

Interactive comment on “Cloud thermodynamic phase inferred from merged POLDER and MODIS data” by J. Riedi et al.

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The authors would like to thank sincerely the two reviewers for their thorough reviews, very useful and constructive comments which hopefully helped in improving significantly the manuscript.

Both reviewers have clearly identified and pointed out that a major weakness of the initial paper was the confusing description of the final phase index and its interpretation in terms of retrieval confidence.

The authors agree that ample space existed for improvements with this respect. In particular, the phase index and the associated confidence level may have appeared as two distinct values in the initial manuscript. In practice, there is only one index ranging

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from 0 to 200 and the confidence is carried by the exact index value within this range. This is now clearly stated in the text.

We have made significant changes in the text to explain better how the individual results of the three methods are being merged to provide a unique phase index. The logic used to create the final index is described in more details and the interpretation of the index values has been improved. Also a flowchart of the logical decision tree has been included to help in the understanding.

Also the definition and interpretation of *Mixed* phase cases was not entirely satisfactory. We have now included a better description of the phase index and specifically addressed the case of "Mixed" phase which should clarify the interpretation. The difference between "Mixed" and "Undetermined" is also discussed. It is made clear in the paper now that "Mixed" is an indication of inconsistent decision from the individual methods whereas "Undetermined" results of none of the three methods being able to provide information. The value of 100 for Mixed cases therefore stands at equal distance between the high confident liquid (0) and the high confident ice (200) to indicate not the lack of information but rather the occurrence of both liquid and ice signature in observations.

Beside these two main concerns that the two reviewers had in common, we provide in separate responses to individual reviewers a detailed response to their respective comments/questions.

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 14103, 2007.