

Reply to Referee #2

We thank the reviewer for their time and valuable and detailed feedback. We have now addressed all comments and discussed them in the following.

The manuscript tries to develop five high-resolution (5 km) gridded drought records based on the Standardized Precipitation Evaporation Index (SPEI), which is essential and exciting for related fields. The structure of the paper is clear and the research questions are clear.

Authors' response:

- Thank you for acknowledging the work and feedback

However, I think the introduction part needs to improve, and more details about the development of such a field need to be described.

Authors' response:

- Thank you for the suggestion. We have added few lines on the need and development of the datasets, including the organization of the paper as recommended by reviewer#1.

The result and discussion should be separated and focus on the main result of the study.

Authors' response:

- Thank you for the suggestion. We believe that combining both aspects would be beneficial for this data description paper. We are happy to split the results and discussion if you still believe it is necessary.

Besides, the structure of the result needs to improve significantly, such as in sections 3.1 to 3.3. A significant polish is needed.

Authors' response:

- We have modified this section by adding more results, including additional evaluations with high-resolution Africa-based SPEI and Central Asia SPEI datasets, both of which are available at 0.05° resolution from 1981-2016 and 1981-2018, respectively.

Others, such as line 86-87 is it correct?

Authors' response:

- Thank you for carefully reading the paper. You are right there is an error in line 86-87. This is now modified as: **“The precipitation and evapotranspiration datasets used in this study are widely used and generally reliable, although there may be some regions where their reliability is limited.”**