We thank the Referees for their constructive comments. In the following, we give a point-by-point response to each of the issues raised.

Referee #1

Review of "Measurement report: Plume heights of the April 2021 La Soufriere eruptions from GOES-17 side views and GOES-16-MODIS stereo views" by A. Horvath et al.

General Comments

In this new study, Horvath et al. present a comparison of plume height estimates of a series of eruptions of La Soufriere in April 2021. The study compares the results of different measurement techniques and methods to estimate the plume heights, including side views and stereoscopic satellite imaging in both, visible and Infrared spectral bands as well as plume height estimation based on the minimum brightness temperature of the volcanic clouds. The study provides practical advice on how to interpret and possibly resolve ambiguities in height estimation related to the brightness temperature method.

Overall, this is an interesting and carefully conducted study, which fits well into the scope of ACP. The manuscript is very clear and concise. I would like to recommend the paper for publication in ACP subject to just a few minor corrections and clarifications as listed below.

Specific Comments

l41-43: Although it is a classical method, can you provide some references/examples of earlier studies using the brightness temperature method for volcanic plume height estimation?

We added three references: de Michele et al. (2019), Oppenheimer (1998), and Prata and Grant (2001). We included the first of these per the request of Referee #2, because, like us, de Michele et al. (2019) also uses the term "dark pixel temperature" as a synonym for "the minimum 11μm brightness temperature".

l90-91: It would be good to add a reference for the ERA5 data:

Hersbach, H, Bell, B, Berrisford, P, et al. The ERA5 global reanalysis. Q J R Meteorol Soc. 2020; 146: 1999–2049. https://doi.org/10.1002/qj.3803

Done.

l603-605: Based on recent findings from the Tonga eruption, I was also wondering why one would always necessarily pick the minimum brightness temperature of a volcanic plume to estimate the plume height. For the Tonga eruption, this approach would estimate a layer height close to the tropopause and significantly underestimate the heights of the upper layers of the plume. Upper layers would have to be estimated by inspecting the maximum brightness temperature near the center of the cloud, as suggested here. Perhaps, this aspect could be mentioned/discussed more early in the paper, when first introducing the brightness temperature method.

We included a discussion on this in the last paragraph of Section 2.2, as suggested.

l641-651: This paragraph provides some interesting information on the 1979 eruption of La Soufriere, but it became not so clear to me, how it relates to the present study? Do you like to compare earlier methods for plume height estimate with present state-of-the-art methods in general?

This section simply notes the similarities between the eruptions in terms of atmospheric conditions, plume heights, and measurement techniques. For example, the side view aerial photo measurements are worth acknowledging. The similar plume heights also suggest a comparable level of activity. We made some edits to hopefully better convey the purpose of this paragraph.

Supplements: The videos/animations for the different eruptions are very nice, but could you possibly make them run a bit more slowly? (On my notebook, each of the animations takes only 2-3 s to run.)

We increased the time delay between the frames by a factor of 3–4, thus, the duration of the animations is now 6–8 seconds.

Technical Corrections

l271: fix/explain "put oft-present cirrus"?

Changed to “indicated cirrus”.

l353: "a nice mushroom cloud" -> "a mushroom cloud"

Done.