

## ***Interactive comment on “Optical and geometrical characteristics of cirrus clouds over amid-latitude lidar station” by E. Giannakaki et al.***

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Specific comments:

1. Introduction: More recent references as well as the new IPCC report, should be cited.

The new IPCC has been cited.

2. The paragraph "The lidar technique...2005" should be rephrased, since it is not clear. The paragraph was changed according to the reviewers suggestions as follows:

'Lidars has been regarded as one of the leading techniques for remotely quantifying numerous atmospheric parameters, including cirrus clouds. Backscatter and Raman lidars have been used to retrieve information on geometrical and optical properties of cirrus clouds. This is possible through the application of different methods that have

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been earlier demonstrated in the literature (e.g. Barrett and Ben-Dov 1967; Viezee et al., 1969; Davis, 1969; Fernald et al. , 1972; Platt, 1973; Platt. 1979; Klett, 1981; Fernald, 1984; Grund and Eloranta 1990; Ansmann et al., 1992). Some physical parameters of primary concern are the extinction coefficient, lidar ratio and depolarization ratio as well as the mid altitude and mid temperature of cirrus clouds (Sunilkumar and Parameswaran, 2005):

3. The same for the paragraph "The optical extinction ...in the past".

The paragraph was changed according to the reviewers suggestions as follows:

'The optical extinction of clouds is a key parameter in radiative transfer computations and therefore considerable effort has been put in its retrieval. The evaluation of optical depth of cirrus clouds was done through the application of different methods which are already demonstrated in the literature.'

4. In the 3.1.1, 3.1.2, 3.1.3 sections the measurement accuracy regarding the beta , alpha and lidar ratio retrieval should be mentioned. The measurement accuracy of each method could be found to the corresponding literature which has already mentioned in the text.

In the revised version we added a short statement for each method and its accuracy, based on the studies already mentioned before. Specifically, studies of Ansmann et al. (1992), Klett (1981) and Chen et al. (2002) extensively deal with the accuracy of Raman, Klett-Fernald and transmittance methods respectively. Concerning the accuracy of the algorithms used in our study, details can be found in the papers of Bockmann et al. (2004) and Pappalardo et al. (2004) cited in the revised version.

5. Several typing errors, and many parts of the paper have to be rephrased

Typing errors and parts of the text were corrected for grammar and syntactic errors.

6. The ACP format in the references part and inside the text it should be strictly followed.

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The ACP format was followed.

7. Fig. 11 appears in the text before Figs. 9 and 10. Please change order (section 4.2).

Now the total number of figures is 9 and they appeared in the correct order.

8. Fig. 10, shows no error bars for certain points. What is the reason?

No error bars means that results shown are based only on a single measurement.

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Interactive comment on Atmos. Chem. Phys. Discuss., 7, 9283, 2007.

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