

Interactive comment on “Seasonal drought prediction for semiarid northeast Brazil: About the added value of a process-based hydrological model” by Tobias Pilz et al.

Anonymous Referee #2

Received and published: 16 September 2018

This paper aims at comparing a regression tree model with a process-based hydrological model for seasonal hydrological drought prediction. While the evaluation analysis is comprehensive, critical information is missing before obtaining a conclusion that the statistical model is superior to the process-based hydrological model for predicting reservoir level. I would suggest a major revision for more solid evidences.

1. A common sense about statistical models is that they may have good performance in the training period, but degrade in the validation period. This information is missing for all results (i.e., Figures 3-12). For instance, what is the time period for the simulation in Figure 3? How about separating calibration and verification periods? This

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separation is also critical for hindcast evaluation (Figure 4). In general, we have to use cross validation if there are not enough samples. And totally separating calibration and verification periods would be better. This will allow a fair comparison for statistical and dynamical models. In other words, one will never use any information in the validation period for the training or calibration. This is a basic rule for hydrological forecasting, but such important information is missing both in the text and figure captions. Both the calibration and validation results for both statistical and dynamical models should be presented. And the hindcast and forecast period should also be separated before comparison.

2. Regarding dynamical hindcast/forecast, a critical issue is whether the uncertainty in meteorological forecast affects the hydrological forecast greatly. Only one GCM (i.e., ECHAM4.6) is used in this study, which is not enough. In fact, the North American Multi-Model Ensemble (NMME) hindcast and realtime forecast data for precipitation and temperature are available for the public. There are a few global validation studies that cover the Brazil. Using multiple climate forecast models may provide an opportunity to quantify the uncertainty in the meteorological forecast. In other words, the conclusion that the statistical model outperforms the dynamical model may not be solely caused by the deficiency in hydrological model, and both the hydrological and meteorological parts should be addressed in the analysis.

3. Section “2 Terminology” could be moved to the appendix section in the end.
4. Section “4 Data and Methods” should be revised extensively. While the introduction for the models should be expanded, the introduction for the evaluation metrics could be shortened.
5. Figure 6, what does the “aggregation month” mean? Did you only carry out hindcasts from January each year? The same issue for Figure 10.
6. P2L1, “the many” -> “many”

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