

Ref.: Dr. No. ESSD-2020-345

Title: Long time series of daily evapotranspiration in China based on the SEBAL model and multisource images and validation

Author: Minghan Cheng, Xiyun Jiao, Binbin Li, Xun Yu, Mingchao Shao, Xiuliang Jin

Research Paper

Earth System Science Data

Cover letter

Dear Editor:

I am submitting here a manuscript entitled “*Long time series of daily evapotranspiration in China based on the SEBAL model and multisource images and validation*” (ESSD-2020-345). The manuscript has been revised three rounds by referred to three Reviewers’ good suggestions. First we would like to thank the reviewers for their constructive and helpful suggestions and improvements to our manuscript. Our response to each suggestion or comment are given one by one in the following Pages of this letter. For details, please refer to the responses as follows (Reviewer or editor comments are in black font, responses are in blue or red font)

Looking forward to your favorable decision.

Thanks too much.

With best regards,

Minghan Cheng and co-authors

Responses to Reviewers

Editor comments:

Regarding the paragraph you added as a response to **comment #2** ([list in the follow](#)), about the validation of your data product with limited EC tower availability, I'm afraid the paragraph you added is not easily understood and also does not completely address the concerns of the referee.

Could you please re-write the paragraph (and also, please consult a native speaker again for the English phrasing, some of it could use more clarity), so that you actually discuss the validation basis for your different ET classes, and give some sort of uncertainty estimation. Please take special care to discuss the implication of having only one ground truth EC tower for a class. This is relevant for people who want to use your dataset, it should be clear which parts of the classification have a good validation basis and which should be used with great caution.

The comment 2 of Reviewer #3:

The authors replied very detailly to my comment on the differentiation into different climate zones, terrain types etc. by referencing other papers that used a similar number of EC stations for assessing model performance. In my opinion, this is still not convincing since e.g., the class cropland includes a single site while croplands exhibit very different ET rates and dynamics based on the cultivated crop. The same will hold true e.g., for climate types. In my opinion the authors should at least state that the low number of stations per class (land cover, terrain type etc.) might reduce the validity of these findings.

Response: Thank you for your help and suggestions in improving our manuscript. We have rewritten this paragraph ([Lines 432-446, Pages 22-23](#)). The potential bias in the findings was acknowledged and analyzed. Compared to classes which had multiple validation sites, the representativeness of the evaluation was inevitably compromised in cropland, tropical zone, and warm-temperate zone, which had only one site available. Nevertheless, this deficiency was alleviated in this study by incorporating the long-time-series data. The details are as follows:

'Although a comprehensive evaluation of SEBAL ET over different classes was conducted in this study, users should be aware of the uncertainties due to the limited number of validation sites in some classes. For example, only one site was available for the

evaluation over cropland. Because this cropland flux tower site was set in plain and warm-temperate zone, the accuracy may only represent the data quality of cropland ET in the warm-temperate plain zone, but not other regions. Nevertheless, long-time-series data were obtained from this site which covered different seasons and different crop types. Employing these hundreds of samples in the validation could remedy the single-site insufficiency to a certain extent. Similarly, only one site was found in the validation over two other classes, i.e., tropical zone and warm-temperate zone. Long-time-series data were also incorporated to enhance the representativeness of the single site. Regarding the other classes, two or more sites were used which will lead to more reliable results. Compared to previous studies (Aguilar et al., 2018; Hu et al., 2015; Ramoelo et al., 2014; Yang et al., 2017), a larger number of validation samples (flux tower sites) were used in this study, indicating that the findings were reliable. Additionally, although the validation of SEBAL ET in this study followed the literature (Kim et al., 2012; Ramoelo et al., 2014) and considered different land cover types, climate zones, elevation and seasons, several more situations may need to be considered. For example, whether the SEBAL accuracy was different across years (Velpuri et al., 2013) and satellite sensors (Long et al., 2011). Overall, with the increasing number of flux towers set up in China, more reliable and comprehensive validation of SEBAL ET can be conducted in the follow-up research.'