

SoilTemp: towards a global database of soil and near-surface temperatures

For more information:

SoilTemp website: www.soiltempproject.com

SoilTemp email: soiltemp.project@gmail.com

Short: we are looking for in-situ measured microclimate time series from all over the world, optionally with additional biodiversity data. We focus on soil and near-surface temperature recordings from all heights and depths above and below the soil surface, yet also accept associated other microclimatic measurements (e.g., soil moisture, relative humidity...).

For details on the projects' rationale, check our call for data in Global Change Biology: <https://doi.org/10.1111/gcb.15123>.

Data submission

Ultimately, the database will be a collection of datasets with georeferenced **soil and near-surface microclimate time series** (temperature, soil moisture, relative humidity...), **possibly associated with plant species composition and/or trait data** from the same or a nearby location.

Data needs to be submitted following the SoilTemp data submission format, which can be found on the website at <https://www.soiltempproject.com/how-to-submit-data/>

Network rules

Member types

The database is maintained by SoilTemp-members, organized at four levels regarding data contribution and decision making:

- 1) SoilTemp Steering Committee

The SoilTemp SC consists of:

- Caroline Greiser (University of Stockholm, Sweden)
- David Klinges (University of Florida, USA)
- Eva Gril (Université de Picardie Jules Verne, France)
- Ilya Maclean (University of Exeter, UK)
- Ivan Nijs (University of Antwerp, Belgium)
- Jonas Lembrechts (University of Antwerp, Belgium)

- Jonathan Lenoir (Université de Picardie Jules Verne, France)
- Julia Kemppinen (University of Oulu, Finland)
- Juha Aalto (University of Helsinki; Finnish Meteorological Institute, Finland)
- Koenraad Van Meerbeek (KU Leuven, Belgium)
- Liesbeth van den Brink (University of Concepción, Chile) (South American representative)
- Maroof Hamid (University of Kashmir, India) (Asian representative)
- Martin Kopecký (Institute of Botany of the Czech Academy of Sciences, Czech Republic)
- Matej Man (Institute of Botany of the Czech Academy of Sciences, Czech Republic)
- Mick Ashcroft (University of Wollongong, Australia) (Australian representative)
- Miska Luoto (University of Helsinki, Finland)
- Peter le Roux (University of Pretoria, South Africa) (African representative)
- Pieter De Frenne (Ghent University, Belgium)
- Rachel Penczykowski (Washington University in St. Louis, USA) (North American representative)
- Rémy Beugnon (iDiv, Germany)
- Stef Haesen (KU Leuven, Belgium)
- Stijn Van de Vondel (University of Antwerp, Belgium)

From 2024 onwards, election of the twelve SoilTemp steering committee is done by the members. Elections take place for 4-year renewable terms in January by means of an electronic ballot extending over one month. The candidate with the highest number of votes for each continent is automatically elected (6 continental representatives). From the remaining candidates, the six candidates with the highest number of votes are elected; in case of a tie for the sixth position, all persons with the same number of votes are elected. The SC determines one of its members as chairperson.

In addition, there are rotating (every 2 years) and invited (by the SC members) seats for 3 early career scientists (PhD students, postdocs < 3 year after PhD).

The steering committee is responsible for:

- Management and updating of the database
- Judging project proposals using the database and keeping track of ongoing projects
- Meeting every four months to discuss the general status of the network, its management and scientific outputs.

2) Dataset owner

(Co-)owner of a time series submitted to SoilTemp. A *time series* is a unit of data as submitted from a certain sensor, with a fixed set of dataset owners. There is no limit to the amount of owners to one time series; this is left to the discretion of the owners yet should clearly be communicated to the SC. Dataset contact persons (see below) are responsible for providing all necessary information on all dataset owners upon submission, following the format as proposed in the submission file.

3) Data contact person

Each time series can have multiple owners, yet has one contact person. Time series contact persons serve as contact and mediators between time series owners and the SC and the principal investigators (PI) of a given project submitted to SoilTemp and approved by the SC using this time series (see below). They are the first contact regarding all questions (practical, scientific, data use, etc.) for the time series and are responsible to pass on information to the time series owners when necessary.

4) Other members

Membership of SoilTemp within a given project is possible without contributing datasets. 'Other members' can be co-author on any of the resulting papers if they contribute sufficiently to idea development, data analysis and/or paper writing (decisions on this at the discretion of the project leaders).

Projects

Projects using the full database follow the terms of use as specified below, inviting all contributors as co-author. Projects using SoilTempOpen (once it is published) are exempt of this rule.

Each project using the database should submit a one-page summary of the project idea (including a preliminary title, brief outline, core group of people working with the data and list of datasets that will be used) to the SC, which can then approve or reject the idea based on potential overlap with other projects, rationale and feasibility.

Each project has a Principal Investigator (PI). PIs are asked to provide (ir)regular updates on their progress to the interested SoilTemp members through the SoilTemp Slack environment. The PI can agree upon a 'supporting committee' of interested SoilTemp-members that are closely involved in the progress and can provide feedback through semi-regular meetings throughout its execution. Call for membership of these supporting committees go out for each project separately, to all members of SoilTemp.

Terms of use and data ownership

Participation in SoilTemp and use of the SoilTemp database are subject to the following conditions:

1) Dataset ownership and use

- The datasets within the SoilTemp database remain the property of the respective dataset contributors. Power of decision regarding a certain dataset remains entirely with them.
- Upon submission, dataset custodians mark under which license their data can be used. SoilTemp will not publish any data without permission of the data contributor(s) through the data custodian. More information on licensing can be found in the submission file on the website.
- Dataset contributors can at any stage withdraw their dataset from the database, but then are no longer a SoilTemp member.
- Under no circumstances can non-open access data received through the SoilTemp network be circulated to others without permission. Dataset contributors maintain the rights to change their licensing at any time, yet such changes do not work retroactively
- We developed a SoilTemp website (www.soiltempproject.com) linking to a global map (<https://microclimate.shinyapps.io/loggerapp/>) on which some metadata on each dataset will be published (i.e. coordinates, contact information, number of plots, temporal extent and whether species data is available). Dataset contributors can separately decide to be excluded from the website or the map, impose a moratorium, or ask to blur coordinates. It is the

responsibility of the dataset contributor to communicate this to the project leaders (e.g. through the submission form).

2) Publications and co-authorship

- Co-authorship is offered to all dataset contributors for every core publication of the SoilTemp network (unless stated differently in the FORM mentioned above). These core publications include 1) the publication of the call for data (Lembrechts et al. 2020), 2) the SoilTemp maps and 3) the open access SoilTemp database itself (SoilTempOpen). This rule also applies to all papers concerning application of the database that are initiated before publication of the database and that make use of the contributors' data. Publications using SoilTempOpen or the SoilTemp maps after its publication are not required to include data contributors as co-authors, yet will have to cite respectively the SoilTemp database or the maps.
- Submissions before October 20th, 2023 will be guaranteed inclusion in at least publication of SoilTempOpen itself. Submissions after this date will still be included in the database and ongoing analyses and will be included in publication of an update of the database at a later stage.
- Each dataset custodian has the responsibility to check with possible other contributors involved in a particular dataset whether or not they should be offered co-authorship as well.
- All persons that will act as co-author are expected to, at least, review and explicitly approve the publication. If a dataset contributor has initially agreed that his/her data can be used, yet does not respond to emails approving the final publication, he will be removed from the author list (yet the dataset remains included).
- Any member of SoilTemp can propose a publication using the SoilTemp database or SoilTemp maps. Until publication of SoilTempOpen, publication proposals (including a preliminary title, brief outline, core group of people working with the data and list of datasets that will be used) should be sent to the SC. They will check for any conflict of interest with ongoing or planned proposals, contact dataset custodians for dataset access and co-authorship, compile the approved data and send them to the proposer. After publication of SoilTempOpen, contacting the SC to verify conflicts of interest is not required, yet strongly encouraged. When contacting the SC, the full database might be provided.
- Any SoilTemp member can express interest in a particular SoilTemp-analysis by 'liking' it in the Slack-environment, and will then be kept in the loop about progress through Slack.