

Interactive comment on “Quantifying the mass loading of particles in an ash cloud remobilised from tephra deposits on Iceland” by Frances Beckett et al.

Anonymous Referee #1

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This is an interesting and very well written and presented paper that I think is suitable for publication. My comments are limited to very minor clarifications and further questions that the authors may choose to expand upon. The authors use VIIRS measurements to quantify the mass of remobilised Icelandic tephra at low altitude over the North Atlantic on two days in September 2013. They demonstrate (1) the use of a positive brightness signal for identification of ash in VIIRS data (by comparing the observed distribution to NAME model outputs) and (2) the quantification of the mass of re-suspended ash using the VIRR column mass loadings to calibrate the scaling coefficient for the emission (re-suspension) rate.

- This article is an interesting demonstration of a method for quantifying the mass of

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low altitude ash, and it would be useful to have some additional comments from the authors on general applicability. As pointed out in the 2nd paragraph of the discussion, the emission rate calibration for NAME is case specific – but could a similar approach (calibration from VIIRS for a particular date) be applied to track the dropping re-suspension rate since eruptions in Iceland?

- Last sentence of abstract: on first reading this confused me – would help to clarify here that this refers to assumed source area for those eruptions.

- Introduction. It would be useful to have a bit more information about how common re-suspension events are?

- Section 3.1.2. Could this ‘positive BTM signal’ approach be applied more generally? To what extent is it limited to specific meteorological conditions/height of emission - e.g., is there an ash cloud height and mass loading for which BTM is too close to zero to be useful? From Figure S6 it looks like BTM_{min} must have been very close to zero in some cases.

- Discussion: It’s fascinating that a potentially low estimate of resuspended tephra reaches similar mass loadings to Eyjafjallajökull ash on quieter days. I think that the positive BTM approach might be interesting for volcanologists tracking ash emission from frequent, but lower-explosivity eruptions (e.g., VEI 2 or 3 events or even frequent vulcanian events that emit ash at ~few km elevation). Even without being able to estimate total loading from a calibrated model, this could provide volcanologically useful information.

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