Thank you very much for providing detailed comments, which allowed us to refine the manuscript and the dataset.

Please see the comments provided by the referee in black font, and our point-by-point response in blue font.

Anonymous Referee #1:

This paper describes a new open access dataset that will be of great value to hydrologists and others in the earth sciences. It is clear and well written and includes excellent background on NZ's climate, landscape and geology. I recommend that the paper is published if the following minor comments are addressed satisfactorily.

We would like to thank Referee #1 for the positive feedback and the insightful comments. Please find our detailed responses to each point below (blue font).

1. Lines 140-145: I would recommend using a more recent source for future estimates of temperature and rainfall changes instead of King 2010 as this is based on NIWA's modelling done nearly 20 years ago for AR4. For instance:

   Peter Gibson, et al., 2025, Downscaled CMIP6 future climate projections for New Zealand: climatology and extremes, Weather and Climate Extremes, https://doi.org/10.1016/j.wace.2025.100784.

   Thank you and we agree with your comment. We have now updated the paper with more recent assessments for this section based on Gibson et al. (2025) as follows:

   "Recent high-resolution (~12 km) downscaled climate projections for New Zealand, based on six global climate models (GCMs) and three regional climate models (RCMs), project a national annual mean warming of 3.1°C (range: 2.0–3.8°C) by 2080–2099 relative to 1986-2005, under the high-emissions SSP3-7.0 scenario (Gibson et al., 2025). Summer maximum temperatures are expected to increase by 3.9°C on average (range: 2.8–4.8°C), particularly affecting inland North Island and high-elevation areas (Gibson et al., 2025). These findings are qualitatively consistent with earlier CMIP5-based projections (Mullan et al., 2018; King et al., 2018)

   Precipitation projections show a distinct seasonal and spatial pattern, with winter and spring rainfall increasing by over 20% in parts of the South Island's west coast, while northern and eastern regions of the North Island are likely to experience reduced rainfall, especially in spring and summer (Gibson et al., 2025). Across much of the country, extreme precipitation events are expected to become more intense but less frequent, occurring over shorter durations – except on the South Island's west coast, where both totals and extremes increase, likely due to topographically enhanced dynamical processes (Gibson et al., 2024). Overall, these projected changes reinforce trends identified in earlier CMPI5-based assessments (Gibson et al., 2025)."

2. Also when discussing changes in climate, the reference period needs to be included; e.g. "expected to warm by 1 degC by 2040 relative to the 1986-2005 average". In addition,

as currently written only a single scenario has been explored (probably King 2010's mid-range scenario), but this choice needs to be highlighted and the scenario information included for context.

Thank you for pointing this out. We have now included the reference period (1986-2005) in the text and added the paper described in point #1 above.

3. In the context of this dataset, it might also be of interest to describe how NZ's climate has changed over the past 60 years (for example referencing the 'seven station series' (https://niwa.co.nz/climate-and-weather/nz-temperature-record/seven-station-series-temperature-data) or the following recent research on changing climate normals, although there are many other studies that could be used.

   Srinivasan, R., et al. (2024). Moving to a new normal: Analysis of shifting climate normals in New Zealand. International Journal of Climatology, 44(10), 3240–3263. https://doi.org/10.1002/joc.8521

   We appreciate the reviewer's suggestion. We have added a concise summary of New Zealand's observed climate change over recent decades to provide context as follows:

   "New Zealand's climate has warmed by +0.91°C from 1909 to 2009, as shown by the nationally representative Seven Station Series (Mullan et al., 2010). Recent analyses also indicate significant shifts in temperature and precipitation normals across regions and seasons, reflecting both natural variability and anthropogenic climate change (Srinivasan et al., 2024)."

   References:

   Mullan, A.B; Stuart, S.J; Hadfield, M.G; Smith, M.J (2010). Report on the Review of NIWA's 'Seven-Station' Temperature Series NIWA Information Series No. 78. 175 p.

   Srinivasan, R., Carey-Smith, T., Wang, L., Harper, A., Dean, S., Macara, G., Wang, R. and Stuart, S., 2024. Moving to a new normal: Analysis of shifting climate normals in New Zealand. *International Journal of Climatology*, *44*(10), pp.3240-3263.

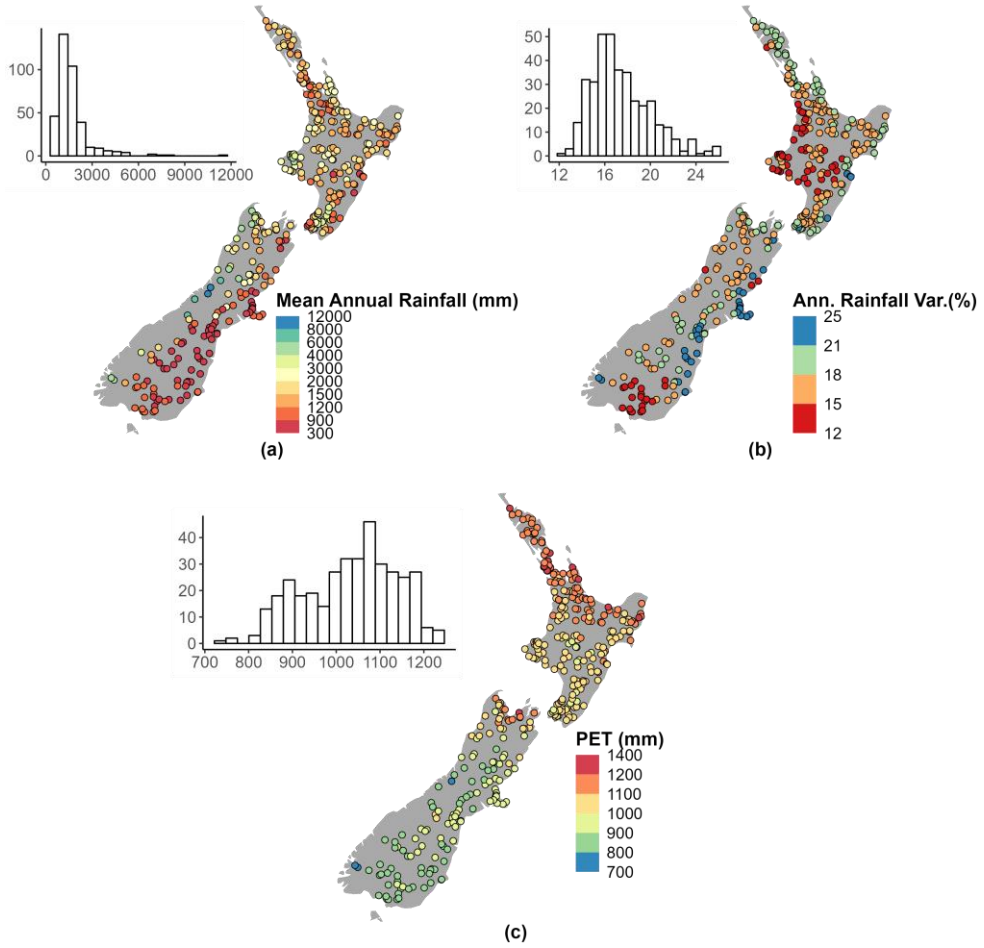
4. Figure 4 and related text: Fig 4a units should be in %. Coefficient of variation is a normalised ratio of SD to MEAN, so either expressed as a fraction or %. The incorrect units are also in Table 3.

   Thank you for pointing this out. We agree and have corrected the units in Figure 4a and Table 3. The coefficient of variation is now properly expressed as a percentage, reflecting its definition as the ratio of standard deviation to mean.

5. Line 253: Related to above, the sentence "Rainfall variability is highest in the eastern parts of both of the North and South Island" is not correct. Annual rainfall variability **relative to the annual mean** is highest in east (i.e. coefficient of variation). Variability (e.g. variance or standard deviation) of annual rainfall is greatest in the higher elevation parts of the West Coast. Without showing a plot of annual mean rainfall, a reader

unfamiliar with NZ, might come away from this part of the paper not realising that the highest rainfalls are on the west. I recommend that Fig 4 also include a map of mean annual rainfall.

Thank you, we agree that the original wording was misleading. We have revised the sentence to distinguish between absolute variability (e.g. standard deviation) and relative variability (coefficient of variation). A map of mean annual rainfall has now been added to Figure 4 to provide appropriate spatial context.



"Rainfall variability is highest in the eastern parts of both of the North and South Island. Annual PET shows a similar pattern, with higher values to the north and east and very low values to the west of the Southern Alps (Figure 4b)." The revised text now reads as

"Figure 4 presents the spatial distribution of (a) mean annual rainfall in mm, (b) annual rainfall variability in %, and (c) mean annual potential evapotranspiration (PET) in mm across the CAMELS-NZ catchments. Relative rainfall variability is highest in the eastern regions of both islands, particularly in the South Island, where lower annual rainfall is observed. In contrast, the western regions exhibit lower relative variability but much higher rainfall totals, as indicated in the mean annual rainfall map (Fig. 4a). This reflects New Zealand's distinct west to east hydroclimatic gradient, where prevailing westerlies and orographic effects produce consistently high rainfall in the west and more variable, drier conditions in the east (Tait et al., 2006)"