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Interactive comment on “Cloud retrievals from satellite data using optimal estimation: evaluation and application to ATSR” by C. A. Poulsen et al.

Anonymous Referee #1

Received and published: 20 June 2011

The paper describes a new developed algorithm using optimal estimation technique to retrieve cloud properties from (A)ATSR instrument series. The authors present a method to use all available channels of the instrument constraining a physical meaningful output for cloud properties. After a general detailed description of the model and the algorithm it is applied to ATSR data and first results are given. Beside this, it is very valuable that the algorithms will provide error information on pixel level for further understanding and interpretation of the results.

The paper is very well structured and very well written. It covers globally what is expected from a paper describing a new method to retrieve cloud properties.

I suggest the paper being published provided some minor changes/improvements are applied.

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Minor comments:

The introduction is referring to several cloud data sets but could be improved in giving proper reference to e.g. the cloud assessment pointing at the importance of using different sensor with its strengths and weaknesses. Recent projects to derive climate time series of cloud properties should/could be mentioned. Please emphasize more the general applicability to further sensors!

p. 2393 line 7: Sayer and Grainger instead Sayer et al.

p. 2393, line 12. EUMETSAT in upper case letters. Same for ENVISAT in line 22.

p. 2394, line 6: âŽn'ear-ir

p. 2394: it is not clear if the algorithm is able to be run during all conditions (e.g. day/night etc.) Please make such a statement.

p. 2396: section 4 the authors expressed that they used a globally fixed value of 1 for emissivity. Please explain why not using already developed and existing (e.g. SARB) MODIS based climatology. What ist the expected difference to a change in emissivity of e.g. 5 % typically in desert areas?

p. 2397, line 9: Takano and Liou

p. 2398: line1: acknowledged

p. 2398, line 24: What is Tcld? Please make sure that every (!) Variable is introduced when first used

p. 2404, line 18: unconstrained

p. 2405, line 15ff: do the authors know what the impact of the ice r_eff limitation is? How often does it occur?

p. 2406, line 5: Introduce GRAPE abbreviation

p. 2407, line 22: very

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4, C901–C903, 2011

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p. 2413: line 25/26: how often does it happen? Is it really a problem in global application?

p. 2414: Although it is clear that there will be no global single number of recommended values for cost and retrieval errors. However it would be very helpful for interested readers to provide may be a range of the costs where a potential user could start with in his application.

p. 2416: Reference section. Sometimes the authors give references to ESA or EU-METST technical notes. They should be replaced by peer reviewed publication where ever possible. The reference list should be carefully checked if authors referenced in text.

p. 2427: Mention the date of the overpass in all Figure captions for a better understanding.

Interactive comment on *Atmos. Meas. Tech. Discuss.*, 4, 2389, 2011.

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