Editor decision: Publish subject to minor revisions (review by editor)
by Genevieve Ali
Public justification (visible to the public if the article is accepted and published):
Dear authors: thank you for addressing comments in the last round of review. Both reviewers think that your manuscript toes the line between a data paper and an original research paper, which I believe is what has made the review process a bit challenging. That said, both reviewers believe that the release of the data and accompanying manuscript will be beneficial to the community, and I fully agree. I am returning your manuscript for a range of minor edits suggested by the reviewers. I look forward to receiving the final version of your manuscript.
With best wishes,
Genevieve Ali

We greatly appreciate the comments of the editor and reviewers and their patience in improving the manuscript. Although minor, the revisions have greatly improved the paper and the data availability. We address all reviewer comments below in blue text.

Reviewer 1:

I found the authors have made significant additions to the manuscript methodology, which was my primary concern. Reading over the response to reviewers, I found that each of my comments was acted upon with additions to the methods. The new additions assuage my concern that this was a "simple" compilation of flow and water quality data. In addition, the additional methods associated with the atmospheric deposition data satisfied my previous comments from the last review.
Author response: Thank you for your time and patience in improving the manuscript. We have addressed all comments below.

I continue to have comments on the dataset itself.
Reviewer comment: - The previously missing Deposition Data ("DepCon_671_1985_2018.xlsx") does not have an associated documentation file, whereas the file "Camel_Chems_Metrics.xlsx" contains documentation for "Camels_chem_1980_2018.csv". Without documentation, I am unable to determine the associated units of measurement.
Author response: We agree and have provided the file DepCon_metadata.xlsx on Hydroshare.

Reviewer comment: - The files within Catchment Attributes also lack documentation, units, etc., and the "gauge_id2" column continues to be present.
Author response: We agree and have provided the file camels_attributes_v2.0.xlsx on Hydroshare .

Reviewer comment: - If the authors aspire for wide use of their dataset, I suggest they significantly improve the documentation files associated with it. A README file outlining the data structure and attributes would be appropriate.
Author response: We agree and have provided the file camels_chem_readme.txt

Reviewer comment: If I were to suggest a higher standard of replicability, I would encourage the authors to make their methodology fully open source: by publishing the algorithms outlined in bullet points in Section 2.3. I am not judging this submission by that standard, but as a potential user, this could be a way to allow for continued integration of updated USGS data (2018 and beyond).
Author response: We have posted the execution files that were used on Hydroshare, in the directory "Source Data Extraction Code (ETL).

Reviewer 2:

Reviewer comment: Line 51: Missing a closing parenthesis ")" following "… Addor et al., (2017)".
Author response: Revised as suggested.

Reviewer comment: 125: Strike “National” from “USGS National NWIS”; it’s already represented in the acronym.
Author response: Revised as suggested.

Reviewer comment: 136: Change “obtained NADP” to “obtained from NADP”.
Author response: Revised as suggested.

Reviewer comment: 229: It appears that the lowercase references to Figure 3 sub-panels are offset by one; for example SO4 and Ca are subpanels “l” and “m” in Figure 3, not “m” and “n” as represented in the document body. This offset needs to be corrected for this and all following references to Figure 3.
Author response: We checked the figure numbers and letters for subpanels carefully and made the changes as requested.

Reviewer comment: 238: Replace “…temperature is measurement relatively…” with “…temperature is generally measured…”
Author response: Revised as suggested.

Reviewer comment: 252: Cumbersome and repetitive sentence beginning with “The range…”. I suggest replacing the entire sentence with “The range of hydrological and meteorological conditions represented is nearly identical between CAMELS and CAMELS-Chem catchments.”
Author response: Revised as suggested.

Reviewer comment: 268: replace “…covered of the percent of the FDC during…” with “…percent of the FDC covered…”
Author response: Revised as suggested.

Reviewer comment: 276 and 278: Table 4, not 5.
Author response: Revised as suggested.

Reviewer comment: 283: Table 5 not 4.
Author response: Revised as suggested.

Reviewer comment: 297: Suggest replacing this sentence with “In many cases these patterns are consistent with patterns in stream chemistry; for example, patterns of NO3 deposition (Figure 7c) compare closely with the corresponding pattern in chemistry (Figure 1j).”
Author response: Revised as suggested.

Reviewer comment: 337: You appear to be missing a citation in the sentence “In another example use of CAMELS-Chem, … used DIC stream chemistry…”
Author response: We agree and have revised accordingly. The sentence now reads: “In another example Stewart et al. (2022) used DIC stream chemistry from CAMELS-Chem to show seasonal changes were controlled by CO_2 concentration distribution with depth, while long-term DIC concentrations were controlled by climate.”

Reviewer comment: 369: Replace “…to develop new hypothesis…” with “…to develop a new hypothesis…” if only one hypothesis, or “…to develop new hypotheses…” if multiple.
Author response: Revised as suggested.

Reviewer comment: 389: Replace “coincident” with “coincidence”.
Author response: Revised as suggested.

Reviewer comment: 570 and beyond: several of your references are listed twice.
Author response: We removed duplicate references.