Alternative Methods to Predict Actual Evapotranspiration Illustrate the Importance of Accounting for Phenology: The Event Driven Phenology Model Part II.

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Anonymous Referee #3.

The paper of Kovalsky and Henerby combines there new developed event driven phenology model (EDPM) with a state of the art evapotranspiration (ET) model (VegET) to simulated ET for a range of agricultural sites. They use different phenological approaches to estimate the potential and performance of the EDPM derived ET estimates. The entire subject and the selected methods address relevant questions for BGD. Despite some necessary modifications and additional clarification the paper should be published.

As I submit this review after reading the already published reviews I will not repeat what is mentioned there, and only continue with aspects I do see important to be discussed /analyzed.

Major points: Looking at the 6 different ways of estimating evapotranspiration it is important to note that the efforts to derive their initial setups is of different complexity. This is important if one would like to judge about the 'best' method. With the EDPM the authors either apply prescribed PTP's or use adequate training to define the PTP's.
I cannot see a similar effort to construct initial settings, and therefore doubt that apart from the analysis shown they are a solid prove for the superior performance of the EDPM. Certainly the model itself is constructed to allow for this, but inadequate efforts have been applied for the others. For example, the authors did linearly fit between MODIS and AVHRR measurements to achieve full temporal coverage. This approach completely neglects the 8 day variability, which can be assessed in various ways. Hereafter I see a large potential to reorganize the analysis with respect to satellite derived climatology's. Evaluation of results is based on entire growing season/year – what about the linear interpolation of 8 day satellite data – this is a source of error in the analysis. Do the results change when the models are driven for satellite observation dates only? At least parts of the analysis should support this idea, when

one could compare only those days. All other points I would have to make are already considered by the two other reviews.

Response. In the paper we used the procedure for deriving AVHRR climatologies of K_{cp} as presented in original VegET paper by Senay (2008). We recognize, however, that the smoothing used in this procedure gives an advantage to the EDPM, which can react to daily changes in growing conditions. Therefore, we inserted the following statement into the discussing section to disclose this relevant issue:

"We also have to point out the smoothing applied to the climatologies, as prescribed by Senay (2008), may have disadvantaged produced phenologies relative to the locally trained EDPM driven by contemporary weather. At the same time, this study was meant to show that interactive capturing of fine temporal details in canopy development can bring the expected advantage to the VegET."

We hope that our responses to comments from other referees will clear all concerns you may have about this manuscript.

Senay, G.: Modeling landscape evapotranspiration by integrating land surface phenology and a water balance algorithm, Algorithms, 1, 52-68, 2008.