Manuscript #hess-2020-595 – Final revision

Interactive comment on "Robust historical evapotranspiration trends across climate regimes" by Sanaa Hobeichi et al.

We would like to thank the editor and the referees for their constructive comments on our manuscript. This document outlines our responses to the final revision. Below we highlight the changes that we made to the manuscript.

Response to Editor

Referee #1 has looked at your revision, and he is satisfied with the latest version. However he pointed out two minor issues that you might want to look at:

- Table 5: I suggest the authors compute the trends over the same periods across all parent data sets for a fairer comparison.

We have now computed the trends over a common period 1982 – 2012, and updated the table and the text that explains the results in Lines 664 - 673.

Table 5: Trends in yearly ET total (mm year^{-1}) spatially averaged across each ET regime calculated for DOLCE V3 and five participating parent datasets available during 1982 – 2012. The text shows slopes of the trend line and their confidence interval calculated at the 95% confidence level, bold text indicates that the trend is reliable since the confidence interval is strictly positive or negative.

Dataset and time span	V.L.ET, H.variability	L.ET, H.variability	M.L.ET, M.variability	M.H.ET, M.variability	H.ET, L.variability	V.H.ET, L.variability
DOLCE V3	-0.04 [-0.23, 0.16]	0.26 [-0.11, 0.63]	**0.44 [0.1, 0.76]**	**0.56 [0.2, 0.87]**	0.07 [-0.27, 0.4]	0.34 [-0.1, 0.9]
ERA5-land	-0.18 [-0.36, 0.04]	0.02 [-0.42, 0.47]	0.14 [-0.38, 0.6]	**-0.65 [-1.14, -0.22]**	**-0.89 [-1.28, -0.51]**	0.11 [-0.2, 0.5]
FLUXCOM-MET	**-0.02 [-0.04, 0]**	0.04 [-0.11, 0.23]	0.05 [-0.07, 0.2]	-0.11 [-0.27, 0.04]	-0.003 [-0.18, 0.17]	0.25 [-0.04, 0.57]
GLEAM 3.5A	-0.08 [-0.28, 0.16]	0.35 [-0.04, 0.76]	**0.59 [0.34, 0.95]**	**0.43 [0.1, 0.77]**	0.05 [-0.33, 0.44]	**0.62 [0.12, 1.31]**
PML	-0.1 [-0.28, 0.15]	**0.42 [0.11, 0.75]**	**1 [0.64, 1.45]**	0.21 [-0.19, 0.64]	0.28 [-0.38, 0.81]	-0.32 [-1.24, 0.62]
PLSH	**0.17 [0.1, 0.24]**	**0.39 [0.16, 0.66]**	**1.3 [0.8, 1.77]**	**1.41 [0.85, 1.89]**	**1.53 [0.75, 2.17]**	**0.82 [0.36, 1.35]**

We repeat the same analysis for all the participating parent datasets that span at least 30 years. Sen's slope of the trends over the period 1982 – 2012 and their confidence interval (computed at the 95% confidence level) are presented in Table 5. As noted earlier, trends' behaviour is deemed inconclusive when the CI encompasses negative and positive values. These are presented with regular (as opposed to bold) typeface and are exhibited by FLUXCOM-MET in all regimes except the driest. In contrast, PLSH shows reliable upward trends in all regimes. ERA5-land shows downward trends in the 'M.H.ET, M.variability' and 'H.ET, L.variability' regimes. Both GLEAM 3.5A and DOLCE V3 show reliable upward ET trends in the two middle regimes. Differences exist in the magnitude of

31   *trends across the majority the products and the regimes. In DOCLE V3, the strongest trend occur in*

32   *the 'M.H.ET, M.variability' regime at a rate 0.56 $mm\ year^{-1}$. Finally, the slopes of DOLCE V3 trends*

33   *are within the range of slopes of trends in available ET products.*

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35   •   L98: "direst" --> "driest"

36   We thank the referee for spotting this. We have now made the change in the text.

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