**Title**

Global monthly sectoral water use for 2010-2100 at 0.5° resolution across diverse scenarios

### Authors

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### Abstract

*170 words maximum*

Future sectoral-specific water withdrawals at a temporal resolution capable of representing patterns in seasonality and a commonly used spatial resolution are an important factor to consider for energy, water, land and environmental research. Projected water withdrawals that are harmonized with assumptions for alternate futures that capture socioeconomic and climatic variation are critical for many modeling studies on future global and regional dynamics. Here we generate a novel global gridded water withdrawals dataset by coupling Global Change Analysis Model (GCAM) with a land use spatial downscaling model (Demeter), a global hydrologic framework (Xanthos) and a water withdrawal downscaling model (Tethys) for the five Shared Socioeconomic Pathways (SSPs) and four Representative Concentration Pathways (RCPs) scenarios. The dataset provides sectoral monthly data at 0.5° resolution for years 2010 to 2100. The presented dataset will be useful for both global and regional analysis looking at the impacts of socioeconomic, climate and technological futures as well as in characterizing the uncertainties associated with these impacts.

### Background & Summary

*700 words maximum*

The Background & Summary should provide an overview of the study design, the assay(s) performed, and the data generated, including any background information needed to put this study in the context of previous work and the literature, and should reference literature as needed. The section should also briefly outline the broader goals that motivated collection of the data, as well as their potential reuse value. We also encourage authors to include a figure that provides a schematic overview of the study and assay(s) design.

### Methods

The Methods should include detailed text describing any steps or procedures used in producing the data, including full descriptions of the experimental design, data acquisition assays, and any computational processing (e.g. normalization, image feature extraction). See the [detailed section in our submission guidelines](https://www.nature.com/sdata/publish/submission-guidelines#sec-5) for advice on writing a transparent and reproducible methods section. Related methods should be grouped under corresponding subheadings where possible, and methods should be described in enough detail to allow other researchers to interpret and repeat, if required, the full study. Specific data outputs should be explicitly referenced via data citation (see Data Records and Citing Data, below).

Authors should cite previous descriptions of the methods under use, but ideally the method descriptions should be complete enough for others to understand and reproduce the methods and processing steps without referring to associated publications. There is no limit to the length of the Methods section.

### Data Records

The Data Records section should be used to explain each data record associated with this work, including the repository where this information is stored, and to provide an overview of the data files and their formats. Each external data record should be cited as described below. A data citation should also be placed in the subsection of the Methods containing the data-collection or analytical procedure(s) used to derive the corresponding record.

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Possible content **may include:**

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* follow-up experiments aimed at testing or supporting an interpretation of the data
* statistical hypothesis testing (e.g. tests of statistical significance, identifying differentially expressed genes, trend analysis, etc.)
* exploratory computational analyses like clustering and annotation enrichment (e.g. GO analysis).

### Usage Notes

*This section is optional*

The Usage Notes should contain brief instructions to assist other researchers with reuse of the data. This may include discussion of software packages that are suitable for analysing the assay data files, suggested downstream processing steps (e.g. normalization, etc.), or tips for integrating or comparing the data records with other datasets. Authors are encouraged to provide code, programs or data-processing workflows if they may help others understand or use the data. Please see our [code availability policy](http://www.nature.com/sdata/policies/editorial-and-publishing-policies#code-avail) for advice on supplying custom code alongside Data Descriptor manuscripts.

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For all studies using custom code in the generation or processing of datasets, a statement must be included under the subheading "Code availability", indicating whether and how the code can be accessed, including any restrictions to access. This section should also include information on the versions of any software used, if relevant, and any specific variables or parameters used to generate, test, or process the current dataset.

### Acknowledgements

The Acknowledgements should contain text acknowledging non-author contributors. Acknowledgements should be brief, and should not include thanks to anonymous referees and editors or effusive comments. Grant or contribution numbers may be acknowledged.

### Author contributions

Each author’s contribution to the work should be described briefly, on a separate line, in the Author Contributions section.

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A competing interests statement is required for all papers accepted by and published in *Scientific Data*. If there is no conflict of interest, a statement declaring this must still be included in the manuscript.

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Figure images should be provided as separate files and should be referred to using a consistent numbering scheme through the entire Data Descriptor. In most cases, a Data Descriptor should not contain more than three figures, but more may be allowed when needed. We discourage the inclusion of figures in the Supplementary Information – all key figures should be included here in the main Figure section.

For initial submissions, authors may choose to supply a single PDF with embedded figures.

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Authors are encouraged to provide one or more tables that provide basic information on the main ‘inputs’ to the study (e.g. samples, participants, or information sources) and the main data outputs of the study; also see the additional information on providing metadata on page 6. Tables in the manuscript should generally not be used to present primary data (i.e. measurements). Tables containing primary data should be submitted to an appropriate data repository.

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### References

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In line with emerging [industry-wide standards for data citation](https://www.nature.com/articles/sdata2018259), references to all datasets described or used in the manuscript should be cited in the text with a superscript number and listed in the ‘References’ section in the same manner as a conventional literature reference. See ‘Citing Data’ below for further details.

### Additional Formatting Information

**Referencing Figures, Tables, and other content**

**The Word document may reference Figures (e.g. Fig. 1), Tables (e.g. Table 1), online-only tables (e.g. Online-only Table 1) and Supplementary Information (e.g. Supplementary Table 1, or Supplementary File 2, etc.). When information from metadata documents must be referred to, it should also be included in the main manuscript as Tables, and formatted in a way that suits human readability. To refer to the ISA-Tab metadata records within the manuscript, use the phrase “see associated Metadata Record”.**

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All references should be numbered sequentially, first throughout the text, then in tables, followed by figures and, finally, boxes; that is, references that only appear in tables, figures or boxes should be last in the reference list. Only one publication is given for each number. Only papers that have been published or accepted by a named publication or recognized preprint server should be in the numbered list; preprints of accepted papers in the reference list should be submitted with the manuscript. Published conference abstracts, numbered patents, and archived code with an assigned DOI may be included in the reference list. Grant details and acknowledgments are not permitted as numbered references. Footnotes are not used.

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1. Hogan, B. *Manipulating The Mouse Embryo: A Laboratory Manual* 2nd edn (Cold Spring Harbor Laboratory Press, 1994)

**Publicly available preprint:**

1. Babichev, S. A., Ries, J. & Lvovsky, A. I. Quantum scissors: teleportation of single-mode optical states by means of nonlocal single photon. Preprint at http://arXiv.org/quant-ph/0208066 (2002).

**Code:**

1. Gallotti, R. & Barthélemy, M. Source code for: The multilayer temporal network of public transport in Great Britain. *Figshare* https://dx.doi.org/10.6084/m9.figshare.1249862.v1 (2014).

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1. Manaster, J. Sloth squeak. *Scientific American Blog Network* http://blogs.scientificamerican.com/psi-vid/2014/04/09/sloth-squeak (2014).

**Technical or government report:**

1. Akutsu, T. *Total Heart Replacement Device.* Report No. NIH-NHLI-69 2185-4 (National Institutes of Health, 1974).

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In line with emerging [industry-wide standards for data citation](https://www.nature.com/articles/sdata2018259), references to all datasets described or used in the manuscript should be cited in the text with a superscript number and listed in the ‘References’ section in the same manner as a conventional literature reference.

An author list (formatted as above) and title for the dataset should be included in the data citation, and should reflect the author(s) and dataset title recorded at the repository. If author or title is not recorded by the repository, these should not be included in the data citation. The name of the data-hosting repository, URL to the dataset and year the data were made available are required for all data citations. For DOI-based (e.g. figshare or Dryad) repositories the DOI URL should be used. For repositories using accessions (e.g. SRA or GEO) an [identifiers.org](https://identifiers.org/) URL should be used where available. For first submissions, authors may choose to include just the accession number. Scientific Data staff will provide further guidance after peer-review. Please refer to the following examples of data citation for guidance:

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2. NCBI Sequence Read Archive <http://identifiers.org/ncbi/insdc.sra:SRP121625> (2017).
3. Barbosa, P., Usie, A. and Ramos, A. M. Quercus suber isolate HL8, whole genome shotgun sequencing project. GenBank<http://identifiers.org/ncbi/insdc:PKMF00000000> (2018).
4. DNA Data Bank of Japan <http://trace.ddbj.nig.ac.jp/DRASearch/submission?acc=DRA004814> (2016).

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