



CHAPTER 5

CONTINUOUS RAINFALL SEQUENCES

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OUTLINE

- Rainfall data preparation
- Rainfall generation background
- Methods and recommendations for generation of point daily rainfall
- Methods and recommendations for generation of point sub-daily rainfall
- Extensions to multiple locations



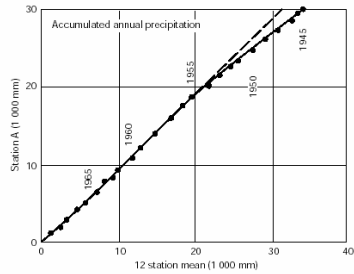
RAINFALL DATA PREPARATION

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RAINFALL DATA PREPARATION

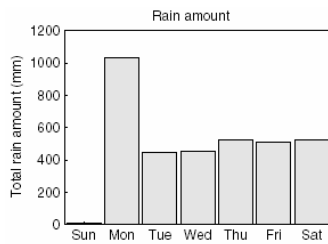
Checking for errors in rainfall data





RAINFALL DATA PREPARATION

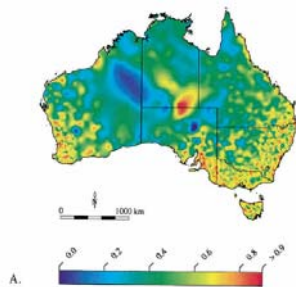
Types of errors in rainfall data





RAINFALL DATA PREPARATION

Alternatives for locations with no rainfall measurements - SILO



Average Coefficient of Determination of daily SILO interpolated rainfall.



RAINFALL GENERATION BACKGROUND

Table 5.x.x – Alternatives for representing seasonal variations in generated series

Alternatives	Description	Examples
Seasonally constant parameters	Parameters remain constant for all days of season, estimated using entire seasonal sub-sample	TPM (see 5.x.x)
Moving window representation	Parameters estimated on a daily basis using a sample of observations falling within moving window of fixed width	ROG-RAG (see 5.x.x)
Fourier series representation	Parameters expressed as functions of calendar day using multiple Fourier series with optimised wavelengths	DRIP (see 5.x.x)

Representation of seasonality



RAINFALL GENERATION BACKGROUND

Table 5.x.x – Alternatives for model parameter estimation

Method	Advantages	Limitations
Maximum Likelihood: Form a likelihood model as a function of model parameters. Estimate parameter set that maximises likelihood, or parameter joint posterior distribution if aim is to characterise uncertainty.	<ol style="list-style-type: none"> 1. Offers characterisation of both parameter and model uncertainty. 2. Reduced sensitivity to outliers depending on the nature of the likelihood model used. 3. Allows incorporation of prior knowledge on parameters, if available. 4. Has become simple to implement in recent years through advent of Markov Chain Monte Carlo (MCMC) methods. 	Increased complexity and interpretability.
Method of moments: Relate model parameters to sample moments and solve for unknowns	Simple to understand and implement	<ol style="list-style-type: none"> 1. Can be sensitive to outliers. 2. Parameter or model uncertainty not directly accountable.

Parameter estimation issues



BASIS FOR RECOMMENDATIONS

- Statistical representation at sub-daily / daily / monthly scales
- Unbiased representation of IFD curves
- Unbiased representation of antecedent (pre-storm) rainfall characteristics
- Simplicity of application



RAINFALL GENERATION MODELS

Considerable emphasis in description of sub-daily generation models

- 5.4.2 Sub-daily rainfall data generation models
- 5.4.2.1 DRIP model
- 5.4.2.2 NSRP and BLRP models
- 5.4.2.3 Daily to hourly disaggregation model
- 5.4.2.4 Daily to sub-daily fragments based disaggregation model



RAINFALL GENERATION MODELS

Mention of feasible alternatives for multisite generation

- 5.4.3 Multi-site daily rainfall data generation models
- 5.4.3.1 Multi-site two-part daily model
- 5.4.3.2 Random cascade daily model
- 5.4.3.3 Nonparametric knn daily model
