HyDEF Project Report
Rglimclim update

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UCL

OUTLINE

- RGLIMCLIM PROGRESS
- MULTI-VARIATE MODELLING SPECIMEN RESULTS
  - Air pressure (Thames catchment)
  - Temperature (Thames catchment)
- NEXT STEPS

MODELLING STRATEGY

PRESSURE

↙ ↓ ↘

WIND → TEMPERATURE ↔ PRECIPITATION
(rainfall and snow)

↙ ↙ ↓ ↘

WET BULB TEMPERATURE | SW RADIATION | CLOUD COVER

Rglimclim

- R-package ready to be uploaded on R

- Implemented distribution choices:
  - Normal-heteroscedastic (e.g. pressure and temperature modelling)
  - Logistic regression (e.g. rainfall occurrence modelling)
  - Gamma distribution (e.g. rainfall amounts modelling)

Rglimclim

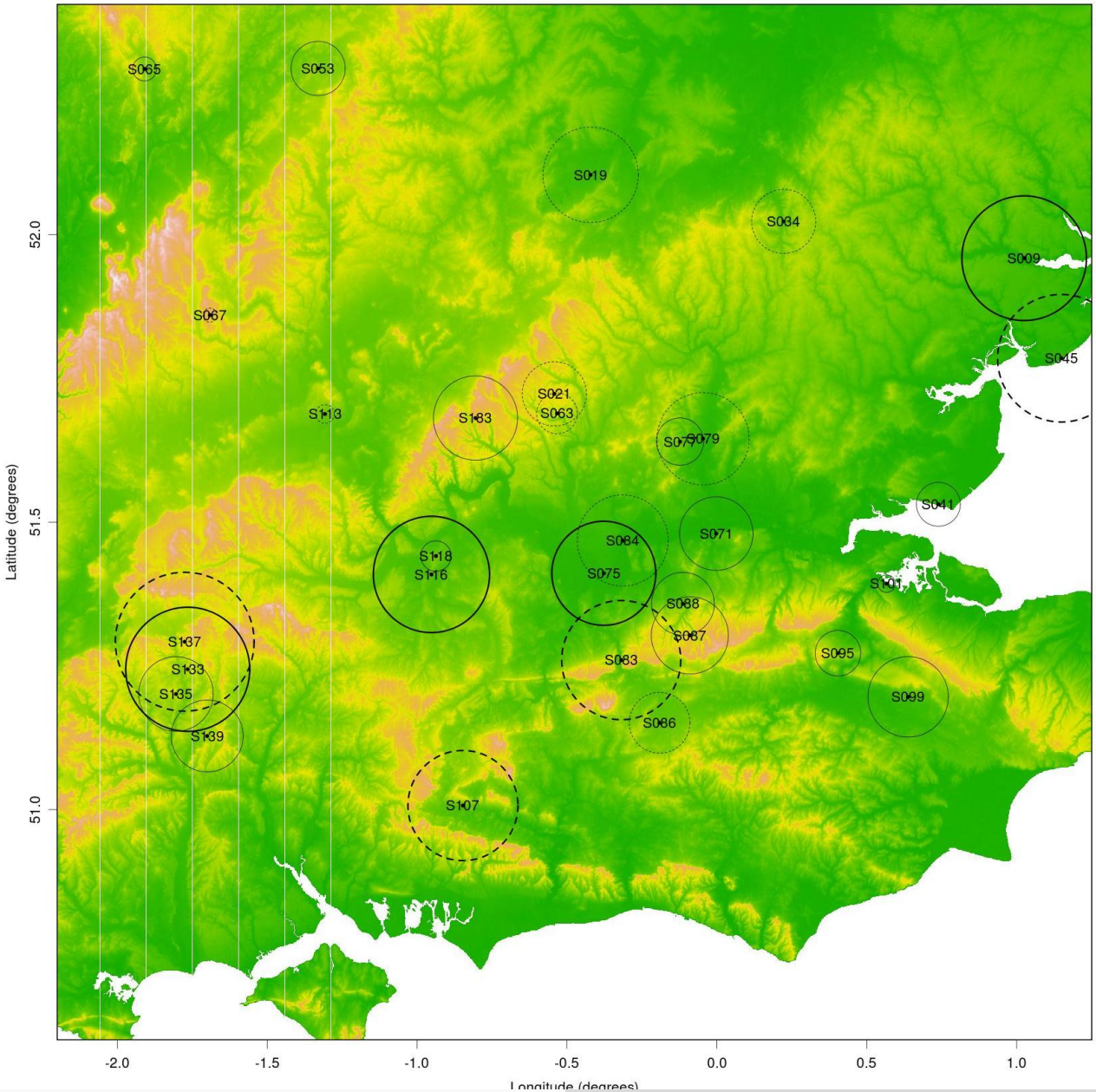
- multivariate extension allowing sequential modelling of multiple variables (e.g. daily local temperature dependent upon daily pressure)
- R-package working on both Windows and Linux operating systems
- built-in command for model comparison allowing selection among nexted models
- built-in command for residuals plotting (e.g. averaged over months, years or sites)

PRESSURE MODELLING (THAMES)

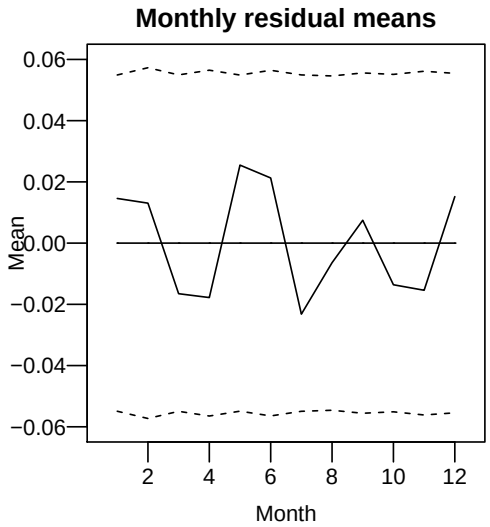
Significant covariates influencing pressure over the Thames domain:

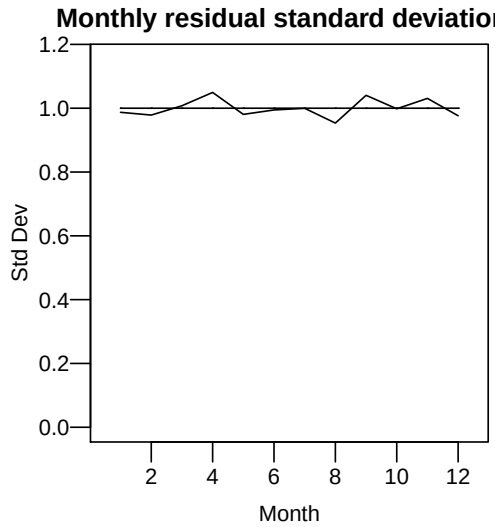
- GEOGRAPHICAL EFFECT: latitude, longitude (3 degree Legendre polynomials)
- SEASONAL CYCLE: 1-year cycle (Fourier basis)
- AUTOCORRELATION: 1 and 2 previous days pressure weighted average
- EXTERNAL FACTORS: large-scale pressure above the domain, AMO and atmospheric river index (from Reading Team)

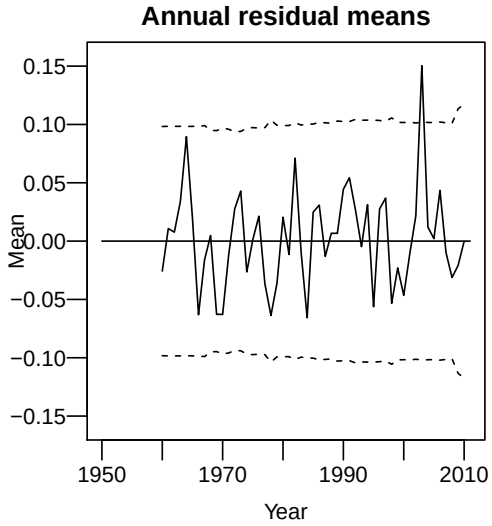
PRESSURE RESIDUAL CHECKS

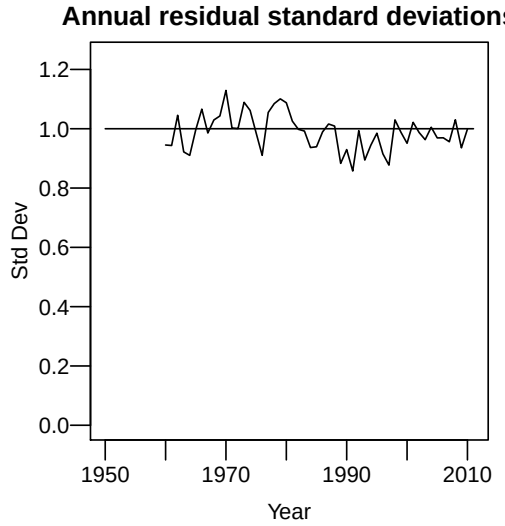


PRESSURE RESIDUAL CHECKS







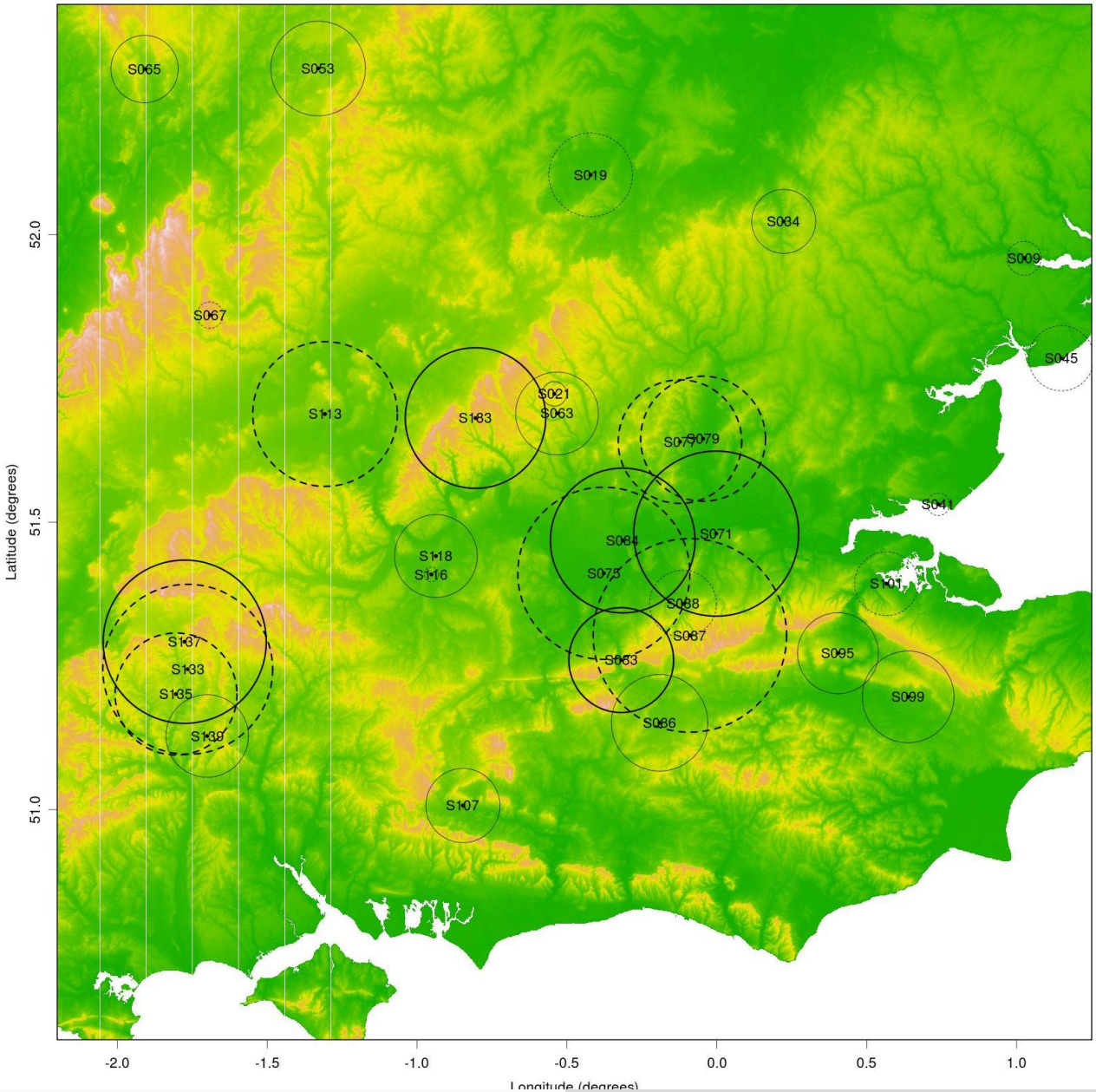


TEMPERATURE MODELLING (THAMES)

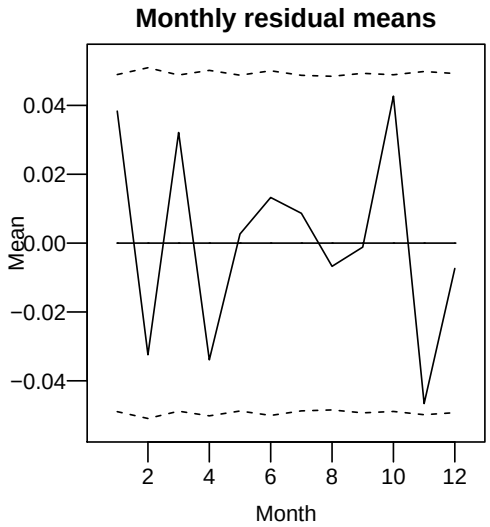
Significant covariates influencing pressure over the Thames domain:

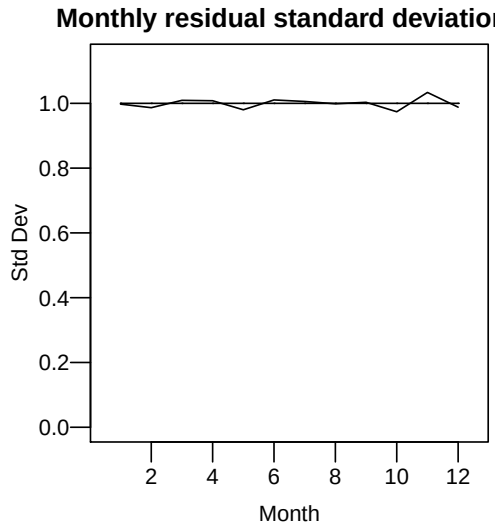
- GEOGRAPHICAL EFFECT: latitude, longitude (3 degree Legendre polynomials) and altitude
- SEASONAL CYCLE: 1- and half-year cycle (Fourier basis)
- AUTOCORRELATION: 1 previous day temperature weighted average
- EXTERNAL FACTORS: large-scale temperature above the domain and AMO

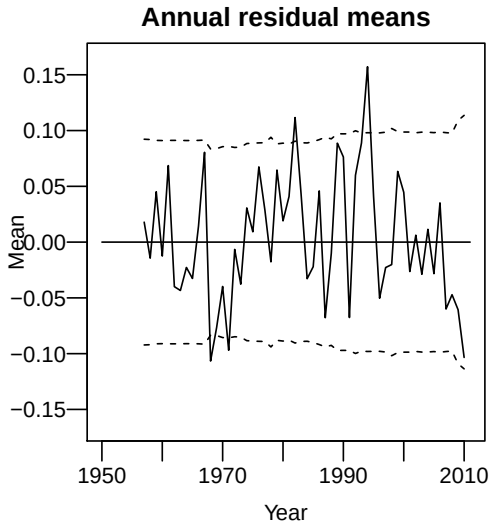
TEMPERATURE RESIDUAL CHECKS

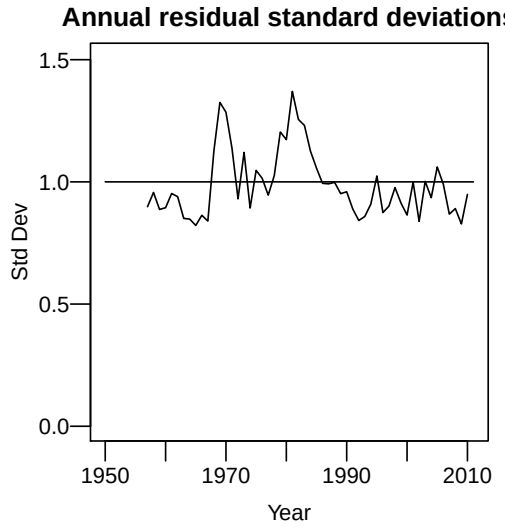


TEMPERATURE RESIDUAL CHECKS









IN PROGRESS

- Rainfall occurrence modelling
- Rainfall amounts modelling
- Finalising simulation code

THANK YOU FOR YOUR TIME!