**Atmospheric
Measurement
Techniques
Discussions**

Interactive
Comment

Interactive comment on "Detection and characterization of drizzle cells within marine stratocumulus using AMSR-E 89 GHz passive microwave measurements" *by* M. A. Miller and S. E. Yuter

M. A. Miller and S. E. Yuter

mamille4@ncsu.edu

Received and published: 16 November 2012

Reviewer Comment

Abstract (and elsewhere): "heavy drizzle" is not well defined a description. Can it somehow be characterized, especially in order to discriminate "heavy" from "light" drizzle, e.g. in terms of rain rates?

Authors' Response

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In the abstract and in Section 2.2, the heavy drizzle floor is established at 0.084 mm/hr per the cloud base Z-R relationship from Comstock et al. (2004) for a reflectivity of 0 dBZ.

Reviewer Comment

p 4574 l 10: if the cloud tops are not iced, LWP=CWP (not "similar"). Otherwise specify how ice clouds are treated (by the way: are multilayer clouds flagged out?).

Authors' Response

As stated in the first paragraph of Section 2.2.2, pixels with a cloud top temperature < 273K are flagged as ice topped cloud and removed. Multilayer clouds are not explicitly identified. As for the similarity or equality of LWP and CWP, the reviewer is correct and we have adjusted the wording accordingly.

Reviewer Comment

p 4575 ll 23f.: It would be worth shortly describing the physical principle behind the 0dBZ threshold.

Authors' Response

There is not anything magical about 0 dBZ. As discussed in Section 2.2, in relation to a LWP of 200 g/m^2, 0 dBZ corresponds to a reasonable threshold, based on many observational studies, where drizzle will usually reach the surface. We know our algorithm cannot detect very light drizzle, so we tuned the algorithm towards the threshold for heavy drizzle that observations in the literature suggested.

Reviewer Comment

p 4576 l 20.: Is the threshold similar for all liquid phase clouds or is it specific for marine Sc?

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Authors' Response

We cannot attest to the fitness of the heavy drizzle threshold for non-marine Sc.

Reviewer Comment

p 4577 ll. 22ff.: Are day and night MODIS data used? Is the MODIS cloud product equally good at day and at night (I doubt it). Consequently, is it possible to get a nighttime cloud bias in the drizzle product?

Authors' Response

MODIS data are only used to screen for ice clouds in the drizzle detection algorithm. The appropriate day/night cloud top temperature product is selected depending on whether we are processing an ascending or descending AMSR-E swath. The cloud top temperature fields come from the MYD06 MODIS Cloud product as stated in Section 2.2.2. The MODIS cloud top temperatures are not expected to have a significant day/night bias and we do not expect that the MODIS data is affecting drizzle detection.

Reviewer Comment

p 4579 ll 10ff.: Here the question is very relevant, if cloud fraction and cloud top temperatures from MODIS are equally good at day and night. As no solar channels are used for cloud flagging at night I assume that the cloud detection is biased at night and that this nighttime bias consequently is also reflected in the statistics of the cloud top temperature. Please discuss this effect.

Authors' Response

Continuing from the response to the previous comment, detection of cold clouds is trivial at night since ice clouds have much lower IR brightness temperatures than the background. Nighttime screening of cold clouds is not an expected source of error.

Reviewer Comment

p 4582 ll 15f.: The red box also covers land pixels. I assume an ocean flag has been used here.

Authors' Response

Land pixels are not used. The IWV and SST data used in the drizzle detection algorithm come from the AMSR-E L2 Ocean product which does not have values for land pixels.

Interactive comment on Atmos. Meas. Tech. Discuss., 5, 4571, 2012.

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