

Interactive comment on “Climate change, re-/afforestation, and urbanisation impacts on evapotranspiration and streamflow in Europe” by Adriaan J. Teuling et al.

Anonymous Referee #1

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In order to follow the discussion, I want to briefly comment on the authors reply to my comments.

One of the main conclusions from the paper is that land-use change had a strong effect on streamflow and evapotranspiration at the European scale. This is quite a strong finding and it should be based on adequate model validation. Thereby I believe that the model should predict the streamflow changes better than a prediction simply based on precipitation and PET changes. I am positive that the authors agree with my argument and look forward to the results.

The authors argue that the Thornthwaite method is preferred because of data availabil-

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ity of gridded temperature. I want to bring to attention that there is data on minimum and maximum temperature from EOBS which can be used to calculate PET with the Hargreaves formulation. An example for Europe is Spinoni et al., 2017 which use EOBS data and compare Hargreaves with Thornthwaite and modified Thornthwaite. They show that Thornthwaite underestimates PET compared to Hargreaves. As I argued in my first comment, this underestimation is problematic in the Budyko approach leading to exceedance of the energy limit. In addition to the EOBS data, CRU provides a 0.5° PET data product based on Penman-Monteith. See <https://crudata.uea.ac.uk/cru/data/hrg/>

Spinoni, J., Naumann, G., & Vogt, J. V. (2017). Pan-European seasonal trends and recent changes of drought frequency and severity. *Global and Planetary Change*, 148, 113–130. <https://doi.org/10.1016/j.gloplacha.2016.11.013>

Interactive comment on *Hydrol. Earth Syst. Sci. Discuss.*, <https://doi.org/10.5194/hess-2018-634>, 2019.

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