

Supplementary Material

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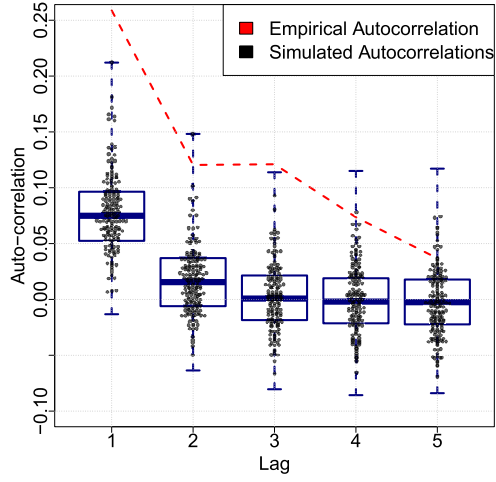
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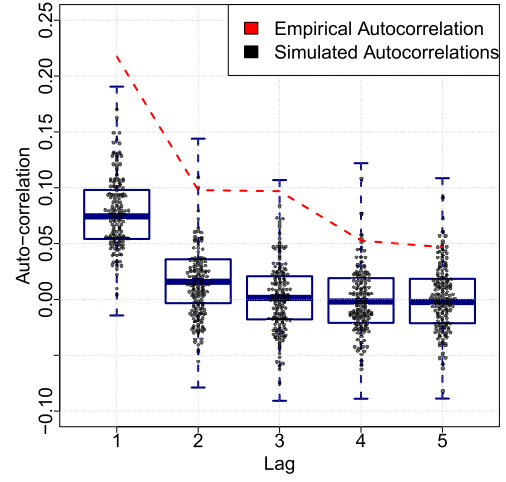
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Contributing authors: n.i.ramesh@greenwich.ac.uk; c.onof@imperial.ac.uk; i.yip@greenwich.ac.uk;

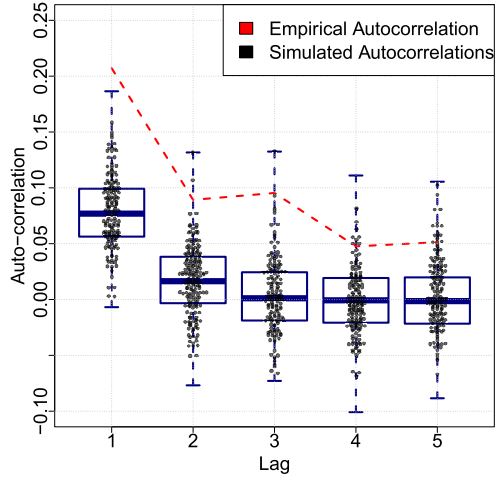
1 Figure 18: Autocorrelation Plots



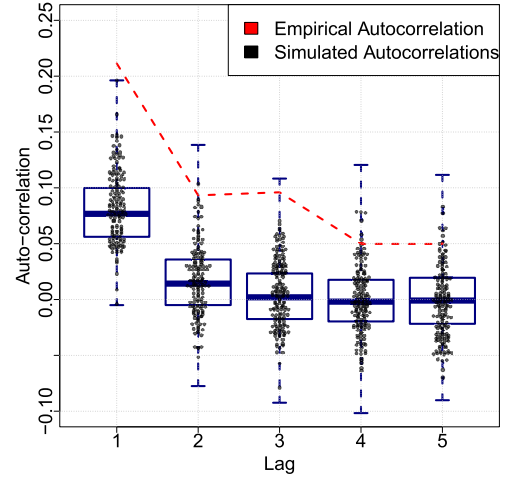
(a) Brent



(b) Pinn

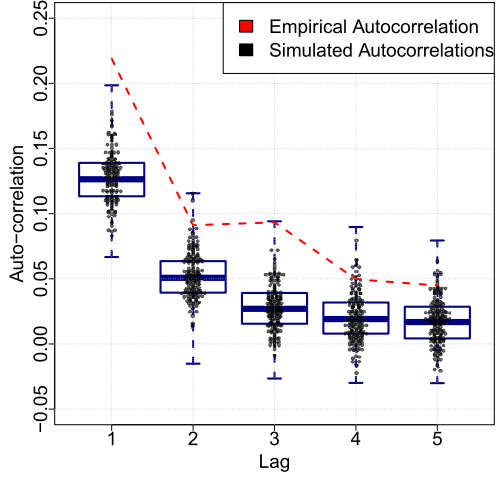


(c) Yeading East

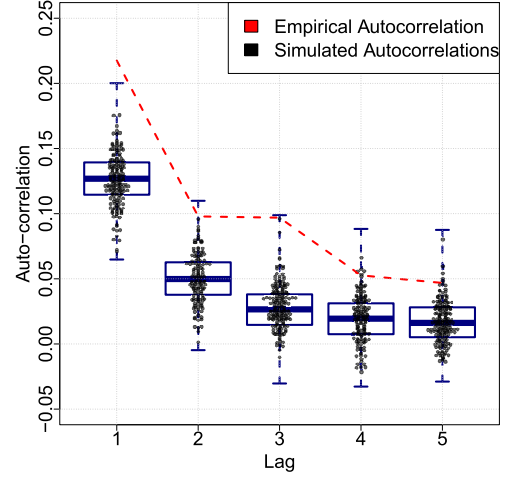


(d) Yeading West

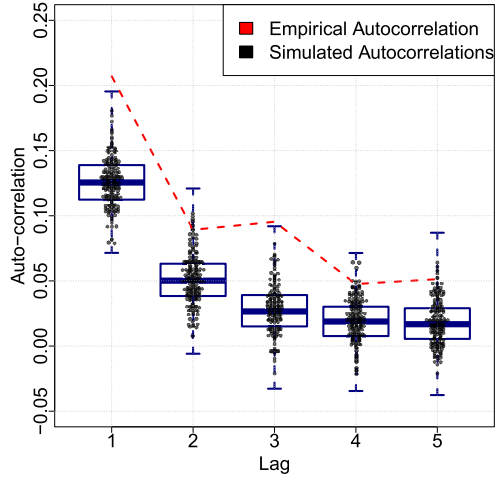
Fig. 1: Box plots comparing theoretical autocorrelation (with jittered black dots) from the M.HMM fit and empirical autocorrelation (red) for the yearly rainfall series at the four stations



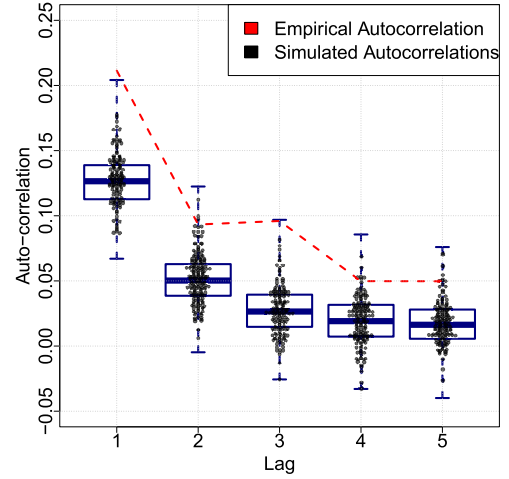
(a) Brent



(b) Pinn

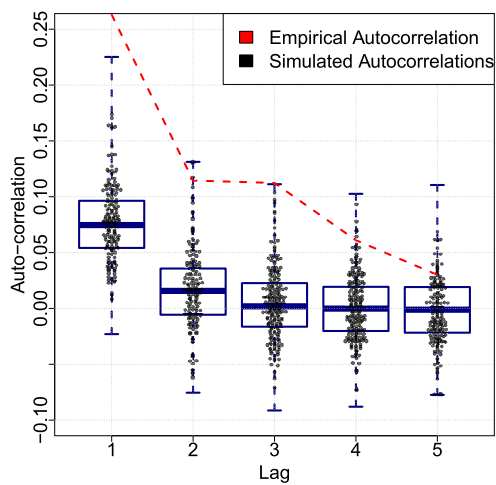


(c) Yeading East

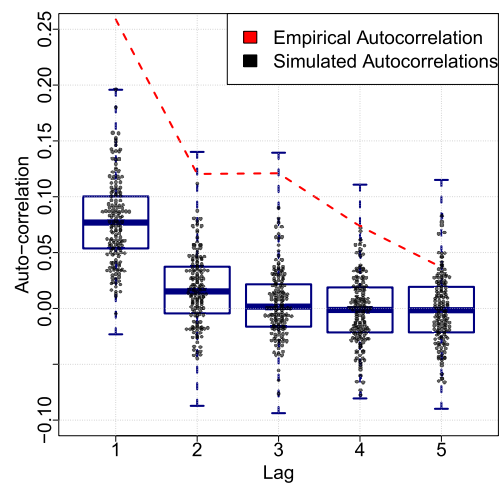


(d) Yeading West

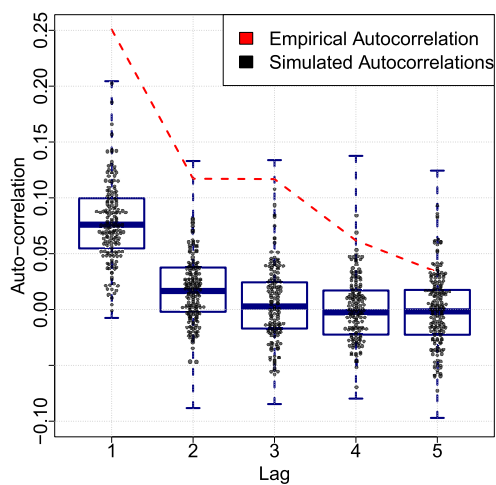
Fig. 2: Box plots comparing theoretical autocorrelation (with jittered black dots) from the MC.HMM fit and empirical autocorrelation (red) for the yearly rainfall series at the four stations



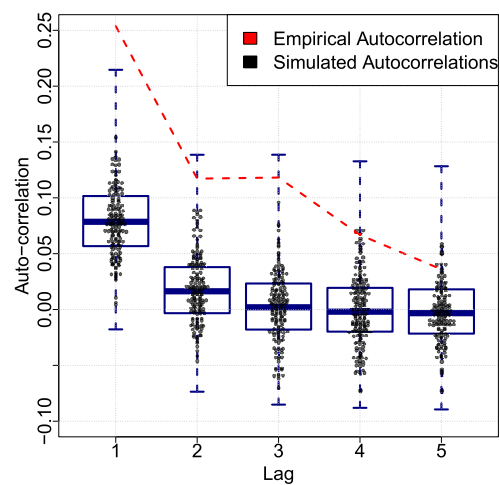
(a) Brent



(b) Pinn

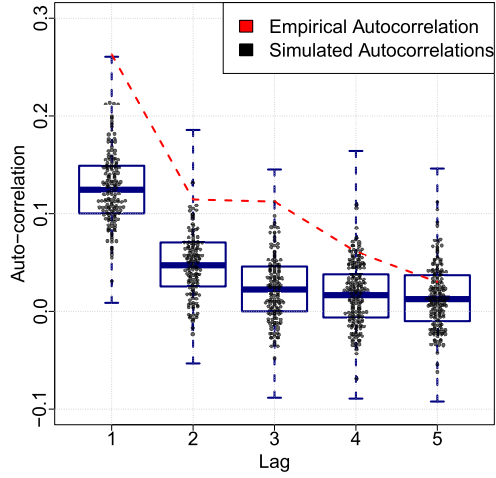


(c) Yeading East

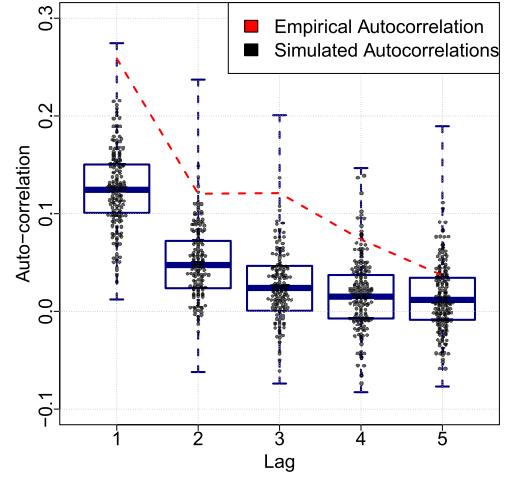


(d) Yeading West

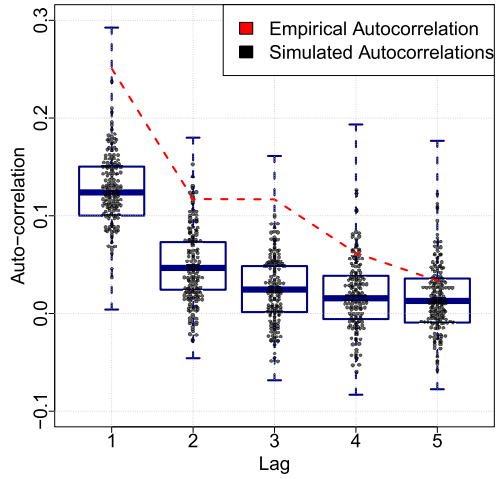
Fig. 3: Box plots comparing theoretical autocorrelation (with jittered black dots) from the M.HMM fit and empirical autocorrelation (red) for the seasonal rainfall series at the four stations



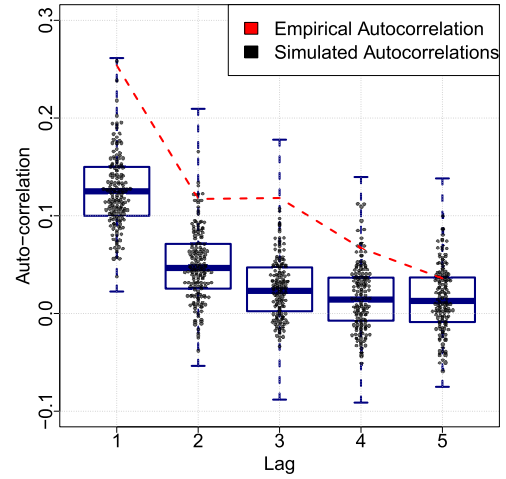
(a) Brent



(b) Pinn



(c) Yeading East



(d) Yeading West

Fig. 4: Box plots comparing theoretical autocorrelation (with jittered black dots) from the MC.HMM fit and empirical autocorrelation (red) for the seasonal rainfall series at the four stations

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Contributions

T.E.Chida: Writing first draft, Formal analysis, Investigation, and Model fitting with guidance from N.Ramesh and C.Onof.

N.Ramesh: Conceptualisation, Methodology, Writing and editing manuscript.

C.Onof: Methodology, Writing and editing manuscript.

I.Yip: Methodology, Writing and editing manuscript.

All authors read and approved the final manuscript.

Data Availability Statement

The daily precipitation dataset used in this study is available through the UK National River Flow Archive. The specific web addresses for each dataset are given below;

1. <https://nrfa.ceh.ac.uk/data/station/meanflow/39131>

2. <https://nrfa.ceh.ac.uk/data/station/meanflow/39137>

3. <https://nrfa.ceh.ac.uk/data/station/meanflow/39145>

4. <https://nrfa.ceh.ac.uk/data/station/meanflow/39098>

The covariates data can be accessed from,

5. <https://www.kaggle.com/datasets/emmanuelwerr/london-weather-data>

Competing interest

The authors have no relevant financial or non-financial interests to disclose.