

***Interactive comment on “Uncertainties in using remote sensing for water use determination: a case study in a heterogeneous study area in South Africa” by L. A. Gibson et al.***

**L. A. Gibson et al.**

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We would like to thank the reviewer for the helpful comments and suggestions. We plan to improve this paper by expanding our introduction in order to state our objectives more clearly and to better place our work within the frame of the literature. We also plan to expand the section on heterogeneity in the revised paper.

Reviewer 4 Comment:

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\* The authors mention that data collected by Jarmain and Mengistu (2009) were used to validate the results (Lines 13-15, pg 6585), however I don't see where this is reported in the discussion paper (except for calibrating fc). Could the authors clarify?

We reply:

An extensive analysis of field validation results is in the process of being written up together with Jarmain & Mengistu and it is anticipated that this will be published.

Reviewer 4 Comment:

\* It would be useful to have a magnitude indicating how much larger the estimated ET was than precipitation in the water balance calculation. This would help to assess the impact of the reported variability of ET due to inputs e.g. according to Fig.4 daily ET varies by about 10% due to differences in the estimated fractional vegetation cover.

We reply:

This is planned for the revised introduction in line with a previous reviewer's comments.

Reviewer 4 Comment:

\* Line 24, pg 6586 "...the satellite..." should rather be something like "...space-borne sensors..." The current phrasing implies that the required measurements can only be obtained from a particular satellite.

We reply:

Noted, we will make the suggested change.

Reviewer 4 Comment:

\* The MODIS and Meteosat SEVERI data products used should have formal citations, brief descriptions and product version numbers to make their content and origin clear.

We reply:

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Noted, we will make the suggested change.

Reviewer 4 Comment:

\* The interpretation of Fig. 3 could be made more clear for the reader by noting in the legend that Day Of Year 193 is during the wet Winter season in this region and that DOY 324 is typical of the dry Summer season.

We reply:

Noted, we will make the suggested change.

Reviewer 4 Comment:

\* How was the curve shown interpolating the data points in Fig. 4 obtained? Is it fitted through the data points for  $f_c$  determined by each method, or by repeatedly varying  $f_c$  and recomputing daily ET? The caption and supporting text should specify this or the curve should be omitted as it implies a behaviour that may not exist.

We reply:

The curve was created by repeatedly varying  $f_c$  and recomputing daily ET. The points on the curve show that for the same pixel, a different formula would produce a different  $f_c$  result. We will state this in the figure caption.

Reviewer 4 Comment:

\* There are several places in the text where the authors refer to either potential or reference ET. It isn't clear precisely what these terms refer to and whether there is meant to be a difference between the two for the purposes of this work.

We reply:

We will be consistent in our use of terms in the revised manuscript.

Reviewer 4 Comment:

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\* I find Fig. 6 very difficult to interpret. A more comprehensive caption and discussion of the figure would be valuable to the reader.

We reply:

In line with a previous reviewer's comments, this will be done in the revised manuscript.

Reviewer 4 Comment:

\* The terms in Eqn. 3 haven't all been defined in this paper.

We reply:

This was an oversight and will be included in the revised manuscript.

Reviewer 4 Comment:

\* In many places in the text, it isn't clear to me whether single MODIS pixels or collections of pixels are being referred to. e.g. Line 8, pg 6595 "...within the MODIS pixel...".

We reply:

In the revised paper, we will try to specify when we are referring to single pixels.

References:

Brutsaert, W.: Evaporation into the atmosphere, Reidel, Dordrecht, The Netherlands, 299 pp., 1982.

Jia, L., Xi, G., Liu, S., Huang, C., Yan, Y. and Liu, G.: Regional estimation of daily to annual regional evapotranspiration with MODIS data in the Yellow River Delta wetland, *Hydrol. Earth Syst. Sci.*, 13, 1775-1787, 2009.

Su, Z.: The surface energy balance system (SEBS) for estimation of turbulent heat fluxes, *Hydrol. Earth Syst. Sc.*, 6, 85-99, 2002.

Van der Kwast, J., Timmermans, W., Gieske, A., Su, Z., Oliso, A., Jia, L., Elbers, J., Karssenber, D. and De Jong, S.: Evaluation of the Surface Energy Balance System

(SEBS) applied to ASTER imagery with flux-measurements at the SPARC 2004 site (Barrax, Spain), Hydrol. Earth Syst. Sc., 13, 1337-1347, 2009.

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 7, 6581, 2010.

**HESD**

7, C3639–C3643, 2010

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