

**General comments:**

The study by Pohle et al. comprises a multi-disciplinary and transdisciplinary case study on multiple drought indicators and impacts on different compartments and management territories of a large city, in this study the German capital Berlin. The study analysed the extreme drought conditions during the years 2018-2023 using a wide data spectrum ranging from classical meteorological data, water level of nearby reservoirs and lakes, stream flow data of two large rivers relevant for the city, groundwater series, modelled soil moisture data and sewage water discharge amounts and water quality data.

The multi-data approach alone makes this article to stand out as it rare to find drought studies that carry out a combined analysis of a whole range of meteorological, hydrological, hydrogeological and surface-water quality data specifically for urban settings. The result chapter presents the deficit aspects of the various compartments in turn, followed by a thorough discussion on the form of drought propagation and a projection for the future, when drought conditions may not be an exceptional and atypical behaviour, but a new normal. The discussion ends with a comprehensive list of how a large city such as the capital Berlin would be affected by such a drastic change of water availability, taking into consideration a wide range of management aspects for drinking water supply, surface water quality deterioration, and the potential need for a drought management plan. I very much liked this study and suggest publication with minor correction.

*We are grateful for the overall positive assessment of our manuscript by the reviewer. The comments are valuable suggestions for improving the manuscript. Please refer to the individual comments below (in grey & italics).*

**Specific comments:**

I have four specific comments, where the authors may consider to implement them to enhance the presentation of the topic:

1. Case study character: you may want to add in the abstract, the introduction and the conclusion that the city of Berlin was selected as a case study to show the diversity of indicators, drought impacts and management questions relevant for large cities. Specifically the abstract and conclusion makes it very difficult to orientate on where this study is 'playing', especially for readers outside of Europe.

*Thank you for this comment. We will elaborate more on our study as an example of drought impacts on a city and add more information in abstract and conclusion about Berlin and its hydrological setting.*

2. Drought propagation: The presentation of the drought propagation across compartments should get a more prominent place in your results or discussion

section, and I suggest to move the visualisation S7 from the supplement into the main part of the paper, as the entire section 5.1 is actually refer to it.

*Thank you for this suggestion. We will move S7 to the main text.*

3. Drought indicators: could you please comment why you haven't used the rather standard rainfall deficit indicator SPI or SPEI to relate the change of meteorological, hydrological etc. droughts? It might be a whole new set of analysis, overlaying the rainfall based deficit analysis and the 'real' data analysis (e.g. SPI-6 for hydrological drought versus low discharge levels actually measured in the rivers) and beyond the scope of this study.

*We agree it would be interesting to assess droughts also in terms of deficit indicators such as SPI, SPEI, SRI. As also mentioned by the reviewer, this would be a new set of analysis and beyond the scope of this manuscript especially as we wanted to apply a consistent method for the different variables used in this study and also show the actual data, e.g. to allow for comparison of absolute values. Further, some of the data sets are too short for standardization whereas for others standardization might not be meaningful due to various influences.*

4. Urban vegetation and plant water availability: lots of different aspects of drought impacts were mentioned (drinking water supply, ship transport, water quality, cooling for energy production), but water demand for urban green was not included, why?

*Thank you for this comment. We agree that it would be very interesting and important to include urban vegetation, especially in terms of water demand for urban green. Both urban vegetation and forests in Berlin were directly affected by the 2018-2023 drought. Unfortunately, no comparative data on water demand for urban green in Berlin is available yet. A soil moisture network was only launched in 2021 only, so that we decided to include modelled rather than observed soil moisture in the manuscript. A sensor network focusing on the soil water balance of urban trees will be established in the near future.*

*We will incorporate these aspects in the discussion part of the manuscript, also referring to the recent (November 2024) forest health report of Berlin.*

#### **Technical comments:**

Line 8ff: add that this is a case study of Berlin, and that the period 2018-2023 was a drought period within central Europe and/or Eastern Germany.

*Thank you for this suggestion. We will revise the abstract so that it becomes more clear that 2018-2023 was a major drought period in Europe and that we analyze this event in terms of a case study for Berlin.*

Line 39: Berlin's drinking water supply was introduced here quite abruptly; maybe inform first, that drought impacts are studied for this city in general.

*Thank you for this suggestion. We will add a sentence about the sectors we are analyzing.*

**Line 55: change references to normal standards**

*Thank you for pointing this out. We will check the manuscript throughout and correct the references accordingly.*

**Line 181: specify what you mean with 'for grass and sand'**

*This refers to model results from the German weather service (DWD) under the assumption that land cover is grass and soil is sandy. We will revise the sentence for clarification.*

**Line 360: where is the origin of this data described – missing in 3.1? Please also provide detailed references to the other data sets, e.g. WSA does not appear in the list of reference.**

*Thank you for pointing this out. We will add more information on these data in section 3.1. As the dataset by WSA is not published as such but has been made available to the authors it is not possible to directly include it in the reference list.*

**Line 360: Figure 8 needs better resolution**

*Thank you for this comment. We will change the resolution of this figure.*