Dear Editor

We thank the reviewers for taking the time to review the paper and their comments. Their feedback has greatly improved the paper and data.

In response to their comments, we have added a new section to the paper detailing guidance on use of the hydro-meteorological datasets, revised the dataset to include new attributes on quality of flow data, and improved the dataset description throughout the paper.

Detailed responses to all comments are provided below. Author responses are in **bold** and any modifications to the manuscript are in *italic* below each of the reviewer's comments.

Best wishes,

Gemma Coxon (on behalf of all co-authors)

Reviewer 1 – Yi He

This manuscript presents a major and valuable update to the CAMELS-GB large-sample hydrological dataset. The inclusion of extended daily records, national-scale hourly rainfall and flow data, groundwater level time series, dynamic land-cover attributes, and enhanced hydrometric and human-influence metadata represents a substantial contribution to the hydrological and Earth system science communities. The manuscript is well written and clearly structured. The dataset is openly available, well documented, and likely to see wide uptake. I recommend acceptance subject to minor revisions.

Many thanks Yi for the positive assessment of the paper and your helpful comments. Please see our detailed responses below.

Major comments

1. Visibility of key methodological details

Several important methodological aspects are described in the Supplementary Information, including propagation and prioritisation of quality-control flags; identification and documentation of suspected outliers and datum changes in groundwater level time series; inter-comparisons between meteorological products at daily and hourly scales. Some of this information is essential for correct dataset usage and could be more explicitly signposted in the main manuscript, to ensure users are aware of these important safeguards and limitations without needing to discover them independently.

Thanks, we agree that this needs to be more explicitly signposted and have now added text throughout Section 3:

"This section describes the CAMELS-GB v2 timeseries in detail including the source datasets and differences between products. Further details on quality flags, comparisons between datasets and identification of outliers can be found in the supplementary information (Figures S1-8, text S1 and Tables S1-4)."

"A national comparison of the different products are shown in Figure 1, while a more detailed comparison of the different products for two catchments can be found in Figure S1 and S2."

"Below, we describe the source datasets of the hourly hydrological timeseries, how the timeseries were produced and the quality control applied to the dataset. Further details on the quality flags can be found in the Supplementary Information (Text S1, Figure S6 and Tables S1-3)."

2. Guidance on choice between alternative data products

The dataset provides multiple alternative products for rainfall and PET (e.g. CEH-GEAR vs HadUK-Grid; CEH-GEAR1hr vs GRaD-GB(1H1K)), which is a clear strength. The manuscript and Supplement provide quantitative comparisons between these products. But the manuscript would benefit from more explicit user guidance on dataset selection. For example:

Which products are recommended for long-term trend analysis versus event-based or flood-focused studies?

Are any products preferred for hydrological modelling consistency with derived attributes?

Are there specific applications for which users should exercise caution due to known biases or structural differences?

Thanks, in response to several of the reviewers comments we have added a new Section 3.3 that provides user guidance on the selection of CAMELS-GB hydro-meteorological datasets.

3. Interpretation of extrapolated peak flows and discharge uncertainty

The manuscript explains (L354-357) that discharge uncertainties were recalculated using longer streamflow time series but the same methodological framework as Coxon et al. (2015). However, it remains unclear why the uncertainty estimates are described in L369 as being based on an 'older set of gaugings', and why newer gauging information was not incorporated. Please clarify this distinction and its implications for peak-flow analyses.

The uncertainty bounds come from Coxon et al (2015) which were calculated from stage-discharge measurements collected in 2013 for the purposes of that analysis. The maximum flow gauging is obtained from the National River Flow Archive, where stage-discharge measurements are updated on a regular basis. It was beyond the scope of CAMELS-GB v2 to re-do all the uncertainty analysis from Coxon et al (2015) alongside undertaking a thorough review of all the stage-discharge measurements. While this will cause some discrepancies between the maximum flow gauging provided and the calculated uncertainty bounds at high flows, we don't expect these differences to have a significant impact for most gauges.

Please clarify how the percentage of time exceeding the maximum gauged flow is calculated (e.g. proportion of valid daily/hourly timesteps) in Fig5.

The percentage of time exceeding the maximum flow gauged flow is derived by calculating the proportion of the timeseries where the daily/hourly flow timeseries in CAMELS-GB v2 is higher than the maximum gauging flow. Only NaNs are excluded from the calculation with all other daily/hourly flow values included.

Minor Comments

L111 " Mean daily averages calculated from 1st October 1970 – 30th September 2022 for the 671 CAMELS-GB catchments." , 'mean' and 'average' are synonymous. Do the authors mean daily averages that were then averaged again? The sentence also misses a verb.

Thanks. We have revised this to:

"The average of the mean daily flows are calculated…."

L323 "increasing land cover over time" should be "increasing urban land cover over time"

Thanks. We have revised this sentence as suggested

L369-371: The sentence is difficult to follow. I suggest clarifying that the uncertainty bounds are derived from an older gauging dataset and may not fully capture uncertainty at extreme flows.

Thanks, we have revised this sentence to:

"the discharge uncertainty estimates provided in CAMELS-GB v2 are based on an older set of gaugings so there may be some inconsistencies between the maximum flow gauging and where uncertainty bounds can be calculated"

L386-387: The sentence structure seems odd and needs rephrasing.

Thanks, we have revised this sentence to:

"CAMELS-GB v2 uses new, open-source datasets to quantify abstractions and discharges in each catchment and provides new reservoir attributes characterising the size and location of the reservoirs."

L444-445: It states that ten catchments have a normalised upstream capacity greater than 0.25. However, based on the released file "camels_gb_v2_humaninfluence_attributes.csv", only nine catchments >0.25. Please check and correct this number to ensure consistency between the manuscript and the dataset. The threshold of 0.25 used to highlight catchments with large normalised upstream capacity is not explained. Please justify the choice of 0.25.

Thanks for spotting the inconsistency between the dataset and the text! We have updated this threshold to 0.2 as Salwey et al (2023) find that highest degree of alteration where the normalized upstream capacity is more than 0.2. The text has been revised to:

"Twelve catchments have a normalised upstream capacity greater than 0.2 where the highest degree of alteration is typically found in the UK (Salwey et al, 2023)."

Reviewer 2 – Alexander Dolich

Thank you for your work in compiling CAMELS-GB v2 and this manuscript. The data is very nicely formatted and the addition of hourly hydro-meteorological timeseries data is extremely valuable to expand the field of large-sample hydrology to sub-daily resolutions. The addition of groundwater data and the extensive quality control of hourly streamflow data is also very valuable and outstanding among other CAMELS datasets. The extension of the daily timeseries length and the expansion of the catchment attributes, especially the changing land cover attributes, are also of great value and show the author's motivation and dedication to maintain and update CAMELS-GB.

The manuscript gives a very detailed and thorough description of the dataset while highlighting its importance and also describing its limitations. I recommend accepting the manuscript after minor revisions.

I think the accessibility of the dataset could be enhanced by offering the option to easily download a compressed file containing the entire dataset. A more detailed explanation of this as well as minor comments and technical corrections can be found in the attached PDF file.

Many thanks Alexander for the positive assessment of the paper and the helpful feedback. Please see our detailed responses below.

The advantage of having multiple meteorological data sources could be highlighted better. There are more advantages for sure (e.g. the possibility to fill gaps in the hourly

radar data with the interpolated station data), but especially deep learning methods can make use of multiple forcing data sources at once (see Kratzert et al., 2021), which could be especially useful when mixing radar and station data as these data sources have different strengths.

Thanks, we have added a new section 3.3 detailing guidance on the use of the hydro-meteorological datasets and added this nice advantage here.

"CAMELS-GB v2 contains hydro-meteorological timeseries from different products, over different timescales and at different resolutions. Multiple products enable users to reflect some of the uncertainty in these data and make use of multiple forcing data at once (e.g. Kratzert et al, 2021). To help users to select the most appropriate dataset for their study, we recommend: ..."

L29-L30: The DOI URL is not working (Error: DOI not found), maybe this needs to be updated? → This is a formatting error, when I click on the link, the URL ends before the line break (the DOI URL in the Data availability section works)

Thanks, we will ensure the link works in the final manuscript.

L52: You could add that the meteorological timeseries are spatially aggregated to the catchment boundaries, I think this would be more clear then "catchment timeseries".

Thanks, this has been revised to:

"hydro-meteorological time series (spatially aggregated to catchment boundaries)"

L84: Is this the correct citation of the exactextract package? Also in the References section (L514). I think extactextract was not published yet, so you would have to refer to it like a website? Maybe refer to one of the Github releauses or to a version on pypi?

Many thanks for spotting this. We have added the website link on pypi (https://pypi.org/project/exactextract/0.2.0/) to the version of the exactextract package we used to the references.

The updated citation is:

"Baston, D.: exactextract, version 0.2.0, [code], https://pypi.org/project/exactextract/0.2.0/ (last access: 22 January 2026), 2025."

We also added the link to the Code availability section.

"The exactextract Python package (https://pypi.org/project/exactextract/0.2.0/, last access: 22 January 2026, Baston, 2025) is used to extract catchment average data from gridded datasets based on the catchment boundary polygons described in Section 2."

L85: suggestion: "used to extract and spatially aggregate"

Thanks, we have revised as suggested.

L86: I would change “by” to “while” here

Thanks, we have revised as suggested.

L154: Label c) is missing in Figure 2

Thanks, we have added the label.

L168: I think it would be good to add information about the timezone of your data. Maybe this is not strictly necessary for Great Britain as it is in GMT / UTC+0, but once there are more CAMELS datasets in sub-daily resolution, the time zone information becomes very important for interoperability. So I would also add that information for CAMELS-GB, just to be clear about it. I guess that you also do not change between summer and winter time, that information should also be added.

Thanks, we added a sentence in the revised paper to clarify the time zone (UTC) for the timeseries data. In addition, all references to specific times (e.g., 09:00) throughout the text, as well as in Tables 3 and 5, have been updated to explicitly indicate UTC (e.g., 09:00 UTC).

“Hourly hydro-meteorological time series of rainfall and river flow are provided for the 671 catchments from 1st October 1990 09:00 UTC to 1st October 2022 08:00 UTC (Table 3). All timeseries data in CAMELS-GB are reported in UTC with no daylight saving time adjustment.”

L258: “Figure 4” is bold

Thanks, we have revised this.

Figure 4: The text size of the legend is very small and should be increased.

Thanks, we have done this.

L276-L279: The length of the hydro-meteorological data was also extended in v2, so the hydrological and meteorological attributes were also calculated for that longer period, right? This could be added here.

A sentence about why these attributes were calculated for the daily data only and not the hourly data could also be added (and what this implies / do you expect major differences when calculating these attributes based on hourly or daily data?). Could also be added to section 5.2 / 5.3.

Thanks, we have clarified the time period that the climatic indices are calculated over and addressed the lack of attributes calculated from the hourly data.

“The climatic indices in CAMELS-GB v2 are derived over the time period 1970-2022 using the HadUK-Grid catchment daily rainfall…”

"Climatic indices calculated from the hourly data are not provided as the long term and seasonal climate indices are very similar regardless of the temporal resolution of the data. While the short-term (i.e. frequency, duration and timing of high and low precipitation events) climatic indices would be different when calculated using hourly data for some catchments, analysis of the impacts of temporal resolution on catchment attributes (including careful consideration of choice of indices) is beyond the scope of this paper."

L324: The decrease in urban land cover from 2021 to 2022 in Figure S9 is really suspicious. Do you think this is an error in the data? Maybe you could reach out to the dataset's authors for clarification and if you get a timely response you could add the explanation to the manuscript.

Thanks, we did reach out to the dataset author prior to the paper being submitted and they listed a number of reasons for the decrease in urban land cover which can be found in the paper in Section 5.4.

L358-L372: I think the comparison of the maximum gauged flow and the maximum flows in the timeseries is very important and can give a good estimate of the uncertainties in high flows. But maybe you could add a sentence about why this is important for uncertainty estimation somewhere at the start of the section. It is about the rating curve and at which point extrapolating beyond the measured values of the rating curve begins, right?

Thanks, we have added a sentence about why this is important for uncertainty estimation.

"These new attributes contain important information about the uncertainty at high flows as users can identify where (and how often) the daily/hourly flow timeseries exceed the highest manual measurement of flow taken at a gauging station and therefore are based on extrapolation of the rating curve which can result in significant uncertainties (Juston et al, 2014)."

Table 1: "No longer providing wind speed, humidity, short-wave radiation and long-wave radiation as these were rarely used." → it's okay if you made this decision, but in my opinion this information could be very valuable in certain tasks, so I do not really understand why you do not provide this information anymore, if it is still available.

When producing CAMELS-GB v2, we decided to prioritise providing climate timeseries (rainfall and potential evapotranspiration) from multiple datasets (i.e. CHESS and HadUK-Grid). While we agree that climate timeseries of wind speed, humidity and short/long-wave radiation could be useful, these climate variables are only available at monthly timescales from HadUK-Grid and therefore wouldn't

be consistent between datasets. These variables from the CHESS datasets are already provided as part of CAMELS-GB v1.

Furthermore, the provision of multiple estimates of potential evapotranspiration in CAMELS-GB v2 means wind speed and humidity are less important as they would primarily be used to estimate PET for hydrological applications.

S4: Labels a), b), c) are missing

Thanks, we have updated for Figures S4 and S5.

Technical corrections

Thanks – we have revised the paper to address all the technical corrections as suggested.

L24: "1970- 2022" → missing white space, should be "1970 - 2022"

L45: "finable" → "findable"

L61: the second "are" is incorrect here

L120 and L127: time spans are not consistent, e.g. "1890 – 2019" and "1961-2019",also the case in other Lines

L263: You suddenly use "CAMELS-GB-v2" in this chapter, to be consistent this should be changed to "CAMELS-GB v2" (also in the caption of Figure 4)

L264: "aggregated to monthly" → "aggregated to monthly values"

L300: "low date" should be "flow date"

L289, L327, L340, L355, L357: citation format (remove "," before year) "Coxon et al., (2020)" → " Coxon et al. (2020)", also in Table 5: "Harrigan et al., (2018)" → "Harrigan et al. (2018)" and "Salwey et al., (2023)" → "Salwey et al. (2023)"

L392: "is based the same" → "is based on the same"

L447: "dataset available" → "dataset is available"

Dataset

I opened all of the CSV files in CAMELS-GB v2 in Python with pandas and the catchment boundary shapefile with geopandas and did some basic checks (e.g. all IDs are present everywhere). I also visually inspected all attribute CSV files and some of the timeseries CSV files. During these checks I did not encounter any issues, the data is very nicely

formatted and, together with the data description and the paper, very easy to work with, great work!

Thanks – we spent a lot of time formatting and checking the dataset so appreciate this comment!

I think that the accessibility of the dataset could be enhanced. When I click on "Download the data", I end up at the eidchub datastore where I can download individual files manually by clicking on them. This is only helpful if users are only interested in individual stations or attributes, which would not be very common. Usually, users of CAMELS-GB want to download the entire dataset. To achieve this, the user has to use wget (bulk download), which can already be challenging for users who are not very familiar with programming and/or Linux and HTTPS servers. I had to do some research on Google to get all the correct wget options to download the entire datasets and exclude the index.html files and I would consider myself quite experienced with things like this. If interested users cannot manage to easily download the dataset, they will just turn away. So I think having the option to just download the entire CAMELS-GB v2 dataset e.g. as a zip file would be very helpful and a lot more user friendly. The compressed zip file of CAMELS-GB v2 is also only 1.8 GB. Maybe I missed something and the option to easily download the entire dataset in one go already exists, in this case it should be directly visible on the data centre page.

We appreciate that different users will have different expectations for data access. We have received feedback on this dataset and the previous CAMELS-GB release that many users just want data for one or a few stations (and therefore would not want to download the entire dataset). We need to balance the needs of these users with users that do want to download the entire dataset. Currently, it is not possible to enable both these options in the data centre, although they are considering future developments to enable this.

Our expectation is that most users wanting to analyse the entire dataset will have programming skills and an example wget statement is provided on the download page, as well as further guidance to help: https://eidc.ac.uk/help/getdata/downloadData#programmaticAccess. Furthermore, we are developing online notebook services to allow direct access to and analysis of CAMELS-GB and other datasets, which would not be possible with a large zip file.

<u>Reviewer 3 – Hörður Bragi Helgason</u>

Many thanks Hörður for the positive assessment of the paper and the helpful feedback. Please see our detailed responses below.

Comments on the manuscript

1. Quality control for daily and hourly streamflow:

The manuscript states that both daily and sub-daily streamflow data are quality controlled by the source institutions prior to release, and that the hourly data originate from the quality-controlled UK-Flow15 dataset. At the same time, detailed quality control flags are only provided for the hourly data, while no equivalent flags or diagnostics are supplied for the daily streamflow. It would be helpful to clarify the rationale for this asymmetry.

I suggest clarifying how users should interpret the statement that no data were removed or modified by the quality control process for the hourly data, given that the data have already undergone quality control within UK-Flow15. Is the term "quality control" used differently for the daily and hourly products? For example screening or filtering at the daily scale versus the provision of diagnostic flags without filtering at the hourly scale.

The sources of the daily and hourly data are different and therefore you are right that the term 'quality control' is used differently for the two datasets.

Daily flows are quality controlled by the original measurement agencies and the UK National River Flow Archive in a process that removes data values that are perceived to be erroneous. Therefore the daily data is the best estimate available and considered suitable for analysis and modelling without reference to flags. The quality control process for the hourly data, applied in production of the UK-Flow15 dataset (Fileni et al, 2025; https://catalogue.ceh.ac.uk/documents/211710ac-f01b-4b52-807f-373babb1c368) acknowledges that some flow data may be incorrect, potentially substantially so in some cases, and addresses this by applying flags to alert users of data issues, rather than removing data. It is therefore important that users have access to these flags in order to make their own judgements about which data are suitable for use for a specific application.

We have now clarified the quality control process in Section 3.1.2 for the daily data:

"The streamflow data undergo quality control by the measuring authorities and the UK NRFA before being uploaded to the NRFA site. This quality control process removes flow values that are perceived to be erroneous, while retaining as complete a series as possible through the use of a range of infilling techniques (Dixon et al, 2012)."

And modified Section 3.2.2 to more clearly highlight the differences in the quality control process:

"The hourly flow and level timeseries are also provided with quality control flags. The hourly flow and level data have been quality controlled using both visual/manual inspection and automated quality control, including novel quality assessment techniques to assess the plausibility of extreme flow events (Fileni et al, 2026). This quality control process is different to the quality control process applied to the daily

flow data. Erroneous daily flow data are removed as part of the quality control process by measuring authorities and the UK NRFA, thus the daily flow data are the best estimate available and considered suitable for analysis and modelling without reference to flags. However, the quality control process for the hourly flow and level data acknowledges that some of these data may be incorrect and addresses this by applying flags to alert users of data issues, rather than removing data. It is therefore important that users use the flag-based system on the hourly flow and level data to identify, remove, or interpolate potentially problematic data as per their study requirements."

In the manuscript, users are strongly encouraged to use the diagnostic flags for the hourly data to decide how to treat potentially problematic observations. While this flexibility is valuable, it may present a barrier for some users. I therefore suggest considering the provision of an additional, ready-to-use pre-filtered hourly streamflow product based on a simple and clearly documented flag selection. This would improve accessibility for users who prefer a conservative default dataset, while still retaining the full flagged dataset for more advanced or customized analyses.

We understand there is some complexity around this that some users might find difficult to navigate. While it is challenging to define a "one size fits all" approach when it comes to suitable data quality for an application, we can make it simpler for users to start using a set of reliable stations. There is no clear default list of stations suitable for all purposes, and removing anything considered unsuitable could dramatically reduce the amount of data available. We therefore have included additional information that will allow users to select a subset of stations to use for different applications, rather than a subset of data values within stations. This has the benefit of retaining complete series for these stations.

We have revised the dataset to include new categorical information on (1) the quality of high flow data for each station, and (2) whether a station has significant issues in their historic record alongside information about these issues. This categorical information is sourced from the National River Flow Archive and the following station attributes : Indicative suitability for QMED" and "Indicative suitability for Pooling" – these have definitions defined here: https://nrfa.ceh.ac.uk/data/about-data/peak-flow-data/indicative-suitabilities, while the methodologies used for identifying issues in the historical record are described in Fileni et al (2026; https://doi.org/10.5194/essd-2026-152).
We have revised Section 3.2, 3.3 and 5.7 of the paper to include guidance for users on how to use this new categorical information as follows:

"Users seeking a simpler way to select a subset of stations that are suitable for a range of applications are recommended to use the "station quality" categorical information contained within the hydrometry attribute file (see Section 5.7)."

"Finally, users should carefully consider the quality of the hourly flow and level timeseries before use in studies. We recommend using the flag-based system on the hourly flow and level timeseries to identify, remove, or interpolate potentially

problematic data as per their study requirements to ensure that only good-quality data are utilised (see Fileni et al, 2026 for a more detailed assessment of the quality control process). Users can also select stations to use based on the station quality information (see Section 5.7). For low flow studies, we would suggest the daily flow data are best to use as they provide a good representation of slowly changing low flows and has been given additional quality control by the UK National River Flow Archive. For mean flow analyses, we recommend removing any stations where major issues have been identified. For high flow analyses, we recommend only using stations that have good quality high-flow data and for flood event quantification and flood frequency analysis we recommend only using stations with the highest quality flow data (see Section 5.7).”

“New hydrometry attributes were added describing the quality of the flow data collected at each station. This includes categorical information from the UK NRFA to help understand the quality of high flow measurements and qualitative information on any issues found during analysis of the 15minute flow data (Fileni et al, 2026). Stations that are suitable for QMED (station_quality_qmed) can be used for high-flow estimation; however, measurements are more likely to deviate from the true values, particularly for the largest flows, while stations that are suitable for pooling (station_quality_pooling) have the highest quality high-flow measurements and are recommended for flood event quantification and flood frequency analysis.”

2. Daily mean temperature definition (Line 134):

The description of how daily mean temperature is calculated from HadUK-Grid data is potentially confusing. A brief explanation of the rationale for this convention, related to the timing of minimum temperature observations and the diurnal cycle, would help readers understand why this approach is used instead of averaging same-day maxima and minima.

Sorry, we did not explain this clearly. Based on the Hydro-PE dataset paper (Robinson et al., 2023), the HadUK-Grid daily climate variables are defined such that the maximum air temperature (tasmax, Tmax, °C) is measured between 09:00 UTC on day D and 09:00 UTC on day D+1, while the minimum air temperature (tasmin, Tmin, °C) is measured between 09:00 UTC on day D−1 and 09:00 UTC on day D. Therefore, using tasmax on day D together with tasmin on day D+1 represents temperatures over the same 24-hour period, from 09:00 UTC on day D to 09:00 UTC on day D+1. This is also how daily mean temperature is calculated in their paper and dataset, and we adopt the same approach.

We revised Section 3.1.1:

“In the HadUK-Grid daily climate variables, the maximum air temperature is measured between 09:00 UTC on day D and 09:00 UTC on day D+1, while the minimum air temperature is measured between 09:00 UTC on day D−1 and 09:00 UTC on day D (Robinson et al., 2023). Therefore, daily mean temperatures have been calculated by averaging maximum air temperature on day D and minimum air temperature on day D+1 to ensure both values represent the same 24-hour period for each day.”

3. Interpretation of daily PET from Hydro-PE (Line 151):

The manuscript notes that several meteorological variables in the Hydro-PE HadUK-Grid dataset are temporally downscaled from monthly to daily resolution using smooth interpolation. While this approach is understandable for achieving long temporal coverage, it implies that daily PET and PETI values do not represent true day-to-day variability in all controlling variables. I suggest explicitly highlighting this limitation and clarifying that the Hydro-PE daily PET is most appropriate for seasonal to long-term analyses rather than event-scale or short-term applications.

Thanks, we have added a new Section 3.3 of guidance for users on dataset selection in the paper and we included this as one of the suggestions.

"Many of the variables used to derive Hydro-PE daily PET and PETI were temporally downscaled from monthly to daily resolution. Therefore, these products may be more suitable for seasonal to long-term analyses, and less appropriate for event-scale or short-term applications."

4. Groundwater well coverage:

The inclusion of groundwater level time series for 55 boreholes is a valuable new component of CAMELS-GB v2. At present, wells are restricted to those located within CAMELS-GB catchments. I suggest considering the inclusion of additional groundwater wells, if available, even if they do not fall strictly within CAMELS-GB catchment boundaries. Groundwater level time series can be highly valuable for hydrological studies even when not directly associated with a specific CAMELS-GB catchment.

We thank the reviewer for this suggestion. We have considered the possibility of a wider inclusion of wells that are part of the National Groundwater Level Archive (NGLA: National Groundwater Level Archive | British Geological Survey (BGS)), but have decided that for the CAMELS-GB v2 data release we are best restricting the groundwater timeseries to boreholes within the CAMELS-GB catchments. The key spatial unit of the CAMELS-GB v2 dataset is the surface water catchment, as defined by the surface topography. Deciding which wells from the NGLA to include/exclude from outside the CAMELS-GB v2 catchments would require defining groundwater basins and conceptualising how these relate to the surface water catchments. This would be a complex undertaking and is beyond the scope of CAMELS-GB v2. The NGLA, of which the CAMELS-GB v2 wells form a subset, is maintained by the British Geological Survey and data are available on request for the researcher/practitioner wishing to consider the role of groundwater in surface water catchment hydrology in more detail. CAMELS-GB v2 still provides a step forward building on previous work (e.g. CAMELS-GB) with the inclusion of groundwater level measurements.

5. Interpretation and flagging of land cover change data:

In Section 5.4, the manuscript notes that most catchments show a decrease in urban land cover from 2021 to 2022 that is unlikely to be reflected in the real world. If this artefact is known a priori, perhaps removing these data for the year 2022 would make sense. If not, it would at least be helpful to clarify how users should interpret these

data. Options could be either explicitly flagging the affected years or transitions in the dataset or metadata, or providing clearer guidance in the manuscript and documentation on how these land cover time series should and should not be used for change detection analyses.

Thanks for this comment. As noted in the paper, some of the land cover change between years is real, but there is also noise in the variability between years, which reflects uncertainty in how the land cover classifications are derived. Consequently, it is difficult to identify (or remove) affected years as we do not know what proportion of the change between years is real or simply noise. We feel it is important to provide all the years to reflect this variability/uncertainty, rather than removing data. We have added some further guidance into Section 5.4 for users:

"Consequently, we recommend users carefully consider how these data are incorporated in change detection analyses and consider pooling data for recent years together to reflect the uncertainty in the change signal."

6. File naming conventions:
The manuscript does not explicitly describe the file naming convention for the time series files. A short note explaining the format would improve the ease of use, for example:
• camels_gb_v2_hydromet_daily_timeseries_{gauge_id}_{start_date}-{end_date}.csv
• camels_gb_v2_groundwater_daily_timeseries_{well_id}_{start_date}-{end_date}.csv

Thanks, the file naming conventions are provided in the supporting documents on the Environmental Information Data Centre. We have now made this clear in the paper.

Minor technical corrections in the manuscript

Thanks – we have revised the paper to address all the technical corrections as suggested.

1. Table 5, hydrometry attributes:
The description of structurefull_flow reads "flow at which the river begins to the wingwalls of a structure", which is missing a verb. This likely should read "flow at which the river begins to overtop / reach the wingwalls of a structure".

2. Line 37: Remove the extra "and" in "Global Streamflow and Indices and Metadata Archive".

3. Line 45: "finable" should be "findable".

4. Line 258: "Figure 4" is in bold, which is inconsistent with formatting elsewhere in the manuscript.

5. Benchmark catchments (Line 387):

The sentence
“All CAMELS-GB catchments are identified as either being part of this network or not to provide users with an indication of ‘near-natural’ catchments and suitable for studies where human impacts need to be minimal.”
is confusing. I suggest rephrasing to something like:
“All CAMELS-GB catchments are flagged according to whether they belong to the UK Benchmark Network, providing users with an indication of which catchments are relatively near-natural and therefore more suitable for studies requiring minimal human impact.”

6. Undefined abbreviation:
The abbreviation “CEH” is used throughout the manuscript but is never defined. Please spell it out at first use as UK Centre for Ecology and Hydrology.

7. Equation numbering: Please consider numbering equations (in Section 5.8.3.

8. Baseflow index description in Table 5:
The description of baseflow_index_ceh refers to “the Gustard et al. (1992) method described in Appendix A”. This appears to have been carried over from the CAMELS-GB v1 paper, as there is no Appendix A in the current manuscript.

Comments regarding the dataset

1. Data access and bulk download
For ease of use, consider providing an option for bulk download that does not require users to create an account on the Environmental Information Platform or use wget, if this is feasible within platform constraints.

We appreciate that different users will have different expectations for data access. We have received feedback on this dataset and the previous CAMELS-GB release that many users just want data for one or a few stations (and therefore would not want to download the entire dataset). We need to balance the needs of these users with users that do want to download the entire dataset. Currently, it is not possible to enable both these options in the data centre, although they are considering future developments to enable this.

Our expectation is that most users wanting to analyse the entire dataset will have programming skills and an example wget statement is provided on the download page, as well as further guidance to help: https://eidc.ac.uk/help/getdata/downloadData#programmaticAccess. Furthermore, we are developing online notebook services to allow direct access to and analysis of CAMELS-GB and other datasets, which would not be possible with a large zip file.

2. Hourly resampling and timestamp conventions:

The manuscript states that 15-minute streamflow data were aggregated to hourly values using a next-hour resampling convention. It is unclear which timestamp convention is used for hourly precipitation. I suggest explicitly documenting the timestamp convention used for all hourly variables and ensuring consistency between streamflow and precipitation.
More generally, adopting start-of-hour timestamps for all hourly variables would be consistent with the definition of the daily data, where values for a given date represent the mean or sum over that calendar day rather than a shifted window. While timestamp conventions differ between regions and institutions, clear documentation and internal consistency are essential for correct interpretation and use of the data.

Thanks. We have added the timestamp convention to the start of Section 3.2 to make this clear.

"Rainfall on a given hour refers to the amount accumulated over the previous hour, whereas river level and flow are reported as hourly averages, representing the mean value over the previous hour."

3. Units in Table 5:
In Table 5, max_daily_flow and max_hourly_flow are listed with units of percent. These appear to be absolute flow values and should likely have units of mm day^{-1}, mm $hour^{-1}$, or m^3 s^{-1}. Please clarify and correct if needed.

Thanks for spotting this – we have revised this.

4. Consistency of flow units:
Flow-related attributes in Table 5 use a mix of mm day^{-1} and m^3 s^{-1}. While this reflects common practice, it may be worth considering whether greater standardisation would improve usability.

Thanks for this comment – as noted, this reflects common practice and so we would like to keep the mix of units for flow.

5. Runoff ratios greater than one:
Seven catchments have runoff ratios exceeding 1.0, notably:
• gauge_id 26006 with a runoff ratio of 3.01
• gauge_id 27038 with a runoff ratio of 2.74
I suggest explicitly identifying these catchments in the manuscript and briefly discussing potential explanations, to alert users.

Thanks, we have added the following text to Section 5.3:

"Seven catchments have a runoff ratio greater than one with gauge ID 26006 and 27038 with the highest runoff ratios of 3.01 and 2.74 respectively. Catchments with a runoff ratio greater than one are either groundwater dominated catchments where the groundwater catchment greatly exceeds the topographical catchment or are impacted

by human activities with water being imported into the catchment for water supply or hydro-electricity."

6. Missing value conventions:
For the attribute high_prec_timing, Table 5 states that NaN is used when two seasons register the same number of events. However, the file camels_gb_v2_climatic_attributes.csv uses "NA" instead of "NaN". I suggest changing this to NaN for consistency.

Thanks for spotting this. We have revised this in the updated dataset.

7. Attributes with high fractions of missing values:
Some hydrometry attributes have more than 50 percent missing values, notably bankfull_flow (53 percent missing) and structurefull_flow (65 percent missing). A brief explanation of the reasons for this level of missingness would help users assess the reliability and appropriate use of these attributes.

This metadata is collated by the UK National River Flow Archive and made available alongside the daily flow data. It is produced by the original measuring agencies and has been accumulated over many years. Its availability is dependent on a number of factors: these metrics may not be relevant to many gauging stations, e.g. an open channel station has no structure and therefore no structure-full flow; metrics such as bank-full flow are often modelled, and this modelling may not have not been undertaken at many stations; there may not have been focused efforts within each agency to produce these values, which are often estimates. The information is considered the best available for this large selection of gauging stations, and despite the level of completeness, is expected to be useful for many types of studies, in particular helping identify where flows significantly exceed those able to be accurately measured and where flood plain flows are likely to be occurring.

We have revised Section 5.7 to include:

"The channel characteristics were also re-extracted from the NRFA with changes for a small number of stations. These data are useful for flood analyses, but it is worth noting there is a large proportion of missing data for these attributes as they (1) may not be relevant for some gauging stations (e.g. an open channel station has no structure and therefore no structure-full flow), and (2) are often modelled and this modelling may not have not been undertaken at many stations."

8. Shapefiles for monitoring locations:
The dataset includes catchment boundary shapefiles but does not appear to include shapefiles of streamflow gauge locations or groundwater well locations. Providing point shapefiles for both river gauging stations and groundwater wells would be beneficial. While the relevant coordinates are available in tabular form, distributing these locations as shapefiles would be consistent with the provision of catchment boundaries and common practice in large-sample hydrology datasets. Including key

attributes directly in the shapefiles (also the catchment boundaries shapefile) would further enhance usability.

Thanks for this suggestion. We believe that these shapefiles can be easily generated by users from the data provided and so have decided not to include these.

Reviewer 4 – Franziska Clerc-Schwarzenbach

General comments

Many thanks to the authors for their efforts that they put into the creation of this new dataset version. Indeed, this dataset offers exciting new opportunities for hydrological modelling, as stated in the conclusions! I enjoyed reading the manuscript and exploring the dataset a lot and I think that both the manuscript and the dataset have been very carefully and well designed.

Many thanks Franziska for the kind comments and the helpful feedback. Please see our detailed responses below.

My main suggestion for improvement is that the authors could give some guidance on which of the data should be used when there are several options available for the same variable (especially for the hydrometeorological time series), if possible. While the users of the dataset can still use a different option, this would lead to less random decisions and thus more comparability among different studies using the dataset. As the meteorological data used in CAMELS-GB v1 are not updated anymore, I assume that users should use HadUK whenever possible. Maybe this (or some other guidance) can be stated clearly in the text and / or in a read me file.

Thanks. In response to several reviewer comments, we have now added a new section to the paper (Section 3.3) detailing guidance on the use and selection of the hydro-meteorological datasets.

Furthermore, I think that it is great that in many instances in the manuscript, users are made aware of potential issues and what to take care of when working with the data. For an easier access to all these 'warnings', I would suggest to include one table, list, or graphic that summarizes them. I can imagine that users tend to be more aware of all these important points when they are well visible and all listed in one place.

Thanks – we believe the new section 3.3 now addresses this comment.

Minor comments regarding the dataset

- When clicking the link to the dataset via 'Assets', 'Datasets', I ended up at the CAMELS-GB (v1) archive. The link given in the abstract is fine, but currently not clickable (see technical corrections).

Thanks for spotting this – we will make sure this is updated on the ESSD website and that the link is clickable in the final manuscript.

- I think that a simpler bulk download option (other than via WGET) would be helpful for users that quickly want to get all the data, without any detours. Maybe, the different directories in which the single files are currently accessible could be made available as zip files. Especially for the timeseries files, this would make things easier.

We appreciate that different users will have different expectations for data access. We have received feedback on this dataset and the previous CAMELS-GB release that many users just want data for one or a few stations (and therefore would not want to download the entire dataset). We need to balance the needs of these users with users that do want to download the entire dataset. Currently, it is not possible to enable both these options in the data centre, although they are considering future developments to enable this.

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- For the groundwater wells, I would suggest to also add the latitude and longitude in addition to the easting and northing currently given (as done for the gauges).

Thanks – we will make this change in the revised dataset.

Minor comments regarding the manuscript

The manuscript is easy to understand and clearly structured. Below, I list some minor suggestions for improvement in chronological order:

- L47: I would split this sentence, as I think it contains two points. On the one hand, an increasing number of LSH datasets, and on the other hand large LSH projects such as Caravan that would also not be possible without the FAIR principles.

We have revised this sentence to make clear this is a separate point:

"There is now a growing community of LSH datasets, such as the CARAVAN dataset, which included data for 6830 catchments when published in 2023 (Kratzert et al., 2023) but now contains data for more than 20,000 catchments."

- L57: The catchments of CAMELS-GB are not only part of Caravan, but also of EStreams. This could be added here, alternatively, I would take out the plural form 'datasets'.

Thanks, we have revised the sentence to:

"It has also been incorporated into continental (do Nascimento et al., 2024) and global catchment datasets (Kratzert et al., 2023)."

- Figure 1: I would suggest to add the full words to the titles of b) and c) and I think it would be easier to grasp the figure if the variable itself was noted again on the axes of the plots (instead of just the dataset with the units).

Thanks, we have made these changes.

- Caption of Figure 1 as well as L116: I would stick to 'precipitation' instead of using 'rainfall'.

Thanks, we have updated this.

- L169: How did you handle the shifts from and to daylight saving time? This could be added here.

There is no shift from and to daylight saving. All data is stored against the time in UTC / GMT. We have added a sentence to clarify that the timeseries data is reported in UTC with no daylight saving time adjustment. In addition, all references to specific times (e.g., 09:00) throughout the text, as well as in Tables 3 and 5, have been updated to explicitly indicate UTC (e.g., 09:00 UTC).

"Hourly hydro-meteorological time series of rainfall and river flow are provided for the 671 catchments from 1st October 1990 09:00 UTC to 1st October 2022 08:00 UTC (Table 3). All timeseries data in CAMELS-GB are reported in UTC with no daylight saving time adjustment."

- Figure 2: In b), it could be helpful to add to the axes labels that this is the fraction of wet hours, so one does not have to search for it in the caption first. In c), 'Elevation' should probably not be capitalized, and I would suggest to give the unit of the elevation as m a.s.l. instead of just as m.

Thanks, we have made these changes.

- L294: I appreciate that you clearly state that the PET data without interception loss were used for the calculations. I think this paragraph would benefit from an explanation why you decided to do so.

Thanks, we have revised this sentence to:

"(without correction for interception as it has more consistency with other global and national PET products)"

- L323: I think it would be better to write something like ‘a trend for increasing urban land cover’ instead of just ‘increasing land cover’ here, as the latter may be confusing when read without the preceding sentence.

Thanks, this sentence has been revised to:

“While a trend of increasing urban land cover over time…”

Technical corrections

Thanks these have been revised as suggested. We will ensure all links are clickable in the final manuscript.

- L29, L157, L448: These links are currently not clickable (I think because parts of the link are not linked).

- L37+: Since ‘Caravan’ is not an abbreviation, the name of this dataset is not capitalized.

- L45: ‘finable’ instead of ‘findable’.

- L85: I think this ‘is’ should be a ‘was’.

- L89: Subtitle should not be in title-case, and you write ‘timeseries’ as one word elsewhere.

- L130+: space missing before ‘km’. Happens also for other units, e.g., L144 before ‘mm’.

- L300: ‘half low date’ instead of ‘half flow date’.

- L399: The hyphen after ‘high’ should be a dash.

- L418: Should this then be ‘abstraction and discharges data’?