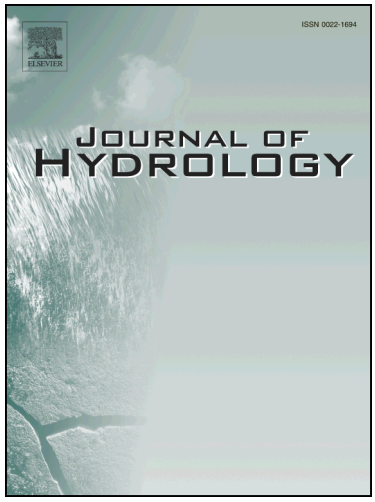

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Jingwan Li, Ashish Sharma, Jason Evans, Fiona Johnson

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Addressing the mischaracterization of extreme rainfall in Regional Climate Model simulations – A synoptic pattern based bias correction approach

Jingwan Li [a], Ashish Sharma [a], Jason Evans [b], and Fiona Johnson [a]

[a] School of Civil and Environmental Engineering, University of New South Wales, Sydney, New South Wales, Australia.

[b] Climate Change Research Centre and ARC Centre of Excellence for Climate System Science, School of Biological, Environmental and Earth Sciences, University of New South Wales, Sydney, New South Wales, Australia.

Corresponding author: Ashish Sharma, School of Civil and Environmental Engineering, University of New South Wales, Sydney, New South Wales, 2052, Australia. (a.sharma@unsw.edu.au).

Abstract

Addressing systematic biases in Regional Climate Model simulations of extreme rainfall is a necessary first step before assessing changes in future rainfall extremes. Commonly used bias correction methods are designed to match statistics of the overall simulated rainfall with observations. This assumes that change in the mix of different types of extreme rainfall events (i.e. convective and non-convective) in a warmer climate is of little relevance in the estimation of overall change, an assumption that is not supported by empirical or physical evidence. This study proposes an alternative approach to account for the potential change of alternate rainfall types, characterized here by synoptic weather patterns (SPs) using self-organizing maps classification. The objective of this study is to evaluate the added influence of SPs on the bias correction, which is achieved by comparing the corrected distribution of future extreme rainfall with that using conventional quantile-quantile mapping. A comprehensive synthetic experiment is first defined to investigate the conditions under which