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Hydrology and Earth System Sciences Discussions

Interactive comment on "Evaluation of Penman-Monteith model applied to a maize field in the arid area of Northwest China" *by* W.-Z. Zhao et al.

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Dear Prof. X. Chang, Thank you for your comments on our manuscript named "Evaluation of Penman-Monteith model applied to a maize field in the arid area of Northwest China" by Zhao et al. On behalf of co-author, I (i.e. W.-Z. Zhao) wish to reply to your comments as follows: PS: My response to comments was marked by blue style.

The manuscript evaluated the performance of Penman-Monteith ïij'LP-MïijL'using N-P (Noilhan and Planton) and J-D (Jacobs and De Bruin) bulk canopy resistance methods in an arid irrigation region by comparing with the observed latent heat fluxes. The description of the experimental set up is sufficiently detailed. The described method

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and results are of significant interest, e.g. in modeling resistance at canopy level and evapotranspiration modeling, especially for arid regions. This effort would benefit the determination of the key input parameters and quality estimation of the output results of Penman-Monteith model. However, the paper should be improved in some aspects: Thanks for your courteous attention.

1.Gap-filling procedures were employed in the paper to replace spurious and missing values of eddy covariance technique, but what is the quality control criteria of it? At present, the flux measurement community has agreed on the eddy covariance technique and data processing routines. However, the average data coverage during a year is only 65% (Falge, et.al., 2001). Therefore, robust and consistent gap filling methods are required. Anyone of gap filling methods will lead to the problem of uncertainty in measuring fluxes. Among these methods, linear interpolation, the look-up table approach and the mean diurnal variation method are the common or universal method for filling of missing or rejected data (Falge et al., 2001).

2. The authors stated that "the N-P is more suitable than the J-D approach to simulate the bulk canopy resistance of the irrigated maize filed under the arid climatic condition", but I found that the difference is little between the results via these two methods (from Fig 5) It is true that the difference between two types of the bulk canopy resistance approaches, in light of the evidence from the simulated results. However, the results of statistical tests indicated that the N-P is more suitable than the J-D approach to simulate the bulk canopy resistance of the irrigated maize filed under the arid climatic condition in this study.

3. I wonder whether both the calculating results and the observed ones are validated at the same scale. The fluxes measured by means of the eddy covariance system and the simulated ones derived from Penman-Monteith model are the same scale (i.e., above canopy).

4. For the description of irrigation scheme in section 4.3, the paper should be moved

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into section 3.1 (site description). Thank you, the descriptions of the irrigation scheme should be added to the Section 3.1.

5. For Figure 2, 3 and 4, change the units for the y axis to stomatal conductance. The units for the y axis in Fig. 2, 3 and 4 are right. But, in the titles of Fig. 2, 3 and 4, "stomatal resistance" should be changed to "stomatal conductance".

Please also note the supplement to this comment:
http://www.hydrol-earth-syst-sci-discuss.net/7/C137/2010/hessd-7-C137-2010-supplement.pdf

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 7, 461, 2010.