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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Estimates of global dew collection potential" *by* H. Vuollekoski et al.

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We thank Anonymous Referee #2 for his/her efforts, and answer to the referee's concerns as follows:

1. The authors do not discuss performance of the used model and its applicability to the considered problem. The only phrase gives a reader some information on these issues: "...we followed the approach presented by Pedro and Gillespie (1982) and Nikolayev et al. (1996), which has been found to agree well with empirical measurements of dew collection (e.g. Beysens et al., 2005)" (page 2; lines 110-113). However, in my opinion, the mentioned paper (Beysens et al., 2005) does not support this conclusion. In fact, the results of the model verification are not presented in (Beysens et al., 2005), except for one picture comparing simulated mass of the condensed water with the mass measured in 1 experi-

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mental site during 8 hours. This result does not give any basis for use of the model without any additional verification, especially for its use for the global and multi-year scales. I suggest the authors to present more references which could demonstrate for a reader that the model is applicable for different physiographic/climatic conditions, seasons, etc. Note that the authors of the model (Nikolayev et al., 1996) did not use any empirical measurements at all for the model verification.

This is a very good comment. It is true that Beysens et al. (2005) present only one figure in support of their figure, but their text states, for example: "This software was verified against the experimental data in Ajaccio, Bordeaux and Grenoble. As a rule, the variance of the difference between the measured and simulated temperatures of the condenser plate did not exceed 0.5 °C." They do, however, acknowledge limitations in the model, and we will include further discussion on these in the revised manuscript.

We will also include several more references to studies that have applied a similar energy balance model. The models vary mainly in their selection of transfer coefficients, and the revised manuscript will include further discussion on this topic.

Nilsson, T, 1996. Initial experiments on dew collection in Sweden and Tanzania. Solar Energy Materials and Solar Cells 40, 23-32.

Madeira, AC, Kim, KS, Taylor, SE, Gleason, ML, 2002. A simple cloud-based energy balance model to estimate dew. Agricultural and Forest Meteorology 111, 55-63.

Jacobs, A., Heusinkveld, B., Berkowicz, S., 2008. Passive dew collection in a grassland area, The Netherlands. Atmospheric Research 87, 377385.

Richards, K., 2009. Adaptation of a leaf wetness model to estimate dewfall amount on a roof surface. Agricultural and Forest Meteorology 149, 13771383.

Maestre-Valero, JF, Martinez-Alvarez, V, Baille, A, 2011. Comparative analysis of two polyethylene foil materials for dew harvesting in a semi-arid climate. Journal of Hydrol-

ogy 460-461, 103-109.

2. Any model has some parameters, which can not be assigned a priori and have to be adjusted though calibration against the available measurements. Without calibration, as well as without any comparison with experiment data, simulation results look rather arbitrary. I suggest the authors to give complete list of the model parameter values and refer to publications from where the values are taken. Also, it would be useful to add small discussion on the parameters variability in space and time.

All the parameters used in our model are listed or explained either in the section Methods or in Table 1 (or among the relevant part of the Results section). Furthermore, the source code of the model will be made public, although only after the article may be accepted for final publication. Although some of the used parameters are at least semi-empirical, the energy balance model itself has a solid theoretical foundation.

Discussion on the variability of the parameters will be added in the revised version of the manuscript.

3. There are many sources of uncertainty of the obtained assessments of the global potential for collecting water from dew. Among the most important, the uncertainties of the model structure, parameters and meteorological inputs can be mentioned. I have no doubt that these uncertainties affect the obtained assessments and their credibility in a large degree. I suggest the authors to take this issue into account in the discussion section and to moderate some conclusions. In particular, I do not see any basis for the conclusion that "the long (simulated) time-series in our study provides information about the seasonal variation of dew formation as well as long-term trends in dew yield, which may be associated with climate change"

Discussion on uncertainties will be added in the revised version of the manuscript. We will also further emphasize the limitations of a global modeling approach.

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