

## ***Interactive comment on “Sulfur dioxide emissions from Papandayan and Bromo, two Indonesian volcanoes” by P. Bani et al.***

**Anonymous Referee #3**

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This paper presents new measurements of sulphur dioxide flux, measured by Differential Optical Absorption Spectroscopy using UV spectrometers at two Indonesian Volcanoes: Papandayan and Bromo. Whilst the data yield an incremental advance in our knowledge of how gas fluxes from these volcanoes vary in time, I believe that this work is really better suited to a monitoring agency report than a peer-reviewed academic paper. There is scant data, little analysis (the paper is exceedingly short) and it is difficult to know how to interpret measurements that take place between eruptions, particularly at Papandayan, where the gas fluxes seem incredibly low. Overall, I would say that this work is a good beginning for a study of degassing at these volcanoes, but a much wider perspective is required, as well as a more critical approach, and any future revision of the manuscript should take this into account.

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I would have liked to see, in the introduction, a full description of previous estimates of SO<sub>2</sub> flux from the Indonesian arc, and exactly how they were calculated and a full discussion of what the issue is that is to be resolved. Satellite-based measurements are not mentioned at all – do the frequent eruptions of Bromo show up on TOMS or OMI images for example? What difference, in the context of the arc-scale estimates, would a more accurate flux estimate for these volcanoes make?

The first part of the introduction is repetitive and simplistic – this could be cut down substantially (the section about what makes up volcanic gases chemically). Primary citations ought to be used instead of secondary, e.g. Vandaele et al. (1994) for the SO<sub>2</sub> absorption feature and perhaps Hoff and Millan (1981) and Galle et al. (2003) for the applications.

The errors must be discussed further and should be broken down into the main components. Is the dominant source of uncertainty the effect of unconventional view angle, 30 degrees from zenith? How might one calculate a detection limit, what does it depend on, and does the emission at Papandayan fall significantly above it? The unfinished traverses at Bromo are certainly not ideal and limits our confidence in the data.

Galle, B., et al. "A miniaturised ultraviolet spectrometer for remote sensing of SO<sub>2</sub> fluxes: a new tool for volcano surveillance." *Journal of Volcanology and Geothermal Research* 119.1 (2003): 241-254.

Hoff, R. M., and M. M. Millan. "Remote SO<sub>2</sub> mass flux measurements using COSPEC." *Journal of the Air Pollution Control Association* 31.4 (1981): 381-384.

Vandaele, A. C., et al. "SO<sub>2</sub> absorption cross section measurement in the UV using a Fourier transform spectrometer." *Journal of Geophysical Research: Atmospheres* (1984–2012) 99.D12 (1994): 25599-25605.

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