2024) should be cited if these data are used.

Supplementary tables:

- Table S1: Detailed chronological correlation of AS2 samples with key stratigraphic units.
- Table S2: Correlation of AS2 samples with principal stratigraphy.

AS2 sample names	Tephra characteristics	Sample collection duration	Stratigraphic layer correlation	Date (2021)	Chronology notes
	Elongated, shiny,				
	fine to coarse			25–29	LU1 duration
CAN_TLP_022	lapilli	93.5 hrs	LU2 base	September	is 8±2 days
	Coarse ash to				LU2 duration
CAN_TLP_042	lapilli	27.5 hrs	LU2	5–6 October	is 13±2 days
	Ash to coarse				LU3 duration
CAN_TLP_057	ash	29 hrs		8–9 October	is 2±2 days
			7		LU total
	Coarse ash to		LU2 to LU3	9–10	duration
CAN_TLP_060	<u> </u>	23.5 hrs	transition	October	23±1 day
	Fine to coarse		LU to MU	10–12	
CAN_TLP_073	black ash	24 hrs	transition	October	
			l	<u></u>	
	Black ash with		MU1 to MU2	14–16	MU1 duration
CAN_TLP_085	red lithics	26 hrs	transition	October	is 4±2 days
CAN_TLP_099					
CAN_TLP_108					
CAN_TLP_114					
	lithics in all		MU2 guide	13–20	Red marker
CAN_TLP_133	samples		horizon	October	horizon
					MU2–5
					transition to
	0 4h				MU6
CAN TID 167	Coarser than			27–29	estimated
CAN_TLP_167 CAN_TLP_168	previous. Fine to	16 E bro	MU5	_	1–3
CAN_TEP_100	coarse lapilli	46.5 hrs	IVIUS	October	November
	Very fine to fine			22–23	MU6 duration
CAN TLP 333	1	23 hrs	End of MU6	November	is 24±2 days
<u> </u>	4011	201110	Lina or wide	110101111001	MU total
CAN TLP 316			Transition of	25–27	duration
	Ash to fine lapilli		MU to UU	November	46±2 days
<u> </u>	Coarse ash to		INIO to CC	110101111001	1022 days
	lapilli, very			27–28	
CAN TLP 347	elongated	28.5 hrs	UU1	November	
CAN TLP 381			1 2 2 .	3–5	
	Ash to fine lapilli	51.5 hrs	UU2	December	
_:=:_555					UU total
	Ash to coarse		UU2, top of	 11–12	duration 17
CAN TLP 434		24.5 hrs	unit	December	±1 days
	ARY TABLE 1: Sur				

SUPPLEMENTARY TABLE 1: Summary chronological correlation of samples collected from INVOLCANs permanent ash collection station AS2 (beneath the dominant plume direction, position X: 28.60652, Y: -17.88285) to the stratigraphic units defined in Fig. 4. The unit boundary dates are by multi-institutional agreement, with uncertainty given here. Tephra sample names reflect those in INVOLCANs open access Litoteca (by request).

Date	Plume height (km)*	Lower Unit 1																	
		Best estimate																	
19 September 2022																			
20 September 2022	3		ΕŅ																
21 September 2022	3		<minimum duration></minimum 	1															
22 September 2022	3		min rati	tior															
23 September 2022			> du	lura															
24 September 2022	6			E															
25 September 2022	4	TLP_13		<u>i</u>	Lowe	r Unit :	2												
26 September 2022	3	TLP_22		<maximum duration=""></maximum>	Best estimate														
27 September 2022	3				TLP_22														
28 September 2022	5				TLP_22														
29 September 2022	4				TLP_22														
30 September 2022	3				TLP_23	<u> </u>													
01 October 2022	6				TLP_29	tior	<u>{</u>												
02 October 2022	5				TLP_29	lura	l ig												
03 October 2022	5				TLP_34	ω	l ä												
04 October 2022	5				TLP_40	m	Ę												
05 October 2022	4				TLP_40	<minimum duration<="" td=""><td>maximum duration-</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></minimum>	maximum duration-												
06 October 2022	3				TLP_42	\) a												
07 October 2022	3				TLP_49		V												
08 October 2022	4				TLP_49				Lower Unit 3										
09 October 2022	4				TLP_57			Best estimate											
10 October 2022	4							TLP_60	< minimu m duration- ->	<maximum duration></maximum 		Middle Unit 1							
11 October 2022	4							TLP_67		<max durati</max 	Best estimate		uoi						
12 October 2022	4										TLP_73		ırat						
13 October 2022	3										TLP_79	un ion	ηρ u	Middle	Unit 2-	-5			
14 October 2022	3										TLP_85	< minimu m duration-	maximum duration>	Best estimate					
15 October 2022	4										TLP_99		-E						
16 October 2022	5							ļ					Ÿ	TLP_108					
17 October 2022	4													TLP_114			\perp		
18 October 2022	4													TLP_118					
19 October 2022	5													TLP_128			\perp		
20 October 2022	4	1						1						TLP_133	_	_		_	
21 October 2022	4			<u> </u>				ļ						TLP_139	<u>-</u> L				
22 October 2022	3													TLP_144	atio	atio		_	
23 October 2022	3													TLP_151	dur	dura			
24 October 2022	3													TLP_157	Ę	E			
25 October 2022	4													TLP_157	-minimum duration>	<maximum duration=""></maximum>	\perp		
26 October 2022	2													TLP_160	i.E	max	\perp	\perp	
27 October 2022	3							1		l				TLP_160	.	Ţ			. '

28 October 2022	3											_	TLP_167								\perp
29 October 2022	3												TLP_168								
30 October 2022	4												TLP_175	1							
31 October 2022	5												TLP_180	1							\Box
01 November 2022	3												TLP_187			Middle	Unit	6			
02 November 2022	4												TLP_192			Best estimate					
03 November 2022	3								1				1LP_192		-	TLP_199		-			\vdash
04 November 2022	3								1							TLP_199					\vdash
05 November 2022	4															TLP_210					+
06 November 2022	3															TLP_214				1	\vdash
07 November 2022	3								1							TLP_216					十
08 November 2022	3															TLP_223				1	\vdash
09 November 2022	3			1					1							TLP_227					╁
10 November 2022	2			+					1			\vdash				TLP_227					+
11 November 2022	3		1		 				1			\vdash		\vdash		TLP_232		^		1	+
12 November 2022	3		+	+		-			+		<u> </u>	\vdash				TLP_232 TLP_245	\- -	maximum duration>		1	+
13 November 2022	3		+	+		1	 		+		 	\vdash		<u> </u>		TLP_258	atio	atio		+	+
14 November 2022	3	+	+	+		<u> </u>	 		+			H				TLP_258	<minimum duration=""></minimum>	dur		+	+
15 November 2022	3		+	+		1	 		+		1	\vdash		 		TLP_258	m.	Ę		1	+
16 November 2022	3	+		1	<u> </u>				1							TLP_264	imu	ij		1	₩
17 November 2022	2			+								-				TLP_270	nin	πaχ		1	╁
18 November 2022	4		-	+					1							TLP_270		Ţ		-	╁
	4			+					1											1	+
19 November 2022 20 November 2022	3			+					1							TLP_279 TLP_286		-		1	₩
21 November 2022	3			+					1						_					1	+-
22 November 2022	3	_	-	+					1					_		TLP_294 TLP_302					₩
23 November 2022	4	+	1	+					1							TLP_302				-	╁
24 November 2022	4			+					1						_	TLP_333 TLP_316		-		-	₩
25 November 2022	4		-	+					1						_	TLP_316			Han	er Uni	<u></u>
25 November 2022		+		+					1							1LP_310			Best	er om	È
26 November 2022															-	TLP_340			estimate		
27 November 2022																			TLP_340		
28 November 2022	2																		TLP_347		
29 November 2022	1																		TLP_350		
30 November 2022	3																		TLP_358		
01 December 2022	4																		TLP_364		
02 December 2022	2																		TLP_370	Ŷ	1
03 December 2022	2																		TLP_374	<minimum duration=""></minimum>	
04 December 2022	2																		TLP_381	rati	, acitarile minimixem
05 December 2022	1																		TLP_388	np I	
06 December 2022	3																		TLP_397	mnı	3
07 December 2022	3																		TLP_402	nin	
08 December 2022	4																		TLP_409	Ę	
09 December 2022	2																		TLP_413	Ÿ	
10 December 2022	1								1						\Box			_	TLP_422		
11 December 2022	2		1						1										TLP_427		
12 December 2022	1		1						1						\Box				TLP_434		
13 December 2022	4	1	1	1	1	t	-	i	_	 	i	_			-				TLP_436	1	4

14 December 2022	2.2											\neg
2 / Bedeimber 2022	2.2											

SUPPLEMENTARY TABLE 52: Correlation of samples collected from permanent ash station AS2 (location in Fig.1), to date and to stratigraphic units defined here. Best estimate, minimum and maximum duration for the layers is shown based by multi-institutional agreement. Sample code shown as TLP_XXX, which is abbreviation of CAN_TLP_XXX. *Average height of tephra plumes as reported in the PEVOLCA reports (https://www.gobiernodecanarias.org/infovolcanlapalma/pevolca/).