

## ***Interactive comment on “Estimation of evapotranspiration by FAO Penman–Monteith Temperature and Hargreaves–Samani models under temporal and spatial criteria. A case study in Duero Basin (Spain)” by Rubén Moratíel et al.***

**Anonymous Referee #2**

Received and published: 4 September 2019

General comments - This paper feeds into an important topic where a changing climate and increasing population makes the current and future efficient use of water resources essential. The consideration of the performance of various evapotranspiration (ET) models requiring readily available data inputs, in comparison to the standard FAO56 Penman-Monteith reference ET model is therefore of value for the chosen semi-arid location where irrigation is used. The paper is generally well presented using clear figures and tables, however some of the phraseology needs to be improved. It is my opinion that the paper is worthy of publication following minor amendments.

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Specific comments - The scientific significance is good. The Hargreaves-Samani (HS) model has been shown to have acceptable levels of accuracy in other arid regions of the world, however, the results showing that the simple calibrated HS (HSC) model performed well in spatial and temporal comparisons to other calculation methods will be of value in irrigation planning in this region of high agricultural water use. The scientific quality is good with valid and generally clear methods. However, as minor points: the methods section also needs to include the time-step used for the ET calculations; the paragraph from lines 205 to 211 would be better placed in the Introduction; and it is not clear whether the first few lines of the Results and discussion section relate to a general site description or are for the study period of the paper. The presentation quality is fair but this could be easily improved (see Technical corrections below for details). The use of the word ‘reality’ in line 406 is not appropriate, as the comparison in the paper is to reference ET not actual ET. In reality ET will be different to the ETO due to a number of factors e.g. crop type. The table and figures are good, being both appropriate and readable.

Technical corrections - Most of these are small and easily rectified. I have not provided an exhaustive list (please re-check the document carefully), but the following stand out as needing to be improved: Line 40, I would rephrasing the first line to start with ‘A growing population...’; Lines 46-47, ‘represented as a loss’ would be better phrased as ‘represents a loss’; Line 51, ‘allows calculating’ may be better as ‘that allows the calculation of’; Lines 61-63 starting ‘ET<sub>o</sub> is affecting’ are not clear. Perhaps this should be ‘ET<sub>o</sub> is only affected by climatic parameters, and is computed from weather data. Crop influences are accounted for by using a specific crop coefficient (K<sub>c</sub>).’; Line 64, would be better as ‘... because of climate differences’; Line 68, I’m not sure what ‘campaign’ refers to here. Maybe planting or the study period? This needs clarification in the text; Line 95 would be better as ‘... the annual calibration being the most studied.’; The paragraph starting at line 100 should mention that the ET models are evaluated against the FAO56 Penman-Monteith model; Lines 120-120 would be improved by ‘However, precipitation ranges from minimum values of 400 ...to a maximum of 1800 ...’; Line

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133, it is not clear what the 10% refers to here; Line 161, 'incorporate' should be 'incorporates'; Line 173 should start 'The FAO ...'; Line 174 should be 'the Penman-Monteith ...' and '... temperature-based models'; Line 184, the end of the sentence and beginning of the next contain typographic errors; Line 191, would be better as 'to calibrate ...'; Line 193, it would be good to mention here that the calculation of  $H_o$  is detailed further on in the paper; Line 198 would be better as 'such as topography, ... (among others) thus using a fixed ...'; Line 273, the abbreviations for the months (e.g. DJF) need to be expanded on first use in the main text; Line 284, I would rephrase 'best behaviour'; Line 285, 'shows no tendency', this is not clear i.e. no tendency to what?; Lines 288-289 are not clearly worded and need to be re-written; Lines 289-290, 'Respect to the models...' should be replaced by something like 'The performance of the models [specify which models] improve as the averages of ...' ; Lines 299-300, 'showed for the PMT model better performance than for the Hargreaves...' would be better as 'showed the PMT model performed better than the Hargreaves ...'; Line 325, the abbreviation 'DPV' is not expanded on first use in the main text; Lines 369-376 are not easy to follow and would benefit from rewriting; Line 428, '... winter is a season that does not worry too much' should be rephrased; Line 429, it is not clear what the 1 mm refers to (ET, I presume), the whole sentence needs to be more clearly written; Line 431, 'season' should be 'seasonal'.

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Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2019-250>, 2019.