

## ***Interactive comment on “On cloud ice induced absorption and polarisation effects in microwave limb sounding” by P. Eriksson and B. Rydberg***

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Received and published: 1 June 2011

First of all, we thank for the overall positive judgement and useful input for improving the manuscript. To be clear, we agree on that this work is quite specific for microwave limb sounding (and don't claim anything else in the manuscript), but is of high importance for this measurement technique. We also selected AMT for our submission (in favour of e.g. ACP), as the study has a clear focus on an observation technique. For the usage of oblate spheroids, see comment below.

1. The manuscript has been revised in detail and been rewritten in several places to improve clarity and grammar. The most significant changes are found in the Abstract, and in Sec. 2.1, 2.4, 3.4, 4 (intro), and 4.3.

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2. Sometime you miss to point out the most obvious facts! The fact that 3D radiative transfer had been made is now mentioned in Abstract, Introduction Sec. 2 and Conclusions.

3. Fixed.

4. A correct observation. Changed.

5.  $\tau^Z$  is difficult to explain with an equation. But the quantity is now better explained and an example is given that should remove any remaining doubt.

6. It is clear that we don't model the micro-physical properties exactly. As pointed out by the referee, the usage of oblate spheroids and the discretisation of the particle size distribution are approximations. However, we don't think that these approximations in no way affect the conclusions of the study. The aim is to understand basic and general principles of the measurements, not to predict "cloud signals" in an exact manner. The later is not possible as relevant input to the simulations for the micro-physical parameters are lacking (as discussed in first paragraph of Conclusions). The main concern when studying polarisation issues is still the (bulk) aspect ratio of the particles, and here we use two values to indicate the range of possible values.

7. A remark about shape (and orientation) has been added to Sec 5.1. The issue is now also addressed in Conclusions.

8. The sentence is rewritten. It was poorly expressed and could be misunderstood. A paragraph has been added to Conclusions, treating point 7 and the importance of the frequency for absorption/scattering ratio.

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Interactive comment on Atmos. Meas. Tech. Discuss., 4, 1493, 2011.

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