Atmospheric
Measurement
Techniques

Discussions

Interactive comment on "Detection of ground fog in mountainous areas from MODIS day-time data using a statistical approach" *by* H. M. Schulz et al.

H. M. Schulz et al.

schulzm6@staff.uni-marburg.de

Received and published: 5 January 2016

Thank you a lot for you constructive feedback. Please find our replies below.

1. This might be true in many areas (e.g. low stratus over Central Europe). In Taiwan, however, the influence of the topography can not be overestimated. An entity of low stratus that does not touch the terrain in most of its part might touch it on the higher mountains only (cf Fig.1). Situation like that do often occur in the valleys on the eastern slope of the central mountain range of Taiwan (e.g. the famous sea of clouds in the Taroko Gorge). Therefore the map of Thies et al. (2015) does (if interpreted as a map of ground fog) most probably overestimate the frequency of ground fog in the low lands of Taiwan (A first (draft) ground fog frequency map for Taiwan calculated from DOGMA

C4692

fog masks confirms this).

2. You are right. The patterns of night time fog might differ from those of day time fog. Of course night time fog will also influence the cloud forest distribution. Future studies will show to which degree the day time ground fog frequency is suited to map the cloud forest of Taiwan. We do think, however, that this is not a problem of the current paper but will keep that in mind for our future work using DOGMA.

We will adress that issue in the end of the conclusion as follows:

"DOGMA's intended use is the creation of ground fog frequency maps. The relationship between fog frequencies and the occurrence of mountain cloud forest in Taiwan will be the subject of future work. In addition, it will be investigated whether a day-time-only approach is suited for the delimitation of mountain cloud forest"

3. Yes, you are right. We will fix that in the final paper.

4. The radiative transfer calculations the coefficients in the formula by Jimenez-Munoz and Sobrino are based on were done for 108 different surface types (soils, vegetation types, water, ice & rocks) that do NOT include clouds (cf. Jiménez-Muñoz, J.C. & Sobrino, J. A: Feasibility of Retrieving Land-Surface Temperature From ASTER TIR Bands Using Two-Channel Algorithms: A Case Study of Agricultural Areas, IEEE Goscience and Remote Sesnsing Letters, 4, 2007). For all these surface types the same formula can be used as the formula does account for the surface emissivity (which is the only important material parameter regarding the emission of light in the IR). As the coefficients c_1 to c_6 are not material dependend and W (the total atmospheric water content) is an parameter of the atmosphere (not of the surface) we do not see any reason why the formula should not be valid for any other materials if the emissivity is correct. In other words: the formula was "trained" using 108 non-cloud surface types, but should also be valid for other surface types.

To make things clear we will add the sentence "While the method was not explicitly
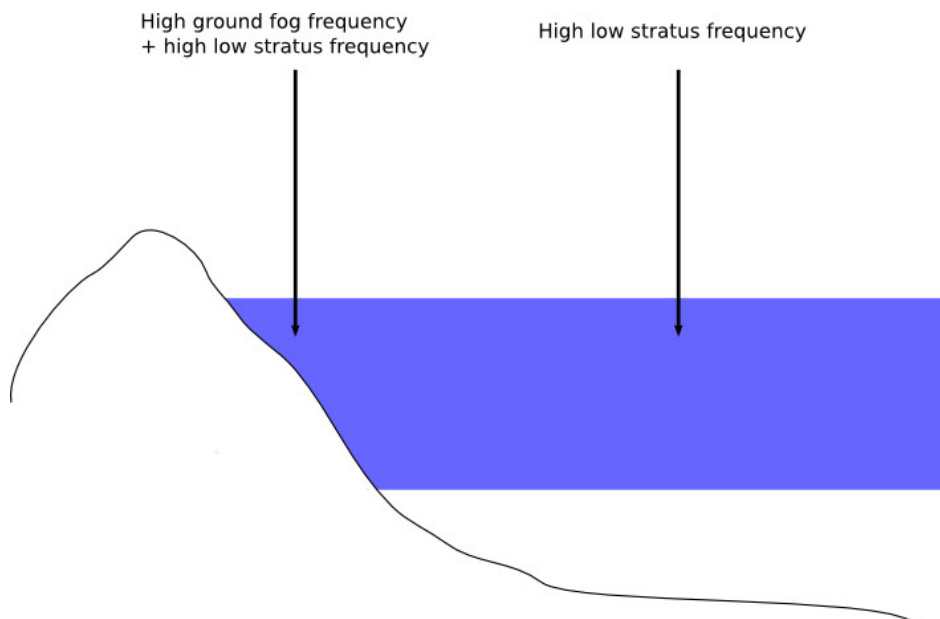
developed for cloud surfaces, there is no reason why it could not be applied here." in the final paper.

5. As stated in p. 12173, l. 9-13 "As the two validations are based on different data sets from different areas, they should not be directly compared to each other. The validation by Cermak and Bendix should only be seen as a reference for the current quality of ground fog detection from space born sensors.". In other words: We want to give some context to the reader what quality he/she can expect from a GROUND fog detection algorithm (As you know space born ground fog detection is still causing a lot of problem and a reader might expect better results). Please let us know if you want some further ellaboration on this in the final paper.

C4694

High ground fog frequency
+ high low stratus frequency

High low stratus frequency

Fig. 1. fog vs. low stratus