

Interactive
Comment

Interactive comment on “Ship and satellite observations over the ocean for verification of the shortwave cloud radiative effect in climate models” by T. Hanschmann et al.

Anonymous Referee #3

Received and published: 21 October 2012

General comments:

The paper considers a highly relevant and interesting topic. Ground(ship)-based as well as satellite-based observations of the atmosphere are fed into the RTM-scheme of ECHAM5-model to calculate the cloud-radiative effect. Results are discussed referring to observations of CRE (DSR). Closure experiments were performed to find optimal collections of data to characterise atmospheric state in the model. It includes a thorough discussion on how to reconcile datasets of different sources on different spatial scales.

For final publication the manuscript should be accepted subject to minor revisions.

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Specific comments:

p.17747, ch.2.1. ship measurements (I)

- with regard to ship movement and salt coating on the radiometer dome a constant measurement error of 4% for hourly means is assumed. Might it be favorable to consider wave height and/or meteorological conditions to reduce uncertainty at least in fair weather conditions ?

p.17748, ch.2.1. ship measurements (II), cloud fraction from TSI vs observation

- 'for the majority of the images ...': even though it is related to another publication - SYNOP is often used as reference observation but several investigations in the past revealed that there are some weaknesses in dedicated atmospheric conditions too. TSI algorithm might suffer some limitations too, how is that handled ? Concerning shaded pyranometer data, are they substituted by calculated quantities ? (last sentence not clear)

p.17749, ch.2.2 satellite based estimates

- the discussion on uncertainties of satellite retrievals refers obviously to accuracy estimates of climate variables, i.e. daily or monthly sampling intervals. For this study instantaneous data are utilised. How it is assured that the referred numbers are valid for the high-temporal-resolution data too ?

p.17751, ch.4.1 reference to figure 1

- the curves indicate the usability of the weighting techniques applied. But some questions arising: CMSAF data should be there around 10, even if MWP is not. If sun is below the horizon no CMSAF data can be calculated, thus 'no data', not zero should be drawn. Is there an explanation concerning the somehow mismatching behaviour around 15 ?

p.17752, ch.5 , item 1

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- "atmosphere in the model is completely described by ship-based measurements", maybe intention here is to say 'described by ship-based measurements only' (?). Pls clarify.

p.17754, ch.5, line 7

- ".. well captured by all experiments with PS-RSAT being slightly better than the other experiments". The statement refers to figure 3a. I can't comprehend - did you use more information than is shown in the figure, pls. explain.

p.17755, 2nd passage

- " ... no systematic differences are found using ship-based or satellite-based cloud properties ...". In fact there were found differences (of course - no one would expect a perfect match), how can be excluded systematic deviations at this stage of evaluation, or asked different: how do you define a 'systematic deviation' ?

p.17756, next to last sentence commencing with "Furthermore ..."

- What cloud cover source is suspected to be biased in relation to what. "cloud side scattering" (coulisse effect is meant ?) is apparent in human observations too. What about parallax correction in SEVIRI data and does that solve the problem comprisingly ? Pls. clarify.

Editorials/typos:

p.17751, 5th line: obtained

p.17752, 5th line: information

p.17754, 7th line: better than

p.17757, next to last line: reduce the limitations

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 17743, 2012.