

## *Supplementary Material*

### **A rapidly convecting lava lake at Masaya volcano, Nicaragua**

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#### **1 Data Availability and Further Supplementary Information**

All raw UV camera SO<sub>2</sub> emission rates, thermal fluxes, lake velocities, and bubble burst data (including calculated masses) are available in the supplementary excel file ‘A rapidly convecting lava lake at Masaya volcano – Data’. Locations of UV cameras and the thermal camera are provided as a supplementary Google Earth ‘.kmz’ file, called ‘Locations.kmz’. UV camera data from the 15<sup>th</sup> June is presented in Figure S1 and example calibrated thermal images in Figure S2.

Supplementary Video 1, provides a short overview of collected UV camera data from the 15 June 17. Supplementary Video 2, provides an example of collected thermal camera data. Supplementary Video 3 3 contains a full length DSLR video of Masaya lava lake.

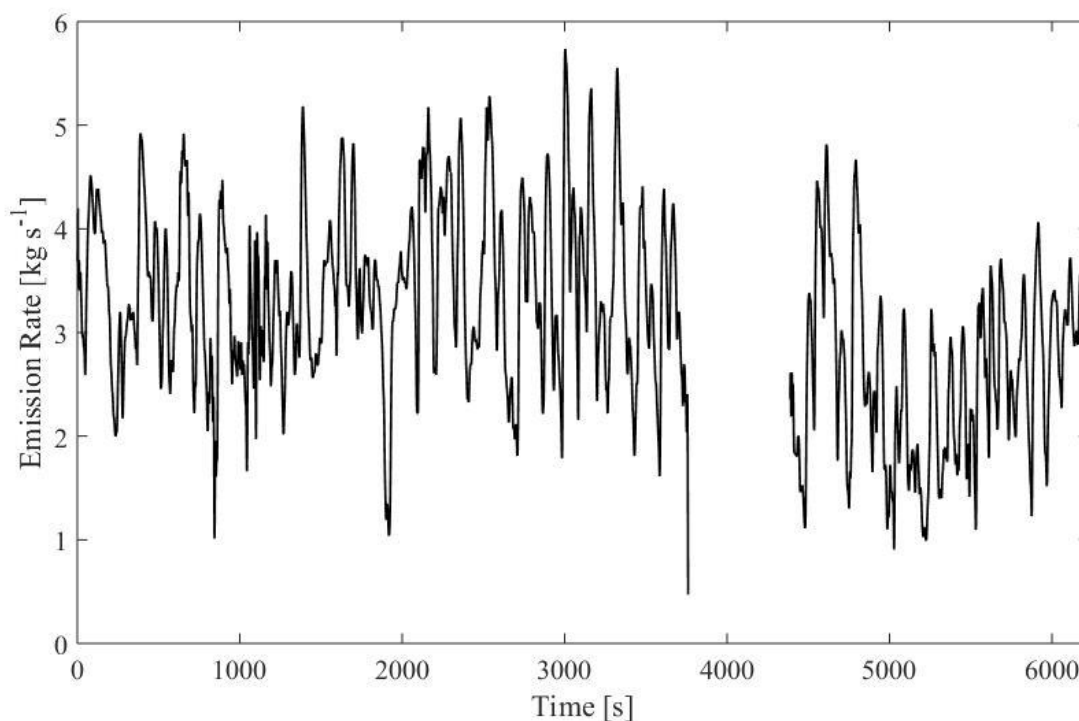
Supplementary Table 1 provides links to a number of videos, available on YouTube which precede our visit to the lava lake and have a date attached to them. Note, that these videos are on YouTube, which represents a potentially great source of data for citizen science, however, videos may not be maintained or available indefinitely.

**Supplementary Table 1:** Links to YouTube videos of the Masaya lava lake highlighting different behaviours through time. Supplementary Movie 3 shows video from our acquisition period.

Video #	Month of Footage	Link
1	March 2016	<a href="https://www.youtube.com/watch?v=J_w28DdI0r0">https://www.youtube.com/watch?v=J_w28DdI0r0</a>
2	April 2016	<a href="https://www.youtube.com/watch?v=fUMKP26QRzI">https://www.youtube.com/watch?v=fUMKP26QRzI</a>

3	April 2016	<a href="https://www.youtube.com/watch?v=yj9gIYBeJKA">https://www.youtube.com/watch?v=yj9gIYBeJKA</a>
4	December 2016	<a href="https://www.youtube.com/watch?v=LXweTy4sccI">https://www.youtube.com/watch?v=LXweTy4sccI</a>

Supplementary material is not typeset so please ensure that all information is clearly presented, the appropriate caption is included in the file and not in the manuscript, and that the style conforms to the rest of the article.



**Supplementary Figure 1.** UV camera derived SO<sub>2</sub> emission rate from the 15<sup>th</sup> June 2017.

**Supplementary Figure 2.** Three example calibrated thermal images (a-c). In (c) obscuration by the fumarole is apparent.

**Supplementary Video 1:** Example absorbance image sequence collected using the ultraviolet camera.

**Supplementary Video 2:** Example image sequence collected using thermal camera.

**Supplementary Video 3:** Example video data collected using DSLR in full colour.