

## Supplementary Materials for

### **Climbing the crustal ladder: Magma storage-depth evolution during a volcanic flare-up**

Guilherme A. R. Gualda\*, Darren M. Gravley, Michelle Connor, Brooke Hollmann, Ayla S. Pamukcu, Florence Bégué, Mark S. Ghiorso, Chad D. Deering

\*Corresponding author. Email: [g.gualda@vanderbilt.edu](mailto:g.gualda@vanderbilt.edu)

Published 10 October 2018, *Sci. Adv.* **4**, eaap7567 (2018)  
DOI: 10.1126/sciadv.aap7567

#### **The PDF file includes:**

Table S1. Characteristics of eruptive deposits from the central TVZ analyzed in this study.

Table S2. Magma compositions used for rhyolite-MELTS modeling of energy change associated with crystallization.

Legend for data file S1

#### **Other Supplementary Material for this manuscript includes the following:**

(available at [advances.sciencemag.org/cgi/content/full/4/10/eaap7567/DC1](https://advances.sciencemag.org/cgi/content/full/4/10/eaap7567/DC1))

Data file S1 (Microsoft Excel format). Includes supplementary tables S3 to S5.

**Table S1. Characteristics of eruptive deposits from the central TVZ analyzed in this study.**

Ignimbrite	Age (ka)	Volume (km <sup>3</sup> )	Source Caldera/ Caldera Complex	Crystal content (%)	Mineral assemblage (qtz + plg + opx)
Ohakuri	~240	~100	Ohakuri	< 10	
Mamaku	~240	> 145	Rotorua	< 10	± hbl
Pokai	~300	~50	Kapenga	< 15	
Chimpanzee	~320-300	~50	Kapenga	< 10	± hbl
Matahina	~320	~150	Okataina	< 15	± bt ± hbl
Whakamaru	~350	> 2,000	Whakamaru	< 35	+ san + bt + hbl

qtz-quartz; plg-plagioclase; opx-orthopyroxene; bt-biotite; hbl-hornblende; san-sanidine

Modified from Gravley *et al.* (23).

**Table S2. Magma compositions used for rhyolite-MELTS modeling of energy change associated with crystallization.**

Composition*	Ohakuri	Mamaku	Pokai	Chimpanzee	Matahina	Whakamaru
SiO <sub>2</sub>	77.1	76.9	76.3	75.3	77.3	75.9
TiO <sub>2</sub>	0.15	0.15	0.15	0.20	0.12	0.16
Al <sub>2</sub> O <sub>3</sub>	12.8	13.1	13.3	13.9	13.1	13.8
FeO	1.32	1.27	1.48	1.73	1.17	1.34
MnO	0.06	0.04	0.06	0.07	0.04	0.04
MgO	0.13	0.10	0.11	0.15	0.20	0.13
CaO	0.82	0.73	0.85	1.14	0.86	1.06
Na <sub>2</sub> O	3.53	3.96	3.82	3.86	3.45	3.16
K <sub>2</sub> O	4.03	3.73	3.84	3.63	3.82	4.38
P <sub>2</sub> O <sub>5</sub>	0.02	0.02	0.03	0.03	0.01	0.02
Total	100.0	100.0	100.0	100.0	100.0	100.0
P (MPa) <sup>§</sup>	74	111	132	228	130	79

\* Compositions determined from data in Gravley *et al.* (23)

<sup>§</sup> Pressures used are based on results from this study for the corresponding unit

**Data file S1. Includes supplementary tables S3 to S5.**