**Atmospheric
Measurement
Techniques
Discussions**

Interactive comment on "Remote sensing of aerosols over snow using infrared AATSR observations" *by* L. G. Istomina et al.

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"This paper offers a nice way to retrieve a single aerosol property over bright surfaces by means of two AATSR measurements; the methodology is well explained and the paper quite well organized. The paper is certainly suitable for the AMT journal. Previous reviewers have already covered a number of issues, and I have only a few additional comments. The paper is stylistically uneven and appears to be written by different people. The abstract, though comprehensive, suffers from instances of incorrect English usage and should be re-written. As noted already, the whole manuscript would benefit from a thorough copy-editing."

Indeed, the contributions to the manuscript are made by the listed authors, which may have affected the overall style. The final version of the manuscript will be thoroughly

checked by a native English speaker.

"P38 Lines 9-16. Apart from the aerosol properties, there are a number of assumptions in the RT simulations in Figs 3 and 4 which are not mentioned. For example: (1) what is TOA? (state the height),"

The TOA for these simulations is at 60km.

"(2) is aerosol confined to the troposphere and if so, to what extent?"

The aerosol is confined to the troposphere and is represented as a uniform layer in the range of heights from 0 to 3 km above the surface.

"(3) what other atmospheric distributions are you assuming (pressure/ temperature, presumably no gas absorption at 0.55 and 3.7 microns, source of Rayleigh scattering, any stratospheric aerosols?);"

We assume no stratospheric aerosols, no Rayleigh scattering, no gas absorption, the pressure and temperature profiles were taken for July at the 75° N, with the temperature at the surface being 280K and standard pressure.

"(4) surface assumptions. Also some details such as number of discrete ordinates, the use of deltam-scaling ansatz and exact single-scatter computation, should be given here."

For the surface we took a Lambertian reflector with albedo equal to zero; this section will surely benefit from a brief explanation of the theoretical basis of the performed RT simulations, it will be added into the final version of the manuscript.

"Although the term 'pseudo-spherical' is mentioned briefly (P43 Line 16), this is not explained. With off-nadir views of 55 degrees, it is necessary to treat path attenuations in spherical-shell geometry, not only for the incoming solar but also for the outgoing view path."

The pseudo-spherical mode of SCIATRAN is calculating the light paths for the direct

solar beam in a spherical atmosphere, and then solves the plane-parallel RT equation. This will be explained in the final version of the text.

"The equations in Section 4.1 do not appear to match the text. Equations (2) and (3) refer to the BT conditions, but the text has these as Equations (4) and (5). Please sort out this confusion."

Indeed, the Eq. 5,6 should be replaced with the Eq. 2,3 and vice versa.

The authors are grateful for the Referee's effort and constructive comments which helped us make the manuscript better.

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