

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 produced global high-resolution ( $0.05^\circ$ ) and long-term (1981-2022) SPEI datasets. It is suitable for publication after a minor correction.

Authors' response:

- Thank you for recognizing our efforts and providing feedback.

Line 191: Replace Table 1 with Table 2.

Authors' response:

- Thank you for the thorough review. We have replaced Table 1 with Table 2.

Line 192: Please justify the selection of a log-logistic probability distribution among others. How you attained the model parameters?

Authors' response:

- The choice of the log-logistic distribution was informed by previous research (Vicente-Serrano et al., 2010; Beguería et al., 2014), which demonstrated its superior performance in generating SPEI series with standardized properties (mean = 0, SD = 1) when compared to other probability distributions.
- The log-logistic distribution involves three key parameters:  $\alpha$  (scale),  $\beta$  (shape), and  $\gamma$  (origin). These parameters are estimated using the robust and straightforward L-moment procedure. Further details on the parameter computation process can be found in Vicente-Serrano et al. (2010).
- In order to enhance the clarity of this section, we have incorporated the following text into the paper.

Remove the underlined sign from the values given in Table 2.

Authors' response:

- Thank you. The underlines are now removed from the numbers.

Beguería, S., Vicente-Serrano, S. M., Reig, F., and Latorre, B.: Standardized precipitation evapotranspiration index (SPEI) revisited: parameter fitting, evapotranspiration models, tools, datasets and drought monitoring, *International Journal of Climatology*, 34, 3001–3023, <https://doi.org/10.1002/joc.3887>, 2014.

Vicente-Serrano, S. M., Beguería, S., and López-Moreno, J. I.: A Multiscalar Drought Index Sensitive to Global Warming: The Standardized Precipitation Evapotranspiration Index, *Journal of Climate*, 23, 1696–1718, <https://doi.org/10.1175/2009JCLI2909.1>, 2010.