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Discussions

Interactive comment on "GPCC Drought Index – a new, combined, and gridded global drought index" by M. Ziese et al.

M. Ziese et al.

markus.ziese@dwd.de

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Comment: In my opinion, the author combined the two kinds of drought indices "SPI-DWD" and "SPEI", and regardes the combination as a new drought index. However, (1) why need to combine? (2) why only chose these two drought indices to combine, why not PDSI, or MSDI? (3) The authors reviewed the existing drought indices, what's the difference between GPCC-DI and exising indices, does it improve? (4) The resolution of inputed data is different, how to evaluate the accompanied error during the regridding process? (5) Too much basic information is missing, for example, what is the starting time of GPCC-DI?

Answer: Thanks for your comment.

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Ad (1): Both drought indices are quite good, but are not applicable at the global scale with the same quality everywhere. The SPI has problems in arid regions. To calculate the PET for the SPEI in cold regions, some assumptions must be taken if you use parameterizations based on near-real-time available data, like the one from Thornthwaite. Therefore, the idea was to use this index, which works without problems and assumptions (like PET at low temperatures).

Ad (2): For monitoring purposes, not all necessary data for the PDSI are available at the global scale. Also the aggregated temporal water deficit varies between regions within the PDSI (see Vicente-Serrano et al., 2010, Journal of Hydrometeorology, pp. 1033-1043, doi: 10.1175/2010JHM1224.1). Therefore we focused on SPI and SPEI.

Ad (3): The main improvement of the GPCC-DI is, that it uses nearly no assumptions in comparison to other globally applied drought indices. It combines two existing indices in such a matter, that both can be used in an optimal way without arbitrary settings like PET=1mm/month for temperatures below 0°C.

Ad (4): We rewrite the last sentence of section 4 and used "weighting" instead of "regridding", which is more precise, because we do an averaging from a fine to a coarse grid and no interpolation. Spatial extremes are smoothed by the averaging, what is expected. But, and therefore shown figures 1 and 2, the overall patterns are similar. The last sentence of section 4 changed from "To match the GPCC grid the data are regridded to 1° spatial resolution taking land portion and area-average into account (see Fig. 2)." to "The resolution of the original CPC data is reduced by means of a land portion and area weighting to match the 1° GPCC grid. This leads to a slight smoothing of spatial temperature peaks (see Fig. 2)."

Ad (5): As we wrote in the last paragraph of the conclusions, the GPCC-DI is available back to January 2013.