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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Uncertainty in runoff based on Global Climate Model precipitation and temperature data – Part 2: Estimation and uncertainty of annual runoff and reservoir yield" *by* M. C. Peel et al.

Anonymous Referee #2

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Attempting to comprehensively address all sources of uncertainty is challenging and it is reasonable for the authors to focus on some particular aspects of the problem. Here it is clear that the main focus lies on addressing the representation of internal variability by generating synthetic time series conditioned on information about low-high frequency variability in the GCM time series. This looks interesting and is well worthy of publication though with some tweaks could probably address some concerns that otherwise could be directed towards this study (note that I'm not commenting on the Hydrological aspects of this paper, e.g. the hydrological model and the reservoir

calculations, these areas are outside my expertise).

1. Can the stochastic method really re-place dynamically simulated ensemble members? If this is a proof of concept paper, it would be good if the authors had selected a GCM with several runs so that we could see the spread of the dynamically simulated ensemble members in relation to the stochastically simulated ensemble members. Further, why 100 simulations - does the spread stabilise around 100 samples?

2. Can within GCM variability really be greater than between GCM variability? Well, I guess it is possible in the near term for variables with large natural variability such as rainfall. The selected 'future' time period here falls in the 'near to mid-term' category, so perhaps it isn't impossible. However, as the authors note - the GCMs have been bias corrected and the sample of GCMs is small so is this conclusion robust? It would be good to relate the spread of the selected sub-sample of GCMs (before and after bias correction) to that of the entire CMIP3 archive in terms of projected precip and temp (regionally and globally).

3. Rather than using bias corrected GCM data as input to the hydrological model,could you not use simple daily scaling whereby you apply the change signal on observed data? There just seems to be a bit of a scale mis-match between the GCM output and required catchment scale. Daily scaling has its obvious limitations, but would better represent the regional variability in precip. Maybe a few words on why you choose to use bias corrected GCM input over this very simple downscaling method.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 11, 4579, 2014.