Statistical bias correction for climate change impact on the basin scale precipitation in Sri Lanka, Philippines, Japan and Tunisia

by C.T. Nyunt et al.

Thanks for reviewing and your short comments which make our manuscript more constructive and informative. We mark our response as "AC: Author comment" and please see our responses as below:

<u>Short Comment from P. Hunukumbura</u>
I have reviewed with great interest the paper by Nyunt, et al. I have a short comment on the method the authors used to correct the future climate precipitation (equation 11 on page 8).

$$X'_{Gcm\_Fut} = F^{-1}_{Obs}\left(F_{Gcm\_past}\left(X_{Gcm\_Fut}\right)\right) \qquad (11)$$

According to the equation, the authors fed future precipitation (X_{Gcm_Fut}) into the the CDF fitted using the past GCM precipitation data (F_{Gcm_Past}) to get the cumulative probability. It means, they assumed that the future precipitation follows the same CDF as the past GCM precipitation. In practice, this is not true. It is better to clarify why authors assumed the same CDF for the past and the future precipitation.

AC: $x'_{GCM\_Fut} = F^{-1}_{Obs\&GCM\_past}\left(x_{GCM\_Fut}\right)$

Equation 11 is modified as above and the main theme is the bias discarded during the control period remain the same in the future period. As a consequence, the same inverse function between the observed CDF and original GCM CDF is used for bias correction of GCMs future precipitation. In other words, future is unknown and the stationary bias assumption (Section 3.4) has been confirmed by using the same function to the different 20 years (1961-1980) simulation at the two stations as the validation where the continuous 40 years (1961-2000) data available. For this reason, we don't assume future GCM precipitation follows the same CDF as the past and we just use the same inverse function between observation and GCMs during the control period for projected precipitation.