

SEMINAR

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FREQUENCY BIAS CORRECTION (FBC) - A NEW ALTERNATIVE FOR ADDRESSING GCM DEPENDENCE BIASES FOR HYDROLOGICAL APPLICATIONS

Abstract

Addressing systematic persistence related biases in GCM simulations is being increasingly recognised as a first step before any hydrological climate change impact assessment. This is in contrast to many bias correction procedures that focus on correcting biases in moments and are referred to as distribution-based bias correction approaches. The current options for addressing persistence biases comprise of the Nested Bias Correction (NBC) or its recursive variant, the Recursive NBC (RNBC), which correct lag 1 autocorrelation biases across specified nesting time scales. While these represent the only alternatives available to correct persistence biases (and hence are of considerable use in storage related applications in hydrology), the assumption of pre-defined time scales and a focus on the lag 1 autocorrelation limits their generality in representing persistence.

Here we present the Frequency Bias Correction (FBC) as an alternative to the NBC, that aims to correct for biases in the spectral representation of the data. By focussing on the entire spectrum instead of a handful of time-scales allows a more comprehensive treatment of any persistence related biases that may exist in the GCM simulations being assessed. The FBC was tested for MIROC5 precipitation simulations across the Australian land mass and compared to the empirical quantile mapping (EQM) and RNBC in terms of its ability to maintain distribution and persistence related attributes. Results indicate that the FBC corrects distributional and dependence attributes relevant in hydrological design and operation of water storage systems.