

Stochastic Disaggregation of Daily Rainfall for Fine Timescale Design Storms

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ABSTRACT

Rainfall data are usually gathered at daily timescales due to the availability of daily rain-gauges throughout the world. However, rainfall data at fine timescale are required for certain hydrologic modellings such as crop simulation modelling, erosion modelling etc. Limited availability of such data leads to the option of daily rainfall disaggregation. This research investigates the use of a stochastic rainfall disaggregation model on a regional basis to disaggregate daily rainfall into any desired fine timescale in the State of Queensland, Australia. With the incorporation of seasonality into the variance relationship and capping of the fine timescale maximum intensities, the model was found to be a useful tool for disaggregating daily rainfall in the regions of Queensland. The degree of model complexity in terms of binary chain parameter calibration was also reduced by using only three parameters for Queensland. The resulting rainfall Intensity-Frequency-Duration (IFD) curves better predicted the intensities at fine timescale durations compared with the existing Australian Rainfall and Runoff (ARR) approach. The model has also been linked to the SILO Data Drill synthetic data to disaggregate daily rainfall at sites where limited or no fine timescale observed data are available. This research has analysed the fine timescale rainfall properties at various sites in Queensland and established sufficient confidence in using the model for Queensland.

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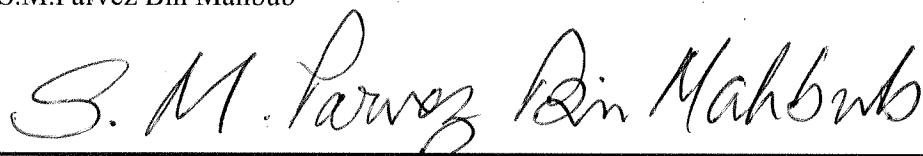
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DECLARATION OF AUTHENTICITY

To my knowledge, this thesis is an original work and has not been published by any other source. References to publications used to support the development of this thesis have been made as required.

S.M.Parvez Bin Mahbub



LITERATURE PUBLISHED RELATED TO THIS THESIS

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