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Interactive comment on "Microwave implementation of two-source energy balance approach for estimating evapotranspiration" *by* Thomas R. Holmes et al.

Anonymous Referee #2

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The authors have used diurnal temperature cycle built on available MW sensors to the well-known ALEXI model. The quality of diurnal temperature cycle based on MW sensors is important to ET retrieval. LSA-SAF LST was used to calibrate MW LST. I am wondering how did they determine or scale MW DTC parameters (especially the diurnal amplitude A) for the regions outside of SEVIRI coverage? Does MODIS ALEXI-IR also use LSA-SAF LST to determine DTC parameters?

I am confusing with eq. 1 and eq. 2 and 3. A_MW can be derived with equation 1. The diurnal cycle can then be produced with DTC3 model. eq. 2 says A_MW is scaled with TIR-based parameters. Then shouldn't the diurnal temperature cycle will also

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be changed by the new A_MW? When A_MW equals A_IR, shouldn‘t dTrad_IR and dTrad_MW be the same or very close? Then ET_MW and ET_IR will certainly have a high correlation. Please compare with other ET dataset, such as the latitudinal transect in Fig. 6, Fig. 7, Fig. 9. Otherwise, comparison between ALEXI_IR and ALEXI_MW is not enough for evaluation of the method.

In addition, when they evaluate the ET results with Fluxnet, please do the analysis on a daily scale. A part of the purpose using MW here should be also providing ET at daily scale. So please assess the daily ET not weekly or monthly.

In the end, the authors have tried to fuse MW and IR ET. I am wondering why don’t they use MW and IR signal to build diurnal temperature cycle directly. Could this method get more accurate daily global ET? Xuelong Chen has found MODIS monthly LST products could capture the monthly mean of diurnal LST variation. This means that the ALEXI could be used to MODIS monthly LST products. The authors might be interested to the following figure 1.

Eq1. If possible, please give the equation of DTC3, then the readers could quickly understand what kind of curves were used to fit the diurnal cycle.

Fig. 4 please specify t1 and t2 time for dTrad.

Fig. 8 how did the authors cope with different spatial resolution when they calculate Pearson‘s correlation. ALEXI-IR is 0.05 deg and ALEXI-MW is 0.25 deg. The correlation is at 0.05 deg resolution?

Fig. 9 why not calculate monthly anomaly? MW provide the possibility of daily ET. 3 months anomaly will provide a more consistent spatial patterns. But the performance at daily or monthly is more interesting. Fig. 7, and 8 also have the same question.

Figure. 10, when you calculate pearson correlation between satellite data and Fluxnet observations, daily, weekly, or monthly time series data was used? Please give RMSE at mm/day. This is more comparable to other‘s result.

page 2, ‘generated a data record of weekly ET’ why not daily? as above comments

Describe what is ti in Equation 1.

Table 2 Comparison is based on weekly averages in the period of 2003 to 2011. Why not use daily ET with gaps to calculate R, RMS? This is more useful for the readers to compare other ET products. Surely, weekly averages will give a higher R and low RMS. But MW provide ALEXI with the possibility for daily ET calculation.

Table 1, MOD43C3 doesn’t have gaps? How did they fill albedo gaps? Please specify at what time step (00:00, 06:00. . .) lapse rate profile is used.

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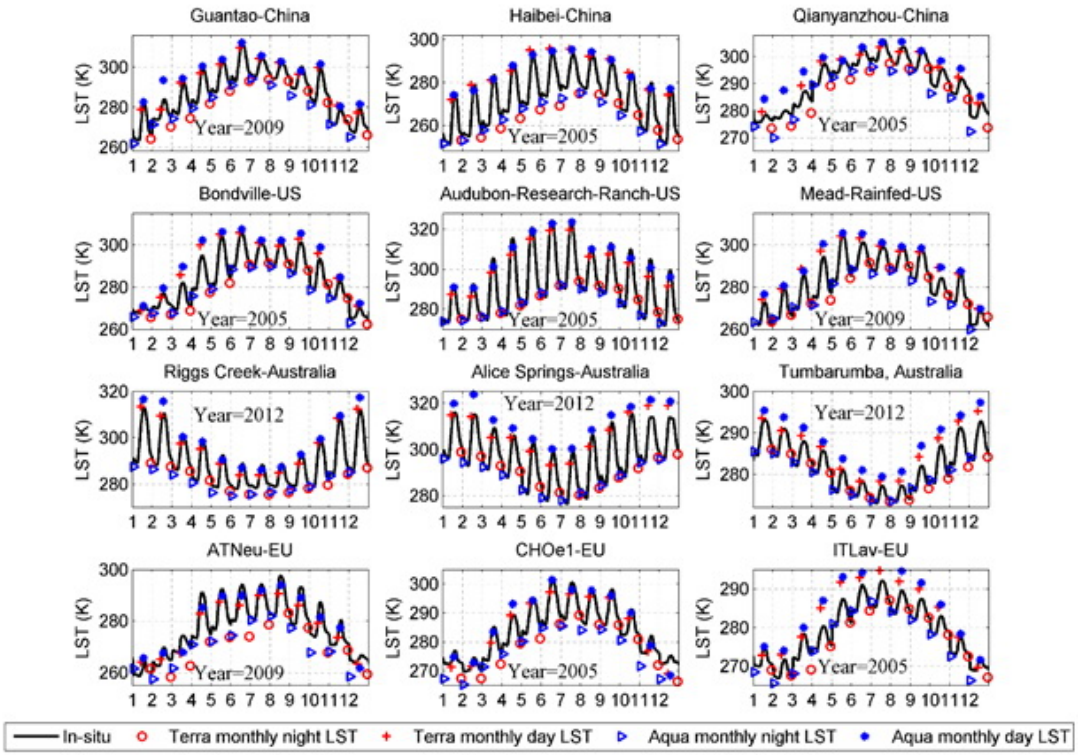

Fig. 1.

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