Comment on hess-2021-329

Anonymous Referee #3

Referee comment on "Historical simulation of maize water footprints with a new global gridded crop model ACEA" by Oleksandr Mialyk et al., Hydrol. Earth Syst. Sci. Discuss., https://doi.org/10.5194/hess-2021-329-RC3, 2021

This study introduces a new GGCM the ACEA which enables long-term global crop water footprint simulations with a case for maize over 1986-2016. The innovative aspect is shown in the separation between blue WF from irrigation and from shallow groundwater, rather than the historical trends simulation, given that there are already global studies available in recent two years (e.g. Chiarelli et al., 2020, https://doi.org/10.1038/s41597-020-00612-0) .

Besides, there are some certain improvements can be made in the revision.

- The authors mentioned many times the "accurate estimation". But there is not enough calibration or validation processes, especially for the ET simulations. It can be easily done by comparing the global remote sensing images. At least for some selected regions, to show the accuracy of the ET results (Gao et al., 2021, https://doi.org/10.1016/j.agwat.2021.107014).
- Fig. 1, the CO_2 concentration should belong to the Environmental inputs, right?
- In the section 2.1.3, it is highly recommended to add the details on how to separate the two components in blue WF, given it is the key innovative point.
- Maybe I was wrong, I am very confused on the second equation in Eq. (4) and (6), how you can just use weight of area to multiply the unit WF to get the so-called average unit WF? Is it the right way of weighted average? Please carefully check.
- Line 283. What is the reason of the increased WF?