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Interactive comment on "A multi-wavelength classification method for polar stratospheric cloud types using infrared limb spectra" *by* R. Spang et al.

Anonymous Referee #1

Received and published: 15 March 2016

The paper by Spang et al. describes the use of a novel method for classifying Polar Stratospheric Clouds (PSCs) based on Bayes' theorem. The paper is suitable for publication in AMT after minor corrections. As stated in the manuscript the new data set will be valuable for the community, but only if it will be made public. How can the community excess the data set? No information is provided in the paper.

Major points:

For the Bayesian classifier four different methods are used to distinguish between the different PSC types. The methods are properly explained in the manuscript. However, the use of different years in the examples (Figures 3, 5, 7, and 8) does not enable the reader to form his own opinion on the author's claim that one method is more reliable

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Discussion paper

than the other to distinguish between the different PSC types. Please use the same year for all example cases.

When comparing CALIPSO and MIPAS, CALIPSO data should be smoothed in the vertical. This would enable a more reasonable comparison not only because of the noise in the CALIPSO measurements but also regarding the differences between CALIPSO and MIPAS in terms of vertical resolution.

In the manuscript you need to state what CALIPSO level data were used for the comparison. Your mentioned V1_00 CALIPSO PSC MASK product, but this product does not seem not to be available for the general public when I checked with LaRC ASDC.

Minor Points:

The labels of the different PSC types in the figures do not agree with the acronyms given in Table 2. Please homogenise.

Figure 3, STS mix: according to Table 2 it includes STS and large NAT particles. However on page 10, line 24, it is stated that STS mix can include optical thin clouds. Why is that not stated in Table 2?

Page 7, line 17 and 21: CALIPSO MIX 1 and 2 consist of liquid/NAT mixtures. What do you mean with liquid: STS droplets or background aerosol?

Page 7, line 23: MIX 2 enhanced is described as containing NAT particles and the group is not masked by liquid particles. However, later on page 28, line 27 it is stated that MIX2 enhanced consist of NAT clouds and/or ice clouds. Please clarify.

Page 15, line1/2: It is stated that only large NAT particles can overlap the area attributed to STS (Figure 6). However, in the upper left panel of Figure 6 Ice particles are overlapping with the STS area. That needs to be discussed in the text.

Technical comments:

The figures need to be improved: there is too much unused space taken by redundant

labels and axis descriptions as well as unnecessary figure titles.

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