

Interactive comment on “Components of near-surface energy balance derived from satellite soundings – Part 1: Net available energy” by A. Jarvis et al.

Anonymous Referee #1

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Background An attempt is being made to estimate near surface net available energy defined as the difference between net radiation and surface heat storage. Used are simplified formulations for each term and observations from AIRS and MODIS. The formulation is at monthly time scale and at 1 degree spatial resolution. The results are evaluated using point measurements from tower sites.

General Comments Net radiation is derived by adding the components of net short-wave and net longwave radiation while the estimates of surface heat accumulation are obtained from day-night surface temperature difference at 12 hour discrete times.

I have several issues with this paper:

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1. It is claimed that a methodology is presented to derive the above referenced parameters while in fact, all that was done is taking simplistic formulations of each parameters and using satellite information of input parameters and plugging these numbers in the equations to obtain global fields of net radiation and heat storage.
2. The formulations are extremely simplistic as compared to current efforts to derive similar information. For instance, in eq. 4 used is one value of clear sky transmissivity for the entire globe for every month and the same constant transmissivity for any cloudy condition. The same simplistic approach is taken in the computation of net longwave.
3. In the formulation of the heat storage again, assumptions are being made that at 01:30 one can assume that $\Phi = 0$ so that heat capacity can be estimated.
4. The evaluation is done as follows: net radiation is being measured on the tower; G is not measured however, sensible and latent heats are measured. Therefore one can estimate Φ (from the sensible and latent heat) and therefore, G can be estimated as the difference between the net radiation and Φ .
5. The above approach raises a lot of questions. On monthly time scale, G is quite small. The errors in estimating and measuring net radiation are quite high, as well as the errors in the other measurements. No discussion is presented regarding the possibility that the computed values of G are at the error level.
6. The various parameters are measured at different levels. There is no discussion what impact this has on the results when they are assigned to one level.
7. What about the applicability of the same formulas to high elevations? Snow conditions? Deserts?
8. What about scale issues when comparing satellite measurements to point observations? No effort was made to reconcile scales or discuss implications of mixing scales. Is it possible that the results compare to the measurements as good as they do due to error cancellations?

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9. No discussion of diurnal integration issues and the fact that the surface temperature is not observed between min and max.

In summary, this paper does not present a novel approach to a difficult problem nor an in-depth discussion of the findings and the implications of the simplistic approach.

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 14387, 2010.

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