

**Response to reviewers' comments on "The UKSCAPE-G2G river flow and soil moisture datasets: Grid-to-Grid model estimates for the UK for historical and potential future climates" by Kay et al.**

**Reviewer 1:**

This data paper serves as a nice bringing together of a variety of existing, but closely related datasets around the G2G national modelling. I find that having all of these details together in one place will be useful for a wide variety of UK-based research and modelling. I have tested all data links for the datasets presented and they currently work (2023-03-10). I have found the paper to be well written with only some minor comments below.

I would note that I have selected good rather than excellent for originality and uniqueness because this paper is bringing together existing data rather than presenting new data.

Though as above, I think this is still useful to bring these datasets under the same lens.

Thank you. [We describe below our response to each comment.](#)

**Minor comments:**

I haven't reviewed an ESS data paper before, but it seems odd to me to have what appears to be acknowledgements as the first paragraph of an introduction. Maybe for this paper format it is fine.

[Given the title of the paper, we felt it was useful to mention the UKSCAPE programme early on. We would be happy to change this at the editor's request.](#)

L98 - The authors may wish to note that the HadUK data used provides all the necessary variables to calculate PE if users require a higher resolution representation of PE. I understand that the intention of this data paper is to draw reader's attention to the soil moisture and flow datasets produced, but I think this addition would be useful.

[The possible future use of PE derived from HadUK-Grid \(Brown et al. 2022\) will be added \(Section 4 para' 4\), although unfortunately many of the required variables are only available at a monthly time-step so have to be interpolated to daily anyway.](#)

[Brown, M.J. et al. \(2022\). Potential evapotranspiration derived from HadUK-Grid 1km gridded climate observations 1969-2021 \(Hydro-PE HadUK-Grid\). NERC EDS Environmental Information Data Centre. doi:10.5285/9275ab7e-6e93-42bc-8e72-59c98d409deb.](#)

L109 - I am missing some mention about why the convection permitting simulations weren't used. It seems this would overcome some of the steps needed in S2.3 and be more accurate in general. At least readers should be made aware of its existence.

[The UKCP Local CPM-based dataset was not available at the time of the work reported in this manuscript, but some comparisons have since been done and reference to this will be added \(Section 4 para' 4\).](#)

Figure 2 - the only lake cells I can identify are the 2 Northern Irish lakes. Are we supposed to be able to spot more? If so they will need more highlighting - or more explicit linking to the text about how the lakes are mainly significant in NI. Otherwise I'm not quite sure the point of Fig 2.

[There are some other lakes mapped, particularly in Scotland, which can be seen if you zoom in on the map in Figure 2 \(note that the final version of the paper will contain higher resolution maps than provided for review\). Section 2.1 para' 2 explains that the effect of lakes is minimal in GB \(largest lake in Scotland ~71km<sup>2</sup> and largest in England ~15km<sup>2</sup>\) but more important in NI \(Lough Neagh ~390km<sup>2</sup> and Lough Erne ~144km<sup>2</sup>\). Figure 2 also shows the gauging station locations.](#)

L238 - I think this paragraph can be written more clearly. Maybe it should start with "For the historical portion of the RCM PPE projections,.. "? But if so, it seems to overlap with the use of 'baseline periods' in the following paragraph (starting L251). I'm still a bit confused by it.

The start of the paragraph will be changed to read “The historical portion of the climate projection-based river flow and soil moisture datasets can be compared to the observation-based datasets...”, and the start of the following paragraph will be edited to make the terminology more consistent, by stating “...baseline (historical)...”.

L267 - If my passing understanding of w@h and UKCP18 is correct (which it may not be), these two datasets can result in different (significantly different?) distributions of (e.g.,) precipitation, particularly at extremes. If this is true, it should be mentioned here. If there is no study that has made this comparison, then that is important information too. It is entirely possible that the w@h and UKCP18 data are different, especially for extremes given the much larger ensemble size of the former compared to the latter, but we’re not aware of a specific comparison of them – this will be clarified (Section 2.6 para’ 6).

Section 3.3 - It seems that the AMIN/AMAX soil moisture figure is missing here. It may not be such a conventionally studied metric but I feel is important to highlight the extremes. Unfortunately, only monthly mean soil moisture grids were produced, not annual minima or maxima (Table 2). We will bear your suggestion in mind for future datasets.

L416 - The authors may find it helpful to cite Schwalm et al. (2020) for this statement and thus support their choice of rcp8.5. Also if I remember rightly there is only RCP8.5 for the UKCP18 regional projections anyway, which may also be worth mentioning and further justifies the use of this RCP.

The reference will be added (Section 4 para’ 4), and the fact that the Regional projections are only available for RCP8.5 will be emphasised (Section 2.3 para’ 1).

Editorial:

L40 & L215 - hyperlinks don't seem to work

This might just be a problem in the version provided for review; they work fine in our version.

L324 - 'highly statistically significant increase' -> 'statistically significant increase'  
Will be changed.