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Assessing the performance of Regional Flood Frequency Analysis methods in South Africa

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The use of a Regional Flood Frequency Analysis (RFFA) approach improves the accuracy and reliability of estimates of design floods. However, no RFFA method is currently widely used in South Africa; despite a number of RFFA studies having been undertaken which include South Africa. Hence, the performance of the current RFFA approaches needs to be assessed in order to determine the best approaches to use and to determine if a new RFFA approach needs to be developed for use in South Africa. Through a review of the relevant literature it was found that the Meigh et al. (1997) Method, the Mkhandi et al. (2000) Method, the Görgens (2007) Joint Peak-Volume (JPV) Method, which uses a K-Region regionalisation, as well as a Veld zone regionalisation, and the Haile (2011) Method are most suitable for application in a nationwide study. Each regional approach was assessed by comparing the design flood estimated using the methods with those estimated from an at-site flood frequency analysis of the observed flood data. The results of the study show that the Haile Method generally performs better than the other RFFA methods, however it also consistently under-estimates. In response to the generally poor performance of the RFFA methods assessed in this study, it has been recommended that a new method be developed for application in design flood practice in South Africa.