

***Interactive comment on* “Evaluation of drought indices at interannual to climate change timescales: a case study over the Amazon and Mississippi river basins” by E. Joetzjer et al.**

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Both appointed reviewers suggested major revisions to this article. I agree with their main concerns, and especially the following points:

- rev #2 & rev #1: The purpose of the article needs to be more clearly defined: On the one hand model- vs observation-based indices are compared, on the other hand these different indices are based on different variables and consider different time scales. A more systematic evaluation should be provided (see also next points).

- rev #2: Soil moisture-based drought indices should be considered (see also discus-

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sions in Wang 2005, Burke and Brown 2008, and Orłowsky and Seneviratne 2012), and possible limitations of the employed hydrological model should be discussed

- rev #1: A more comprehensive evaluation of the role of the considered time scales should be provided

- rev #1: An extension to other river basins should be considered: While this might not be possible for a larger number of basins, an extension to at least 2-3 further basins (e.g. in other continents) would substantially broaden the scope of this study and allow the authors to assess whether the conclusions are valid across several regions.

In addition, the authors should also consider the following points in their revisions:

- In the introduction, a reference to the IPCC AR4 was provided. However, the drought assessment of the IPCC AR4 was substantially revised in the more recent IPCC SREX report (see in particular Summary for policy makers (IPCC 2012) and chapter 3 (Seneviratne et al. 2012)). The authors should refer to the more recent IPCC SREX assessment, which for instance pointed out issues with the use of different drought indices (Box 3.3) and also provided regional assessments for past and projected changes in drought based on several indices (Tables 3.2 and 3.3, in Seneviratne et al. 2012).

- For SRI, also observation-based estimates could be used (e.g. based on runoff observations from the Global Runoff Data Center (GRDC)).

- As pointed by reviewer #1, issues with PDSI-based drought estimates were recently pointed out in the article of Sheffield et al. (2012). The authors should discuss this article and its implication for their results.

Because the reviewers required major revisions, the revised article will need to go through a second review.

Best regards,

Sonia Seneviratne

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