Hydrol. Earth Syst. Sci. Discuss., 8, C2662–C2664, 2011
www.hydrol-earth-syst-sci-discuss.net/8/C2662/2011/

Hydrology and Earth System Sciences Discussions

Interactive comment on "Technical Note: Development of an automated lysimeter for the calculation of peat soil actual evapotranspiration" *by* S. Proulx-McInnis et al.

S. Proulx-McInnis et al.

sandra_mcinnis@hotmail.com

Received and published: 10 July 2011

We would like to thank you for your exhaustive and constructive comments. In this text, I will discuss each of your point one by one, if I agree or not with your ideas.

(1) I agree with you about the weighing lysimeters used on peat soils. I will discuss this point in the introduction as you suggested and the references will be added at the end of the manuscript.

(2) I will add a more detailed discussion about the Sy for a better understanding of the paper. Also, I will change the Sy definition for the one you suggested to me. Moreover,

I totally agree with your point that the assuming of a unit value of Sy could also lead to an underestimation. This sentence will be also modified. As suggested, the sentence (p. 5016, L. 14-15) will be deleted too.

(3) Nevertheless, I do not agree to give a brief example of the AET calculation with a Sy. Clearly, Sy is a fraction applied to ïĄĎWL. If we choose to use a unit value of this parameter because of a lack of information, it may confuse the reader if we explain a method of calculation that includes a Sy.

(4) I understand your point about the "special challenge" related to the non vascular plants without stomatal resistance. I will modify all the sentences about that for: "[. . .] which is different from agriculture soils and forested vegetation". Given that I was on the study site, I know that there were some trees and shrubs, but it was a small percentage. In L.9 on p. 5012, I will change my sentence for "Typical vegetation of this environment consists of a small percentage of small trees and shrubs (Picea mariana (Mill.) BSP, Larix laricina (Du Roi) K. Koch and Nemopanthus mucronatus (L.) Trel.) and a majority of heaths (Ledum groenlandicum Oeder, Kalmia polifolia Wangehn., Kalmia angustifolia L., Vaccinium myrthilloides Michx, Vaccinium oxycoccos L. and Chamaedaphne calyculata (L.) Moench), sedges (Carex sp. principally) and Sphagnum fuscum (Schimp) Klinggr. and non vascular plants (Sphagnum rubellum (Wilson))".

(5) We choose to compare the AET and PET. We are aware that is not a validation of our lysimeter system; there is a bad choice of word. I know that the PET is not the focus of our paper, but we decide to do an AET/PET ratio to compare with other AET/PET ratios in the literature. However, I agree to drop the sentences about PET in the abstract and the conclusion, but I do not agree to drop all the sections about PET in the paper. I explained in the introduction (L. 6-11, p. 5011) that PET tends to overestimate AET. I will keep this sentence, but I will change it to: "[. . .] tends to over or underestimate AET". Moreover, in the introduction, I explained that the PET is not adequate to justify the calculation of AET.

(6) I agree to give more details about the fact that the PET calculation (Thornthwaite, for example) is inadequate on peat soils at p.5020 L. 12-19.

(7) I understand your point that to calculate PET rates anything based on radiation works better, but in our case, there were not a lot of available parameters. The nearest meteorological station (Deschambault) was about 25 km away and does not record the radiation. The Thornthwaite equation is quite simple, but there is no PET equation well adapted to peat soils. It automatically leads to a bias. However, I agree with you that if I had a proper PET equation for peat soils, AET would always be lower than PET. A more detailed discussion about that will be added in the paper. In the methodology, I will call the Thornthwaite approach “Reference ET” as you suggested.

(8) I totally agree with you that the expression “long period” (L.10, p.5013) is not appropriate. I will change it to “short period” and will discuss in more details how the system will work for a longer period of time.

(9) On page 5018 (L. 23), I will use the clearer sentence that you suggested to me and delete the segment “since the system was balanced at midnight”.

(10) I agree to drop the last part of the sentence on p. 5021 L. 4 and the next sentence on L.5.

(11) Small details: - I agree with the majority of the suggested modifications. However, I will keep the Fig. 1. - Loheide needs to be write as Loheide II. - On p. 5013 L. 14, it is the acrotelm of our study. I will clarify in the paper. - On p. 5016 L. 10, it is an absolute value of AET.

Finally, we want to thank you again for the detailed corrections and suggestions.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 8, 5009, 2011.