HyDEF Project Report
Rglimclim update

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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
R-glimclim

- 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

Monthly residual means

Annual residual means

Monthly residual standard deviations

Annual residual standard deviations

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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

Monthly residual means

Year

Mean

1950 1970 1990 2010

0.0 0.5 1.0 1.5

Annual residual means

Year

Mean

1950 1970 1990 2010

-0.15 -0.10 -0.05 0.00 0.05 0.10 0.15

Monthly residual standard deviations

Month

Std Dev

2 4 6 8 10 12

0.0 0.2 0.4 0.6 0.8 1.0

Annual residual standard deviations

Year

Std Dev

1950 1970 1990 2010

0.0 0.5 1.0 1.5

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IN PROGRESS

• Rainfall occurrence modelling

• Rainfall amounts modelling

• Finalising simulation code
THANK YOU FOR YOUR TIME!