

Comment on hess-2020-627

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Community 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-CC1>, 2021

I came across this paper which is a very nice study. The authors used remote sensing data and statistical methods to quantify irrigation effects on maize yield in Nebraska. It is found that water and high temperature stress alleviation contributes to 65% and 35% of yield benefit. 1) This paper reminds a recent paper by Li et al in Global Change Biology. Interestingly, these two studies are very similar in many aspects (topic, data, and Nebraska) but show quantitatively different results. Li2020 reported that 16% of irrigation yield increase is due to irrigation cooling, while the rest (84%) is due to water supply and other factors. This work (Line 373-383) reported a 79% (water) and 21% (temperature) contribution for water and temperature respectively using eq 8 while the numbers became 65% and 35% with Eq 9. However, the later numbers appeared in the abstract. This shows that there might be large uncertainty in the reported contribution numbers. The important questions are how to understand these different results and which one is more reliable? I feel that numbers with range is more appropriate than just a single number. A comparison or discussion with Li2020 and with the authors' own results would be very needed for the readers to understand the robustness and possible causes for different results. 2) In my opinion, the usage of 1km Daymet air temperature is not suitable for studying the irrigation cooling. The gridded air temperature data were typically produced by interpolation of weather stations with many assumptions and tricks. The irrigation cooling signals would be lost in the interpolation and processing. This is probably the primary reason why air temperature showed no cooling compared to LST. Ref Li, Y., Guan, K., Peng, B., Franz, T. E., Wardlow, B., & Pan, M. (2020). Quantifying irrigation cooling benefits to maize yield in the US Midwest. *Global Change Biology*, 26(5), 3065–3078. <https://doi.org/10.1111/gcb.15002>