Atmospheric Measurement Techniques Discussions

Atmos. Meas. Tech. Discuss., referee comment RC2
https://doi.org/10.5194/amt-2021-431-RC2, 2022

Comment on amt-2021-431

Gregg Swayze (Referee)

Referee comment on "Contrasting mineral dust abundances from X-ray diffraction and reflectance spectroscopy" by Mohammad R. Sadrian et al., Atmos. Meas. Tech. Discuss., https://doi.org/10.5194/amt-2021-431-RC2, 2022

This manuscript has concise text and was easy to understand. The experiment is well designed but could benefit by testing the spectroscopic model with a few constructed mineral mixtures with know weight percent constituents. Hapke modeling may not do well with complex mixtures like these dust samples especially with trace level constituents. Amorphous "humps" in XRD patterns can be used to qualitatively assess samples for the presence of non-crystalline phases and they should be re-examined for this evidence. The call for a library of mineral spectra at dust grain sizes is an excellent conclusion. Showing the difficulty of using existing spectral libraries with spectra of coarse grained sized samples for spectral modeling of dust is a great contribution to the radiative forcing scientific field. This is a timely article given the imminent lauch of the EMIT spectrometer. I've inbedded numerous additional comments in the text of the attached pdf.

Please also note the supplement to this comment:
https://amt.copernicus.org/preprints/amt-2021-431/amt-2021-431-RC2-supplement.pdf