

Interactive comment on “Components of near-surface energy balance derived from satellite soundings – Part 2: Latent heat flux” by K. Mallick et al.

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Referee 2

Comments It is claimed that a new method is introduced to estimate latent heat flux at global scale. The Bowen Ratio concept has been around since 1926 and as such, is not new. It has been used by various investigators both over land and oceans (due to its simplicity) utilizing information on temperature and humidity from a variety of sources. AIRS information is more current and available at global scale; yet, using it does not make the approach new.

Response: We are not aware of any previously published work using satellite sound-
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ings to estimate surface fluxes using the Bowen ratio approach. As stated in the manuscript (P14421 L12-14) “Despite having been used to refine estimate of near surface air temperature over the oceans (e.g., Hsu, 1998), the use of Bowen ratio methods in conjunction with satellite sounder data somewhat surprisingly appears to have been overlooked as a method for estimating E.” R2, like R1 in the review of the accompanying NAE manuscript appears to struggle with the words “new method”. As a result we suggest “new approach” (which it certainly is) as a compromise.

Moreover, only one observation per day from AIRS is used which raises questions about the daily values

Response: The values we report are clearly identified as 13:30 hour samples and nothing more.

and also bias towards clear sky conditions.

Response: This is discussed (P14425 L8-10; P14429 L 9-13 & 9-18).

In the age of ongoing sophisticated land/atmosphere modeling efforts, the approach exercised in this paper seems to be far behind the state of the art

Response: The approach is explicitly developed and presented as an alternative to the ‘sophisticated’ modeling paradigm with all its contingent (untestable?) modeling assumptions. As highlighted from the outset by R1, this is a strength of the approach as it yields data that may well prove useful for independent testing of such ‘sophisticated’ approaches.

, ignoring the complexity of various surface types, limitations of soil moisture, stability effects, to name just few.

Response: This statement highlights one of the strengths of the approach being advocated in the paper. Not only do we ignore “limitations of soil moisture” we don’t have a land surface parameterization at all! Admittedly the assumptions behind the Bowen ratio approach limit its applicability, but we believe it marks an important step toward

attempting to derive satellite-only surface fluxes that do not rely unduly on “sophisticated” (yet imperfect) models so that we are able to produce global flux fields that are amenable to testing such models. R1 clearly picks up on this.

I have a difficulty to see a new contribution to the advancement of our knowledge on this topic.

Response: We have to disagree and side with R1 in recognizing the novelty of the approach and, although preliminary, its potential.

REFERENCES

Hsu, S. A.: A relationship between the Bowen Ratio and sea–air temperature difference under unstable conditions at sea, *J. Phys. Oceanography*, 28, 2222 – 2226, 1998.

Interactive comment on *Atmos. Chem. Phys. Discuss.*, 10, 14417, 2010.