Geosci. Model Dev. Discuss., 4, C1297–C1299, 2012
www.geosci-model-dev-discuss.net/4/C1297/2012/

Geoscientific Model Development Discussions

Interactive comment on "GEWEX Cloud System Study (GCSS) cirrus cloud working group: modelling case development based on 9 March 2000 ARM SGP observations" *by* H. Yang et al.

Anonymous Referee #2

Received and published: 8 January 2012

General:

The aim of the manuscript is to present an observation based cirrus case that can be used for the evaluation of 1D, 2D and 3D cirrus models. A comprehensive data set including remote sensing, radiosonde and aircraft measurements is used for that purpose and the observations are extensively analysed to understand the meteorological situation leading to cirrus formation in order to provide a reliable data base for model testing. Altogether, the paper is an important contribution to the field of cirrus cloud modelling which should be published.

However, I agree with referee #1 that uncertainties should be discussed. Further,

(a) I think the manuscript needs language polishing (maybe here the native English speaking co-authors can help) and tightening

(b) I suggest to add already in this paper an example of the observed/modelled number concentrations and fall speeds of ice particles as these are crucial parameters in cirrus properties which are mentioned in the manuscript several times

(c) the discussion of the influence of nucleation modes on cirrus development should be extended and maybe accompanied by a graph.

Specifically, can you explain the physics behind the statement on page 2768, line 7 ff:

'... however, since the ascent rate is weak heterogeneous nucleation was the dominant mode in the cloud formation. Runs with only homogeneous nucleation switched on required much greater initial super-saturation (or much stronger forcings), which did not agree with the water vapour profile at the time of cloud formation.

Minor comments:

1) Title: The title of the paper is somehow clumsy, I suggest:

GEWEX Cloud System Study (GCSS) cirrus cloud working group: development of an observation based case study for model validation

2) Abstract: the abstract should be shortened.

3) A list of used acronyms would be helpful.

4) Conclusions: The conclusion section is more a summary and should be entitled as this. Further, it also should be shortened and tightened.

5) Fig. 4, left column:

a) the quality of the plot is insufficient,

b) the units of Effective radius and Mass mean length is cm ?? Not micrometer ??

c) the time scale is noted as UTC, but the numbers seem to be something else.

6) Fig. 10: what time do you mean? Please synchronize the time in all plots.

Interactive comment on Geosci. Model Dev. Discuss., 4, 2751, 2011.