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Hydrology and Earth System Sciences Discussions

Interactive comment on "Role of climate forecasts and initial land-surface conditions in developing operational streamflow and soil moisture forecasts in a rainfall-runoff regime: skill assessment" *by* T. Sinha and A. Sankarasubramanian

Anonymous Referee #1

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This manuscript presents an assessment of the experiments conducted using VIC land surface model to forecast monthly streamflow with lead time up to 6 months. The VIC model had been calibrated and forced with precipitation statistically downscaled in spatial and temporal scales. The results of another experiment were obtained using the same model forced by daily climatology of precipitation. In addition, skill scores of the monthly streamflow forecasts developed using statistical Principal Component

Regression model were presented along with scores of streamflow forecasts based on the VIC model.

This study has significant scientific and practical importance. With an introduction of a few clarifications and changes, the manuscript will be suitable for publication.

Recommendations

The title of the manuscript is too long. It is therefore advisable to make it more concise.

Section 2.3

Authors have mentioned that seven ECAHM4.5 grids that exhibited significant correlations with averaged monthly precipitation were selected.

My questions are: 1) Are these grids from the study area or they displaced in relation to study area? 2) At what significance level do they exhibit significant correlation with observed precipitation data? 3) What is the performance of precipitation forecasts from ECAHM4.5 in relation to the lead time?

Because of the significant uncertainty in the forecasting of precipitation with GCM models, it is important to demonstrate how well ECAHM4.5 model simulates precipitation. In addition, results of this study don't display clear additional skill that could be gained using precipitation forecasts from ECAHM4.5 over the climatological forcings. I would recommend that the authors provide some information about skill scores of ECAHM4.5 precipitation forecasts before application of downscaling approach.

Section 3.1.2

To reduce the dimensionality and eliminate noise, the PCA analysis was applied to predictand and predictor data set. Originally, dimension of predictand data set was 251x54, and for predictor it was 7x54. After the PCA procedure, first six principal components were retained for predictor as well as for precitand. There is no substantial reduction in dimensionality in case of predictor. Originally, it was 7x54 and after PCA

applied it was 6x54. Retaining of 2 or 3 first principal components (or keeping original 7 grid points), would be enough for the predictor.

Section 3.1.3

To make the monthly ECAHM4.5 precipitation forecasts useful in the VIC model, disaggregation of the monthly precipitation into daily interval was done. My recommendation is to present the analysis of errors introduced by temporal disaggregation as authors have done for spatial downscaling.

Ref. p.5237 line 2: Authors point out that "... Fig. 4f for the month of October indicates the ability of the forecasting scheme to predict October flows based on the initial conditions prior to May and using the six month ahead monthly precipitation forecast issued in May for the month of October." I don't agree with this statement. According to Fig 4f, the VIC fcst exhibits non significant skill for the month of October.

Ref. p.5242 line 19: Authors say "During normal ENSO times, ECAHM4.5 precipitation forecasts based streamflow predictions (VIC fcst_norm) issued during the winter season perform better than VIC clim_norm..." Accoring to Fig 7, this statement is not so obvious.

Ref. p.5234 line 6: It should be "Figure 3", not "Figure 2".

Ref. p.5234 line 11: It should be "Fig. 3", not "Fig. 2".

Ref. p.5238 line 15: It should be "In", not "xIn".

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 9, 5225, 2012.