

Reply to comments by anonymous reviewer #2

Comment: The paper describes a small study which explains why there can be green sunsets after volcanic eruptions. Radiative transfer model simulations are performed for various different aerosol assumptions to explain the green color and to also constrain stratospheric aerosol parameters, i.e. size distribution and aerosol optical thickness. The detailed discussion shows that the found parameters are reasonable. The authors suggest that the method could be used to constrain aerosol properties of historic eruptions, however I suppose that this would be difficult because there are not many reports about the sky colors available and of course also no quantitative observations.

The paper is clearly presented and since it explains the phenomenon of green sunsets to my knowledge for the first time I recommend to publish the paper after very minor corrections (see below).

Reply: *We thank the reviewer for his/her positive assessment of our manuscript!*

Comment: Often, the term "anomalous scattering" is used. I think that this is misleading because the dependence of the scattering coefficient on wavelength is just a result of well-known Mie theory and not "anomalous".

Reply: *We agree that "anomalous scattering" may be misleading, but this is a standard technical term for the case, where the scattering cross section increases with increasing wavelength. It has been used in the past (e.g. Porch et al., 1989) and was not introduced by us. For this reason we would like to keep the term. However, in order consider the reviewer's comment and to clarify this point, we added one sentence to the introduction stating that Mie theory can also be used to simulate anomalous scattering.*

Reference:

Porch, W. M., Blue moons and large fires, Appl. Opt., 28, 10, 1989.

Comment: It is not mentioned how the optical properties of the aerosols were computed. I assume Mie theory?

Reply: *The reviewer is right, this was not mentioned. Instead, we did refer to earlier papers based on a similar approach. But it is certainly an important piece of information and is now mentioned in section 2.*

Comment: The term "volcanic sunset" in the title sounds strange. To me "Explaining the green sunsets after the 1883 volcanic eruption of Krakatoa" sounds better.

Reply: *OK, changed.*