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Discussions

Interactive comment on "The SPARSE model for the prediction of water stress and evapotranspiration components from thermal infra-red data and its evaluation over irrigated and rainfed wheat" *by* G. Boulet et al.

Anonymous Referee #2

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he paper by Boulet et al paper describes a remote sensing-based land surface model model (SPARSE) which appears to be a derivative of the the Two-Source Energy Balance (TSEB) modeling scheme. The differences between the original TSEB modeling framework and the SPARSE are described in some detail, but the paper in places does not provide details needed to understand how SPARSE works and distinguishes itself from TSEB. Moreover, there are assumptions made in the model that do not appear to have any physical basis or are justified theoretically. I therefore recommend the paper undergo some major revision and re-review before being accepted for publica-

tion,..below are some specific comments:

Page 12 Eq. (7) & (8): How are Ts and Tv determined and is the view angle of the radiometer accommodated? I can't find an expression in the text that describes this.

Page 15 Eq. (24): What is the physical basis for simply weighting the aerodynamic temperature estimated for the soil and vegetation? In addition, have two aerodynamic temperatures for the soil-canopy system is not physically plausible at the canopy/micrometeorological scale-this needs some explanation/discussion.

Page 17 Lines 5-9. It's unclear to me how the iterative procedure works...more clarification is needed.

Page 18 Lines 21-24. The discussion of realistic bounds for LEx based on Su (2002) seems to be a critical part of the modeling approach, but is not explained in any detail. Some further discussion is needed.

Page 19 Section 3.1/3.2. It's not clear to me if this simulation experiment/synthetic test is truly independent of the model structure. Why didn't the authors use a more complex SVAT that generates Trad, Ts and Tv and component fluxes to compare with SPARSE? Justification for this synthetic test needs to be made.

Page 23 Line 5. What was the closure values achieved by the eddy covariance system and what was done with the missing energy flux?

Page 23 Lines 26-27. The minimum stomatal resistance was set to 100 s/m, so what would happen if 50 m/s was chosen? This is certainly plausible for cereal crops. . .

Page 24 Lines 5-19. There is little explanation again on how the bounded versus unbounded model results were determined. Also Tables 1 and 2 should include more statistics, such as mean of observed and modeled, also the mean absolute error statistic and a percentage difference. Moreover, I'm confused that the series TSEB model is based on a citation from Cammalleri et al (2010) while the authors use the citation for TSEB parallel version of Kustas and Norman (1999), even though I believe a series

version is also developed in that paper. There needs to be an explanation as to what the differences are in TSEB formulations used in the 2 papers.

Page 28 Lines 5-8. So is the SPARSE model considered more reliable than the TSEB based on Table 1 and 2 results? In larger scale applications, should the authors consider a lack of having reliable vapor pressure data and what impact this may have on models such as SPARSE which require this input?

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