DMP title

Project Name Attribution analysis of changes in global droughts to anthropogenic influences-Senior postdoctoral fellowship - DMP title

Grant Title 12P3222N

Principal Investigator / Researcher Hossein Tabari

Description Drought is one of the most destructive natural disasters due to its prolonged and extensive socioeconomic impacts. It affects a massive number of people each year and inflicts significant challenges to the society and the environment. Compared to other natural hazards, the identification and characterization of drought are more challenging because of its slow onset and slow recovery, lack of a unified definition and the difficult specification of its exact area. It becomes even more complex by the interdependencies between drought characteristics and between drought and other extreme events such as heatwaves. A concurrent occurrence of drought and heatwave events can cause more severe impacts than any of the single hazards alone. The occurrence probability of such compound events is expected to rise due to climate change. Owing to these interdependencies at different spatial and temporal scales, a univariate analysis may lead to a significant underestimation of the overall drought impact. It thus calls for a multivariate analysis for a more realistic estimation of the impact to design adequate adaptation strategies, which has been overlooked. This research addresses this knowledge gap by a multivariate analysis of the contribution of anthropogenic influences to single drought events and compound drought-heatwave events at the global scale.

Institution KU Leuven

1. General Information

Name applicant

Hossein Tabari

FWO Project Number & Title

12P3222N: Attribution analysis of changes in global droughts to anthropogenic influences

Affiliation

- KU Leuven

2. Data description

Will you generate/collect new data and/or make use of existing data?

- Reuse existing data

Describe in detail the origin, type and format of the data (per dataset) and its (estimated) volume. This may be easiest in a table (see example) or as a data flow and per WP or objective of the project. If you reuse existing data, specify the source of these data. Distinguish data types (the kind of content) from data formats (the technical format).

Type of the data	Format	Volume	Data source
Climate model data	NetCDF	20 TB	ESGF
Global hydrological model data	NetCDF	5 TB	ESGF
Reanalysis data	NetCDF	5 TB	ECMWF
Satellite data	NetCDF	5 TB	NOAA
Gauge-based data	NetCDF & text	500 GB	NOAA & Climatic Research Unit
Socioeconomic data	NetCDF	1 TB	
Geographical data	Shapefile	500 GB	USNA & USGS

3. Legal and ethical issues

Will you use personal data? If so, shortly describe the kind of personal data you will use. Add the reference to your file in KU Leuven's Register of Data Processing for Research and Public Service Purposes (PRET application). Be aware that registering the fact that you process personal data is a legal obligation.

- No

Privacy Registry Reference:
Short description of the kind of personal data that will be used:

Are there any ethical issues concerning the creation and/or use of the data (e.g. experiments on humans or animals, dual use)? If so, add the reference to the formal approval by the relevant ethical review committee(s)

- No

Does your work possibly result in research data with potential for tech transfer and valorisation? Will IP restrictions be claimed for the data you created? If so, for what data and which restrictions will be asserted?

- No

Do existing 3rd party agreements restrict dissemination or exploitation of the data you (re)use? If so, to what data do they relate and what restrictions are in place?

- Yes

Use of the public data has to be properly acknowledged with citations of scientific publications.

4. Documentation and metadata

What documentation will be provided to enable reuse of the data collected/generated in this project?

Each analysis consists of three folders including inputs, processes, and outputs along with a text file that clearly describes the content of each folder, e.g., the description of the data used as inputs and on how outputs files (e.g., mat files) were generated.

Will a metadata standard be used? If so, describe in detail which standard will be used. If no, state in detail which metadata will be created to make the data easy/easier to find and reuse.

- No

5. Data storage and backup during the FWO project

Where will the data be stored?

The data will be archived on storage resources at the ICTS services of KU Leuven.

How is backup of the data provided?

Apart from storing the data on the university's central servers with automatic weekly back-up, a monthly data backup on external hard drives is planned to save the files from inevitable data loss situations due to system crash which is common when working with big data. Two sets of the hard drives are provided and stored safely, which should allow to preserve and use the data for a period of at least 5 years after the end of the project.

Is there currently sufficient storage & backup capacity during the project? If yes, specify concisely. If no or insufficient storage or backup capacities are available then explain how this will be taken care of.

- Yes

There is sufficient storage & backup capacity for the project. The storage resources were provided using the annual bench fee of this project, which will be expanded in the future if needed.

What are the expected costs for data storage and back up during the project? How will these costs be covered?

The costs are covered by the annual bench fee of this project.

Data security: how will you ensure that the data are securely stored and not accessed or modified by unauthorized persons?

The data will be archived on storage resources which are password and key protected.

6. Data preservation after the FWO project

Which data will be retained for the expected 5 year period after the end of the project? In case only a selection of the data can/will be preserved, clearly state the reasons for this (legal or contractual restrictions, physical preservation issues, ...).

Re-used data will not be retained as they are publicly available. Only in the case, data providers no longer supply the data, they will be preserved. All created data will be stored on external hard drives for at least 5 years after the end of the project.

Where will the data be archived (= stored for the longer term)?

Two sets of the hard drives are provided and stored safely, which should allow to preserve and use the data for a period of at least 5 years after the end of the project. The supervisor of this project (Prof. Willems) will be responsible for data storage and management after the project is finished.

What are the expected costs for data preservation during the retention period of 5 years? How will the costs be covered?

The data will be stored safely at two sets of hard drives which will be purchased with the annual bench fee of this FWO project.

7. Data sharing and reuse

Are there any factors restricting or preventing the sharing of (some of) the data (e.g. as defined in an agreement with a 3rd party, legal restrictions)?

- No

Which data will be made available after the end of the project?

The data are produced in the MAT-file (MATLAB) format and high-quality display items such as global maps are created in TIFF format.

Where/how will the data be made available for reuse?

Data will be available on request from the principal investigator and supervisor and the source code for this project will be released on GitHub. The publications from this project will be in open-

access journals which will be made available on the journal website and the KU Leuven tool Lirias.

When will the data be made available?

- Upon publication of the research results

Who will be able to access the data and under what conditions?
The data will be accessible to everyone.

What are the expected costs for data sharing? How will the costs be covered?
N/A

8. Responsibilities

Who will be responsible for data documentation & metadata?
Project PI (Hossein Tabari)

Who will be responsible for data storage & back up during the project?
Project PI (Hossein Tabari)

Who will be responsible for ensuring data preservation and reuse ?
Project PI (Hossein Tabari)
Supervisor (Prof. Patrick Willems)

Who bears the end responsibility for updating & implementing this DMP?
The PI bears the end responsibility of updating & implementing this DMP.