

## ***Interactive comment on “Upscaling of evapotranspiration fluxes from instantaneous to daytime scales for thermal remote sensing applications” by C. Cammalleri et al.***

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Received and published: 12 November 2013

We appreciate the comments provided by the anonymous referee and we will try to improve the structure of the paper based on your suggestions. Regarding your Major comments:

1 - We will ensure that Table 1 is included in the revised version. The current analysis focused on specific times of the day instead of normalized quantities because satellite overpass times are not normalized, hence is interesting how the upscaling from a certain overpass time performs over different sites. We will emphasize more clearly

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this point in the new version of the manuscript. However, we understand that your suggested approach can return both complementary and interesting information. We will investigate the impact of time-normalization and successively decide if it's worth including this analysis in the text.

2 - As we say in the paper, P5L23 to P6L3, while a general consensus on the value assumed by  $\bar{\alpha}_c$  for EF method is reached, this is not true for the other methods. Indeed, the study reported here suggests that the RS method may not require any correction, while it's clear that the bias in TOA is related to local cloudiness and therefore no single correction factor can be obtained this method. Perhaps, the only method that can benefit from a variation in  $\bar{\alpha}_c$  is the REF method. Some considerations on this point will be added to the manuscript.

3 - The statistical metrics MAE and MBE were used in this paper only to highlight the limited applicability of this “standard” approach when a significant uncertainty in the EB closure is present in the observed data. The main analysis in the paper does not use those metrics, hence the benefits from reformulating the definition of these metrics as stated will be very limited.

4 - We partially agree with these comments. Indeed, we agree that there are some instances where results and discussion are mixed. However, in some other circumstances, like section 3.1, this choice was dictated by the need to justify the introduction of an alternative procedure for the analysis of the data. In our opinion, as stated in the previous point, the results reported in Fig. 1 are not strictly part of the analysis but only a justification for the introduction of the actual method. We believe that a reader will question the need of an alternative method if those data weren't presented as such early in the text. In general, we will try to keep at minimum such breaks with “standard protocol”.

5 - This is indeed a key section, hence we plan to reshape this section to make it more clear based on the reviewer's concerns.

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6 - As stated above, we consider this section fundamental to understand the need of an alternative procedure for the analysis of the upscaling methods. We do not consider the data reported here as part of the result of the study, but as part of the development of the alternative method.

7 - As stated in the text (P15,L10-20), there are currently several operational products based on remote sensing data for estimating RS over large areas. We will further emphasize this point, also highlighting the possibility of combining local and remote estimates to further improve the accuracy of those products.

8 - We agree that the estimation of 24-hours ET is indeed a key point. However, the issue of nighttime fluxes is only partially related to the current analysis, not only due to the low accuracy of nighttime fluxes measured by flux tower. Most of these methods in fact are based on the self-preservation of some quantities during daytime hours. The behavior of nighttime fluxes cannot be obviously accounted by these approaches, and even the modeling of the reference quantities during nighttime is questionable (see available energy, or the obvious absence of solar radiation). There are some papers using lysimeter data to verify upscaling to 24-hr total ET, and these will be cited in the revision.

9 - Based on this and the previous comments, we will reshape both the discussion and conclusion sections.

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 10, 7325, 2013.