Climate of the Past Discussions

Clim. Past Discuss., referee comment RC2
https://doi.org/10.5194/cp-2022-38-RC2, 2022

Comment on cp-2022-38

Anonymous Referee #2

Referee comment on "Is it possible to estimate aerosol optical depth from historic colour paintings?" by Christian von Savigny et al., Clim. Past Discuss., https://doi.org/10.5194/cp-2022-38-RC2, 2022

The manuscript challenges the notion that historical paintings can be used to quantitively assess the amount of stratospheric sulphate aerosols following major volcanic eruptions, based in particular on a series of sensitivity tests with an atmospheric radiative transfer model.

In general the manuscript is clear and well written, and it could be of interest to Climate of the Past readers.

I think that already in the introduction the authors should clarify the premises of this study, as the readers may not be familiar with all the background facts, for instance by concisely but explicitly addressing the following issues:
Why do you focus on near-horizon radiance (e.g. evenings)?
Why do you focus on the red/green ratio?
How do you know that the painting is depicting the evening?
How do you know that the painter's style was realistic in reproducing the colors?
How do you know that pigment conservation allows for estimating the original colors faithfully?

Specific comments

9) Krakatoa?

55) "The troposphere was assumed to be free of aerosols". This appears to be a strong assumption. Was there a basic sensitivity test at least, to justify this? No reference is provided either, of why this assumption should hold.

Table 1) If I interpreted the parameter values correctly, the central case is that of painters reproducing on canvas what they see in front of them, just before sunset, while giving their back to the setting sun. Is that correct? Maybe it's worth spelling this out.

59) Since the red/green ratio is relevant here, and the application of tristimulus values implies using specific wavebands, it would be worth seeing a curve of RI vs wavelength

85) Why not showing a plot of the tristimulus values wavelength dependence?