

Supporting Information for ”Mechanical tomography of a volcano plumbing system from GNSS unsupervised modeling”

François Beauducel^{1,2}, Aline Peltier^{1,3}, Antoine Villié⁴, Wiwit Suryanto⁵

¹Institut de physique du globe de Paris, Université de Paris, CNRS, F-75005 Paris, France

²Institut des Sciences de la Terre, IRD UR 219, Yogyakarta 55166, Indonesia

³Observatoire Volcanologique du Piton de la Fournaise, IPGP, F-97418 La Plaine des Cafres, La Réunion

⁴Laboratoire de biométrie et biologie évolutive, CNRS UMR 5558, F-69622 Villeurbanne, France

⁵Geophysics Research Group, Universitas Gajah Mada, Yogyakarta 55281, Indonesia

Contents of this file

1. Table S1

Additional Supporting Information (Files uploaded separately)

1. Caption for Movie S1

Introduction

Table S1 shows all parameters of the best models obtained for the 15 periods of time as used to produce the Figure 4 of the main paper. These models correspond to the best

misfit selected from 2.5 millions of computed forward models. See the Figure 3 in the main text to have a better description of the model space for each of the periods.

Movie S1 shows best models in 3D perspective view.

Movie S1.

The short 1 minute length movie shows the best models sources in a 3D perspective view with illuminated topography. The camera position makes two loops around the volume with an additional sinusoidal vertical movement. In the main text, the Figure 4 is a single view selection from the same representation.

Table S1. Summary of the best model deformation sources: time period (days of June 2014), source type (deflation ‘−’ or inflation ‘+’), source approximate shape as ellipsoid (E), sill (S), pipe (P) or dike (D) and main orientation, coordinates (latitude South, longitude East, in degree), depth b.s.l. (in km), volume variation ΔV (in Mm^3), source geometry (A , B , ΩX , ΩY , ΩZ) and global misfit of the best-fit models at 68.3% confidence for each period we defined.

Time	Source	Source	Lat. S	Lon. E	Depth	ΔV	A	B	ΩX	ΩY	ΩZ	Misfit
Period	Type	Shape	(deg)	(deg)	(km)	(Mm^3)			(deg)	(deg)	(deg)	(mm)
02-08	−	Vert. E	21.244	55.756	$+4.1 \pm 0.7$	-9.5 ± 0.8	0.07	0.87	−13	−15	+32	5.3
03-09	−	Vert. P	21.246	55.721	$+7.5 \pm 0.4$	-7.1 ± 0.7	0.04	0.56	+36	−2	+38	1.8
04-10	−	Vert. P	21.248	55.723	$+3.7 \pm 0.6$	-8.2 ± 0.8	0.10	0.47	+4	+10	−15	1.9
05-11	−	Vert. E	21.239	55.726	$+3.0 \pm 0.3$	-6.7 ± 0.9	0.02	0.70	−21	+4	+34	2.2
06-12	+	Tilt. D	21.239	55.709	$+4.5 \pm 0.6$	$+3.2 \pm 0.7$	0.93	0.83	−37	+43	−7	4.5
07-13	+	Hori. S	21.240	55.713	-0.6 ± 0.7	$+0.15 \pm 0.3$	0.99	0.34	−4	+19	−10	3.6
08-14	+	Hori. S	21.238	55.712	$+2.9 \pm 0.8$	$+1.4 \pm 0.7$	0.97	0.40	+26	+24	+19	3.3
09-15	+	Vert. P	21.245	55.715	$+3.1 \pm 0.6$	$+5.3 \pm 1.0$	0.07	0.50	−29	−10	+19	2.3
10-16	+	Vert. P	21.258	55.718	$+2.5 \pm 0.4$	$+6.4 \pm 1.0$	0.07	0.44	+4	−1	−9	2.4
11-17	+	Vert. P	21.250	55.710	-0.7 ± 0.6	$+0.23 \pm 1.0$	0.05	0.55	−20	−9	−12	2.1
12-18	+	Vert. P	21.247	55.711	-1.0 ± 0.2	$+0.19 \pm 0.01$	0.06	0.46	−12	−2	+27	1.9
13-19	+	Vert. P	21.251	55.711	-1.0 ± 0.2	$+0.21 \pm 0.06$	0.00	0.43	−1	+8	−14	2.5
14-20	+	Vert. E	21.251	55.714	-1.8 ± 0.05	$+0.08 \pm 0.01$	0.16	0.84	+15	+17	+11	3.6
15-21	+	Tilt E	21.247	55.715	-2.3 ± 0.05	$+0.24 \pm 0.01$	0.66	0.65	+33	−24	−16	49
16-22	+	Tilt D	21.248	55.715	-2.2 ± 0.01	$+0.3 \pm 0.01$	0.87	0.00	+43	−22	+2	76