

Interactive comment on “Analyzing influence of spatial resolution on the estimated evapotranspiration by using remote sensing data over an oasis area in Northwestern China” by H. Tian et al.

Anonymous Referee #1

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hessd-6-1321-2009: Analyzing influence of spatial resolution on the estimated evapotranspiration by using remote sensing data over an oasis area in Northwestern China by Tian et al.

This paper considers the effect of spatial resolution on ET derived from remote sensing data over a Chinese oases area using Landsat and Modis data. Generally, this paper covers a very interesting and scientifically relevant topic, but needs many improvements both literary (a native English speaker should check the text) as well as on the presentation of the used methodologies. To my opinion, the authors try to work

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out too many objectives in a rather small study analysis. In fact, this paper touches so many items, but none of them are provided with an in-depth analysis. In the end, this paper suffers from an accumulation of shallow analyses.

Up-scaling ground observation and remote sensing data is a real discipline itself. Yet, little considerations are given on existing up-scaling techniques from the literature. This seems to be a general flaw of the manuscript. The authors clearly fail in situating their study in a larger framework and proper credits on literature reports is lacking throughout the manuscript. For instance no discussion or situation of the results with respect to published international papers is given. And since the literature on modelling ET is enormous, it is not difficult to find related papers (even papers on ET modelling across different scales).

Another major drawback of this manuscript is that the authors do not demonstrate the added value of their proposed methodology by using more Landsat images. At this stage, only one image has been used. Hence, to my opinion, conclusions are drawn based on a too few amount of results (for instance evaluating LST values only using 6 numbers). This manuscript also contains poorly explained methods (as indicated below). Sometimes, I really do not understand what the authors mean, or equations are presented without providing the proper context. Also the use of the evaporative fraction for temporal up-scaling is presented in a very confusing way as indicated below. The authors should clearly explain why this method is used, the made assumptions of this technique, and why its implementation is justified. Also the procedure of collecting ground reference data for surface temperature is lacking. How many measurements per location were collected? Etc.

- This title is too long: consider next suggestion “The effect of spatial resolution on remotely sensed derived evapotranspiration of an oasis area in Northwestern China;

- As a non-native English speaker, I feel that the grammar needs improvements; For instance on the use of the article ‘the’. Sometimes the authors should leave it, some-

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times they should add it: p1322, l3 ... western China by using the Landsat-Tm and Modis data” or p1322, l10: “of 250 m resolution was syncretized into THE MODIS LST retrieval algorithm”; Is “syncretized” a proper English word? Etc (too many to mention them all). Some paragraphs are well written, other paragraphs are very not tidy;

- P1322, l3-4: “A relatively high consistency was observed between the TM-based latent heat flux and daily ET estimates AT ONE HAND and in-situ measurements AT THE OTHER HAND, with relative errors of 9.7% and 8.8%, respectively.”

- P1322, l13-17: this is not a well written sentence ...Etc.

- For the readers comfort, please stick to ET. Do not use ET and latent heat flux together.

- P1323, l10: this is a very limited amount of references! As the literature on RS based ET is huge, you should at least provide some more references, and perhaps also some review papers?

- This list of objectives is not well formulated. It should be “Deriving different spatial resolution ...” and “Introducing a simple method ...” and “Verifying ...” and “Deriving and validating remotely sensed ET from LANDSAT and MODIS against eddy covariance measurements... ” etc. To my opinion the use the word “authentic” is not right.

- P1325, l 5: “reaches of the Hei river basin where is an arid inland river basin in the”; there is something wrong with the sentence;

- P1325, l20: “The Terra-MODIS images used in this study were at 10:30 LT”; there is something wrong with the sentence;

- Include references on how the LANDSAT image was atmospherically corrected!

- P1326, l 17: “component L# can take ground observed values”; there is something wrong with the sentence; “can be taken from ground observations”?

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- P1327, I 6: “Model and its application”; I do not understand why you bring forward its application. This is not the right place.
- Equation 4: why using the square?
- P1327, I8: what interpolation method? Please briefly describe!
- Is the soil heat flux equation origination from Ma et al (in CHINESE!)? Perhaps he parameterized it differently, but I did not know that he derived the equation.
- P1327, I 13-21: To my opinion this is not the right place. This is a discussion.
- P1328, I1: Section 3.2.: better “Spatial upscaling of the TM estimates to the MODSI grids”.
- P1328, I1-12: very sloppy formulation! Contains spoken language, typos, etc. I do not understand what the authors are trying to tell. How can you use VIS and NIR from TM with ground measured TIR in combination with Modis?
- Why did the authors use TM and Modis imagery from different dates? Since Modis has a daily coverage, the same day could be used . . .
- Equation 7. Since LST is used in the fourth power, there is no linear relation and thus it is mathematically incorrect to split it in the way you do! Consequently, the authors cannot use this as such since some assumptions are involved;
- Equation 8. In fact you assume a linear mix. Can this be justified? - P1329, I 2: the authors mean brightness temperature?
- Equation 10. How sensitive are the results on LST if slight different alpha and beta coefficients are used?
- P1330 I 7-11: the authors proportionally resize the LST using NDVI? Or what did the authors? This is not very clear.
- P1330, I12: here the authors should better stress that TM produces instantaneous

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ET, and that this value should be converted to daily values.

- Equation 11. This Eq needs clarification: what is ET_{ref} here? Is that the potential reference crop ET, or something else? In that case $ET_{act}/ET_{pot,ref}$ equals the crop factor K_0 . Or do the authors want to use the fact that the Evaporative Fraction (EF) (which is by definition $LE/(LE+H)$) more or less is conservative during the day and use that to convert instantaneous values to daily values? I think it is the last case, but then this should be clearly mentioned and proper reference should be given to this statement! It is common knowledge that this conservation of EF during daytime is only an approximation, and as such the authors should clearly state why for their case the assumption can be made!

- P1330, l22: from this I interpret that the authors are using ET pot for a reference crop? Or is it actual evapotranspiration?

- P1332, l4: use “reference data” in stead of “ground truth”.

- P1332, l7: smallest instead of least?; “almost twice AS high as ...”.

- P1332, l10-13: this is not clearly phrased!

- P1332, l10-14: “it is OBSERVED”, in stead of “seen” (also in l25); un-proper use of the word “factually”.

- P1332, l 17: “lightly changed”? the authors mean “slightly”?;

- P1333, l19: “can suffer less” ? This is not the right expression.

- Fig. 2.: what about the other sites? Which sampling scheme was used to collect reference LST values at each site? Why are there different amount of sites in both figures?

- Fig. 3: what about the EF of the other observation sites? Include them in the figure.

- Fig. 4: to my opinion, the use of 6 values is far too low for drawing conclusion on

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the implemented methodology. What is “RE” in the legend of de figures? Latent heat fluxes are instantaneous values? Why including such a large range in the figures, if for instance LST values range from 25 to 35 °C (the authors give a range from 0-100°C)?

- Fig. 5: what are the R^2 and the slope and intercept of the regression?
- Fig 6. Include units!
- Fig. 8. “Fine days”? What do the authors mean? What is the purpose of this figure?

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 6, 1321, 2009.

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