Response to Referees

Anonymous Referee #1
Received and published: 26 June 2014

The comment made by Shuttleworth on Lhomme et al.'s technical note is in fact a clear and concise summary of the Matt-Shuttleworth method, a method which transforms the tabulated value of crop coefficient into crop surface resistance. This method has been previously described with more details (but maybe in a somewhat confuse way) in Shuttleworth (2006, 2012). From the elements of the discussion following Shuttleworth's paper, it appears that there is no real divergence between Lhomme et al. (2014) and Shuttleworth (2014), but only a simple misunderstanding explained in Lhomme's comment (SC C1551). As also pointed out by Boudhina (SC C1769), there is an agreement on the main point, i.e.: the preferred value of the climatological resistance (inferred from E0 = EPT) is a default assumption needed because the meteorological conditions under which the Kc values were determined are unknown; and if they were known, the method would be easily adaptable by using the corresponding value of the climatological resistance (preliminary step before deriving the effective value of crop resistance).

As far as I understand, Shuttleworth's paper does not contradict Lhomme et al. (2014) conclusions; it simply synthesizes the main steps of the method and clearly explains the reasons which justify the key assumption (sub-humid conditions with E0 = EPT). From my standpoint, the main interest of this technical note relies more on the clear and concise depiction of the Matt-Shuttleworth method than on the controversy concerning the point of view expressed in Lhomme et al. (2014). Consequently, as admitted by Shuttleworth in his AC C1658, some paragraphs of the paper which could cause "offense" by stressing the contradiction and which are not essential to the main purpose of the paper should be removed before publication: 1. End of section 1 P5369 "…but it is never the complex function of weather variables and Kc given as Eq. (10) of Lhomme et al. (2014)". 2. The first paragraph of section 2 (P5369-5370). 3. P5371 Line 13 to 18. 4. P5375 Line 1 to 6.

Response:
The suggested omissions given are those referred to in my own comment on the "offense" issue, and they have been removed from the final draft of the paper.

Anonymous Referee #2
Received and published: 15 August 2014

The key problem of the controversy is "whether the reference crop evapotranspiration is equal to the Priestley-Taylor estimate with a fixed coefficient of 1.26". In the paper "Towards one-step estimation of crop water requirements", Shuttleworth used the "particular sub-humid climate condition for which equation 3 gives an evaporation rate equal to that given by the FAO-Penman-Monteith equation"(Shuttleworth,2006, 932, Line 29 32 and Figure 1). The Shuttleworth's research (2006) provide "theoretical analyses for one-step estimation of crop water requirement", and the more research is need for this study.

Response:
This comment is actually directed towards Shuttleworth (2006) and suggest the need for additional research in that context. Nonetheless, the present paper has been modified (see lines 128-150 and lines 169-173) to say there is a need for additional activity in respect of defining values of r_{clim} corresponding to sub-humid and semi-arid conditions, then attempting to define for which crops it should be assumed the calibration of K_c was made in sub-humid, semi-arid, and default conditions.