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Hydrology and Earth System Sciences Discussions

Interactive comment on "Spatial and temporal patterns of land surface fluxes from remotely sensed surface temperatures within an uncertainty modelling framework" *by* M. F. McCabe et al.

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General Comments:

Authors present a method to use multi-temporal NOAA/AVHRR derived surface temperature differences to condition the prediction of spatial evapotranspiration rates. They use the TOPUP SVAT-model within the GLUE uncertainty estimation framework. I believe that the methodology presented here is well suited for the assimilation of remote sensed information into the prediction process by simultaneously considering data and model uncertainties in an appropriate way. Due to its generality it might serve as a general framework for the use of remote sensed information within hydro-meteorological

modeling/prediction applications. Also, it is my view that in order to avoid noise from atmospheric or other influences, the use of differences (or gradients), rather than absolute (temperature) values is a much more robust way of making use of remote sensed information. Thus, I feel the presented paper represents a an interesting andimportant contribution to hydrological science and is therefore well suited to be published in HESSD. It will certainly be of interest to a large number of readers. However, there are some important and minor questions and comments I would like to see addressed in a minor-moderate revised version of the manuscript. These are listed in the following:

Specific Comments:

1. Introduction:

570, l23: add references

2. Methodology:

574, l24: the reference citied here (Franks and Beven, 1997) does not contain any description for surface temperature, this is an extension in Franks et al. 1999. I feel a short overview of the model elements within one section would be helpful to the reader.

576, l20: please add a reference for the Koeppen classification system

577, l24: I would suggest to move this sentence to 2.4

578, l26: Please specify briefly your quality control s.a. atmospheric correction etc.

579, l23: it is difficult to understand how this works as a regionalization strategy, could you please extend this section to be more explicit

579, l27: What are the meteorological forcings? Net radiation? Are these spatially averaged values from a variety of local stations? How are they averaged? If yes, what is the effect of using averaged forcings in generating the model space and conditioning against “local/pixel” surface temperature differences? This needs some discussion!

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3. Results:

581, 8ff: Fig. 2 shows pattern of temperature differences(!!). So you should discuss the differences rather than temperatures (s. l8, l10, l13)

582, l2-5: see comment above about averaged forcing data!

582, l7: I would suggest to begin the sentence with “Calculated spatially distributed Ĕ” in order to make clear that these are model results!

584, l13: Is EF measured or calculated?

587, What is the additional information/research gain when additionally looking at surface resistances? Currently, I do not see any obvious conclusions or results (patterns in the spatial predictions) that can’t be derived from looking only at cumulative evaporation. Please emphasize on this aspect!

588, ff: Figure 8 is not included in the pdf. So, I can’t follow that discussion!

4. Discussion:

590, l25: Here authors claim, that temperature differences help to constrain predictions. It is not shown in this paper to what extent this constraining takes place. What would the mean of spatially distributed or mean cumulative evaporation look like without conditioning? I feel a comparison would be very useful!

Interactive comment on Hydrology and Earth System Sciences Discussions, 2, 569, 2005.