Atmospheric Measurement Techniques Discussions

Atmos. Meas. Tech. Discuss., community comment CC1
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Comment on amt-2021-103

Dennis Piontek

Community comment on "Ash particle refractive index model for simulating the brightness temperature spectrum of volcanic ash clouds from satellite infrared sounder measurements" by Hiroshi Ishimoto et al., Atmos. Meas. Tech. Discuss., https://doi.org/10.5194/amt-2021-103-CC1, 2021

A very interesting and promising work! One remark: As you pointed out in line 64, fine ash particles might might have, for example, an increased fraction of volcanic glasses. Also porosities can be present. In
https://doi.org/10.1016/j.jvolgeores.2021.107174
we derived the refractive indices of volcanic ashes by combining the refractive indices of minerals according to generic petrological compositions of volcanic ashes. Furthermore, we calculated the densities and the resulting optical properties to investigate the impact of the composition on these properties. The results indicated that the refractive index might be dominated the silica content and possibly the porosity, and influenced only to a lesser degree by the glass-to-crystal-ratio. However, the glass-to-crystal-ratio has a notable impact on the optical properties. This could explain some of the deviations between your retrievals and the laboratory measurements of tephra samples (as reported in line 966).