

# ***Interactive comment on “Spatial variability of mean daily estimates of actual evaporation from remotely sensed imagery and surface reference data” by Robert N. Armstrong et al.***

**Robert N. Armstrong et al.**

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We are grateful for the comments from RC2. The following responses are intended to address the range of comments given by the reviewer regarding objectives, organisation, methods, and results and discussion.

The study objectives and potential for advancing understanding for examining improved methods of upscaling evaporation estimates has now been clarified in the introduction / background section. The ratio indexing methods represent a new way of scaling point measurements across large fields for evaporation modelling.

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Portions of the text have been reorganised and edited based on the comments regarding clarity and organisation. Specifically, the last sentence of section 1 has been better integrated earlier in the introduction/background. Regarding the mix of methods and results, text related to the methods has now been worked into the methods section.

Regarding comments related to the Methods: Repetition of the normalised index equations, i.e. equations 7-9 are referred to later in section 4.5 and Equation 10 shows the general integration for calculating net radiation – it may be preferable to leave these as is for clarity.

The reference parameters section and relevant parameters have been moved into the methods section for clarity.

A discussion of the Eddy covariance measurements and corrections has been clarified in the field observation section 3.2 and further in a new section (4.10) in relation to the modelling uncertainty. The confusion regarding the 2006 EC study has been addressed in the text – the data collected was referenced by the Armstrong et al., 2008 study cited in the manuscript, but the year 2006 refers to when the data was collected, which has been clarified in section 3.1. The relevant text related to the methods was moved section 3.3.

In the interest of reducing costs of publication, using greyscale images/figures is preferred for this manuscript. Figure 1 has been replaced with an actual greyscale photo the region taken during the study flight on August 5 2007. The albedo sampling points from Figure 1 were moved to figure 2. Replacement of Figure 1 provides clearer context so specific references to ponds have been removed as they can be seen clearly in the photo.

The text referring to upwind fetch has been clarified to indicate that 80% of the upwind contribution comes from 100 m upwind of the EC station, based on the cumulative flux calculation with the footprint model of Scheupp et al, 1990. This is along a similar linear transect used for averaging the G-D model estimates upwind of the EC station which

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has now been added to Figure 9.

Regarding comments related to the Results and Discussion: The text which describes the corrections applied to the field measurements of broadband albedo have now been moved into the methods section 3.4.3 under the methods describing the derivation of the normalised index for albedo.

It has been more clearly stated the study was relatively cloud free – the data shows just two 15 min periods later in the day when clouds passed over.

With respect to the Figure 7 relationships - the regression equation was removed from the figure. The r-square was left as it simply reflects the validity of assuming net radiation at midday can be used for temporal scaling of mean daily net radiation which appears to be more stable under clear sky conditions.

The basis for comparing the estimates and measured evaporation in section 4.7, now section 4.6, has been stated in terms of % error in the overestimate to be more relevant.

The purpose of section 4.8 and 4.8.1 (now 4.7. and 4.71.) have been edited to improve clarity and several figures have been combined into a single figure for more clarity and relevance to the discussion.

In the interest for avoiding confusion on the general notation of the evaporation equation (Eq. 1) and rearrangement to obtain contributions from the individual components (Eq. 14) it may be preferred to keep the two equations separate, but if crucial this can be changed.

Typographical errors have been re-checked and edited where found. It is also noted that British spellings are also being applied throughout.

The number of figures has been reduced from 17 to 12 by combining figures 10 – 11 (now fig 10), 12 – 14 (now fig 11), and 15 – 17 (now fig 12).

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2018->

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