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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Dew frequency across the US from a network of in situ radiometers" *by* François Ritter et al.

Anonymous Referee #1

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The manuscript "Dew frequency across the US from a network of in situ radiometers" by Ritter, Berkelhammer and Beysens describes an interesting analysis of data from a network of landsurface stations (NEON). The focus is on dew duration derived from radiative surface temperature and dew point at reference height. Also an attempt is made to come to quantitative estimates of dew yields. The topic is certainly relevant and also suitable for this journal.

General comments:

I am very enthusiastic about the set-up of the NEON network. One can hardly overestimate the importance of this type of networks where the same kind of measurements methods are applied in a standardized manner for various relevant eco-system types.

Regrettably there are no independent flux observations available to back up the dew yield estimates, which are now based on MO-theory. Although I acknowledge the difficulty of such observations, it would already help to verify the sensible heat flux estimate by 3D sonic anemometer/thermometer flux observations. I would welcome a disclaimer on this in the concluding section 4.

Specific comments

P4L12-13: The authors may want to refer to: Bosveld, F.C., A.A.M. Holtslag and B.J.J.M. van den Hurk, Night time convection in the interior of a dense Douglas-fir forest. Bound.-Layer Meteorol., 1999, 93, 171-195.

P4L16-18: Is the reverse also true. When no dew detected then the dew point temperature is below the radiometric surface temperature?

P5 Ch2. Methods: The IR-radiometers are essential for this study. Figure 1a gives a nice summary of instrumentation of the various sites used in this study. But it remains unclear what the IR-radiometers are actually "seeing". How are they directed what are their opening angles, please provide further information.

P5Ch2: Provide information on calibration (where how and how often).

P5L9: Discuss the accuracy of the RH sensors, especially in relation to the results shown in Figure 7. RH measurements during wet episodes are notoriously difficult.

P5L17: In the figure no RH sensor is shown at 15 m.

P5L18: "Canopy temperature" what is meant here, air or radiative temperature?

P5L29: The uncertainty of +_0.5oC in the Apogee sensor might as well by systematic between calibration events. Thus a simple sqrt(N) reduction of errors might be too optimistic, please comment.

P6L6: Due to the dew process a moisture gradient between RH observation level and the surface will occur. Please discuss the possible sensitivity of you duration estimates

in this light. P6L29 This tau is dimensionally incorrect, may be better to split this calculation 30x60 sec and then remark that the outcome is multiplied by 100 to arrive at mm.

Fig7 and 8: Please explain in the main text the method of “close neighbours”.

P12L11-20: if I understand it correctly the authors estimate H and LE from MO-theory and Rn is measured. And then the residual is assigned to S-G. Please be more specific about this in the text P12L11-20.

P14 L13: But I see now drop of Ts below Td at all in these two figures?

P14L15: This might be related to downward convection from the crown level. See the same reference as given above (Bosveld etal, 1999).

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