**Hydrology and
Earth System
Sciences
Discussions**

Interactive comment on "Combining remote sensing and GIS climate modelling to estimate daily forest evapotranspiration in a Mediterranean mountain area" *by* J. Cristóbal et al.

Anonymous Referee #2

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This paper outlines a simple remote sensing method for estimating evapotranspiration over a scots pine stand in a mountainous terrain. In general, the paper is well written and robust techniques for mapping ET are of great importance. However, additional thought could be put into how to better distinguish this paper from ET papers that abound in the literature.

The method itself is quite simplified, and more physically sound techniques exist. It is not clear how a methodology like this will be useful in practice, given that it appears to require intensive local calibration - this should be better motivated within the text. It would have also been nice to see specific demonstrations of where the GIS/DEM-

based analysis of met and LST inputs to the model really made a difference compared to a more simplistic treatment. This component of the analysis is novel, and could be better promoted.

Specific comments

Abstract:

L14: What is the "B parameter"? This has not been defined yet.

L20: Give absolute and %error for MODIS at this point, so user can compare to Landsat performance. May want to state spatial resolution of Landsat and MODIS assessments somewhere in abstract.

Pg 1128

L20: Expand model acronyms at first use. 30% errors in daily ET are not great. Typically errors more like 10% are being obtained routinely with LST-based energy balance models.

Pg 1129

L1: Expand these acronyms as well

L15: Use "moderate" in place of "medium"

L25: Swap phrases, as "The objective of this paper is to evaluate a simple method for computing daily ET using stand-scale sap flow measurements made in Scots Pine in a heterogeneous…."

Pg 1130

L1: Again, use moderate instead of medium

L21: LST is being used for both land-surface temperature and local solar time.

Pg 1132

L20: The aerodynamic resistance has a strong dependence on wind speed. How can a single value for Ra be used?

L24: Again, where is windspeed playing a role in Equation 2, as is stated in this sentence? Should mention somewhere in this section that the soil heat conduction flux is being neglected, and give a rationale for doing this.

P 1133

L9: "and a mean RMSE less than 15m was obtained." What does this mean? RMSE in what? This relief correction technique needs a little more explanation.

L17: MODIS products are generated by the MODIS teams (NASA-related), not by USGS.

P 1134

L1-9: This air temperature analysis technique needs more explanation, since it seems to be a crucial component of this work.

L14: It yielded an RMSE of 1K in comparison with what? Ground-based LST measurements? Explain. Avoid starting sentences with "It" – too ambiguous.

Eq 5: Should this be Rnd, like in Eq 1? Distinguish Rs as a daily value with a d subscript as well. LST and Ta are instantaneous values, right? ...how does that work into the daily net radiation computation?

Pg 1137

L4: By this do you mean that the B-Rn ratio method yielded ET estimates that had an RMS error of X with respect to sapflow measurements? Be precise in your wording.

In comparing to sapflow, are we assuming the expected soil evaporation component is negligible, or do these methods only model transpiration fluxes?

Pg 1141

An LST image pair over the same study area from both MODIS and Landsat would help the reader to understand visually the relative information content provided by each sensor.

Pg 1155

Fig 2: In text, need to define what "bow-tie" effect means.

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