Open Access Earth System Science Data Discussions

Earth Syst. Sci. Data Discuss., community comment CC1
https://doi.org/10.5194/essd-2022-309-CC1, 2022

Comment on essd-2022-309

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Community comment on "GSDM-WBT: global station-based daily maximum wet-bulb temperature data for 1981–2020" by Jianquan Dong et al., Earth Syst. Sci. Data Discuss., https://doi.org/10.5194/essd-2022-309-CC1, 2022

Hello,

Thank you for considering many factors to produce a quality controled wet bulb temperatue (Tw) dataset. In framing the discussion in reference to heat stress: when Tw is higher than >20°C, Tw becomes relevant for human and animal health. Something to think about might be checking the effect of long term pressure on high Tw, because small changes on high Tw can produce large changes in impacts. Are the biases stable at high Tw?

I also appreciate referencing the HumanIndexMod. There is an updated version which is python compatible correcting a minor error in the code. The error is <±0.001 in Tw. (https://github.com/jrbuzan/HumanIndexMod_2020) This uses f2py as part of numpy to compile the fortran object. On top of that, unlike Dr. Kopp's matlab version, this python enabled version will give you access to all of the heat stress algorithms in the code block, not only Tw. Convient for compairing Tw with commonly used heat indices.

A pedantic, but necessary comment on acronymes, abbreviations, and subscripting of heat stress indexes vs thermodynamic state variables. Wet bulb temperature is a true thermodynamic property of the atmosphere. It reflects the bouyancy of the air, and is directly related to equivalent potential temperature, and as thus, is an atmospheric state variable. Since wet bulb temperature is intrinsically a form of temperature, it is denoted with a subscript, for example using the LaTeX code: T_{w}. This differentiates wet bulb temperature from heat stress indices, like the Universal Thermal Climate Index, which is abbreviated as UTCI, HUMIDEX, or Apparent Temperature (AT). The heat stress indices are not true thermodynamic state variables, which is why they are traditionally abbreviated as capital letters. This is an easy fix, and would be inline with atmospheric, medical, and epidemiological literatures. The acronym WBT was recently introduced into the literature, and i believe it is due to using the raw output labled as WBT from CLM5 netcdf files, and authors not converting it to the state variable, Tw.

Lastly, I encourage the authors to check out Buzan and Huber, 2020. I describe in the article why sub-daily calculations of heat stress related variables is important, which is relevant to the motivation for in your work here using sub-daily values. Also, there are many insights in that manuscript that one might find fascinating on the topic of moist heat stress that may be useful in your discussion section. Additionally, Poppick and McKinnon 2020 and McKinnon and Poppick 2020 are likewise important manuscripts describing the

statistical robustness behind temperature-humidity covariances, and would be good additions to your discussion.