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Comment

## ***Interactive comment on “Towards an automatic Lidar cirrus cloud retrieval for climate studies” by E. G. Larroza et al.***

### **Anonymous Referee #2**

Received and published: 3 July 2013

The paper presents a methodology for accurate determination of geometrical and optical properties of cirrus clouds using lidar and radiosonde measurements. Such measurements are extremely important especially in the tropics and thus the potential for time series of cirrus clouds properties over Brazil is extremely important for climate studies. In addition it is crucial that such studies are conducted among different stations in a homogenized way and thus the fact that the authors from Brazil collaborated with their colleagues from France, known to have long experience in lidar based cirrus cloud measurements, is towards a homogenized approach. There are however some issues in the paper that should be clarified before final acceptance:

General comments:

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It is not clear from the text to what extend their methodology provides a real alternative (alternative to what actually?). Concerning the optical properties the authors apply more or less existing and widely applied methods, which they cite in the manuscript. The authors should be here more specific, what is new in their application.

The authors suggest an iterative procedure for the determination of the lidar ratio (equations 5 to equations 9) but it is not clear as it is written what they mean. From equation 9 one can determine the LR from the values of the SR and the optical depth determined with the transmittance method. Then the authors say that they update tau and SR from equation 4 and recalculate LR, but equation 4 just calculates the standard deviation. In addition what are the convergence criteria? Please correct and be more specific. As it is written it is very confusing.

Section 5 presents a discussion for the case study on which the methodology has been applied. As the paper aims to be a methodology paper the discussion could be shortened, since the characteristics of the evolution of a single cirrus cloud are not representative for the area and as it is written the reader can get erroneously the impression from this paragraph that the methodology has been validated and that provides consistent results with other ones. You cannot conclude that from one case study, you can only demonstrate the application of the proposed methodology. Please revise this section accordingly.

Specific comments:

The text will require some editing concerning the language and the syntax.

Figures 1 and 2 and their discussion do not fit in a section that describes the system and its location. It would be more appropriate to include them when you start discussing the measurements in the next section. So I would suggest to restructure this part.

Page 7, Lines 243-246. The sentence is very confusing, especially after “as well as..”

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Page 8 Line 262: Replace “research” with “investigate” or “determine”

Page 8 Lines 266-269. It is not clear from the discussion and Figure 5 what the authors mean. When they say contrary trend they mean between tau and CT? Between time periods? Please be more specific.

Page 9. Lines 278-280. Please re-write the sentence, it is hard to follow.

Page 10, lines 305-309. See also my general comment above.

Section 3.3 The authors should make more clear that effective LR and tau are what it is measured without considering the multiple scattering and LR and tau are the true ones after correction. Please re-write.

Conclusions. The authors should mention here explicitly if their methodology can be applied in an automated procedure concerning data processing.

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Interactive comment on Atmos. Meas. Tech. Discuss., 6, 4087, 2013.

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