

## ***Interactive comment on “Mapping daily evapotranspiration at field to global scales using geostationary and polar orbiting satellite imagery” by M. C. Anderson et al.***

**M. C. Anderson et al.**

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We would like to thank Referee #3 for the helpful comments on the submitted manuscript.

1)"This is clearly a “picture book” paper. The first part provides a comprehensive description of The ALEXI/disALEXI models. The second one presents some application of the model from the irrigation district to the global scales. Unfortunately, apart from the drought analysis over the US, little effort is made to provide insight about the performance of the model against ground data at the irrigation district scale. Additionally, the

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conclusion about the performance of the approach at the irrigation scale is optimistic knowing the limitation the image sharpening technique when the parcels are small , when irrigation is present or with the presence of trees. Theses limitations have been discussed in Agam paper. In this regard, the authors could mention the work performed by Merlin et al. (2010) with regard to TIR desaggregation under complex conditions."

As mentioned in the response to Referee #1, this paper is intended as an overview of recent advancements in ALEXI applications, submitted as part of a special issue resulting from the Earth Observation for Water Cycle Science Conference in Frascati, Italy, 18-20 November 2009. Here we report first results in applying ALEXI to MSG LSA-SAF products, outlining test studies currently underway in Spain, Italy and Africa. Evaluation of model performance in each of these studies is in progress, and results are being prepared for publication by the collaborators.

Regarding application of thermal sharpening over irrigated landscapes, note that we have acknowledged the issues of unresolved moisture variability (as discussed by Agam) when one tries to sharpen MODIS-scale TIR images at 1-km native resolution, and we do not propose to pursue this. In this paper, we promote sharpening of Landsat imagery at 60-120m down to 30m or lower. At the Landsat TIR resolution, moisture variations due to irrigation are largely resolved and NDVI-based sharpening is effective. This point is now made more clearly in the text.

The work by Merlin et al. (2010) is now cited, and provides a valuable tool for accounting for residue/tillage effects on the LST distribution. We thank the reviewer for supplying this reference.

2)"The authors should provide a brief description of the STARFM model"

A brief description of STARFM is now included.

3)"This paper cannot be published as it is, I recommend to the authors to rewrite the paper and to keep only the application to the drought monitoring over the US and

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to analyze the effective added value of the approach comparatively to other drought indices."

As noted above, the primary goal in this overview paper was to provide first looks at ALEXI implementations over the MSG imaging domain. A paper currently in press in *J. Climate* provides an detailed intercomparison with other drought indices over the US and is cited in this text (Anderson et al., 2010), and so we provide only a brief review of this effort here.

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 7, 5957, 2010.