Hydrology and
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Sciences
Discussions

Interactive comment on "Mapping evapotranspiration with high resolution aircraft imagery over vineyards using one and two source modeling schemes" *by* T. Xia et al.

Anonymous Referee #3

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In this paper, the comparison of two SEB approaches of different complexity based on airborne TIR observations over irrigated vineyards is carried out with a rigorous approach; significant details of the elaborations performed are given and the paper is generally more informative for the reader than other similar ones. It should be noticed that the main concept (and the core) of DATTUTDUT model has been already published by Roerink et al., in Phys. Chem .Earth, Vol. 25 (2):147-157). This latter reference is not present in the paper, but it has been given instead in Timmermans et al. (2015), where the only addition is a simple definition of radiometric temperature end-members in order to easily extract them from the image.

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The sensitivity tests presented for both models highlight some interesting feature of both models. According to the results presented in the Table 4, an uncertainty of +/- 3°C is not acceptable in TSEB. However, in the present paper no atmospheric correction has been applied to airborne TIR data (P11919-L18), diversely from VIS-NIR data. Atmospheric effects on radiometric temperature are certainly in the order of magnitude of 2-5 °C, but the authors do not comment on this issue, which is quite relevant for the correct application of TSEB in general. To this extent, it might still be useful to further explore the possibility of introducing contextual (image-based) information in the TSEB model, similarly to the approach proposed by Cammalleri et al. (2012, Remote Sensing of Environment, 124: 502–515).

In the final part of the text, the latent heat flux is used for calculating the water consumption at plot scale, with the aim of emphasizing the impact of TIR observations in operational water management. This part raises some questions. Indeed, the proposed approaches (and the description given in the paper) do not give most relevant information on irrigation scheduling (i.e. occurrence of water stress, soil water deficit) but just a "one-shot" picture on the day of observation. It would have been interesting to highlight which threshold values of the evaporative fraction could be considered as an indication of crop water stress conditions, or to which extent the crop water requirements are met (accordingly to the "standard conditions" defined by FAO56). This element would have improved the paper rather than the simple water consumption calculation.

Some other specific comments: - It would be useful to give some comments about the influence of the flight acquisition time on the results. Were the flights time fixed in coincidence of Landsat overpass or there were other reasons? - Why different equations are given for the LAI(NDVI) relationship on DOYs 163 and 218?