

Comment on hess-2020-627

Anonymous Referee #2

Referee comment on "Untangling irrigation effects on maize water and heat stress alleviation using satellite data" by Peng Zhu and Jennifer Burney, Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2020-627-RC2>, 2021

Irrigation benefits crop yield mainly through water stress and high temperature stress mitigation. Although water stress alleviation via irrigation has been addressed intensively, a further understanding of high temperature stress alleviation is still required. This paper attempts to separate the irrigation effects on maize heat stress from that on water stress using satellite vegetation, temperature, and evaporation products. The paper is well written and structured overall. The conclusions are drawn based on solid analyses and interpretations of the results. The pathway provided to improve the state-of-the-art crop models is of great interest to the community.

The only major concern for me is the collinearity between LST and ET considering LST is directly impacted by ET through surface energy balance. Thus, it should be careful to disentangle the heat stress and water stress. More illustrations would be required.

Some minor comments are as follows.

Lines 190-194, I could not find the citations 'Senay et al., 2013' and 'Velpuri et al., 2013' in the reference.

Lines 195-196, Is the PET also available in the SSEBop ET product? It would be better to use consistent ET and PET to calculate the water stress index.

Lines 256-257, I would suggest to simply describe the uncertainties of AGE rather than just include the reference for better readability.

Lines 286-287, what is the added value by using daytime LST difference considering the relative contribution of water and high temperature stress alleviation to yield benefit has been analyzed using Eq. 8.

Lines 317-318 and lines 346-347, could some explanations be found for the different performances between LST and air temperature?