

Interactive comment on “Drought monitoring and prediction in climate vulnerable Pakistan: Integrating hydrologic and meteorologic perspectives” by Taimoor Akhtar et al.

Saeed Golian (Referee)

saeed.golian2@gmail.com

Received and published: 7 October 2020

The paper deals with applying both a climatological (SPEI) and hydrological (SSI) drought index to assess their combined application on drought monitoring over four catchments in Pakistan (and Afghanistan). While the methods they applied are very straightforward, there are some issues which should be addressed to increase the quality of manuscript and to make it publishable by HESS. My comments are as follow:

Line 126: what's the spatial resolution for this dataset?

Lines 126-128: Add some examples on correlation values between CRU TS4.3 and

C1

observed data in Pakistan, especially the study area.

Lines 129-134: Is data used for streamflow analyses regulated or unregulated? Line 203: What's the logic behind choosing -1 as threshold value for drought events?

while the authors chose -1 as the threshold, 0 should be replaced by -1 at like 211, ($I_i < -1$ and $I_{i-1} \geq -1$).

Lines 240-246: Even using the visual judgment, Log-logistic is not the best distribution for some cases, e.g. Kabul-July, Indus-July, Chenab-July and Chenab-January. As the authors also indicated, the best probability distribution cannot be ascertained visually. There are many goodness-of-fit tests which should be used here and the results should be presented to support the choice of best distribution function for each catchment/month combination.

Table 1 and Figures 5 and 6: again while -1 is the threshold for drought detection (Table 1 and inside the text), Figures are based as 0 as the threshold!

Figure 8 and Lines 287-288: why cross-correlations are calculated with SSI-1? Why not SSI-3?

Line 308: What do authors mean by Lagged by 2 while Figure 9 is not about lag issue?

Section 4-4: I suggest that instead of this section which I believe can be removed from the text without losing any specific information, authors can develop some multivariate regression equations to predict SSI-1 using SPEI-3 with 1 to 3 months lead-time. They can choose the wettest and driest months as sample and develop the relationship based on those SPEIs with highest correlation values.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., https://doi.org/10.5194/hess-2020-297, 2020.

C2