

## ***Interactive comment on “Spatiotemporal Changes in Aridity of Pakistan during 1901–2016” by Kamal Ahmed et al.***

### **Anonymous Referee #1**

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The present article deals with aridity in Pakistan, certainly an important issue that merits publication in HESS. However, in its present form, this MS has too many drawbacks and a very limited benefit to the readers. This is due to several reasons such as, confusing definitions of the two seasons Rabi and Kharif (p.23, l.21-25). Once Rabi is defined as Nov.-May and later as Dec-Mar.; Kharif is defined as Apr.-Oct. and then as Jun.-Sep. To which definition one should refer? Non-comparable presented maps and partial information in some charts. Figure 1 - I assume that the six different height categories were selected in order to present equal areas in each category. This caused that range of each category is arbitrary and unusual. However, I could cope with this figure as we don't have to compare it to other maps. It is more severe with the rest of the maps. Figure 2 - The same problem as with the previous. It is impossible to

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compare among the precipitation maps (2a-2c) or the PET maps (2d-2f) in the different seasons. Furthermore, I suggest the authors to present the precipitation and the PET in the different seasons (2b-2c and 2e-2f, respectively) as a percentage of the annual totals and not as absolute values. This will be more explicit. In their present form, these maps are completely useless. Section 4.5 and Figure 6 and 7 – The authors present a moving average of 11 years of aridity, precipitation and PET trends. I don't understand why they chose increments of 50 years, why not calculate a moving average of 11 yrs. (or any other duration) for the entire period? Such a calculation would result in a less "fuzzy" behavior of the trends and enable to better locate the drier or wetter periods. Apparently there is no reason to assume that trends change with increments of 50 years. Furthermore, a comparison of Figures 6 and 7 reveals that the trends during Kharif are by far more important in determining the entire year trends. Figure 7 is misleading as the vertical axes of a, b and c (Rabi) are different from those of d, e and f (Kharif) and give the impression of trends of the same order of magnitude in both period, which is not the case. The results presented in Figure 8 and Table 1 contradict the postulated in the introduction regarding increased aridity in Pakistan (p.2) and the results cited from Haider and Adman (2014). Overall there is no tendency over the majority of the territory (88%) and in those regions with a tendency it is mainly towards a reduction in aridity. Therefore, large parts of the introduction are irrelevant. Concluding that aridity depends mainly on precipitation (p.23, l-14-15) is very trivial. The authors should consider editing the text by a native English speaker.

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