

Interactive comment on “Impact of ship emissions on the microphysical, optical and radiative properties of marine stratus: a case study” by M. Schreier et al.

M. Schreier et al.

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We would like to thank Reviewer 1 for the stimulating review. We agree that plotting the cloud mask over the satellite reflectivity helps to show the efficiency of the cloud mask algorithm and included this figure in the revised manuscript. It is correct, that a lot of pixels are lost by the ship mask algorithm. However, the barely visible ship tracks in Fig.1 are all detected, why we show both figures.

We followed the reviewer’s suggestion and in the revised version we included a sensitivity study how the detected percentage of pixels varies with different cloud mask algorithm parameters. However, this algorithm was tested with the given scene and further investigation is needed with further ship track scenes to estimate uncertainties in

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the automatic ship track detection for other scenes.

The reviewer mentioned that the albedo of 0.03 for $0.86\ \mu\text{m}$ is too high. The value was taken from Jin et al., 2002, and the reference is now included in the revised paper. Nevertheless we tested that any value between 0.00 and 0.03 is not changing the results. Concerning the analysis in chapter 3.3., the reviewer remarked that Fig. 7 is misleading. The chapter is now shortened and new figures are put there instead of Fig. 7 and 8.

The reviewer also recommends to quantify the error in the radiances introduced by the ship track algorithm. Therefore a sensitivity analysis of the resulting changes in the radiation when varying the cloud mask algorithm parameters is introduced (new ch. 4.4).

We agree with the reviewer that the accuracy to the second decimal-point is much too high. Because of the high uncertainty of the values the standard deviation is always presented in the tables and point out this uncertainty. All numbers were reduced in the summary to the first decimal point.

Following the recommendation of the reviewer, we have added a comparison to MODIS standard cloud products in chapter 4.2. A comparison of the SACURA and MODIS standard products was already done by Nauss et al, 2005.

Minor comments:

1. The number by Durkee et al, 2000 for cloud top height is the best available at the moment. The statement is softened in the revised text.
2. Done in the revised version.
3. The resolution of the used data was $1\text{x}1\text{km}$.
4. Order of chapters is changed for 3.2. and 3.3.
5. See above.
6. Reference for the chosen wavelengths of the retrieval is Kokhanovsky et al, 2003 (same line in the text). We tried to better explain why $2.1\ \mu\text{m}$ is used for ship track

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identification in revised chapter 3.3 or 3.2. We emphasized, that the cloud property retrieval and the cloud mask algorithm channels are independent of each other.

7. The references have been added to the revised paper as suggested.

8. Changed to “sufficient”.

9. Referring to the cloud properties retrieval and solar backscattering, the error should be small, however, for the longwave simulations, the error could be high and we point this out in the revised text.

10. The intention was only to point out the lack of obvious changes in liquid water path.

11. We emphasize this point.

12. the chapter about drizzle suppression is removed.

13. We are working on the next step.

14. The abstract is changed and the accuracy is only one decimal point.

Interactive comment on Atmos. Chem. Phys. Discuss., 6, 1023, 2006.

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