



Climatic Research Unit Weather Generator

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Model

Primary generated variable:

Precipitation (mm)

Secondary generated variables:

Minimum temperature (degrees C)

Maximum temperature (degrees C)

Vapour pressure (hPa)

Wind speed (ms^{-1})

Sunshine duration (hours)

Calculated variables:

Relative humidity (%)

Reference potential evapotranspiration (mm day^{-1})

Sites



Model

- Daily values for the primary and secondary variables are generated from formulae with parameters fitted to observed data.
- Observed data 1961-90
- The precipitation distribution is represented by the incomplete Gamma function and fitted using two parameters γ and β .

Model

Transition types

- All fitting parameters are calculated by half month and by transition type.
 - **DD** dry day yesterday dry day today
 - **WW** wet day yesterday wet today
 - **DW** dry day yesterday wet today
 - **WD** wet day yesterday dry today

Model

Temperature mean and range

DD and WW

$$X_i = aX_{i-1} + \varepsilon$$

DW

$$X_i = aX_{i-1} + bP_i + \varepsilon$$

WD

$$X_i = aX_{i-1} + bP_{i-1} + \varepsilon$$

Temperature

- Use regression formula where X is either T or R and P is precipitation and ε is random.
- i and $i-1$ refer to today and yesterday.
- DD, WW, DW and WD are the type of transition.

Model

Vapour pressure, wind speed and sunshine hours.

$$X_i = aX_{i-1} + bT_i + cR_i + dP_i + \varepsilon$$

Other variables

- Use regression formula where X is either Vapour pressure, Wind speed or Sunshine hours.

Model

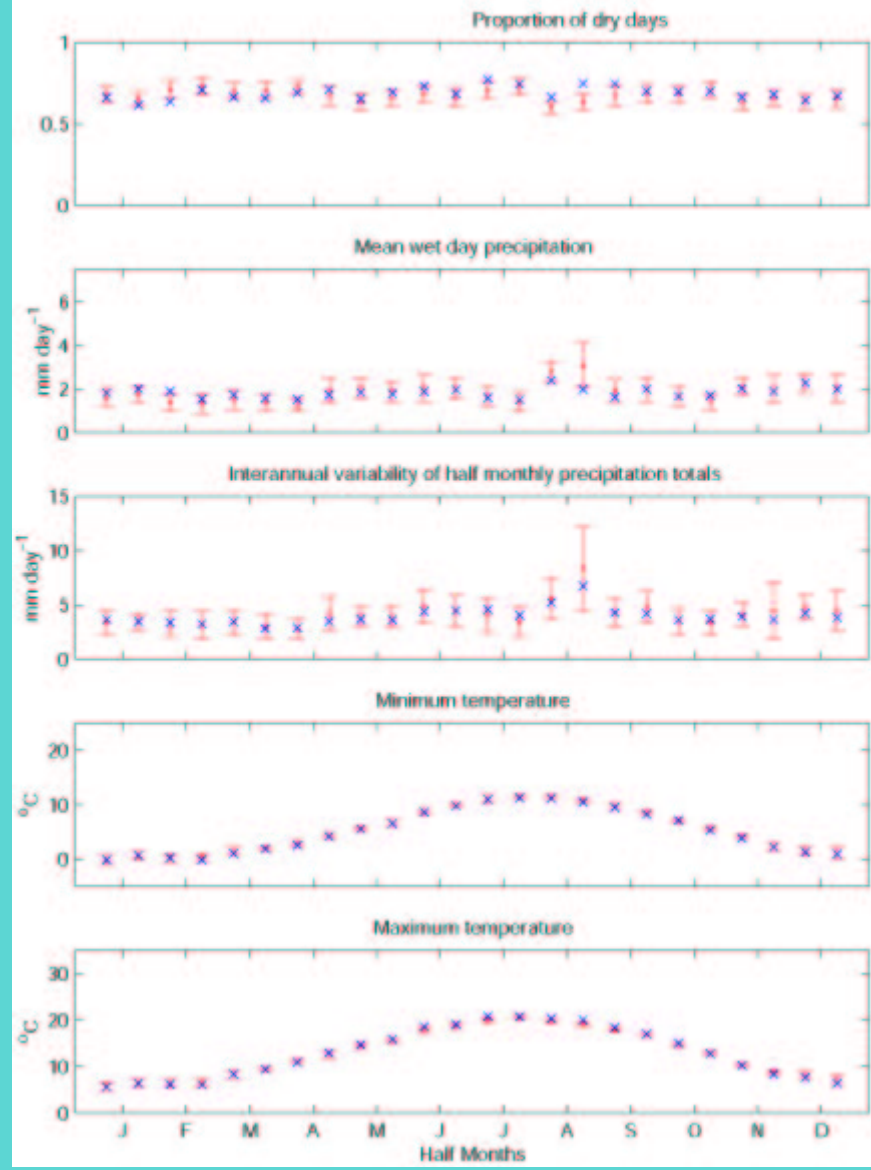
- Calculated Variables
 - Relative Humidity
 - PET (Penman-Monteith FAO)

Model

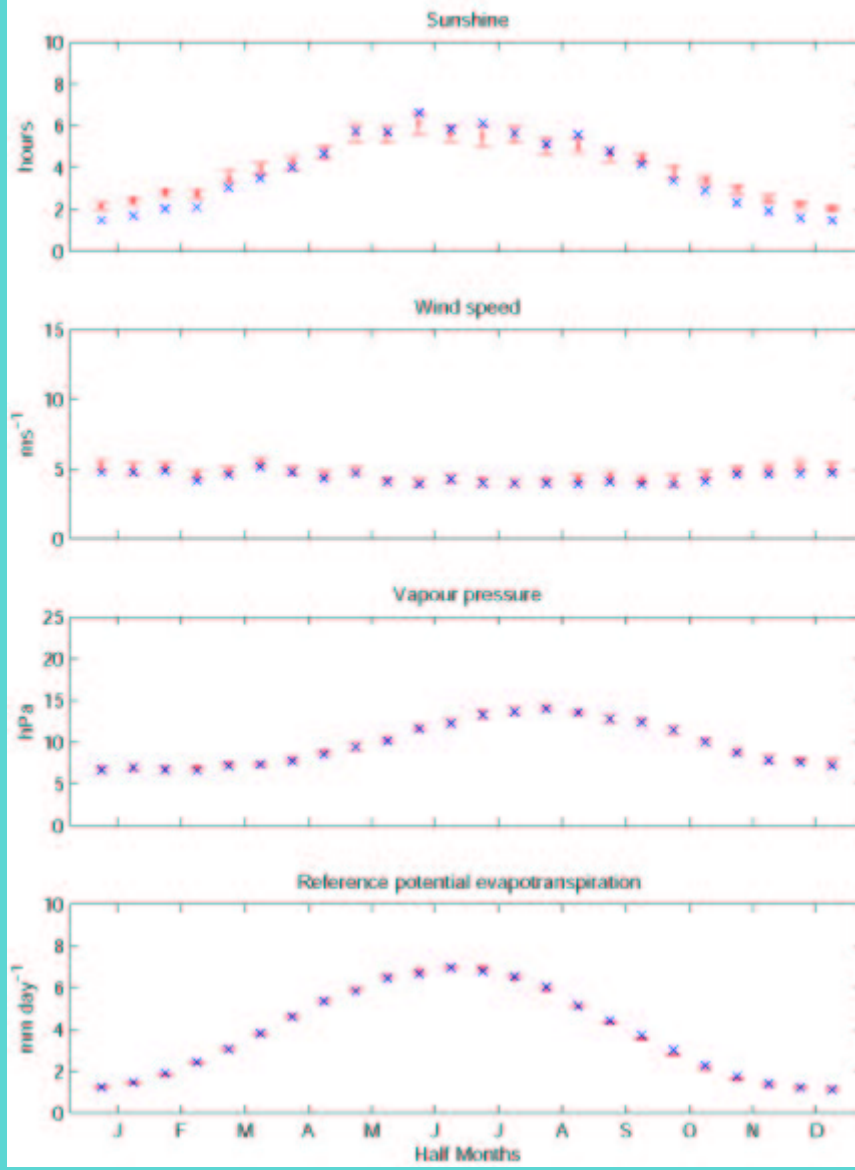
Output Variables

- Precipitation
- Maximum Temperature
- Minimum Temperature
- Vapour Pressure
- Relative Humidity
- Wind Speed
- Sunshine Hours
- Potential Evapotranspiration

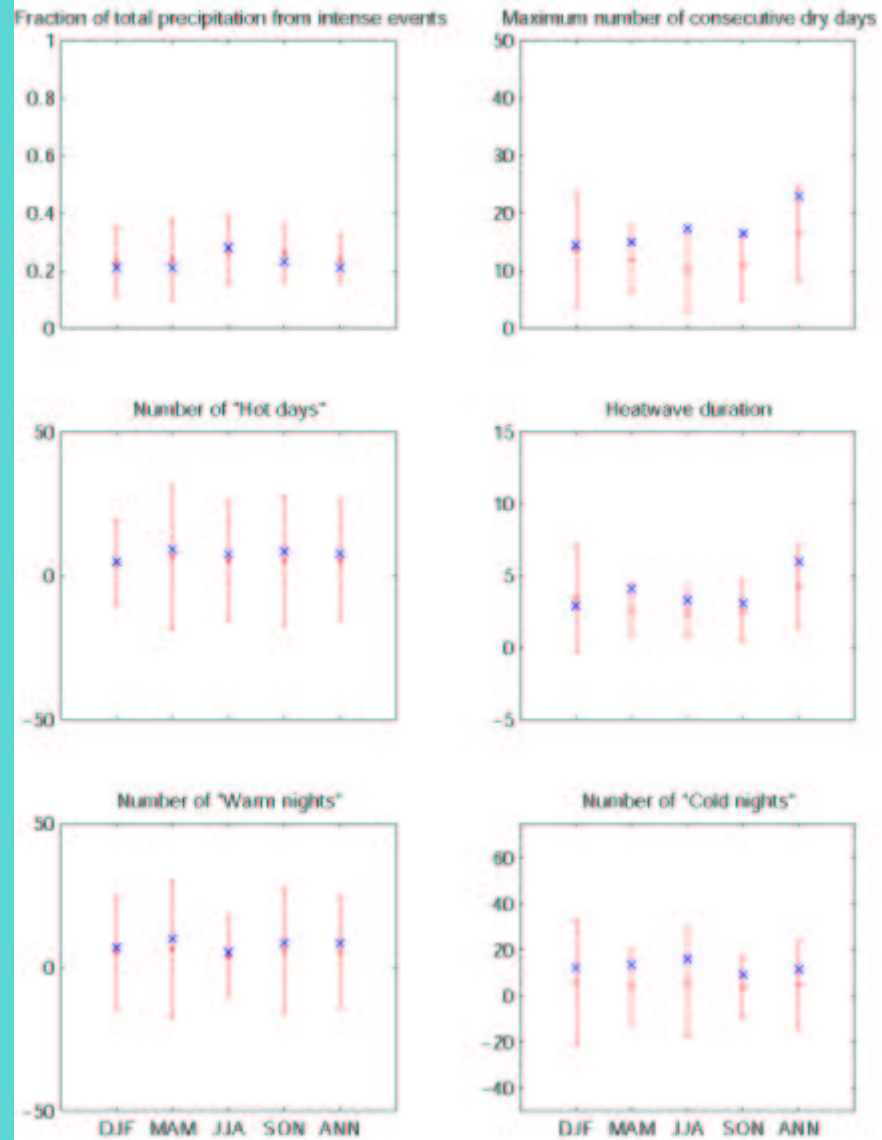
Elmdon (1961-90) Validation



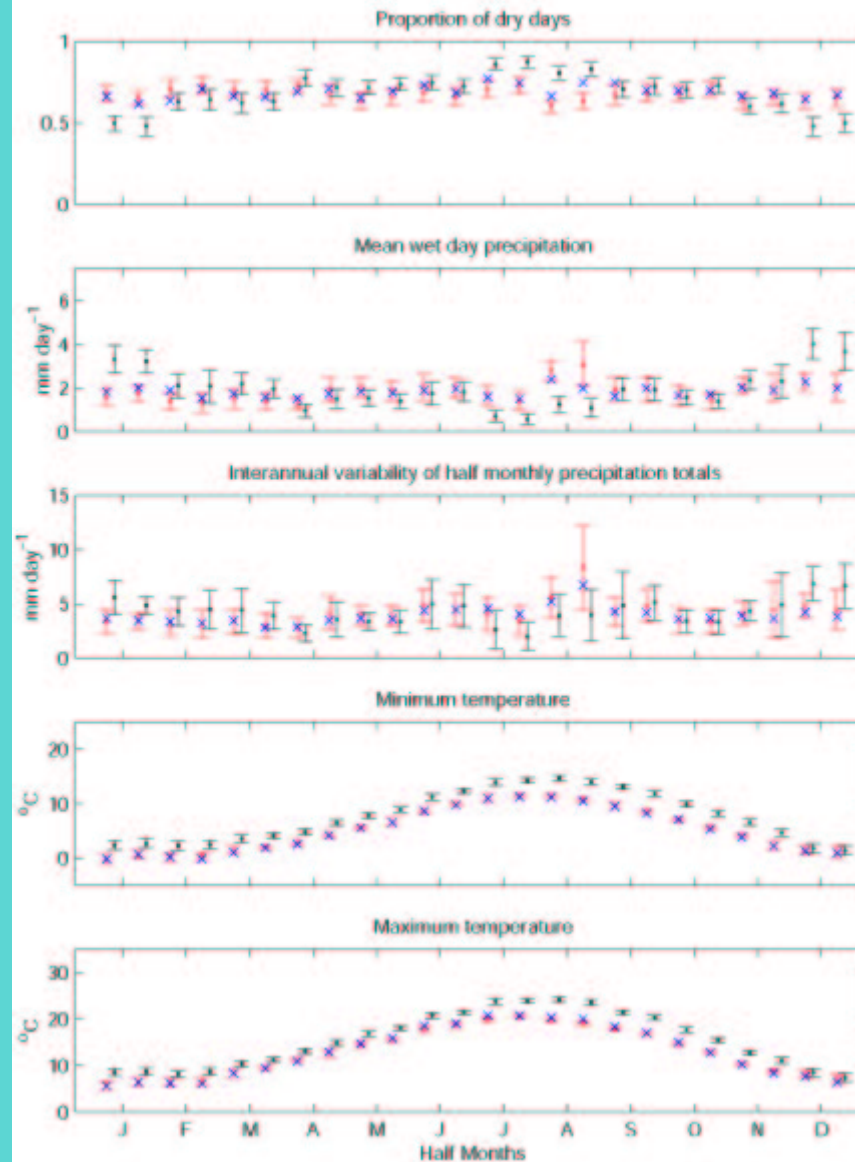
Elmdon (1961-90) Validation



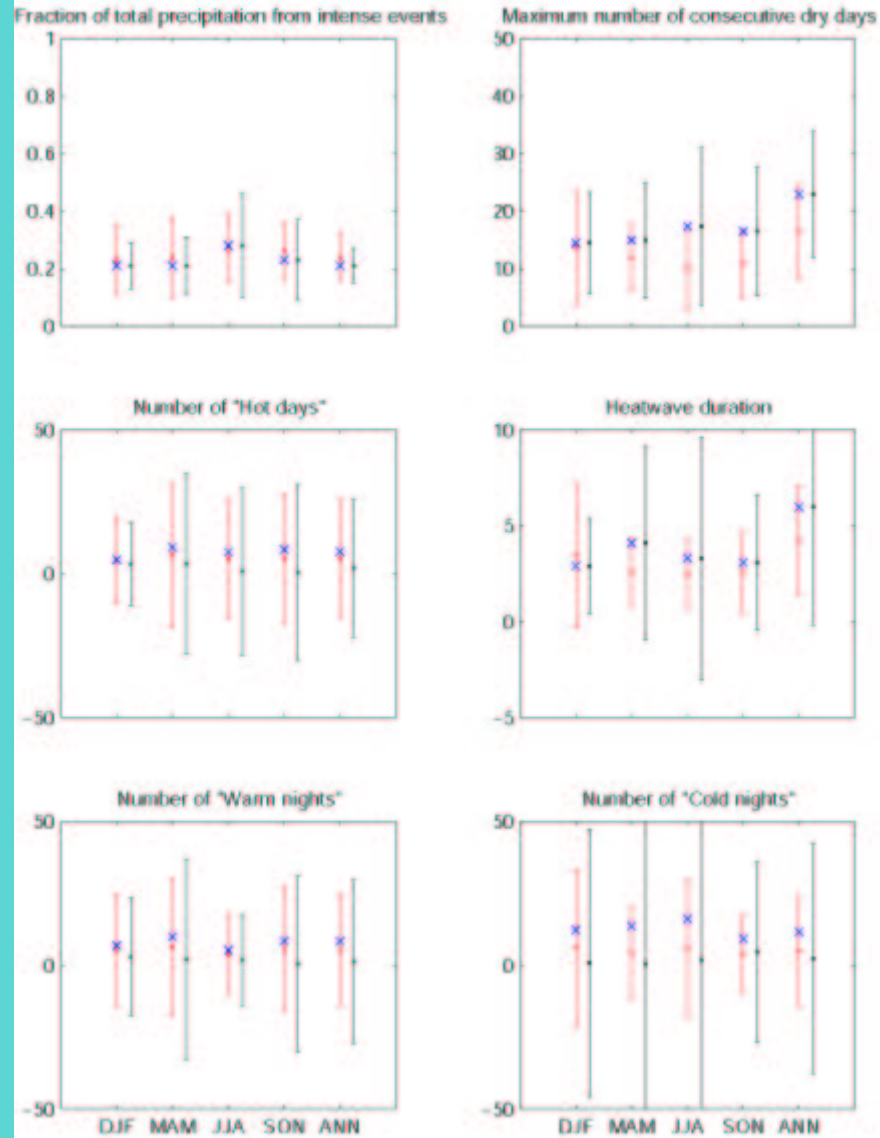
Elmdon (1961-90) Validation



Elmdon (2080-00) Perturbed



Elmdon (2080-00) Perturbed



Conclusions

- Complete sub-daily modification.
- Precipitation disaggregation
- Run model with Newcastle Precipitation data