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Comment on **essd-2021-303**

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Community comment on "HOTRUNZ: an open-access 1□km resolution monthly 1910–2019 time series of interpolated temperature and rainfall grids with associated uncertainty for New Zealand" by Thomas R. Etherington et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2021-303-CC1>, 2021

This is a welcome resource and I agree with the authors that this is likely to have a range of applications. As noted, the applications are limited because the dataset is monthly so extremes in temperature in particular will be masked in the monthly averaging. However, the strengths in the dataset are the long timeseries and the spatial resolution with well-defined uncertainty.

Overall, the paper is well-written but I was interested in seeing a stronger justification for the dataset. For instance, how does the rainfall product improve on work by Andrew Tait (and colleagues), e.g. Tait et al 2012? Is it that this new dataset is freely available, a longer time series, better indication of uncertainty, or perhaps all of these and more? I think a bit more scoping of what is currently available and how this dataset improves on that would be useful. I think open access might be one of the biggest advances here but as a potential end user, I wanted more information around this so I could be certain it was the best dataset (rather than just being what's freely available).

My second suggestion has to do with the choice of climate variables. I agree that rainfall and temperature both highly useful. I suggest adding vapour pressure deficit (or at least relative humidity so VPD can be estimated from temperature and RH). Plants are highly responsive to VPD and this influences plant productivity, water use and survival under extreme events such as drought (see Grossiord et al. (2020) for a review of plant responses to VPD). Because different species respond to drought and VPD in different ways (Volaire 2018), VPD is key to understanding plant species distributions and other factors such as seasonal dynamics in plant moisture (relevant to spatial and temporal patterns of fire risk) and vegetation transpiration and productivity. Beyond ecology, hydrology is mentioned as a possible application for the dataset. Hydrological models in New Zealand have poor quality estimates of transpiration and this means estimates of streamflow, soil moisture and other hydrological variables are unreliable (because transpiration is a dominant flux in water budgets). Improving the accuracy and reliability of hydrological data will improve our ability to manage water resources, including mitigating against floods and ensuring water is used wisely when scarce. See Whitley et al. (2013), Sulman et al. (2016), Miralles et al. (2019) and more locally, Macinnis-Ng et al. (2013) for examples of VPD as a key driver of transpiration. Including VPD (or RH) as an addition variable in this dataset would increase the range of potential applications of the dataset. While the existing dataset is still valuable contribution, as a potential end-

user, I would find the dataset much more useful with this additional variable.

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