

Interactive comment on “Hydrological drought forecasting and skill assessment for the Limpopo river basin, Southern Africa” by P. Trambauer et al.

Anonymous Referee #2

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The paper presents hydrological seasonal prediction experiment using three different driving meteorological inputs (dynamic ECMWF seasonal forecast, ESP and ENSO conditioned ESP) for Limpopo River basin. The study in general follows correctly a common methodology applied for such studies, however does not provide detail information about some important steps of the whole process (see. below). The text should be more inclusive to provide reader with all important information on methodology without simply referring to other existing studies; e.g. the results of NS criterion of hydrological model calibration should be stated (authors only refer to another study of the same team - P9978 "In these stations the performance of the hydrological model is found to be satisfactory based on evaluation measures and ranges proposed by Moriasi et al. (2007). These results are presented by Traumbauer et al. (2014)."). In

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general, a text is understandable but some sentences are difficult to read and need overall grammar revision ("It is, however, unreliable, causing frequent droughts and floods also commonly occur in the rainy season."). In a whole, if revised for English and completed by missing detailed information I consider this study a valuable contribution to extended hydrological prediction system literature.

Specific comments: P 9963-9965 Introduction does not provide literature review of existing studies (or operational implementations) on seasonal hydrological prediction systems.

P 9966 There were four stations evaluated in the study. Two of them representing smaller area have provided generally less satisfactory results. A bit surprisingly the best result has not been gained for the closing profile of a study basin (P 9979/5-10). This is not discussed and authors do not attempt to explain it. With respect to this I miss more detailed information about sub-basins (area, general geographical conditions etc.). Such information might be interesting (and supporting) for interpretation and discussion of results.

P 9968 A method of deriving of precipitation data is not sufficiently described and validated (a critical impact of meteorological input is obvious from gridded pattern of fig. 7). A way how monthly precipitation data are converted to daily time series for model simulations remain unexplained.

P 9969 Information about initializations dates and lengths of simulations is quite confused in this section and in results description. I would propose to include a figure with overview of forecast periods during the year and its relation to Limpopo river flow regime.

P 9971/18 Does "multi-annual mean" mean the same as "mean" long term climatology?

P 9971 According to a described precipitation bias correction the monthly mean correction factor is "linearly interpolated from monthly values to daily assuming it corresponds

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to day 15 of the particular month". This might suggest that interpolation has been done the way illustrated in fig. 1. Daily time series (a) is bias corrected on monthly basis (b). Let's suppose the correction factor (alpha) is 2.39 for a given month and 0,6 for a preceding and following months. If this number is applied to correct daily rainfall uniformly during the given month the corrected monthly precipitation total would equal to 255 mm (8,5 mm per day) while if interpolated according to description of authors the monthly corrected total would be 214 mm (7,1 mm per day) only (c). I believe that was not the case, only a method description should be more precise.

P 9974 and 9976 Resampling procedures have to be described in more detail.

P 9976/20 Root stress indicator is used, however it is not defined. Is the Root stress the same as a modeled soil water deficit?

P 9978/1 The "mean runoff season" and "high runoff season" need to be defined.

P 9984 Authors conclude that initial hydrological conditions (IHC) contributes to predictability up to 2 to 4 months but do not discuss these findings with Shukla et al. (2013) who have found shorter impacts of IHC.

P 9982-9985 Station 24 (closing gauge of the basin) is in general predicted with less skill than upstream station 1 but physical explanation is not discussed.

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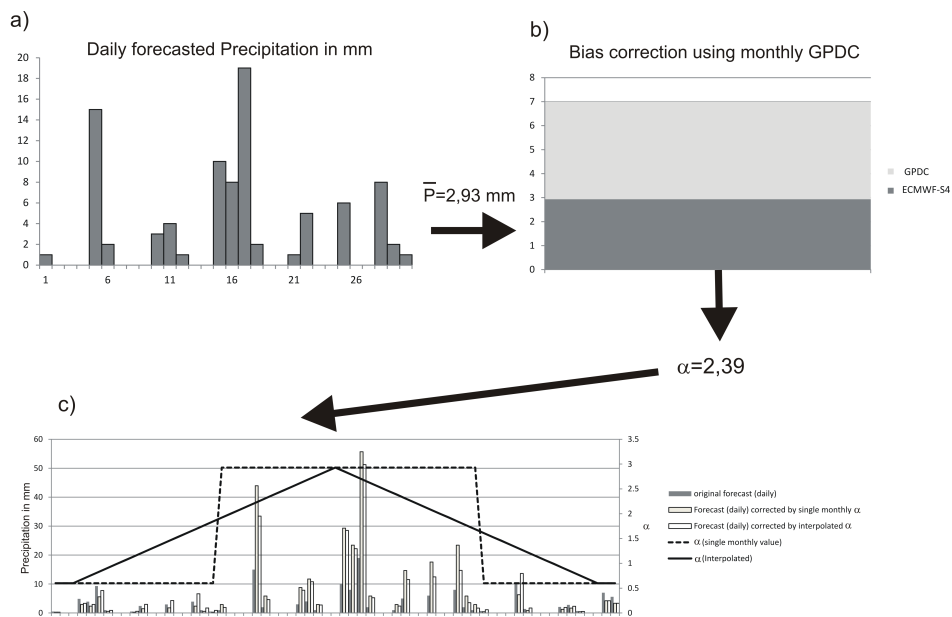


Fig. 1. Fig. 1 bias correction process (see text for explanation)

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