

# Online Resource 01 - Supplementary appendix E

How does the temperature vary over time? Evidence on the Stationary and Fractal nature of  
Temperature Fluctuations

*John Dagsvik, Mariachiara Fortuna, Sigmund H. Moen*

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Mariachiara Fortuna, freelance statistician, Turin;

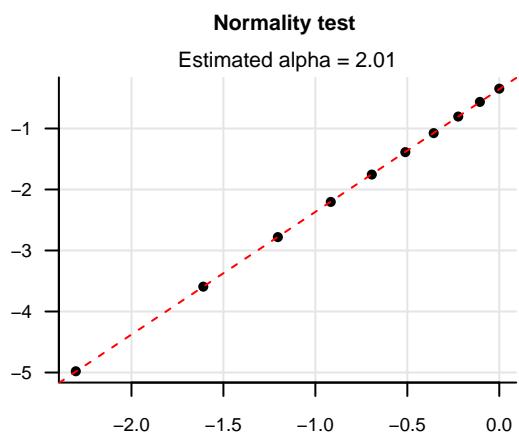
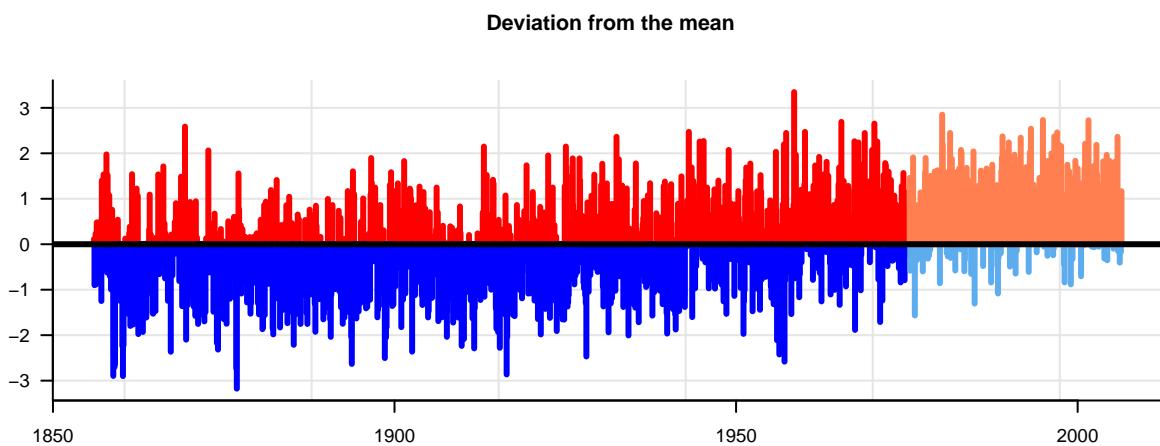
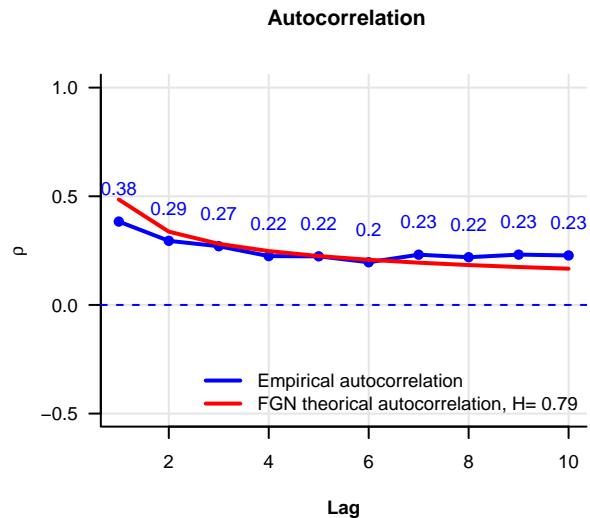
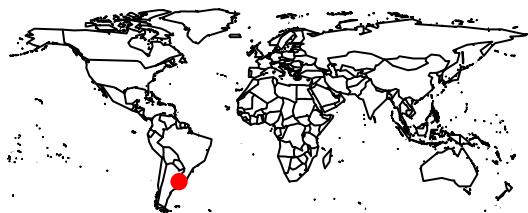
Sigmund Hov Moen, Westerdals Oslo School of Arts, Communication and Technology.

**Corresponding author:**

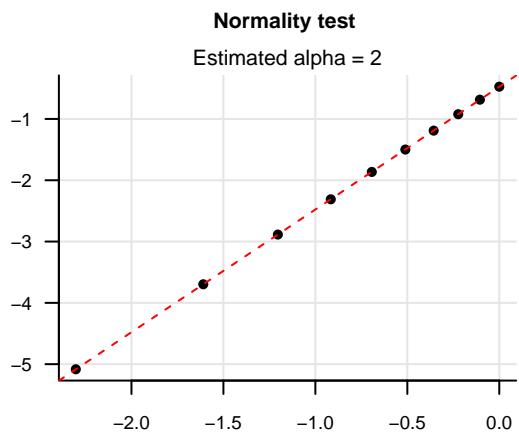
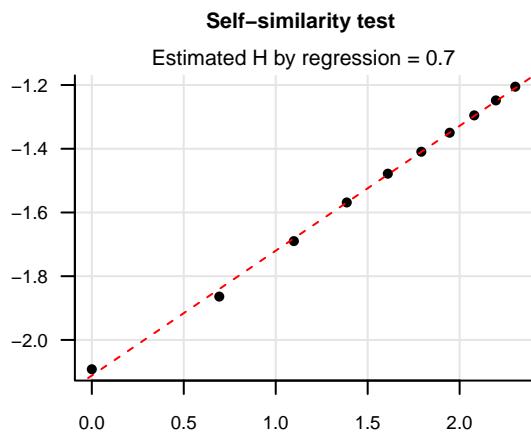
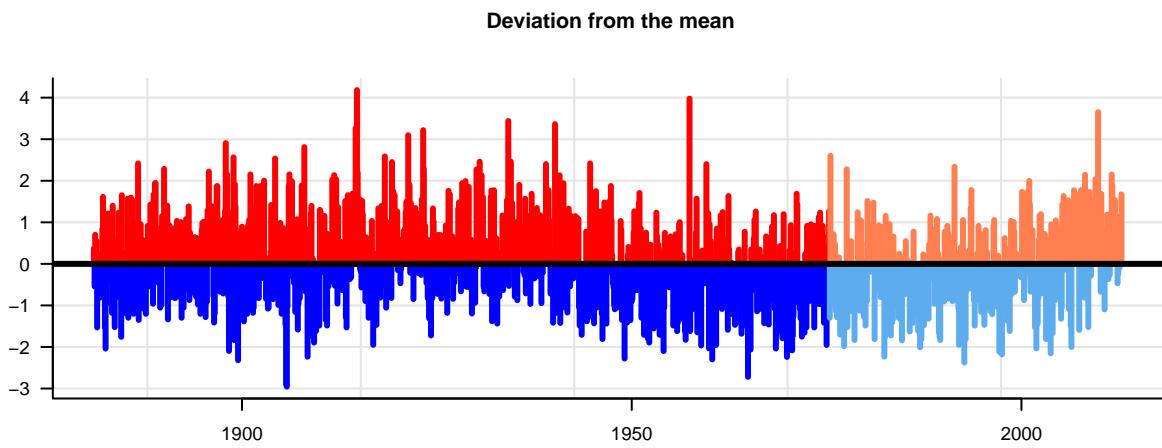
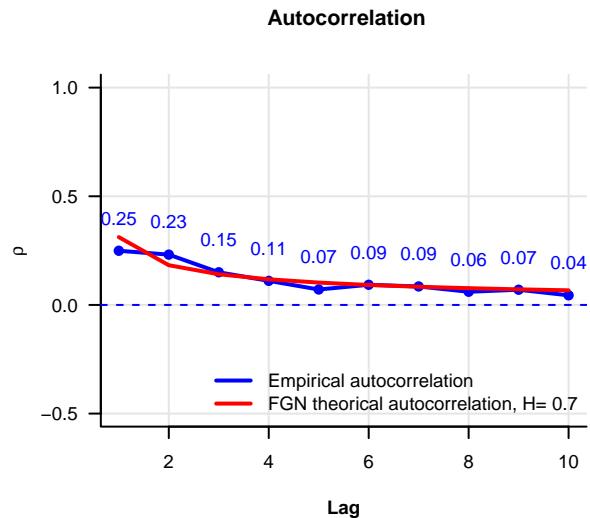
John K. Dagsvik, E-mail: john.dagsvik@ssb.no

Mariachiara Fortuna, E-mail: mariachiara.fortuna1@gmail.com (reference for code and analysis)

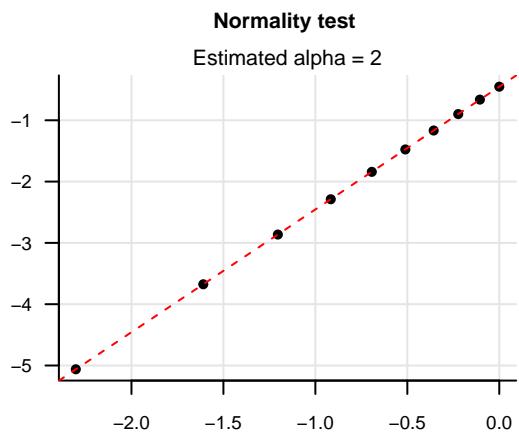
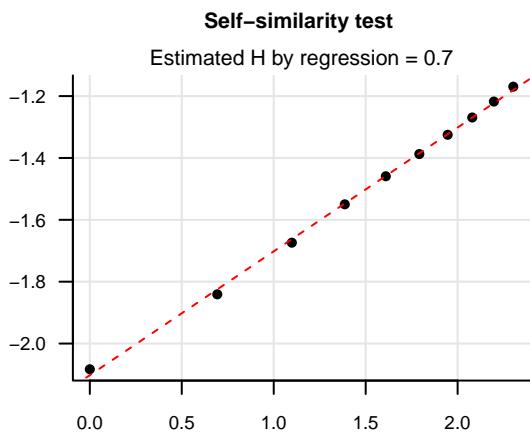
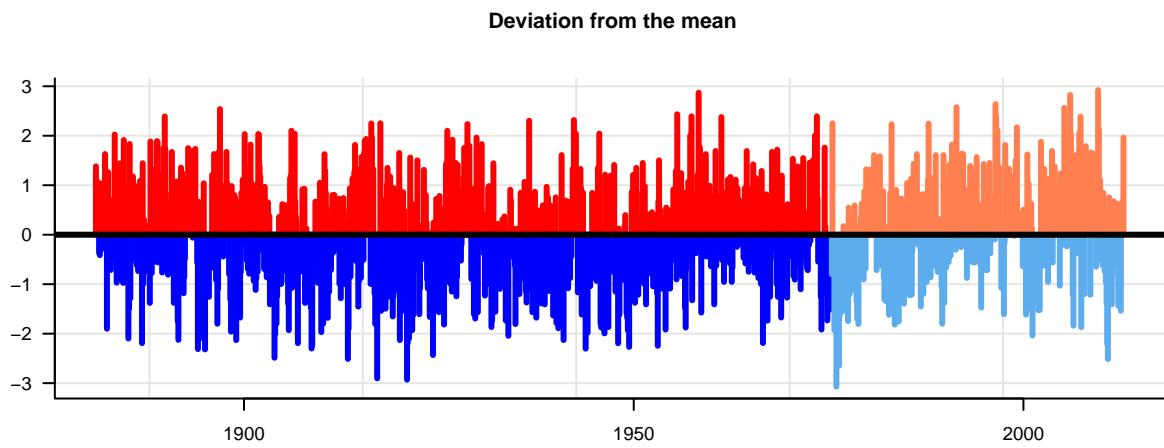
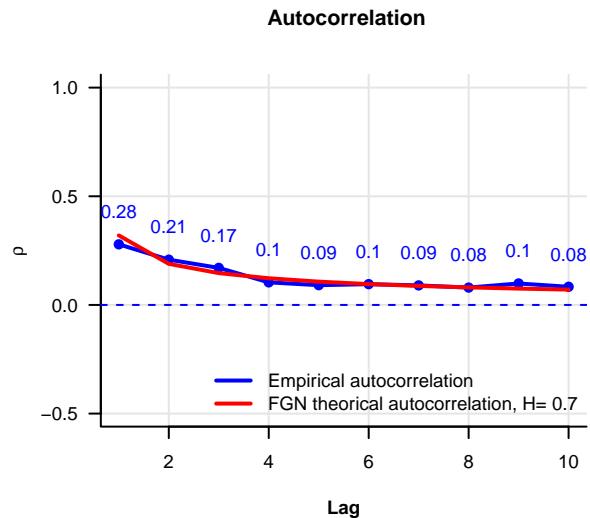
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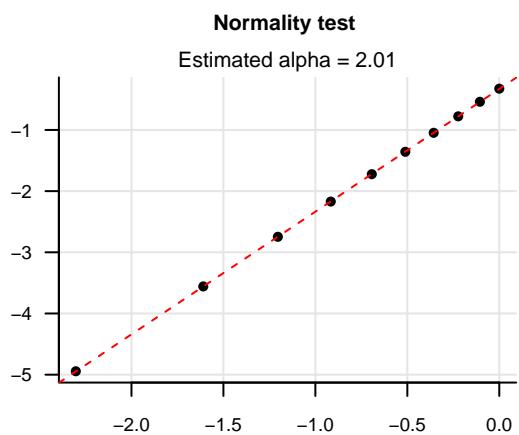
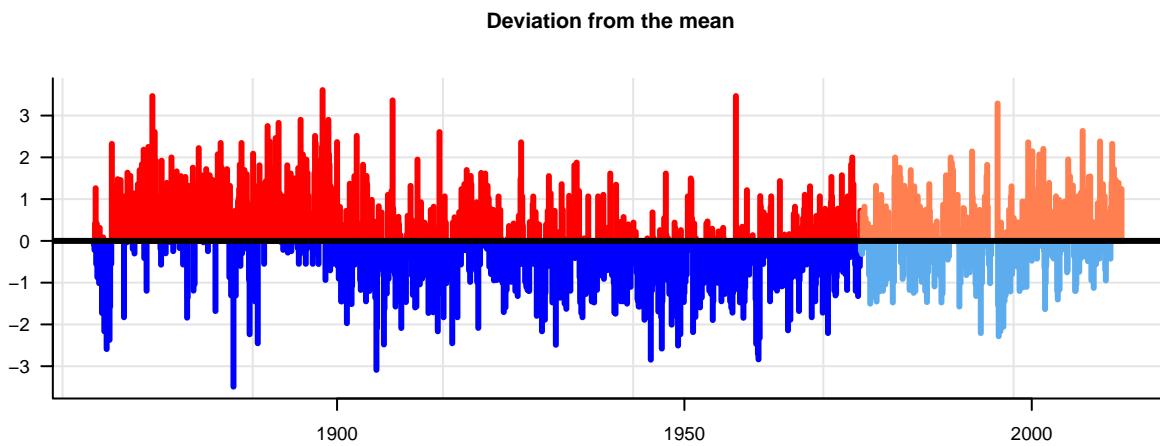
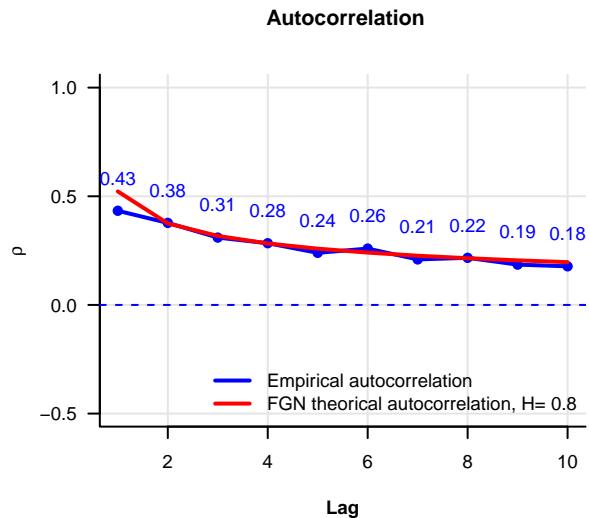
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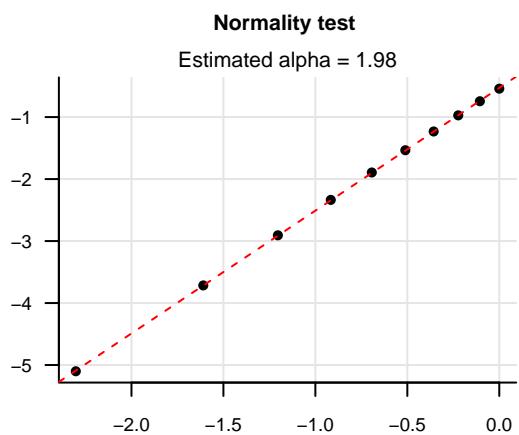
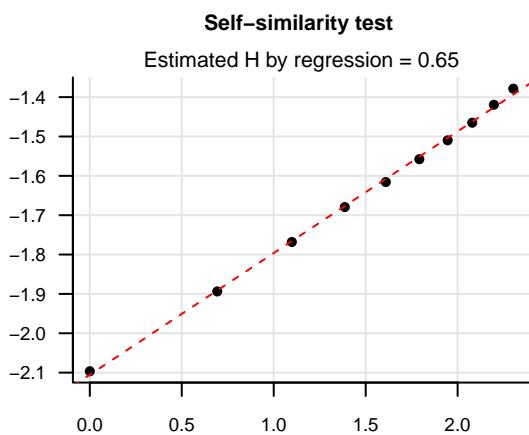
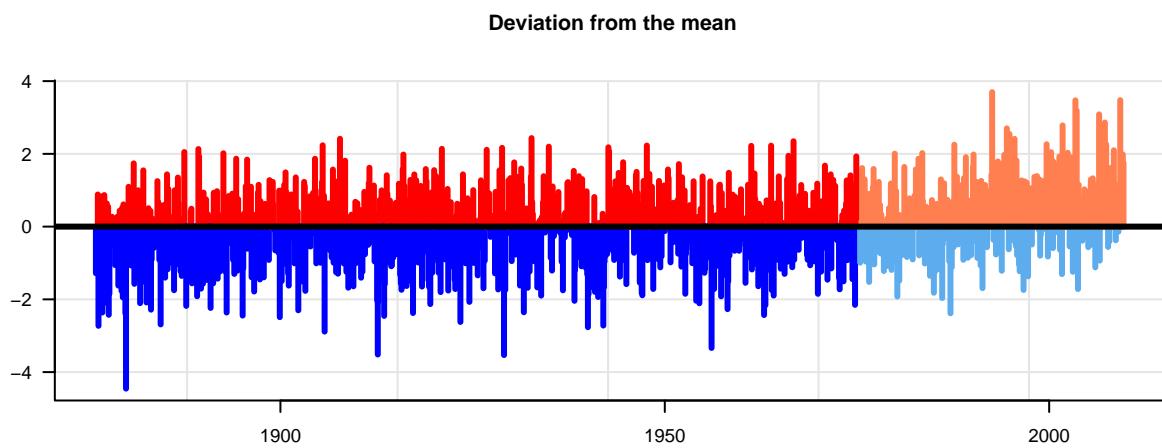
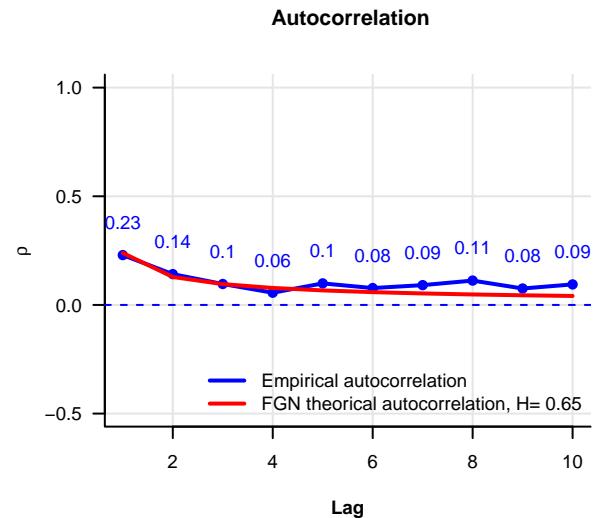
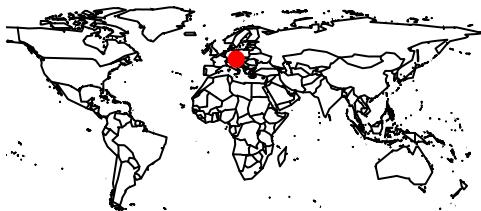
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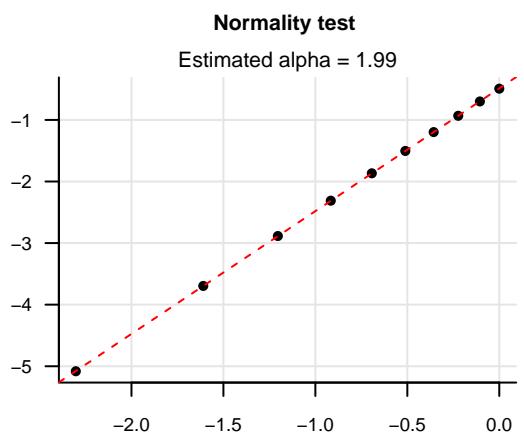
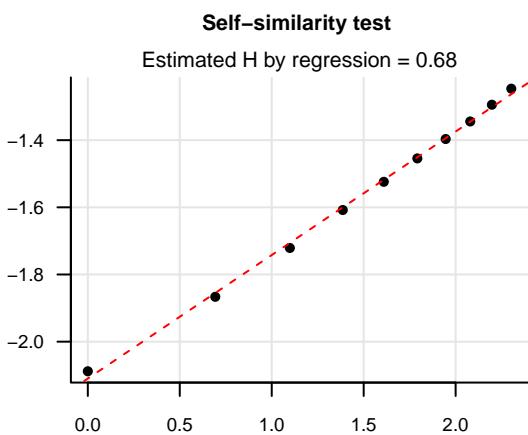
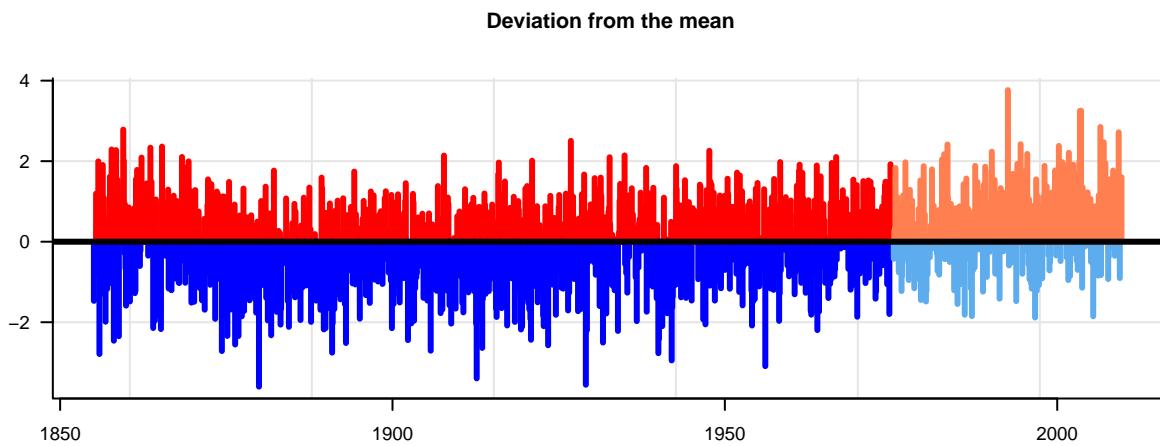
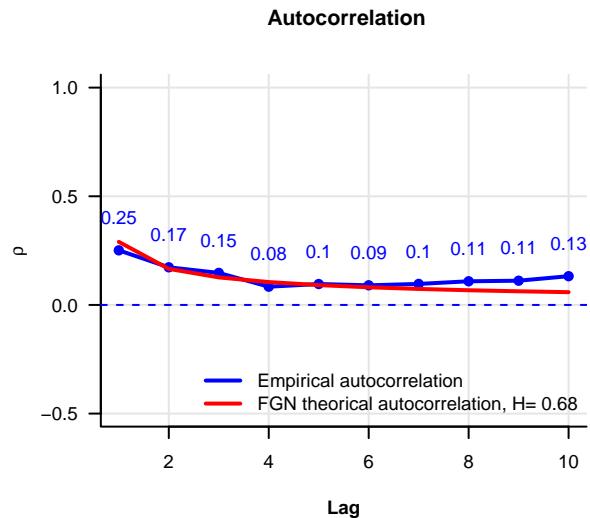
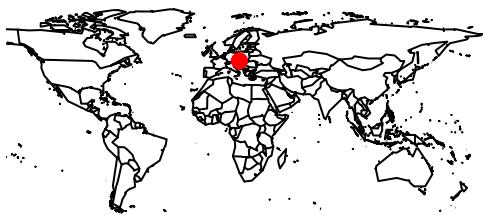
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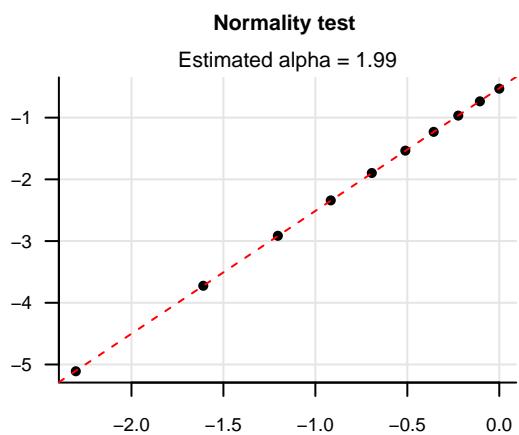
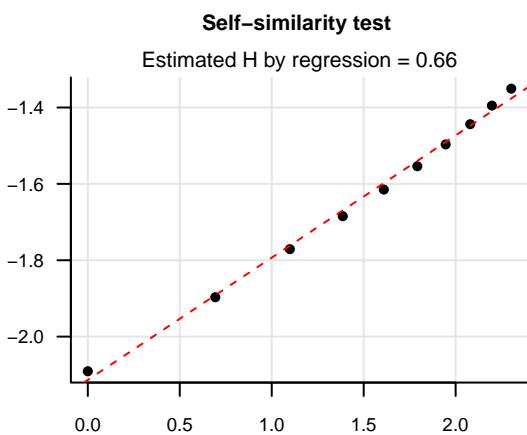
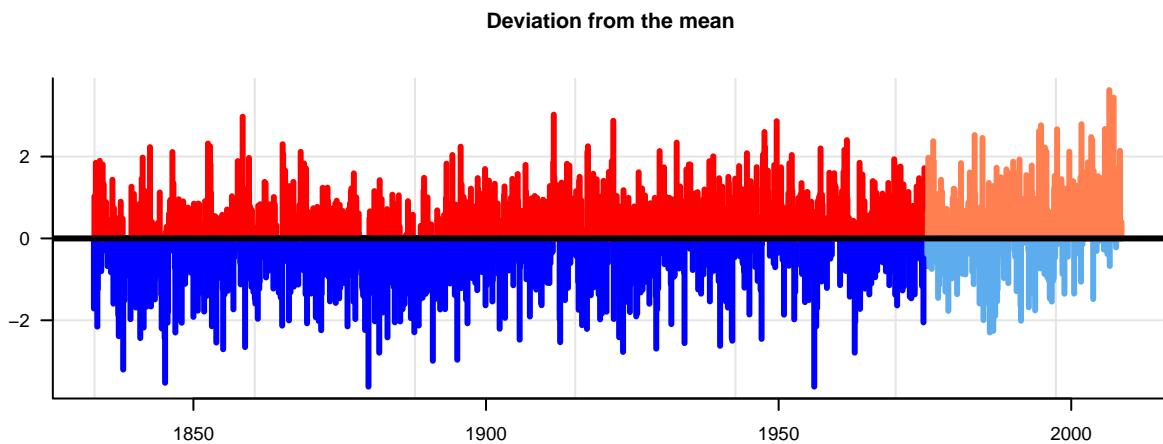
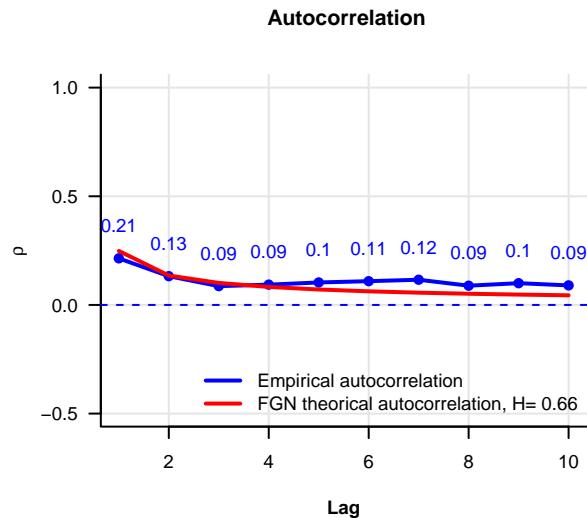
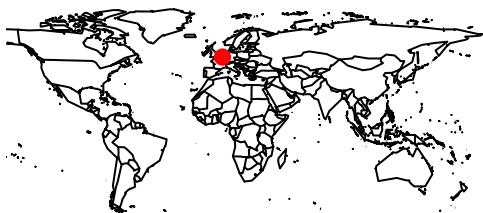
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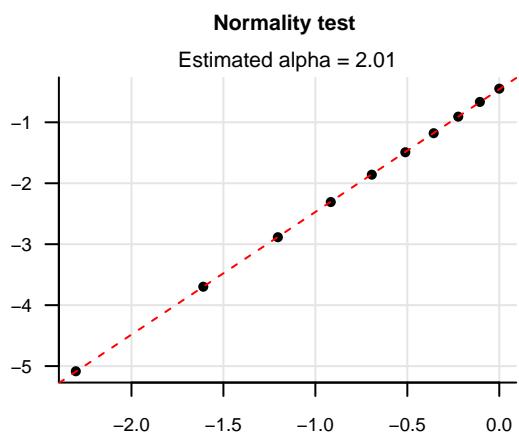
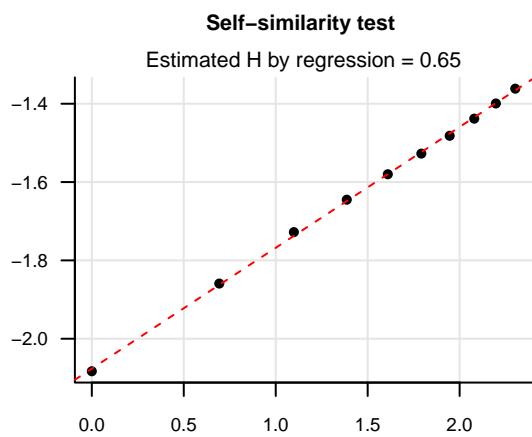
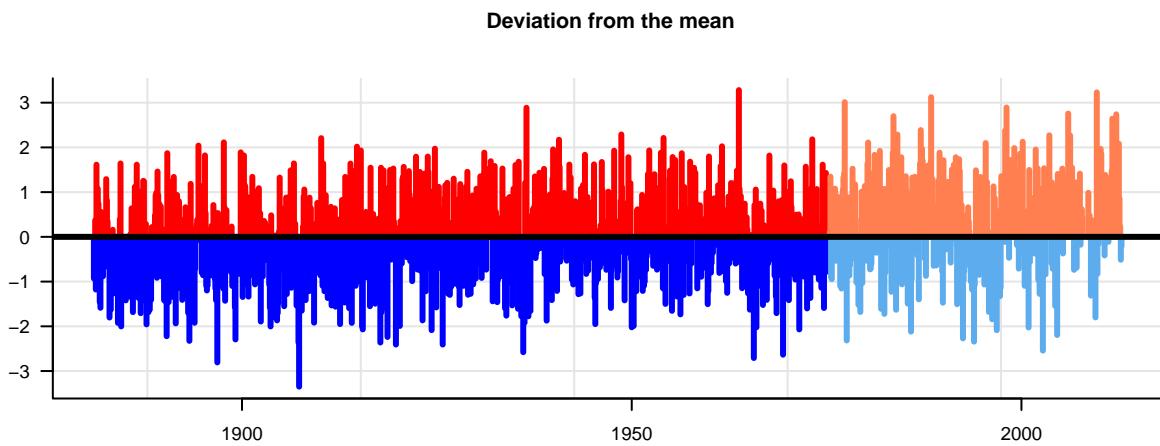
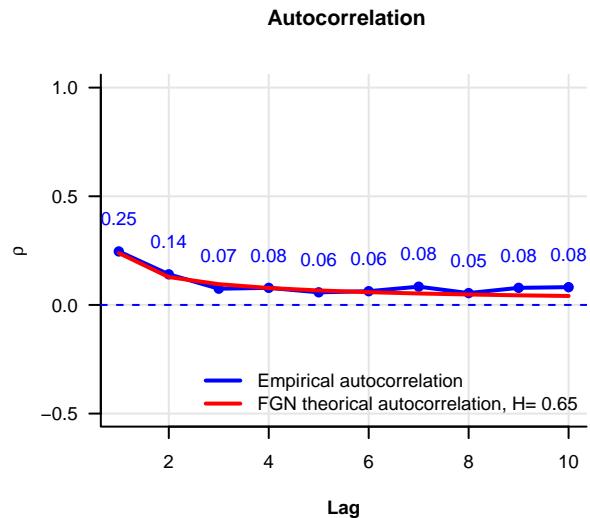
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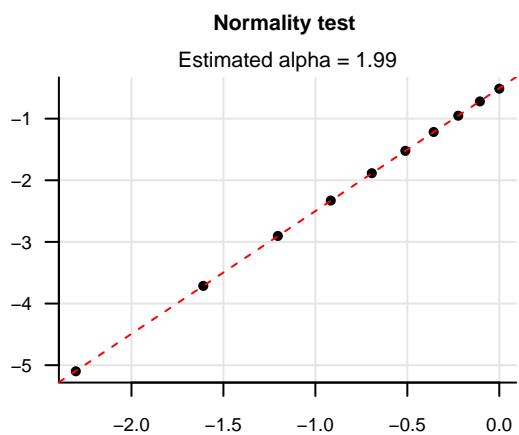
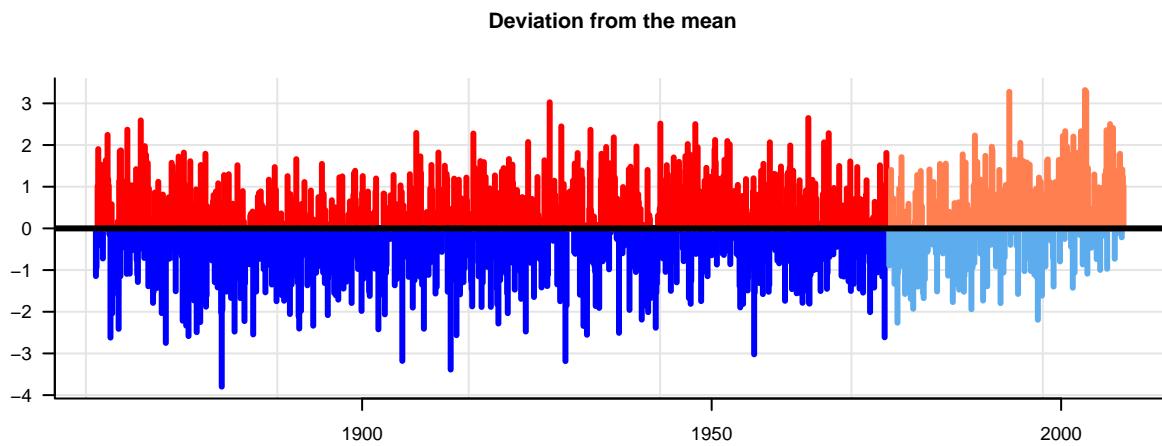
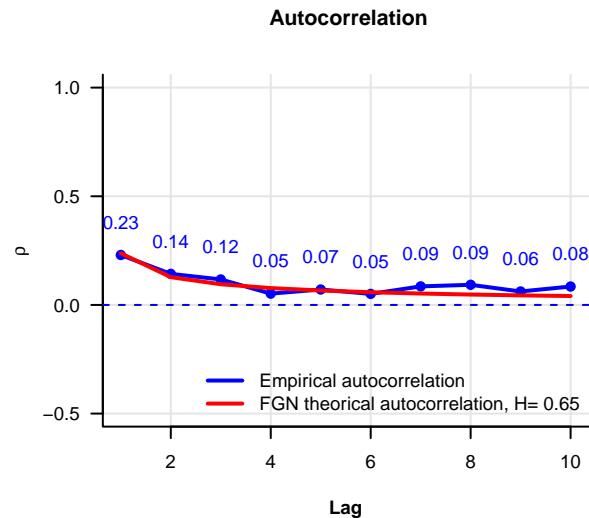
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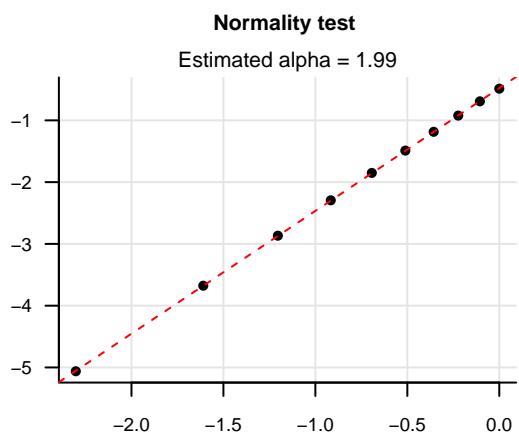
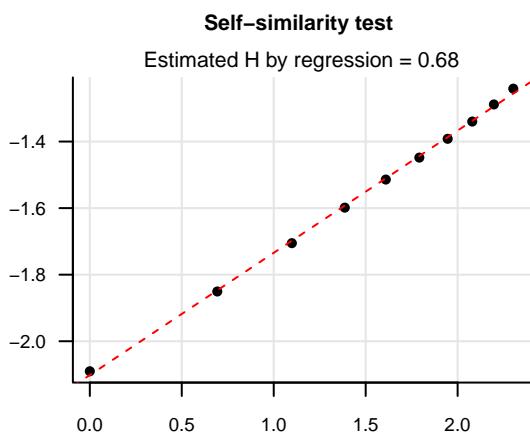
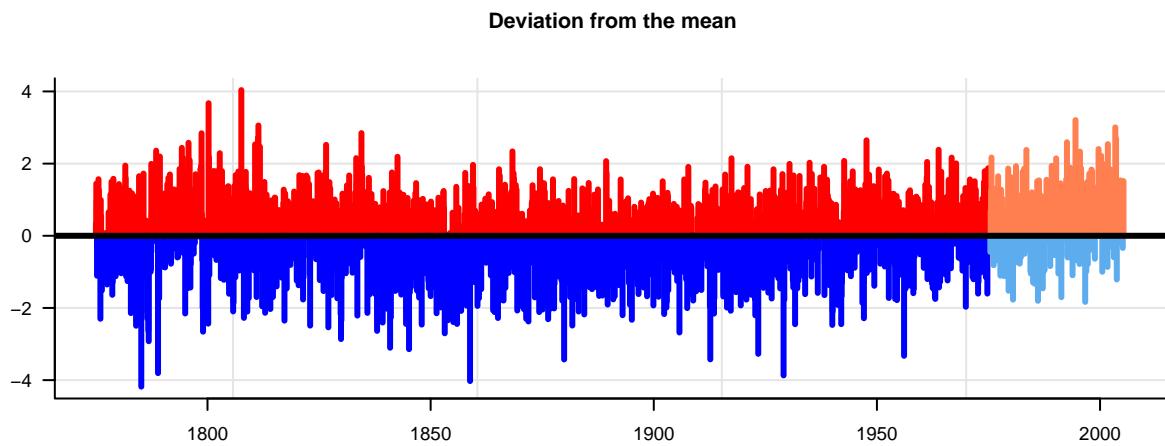
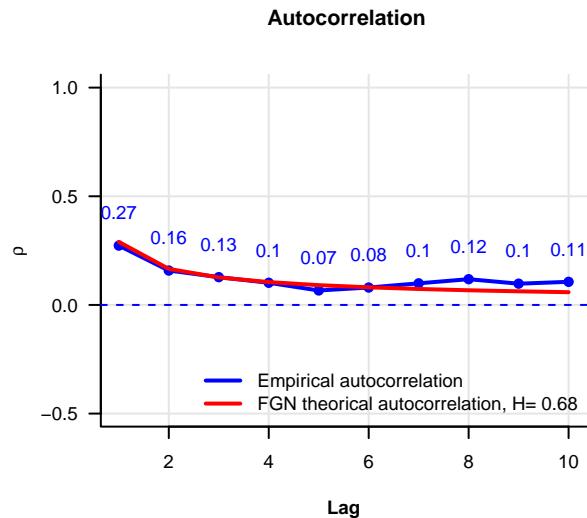
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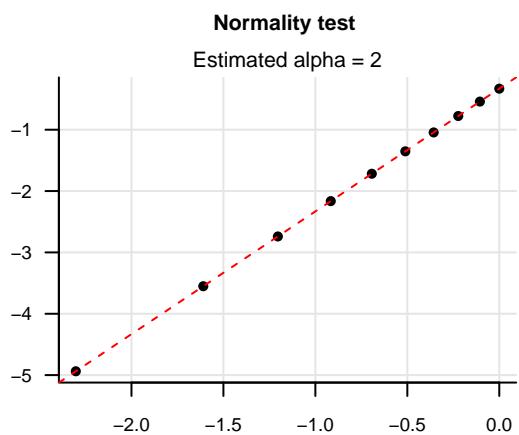
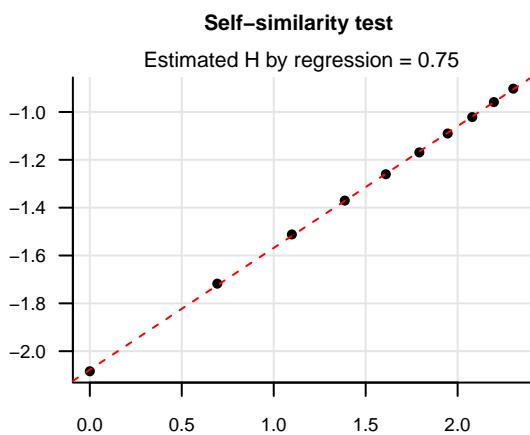
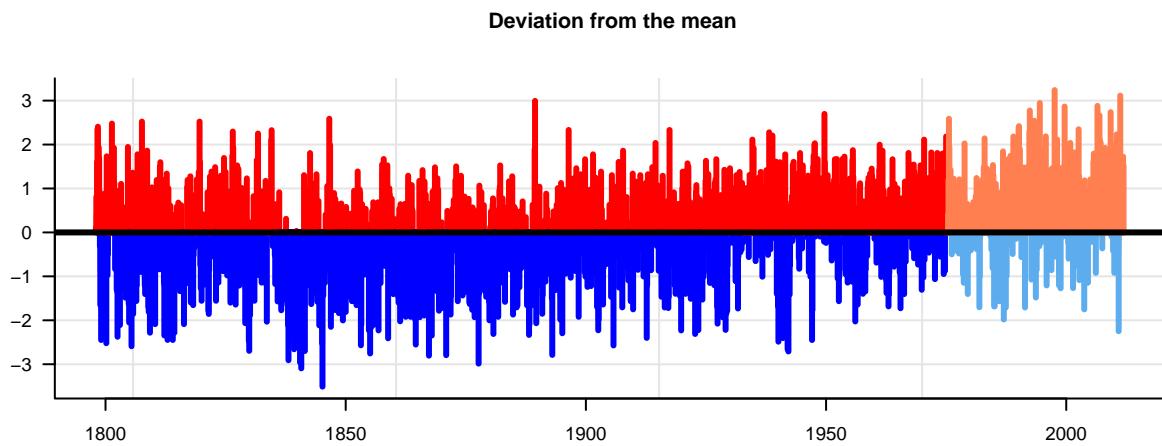
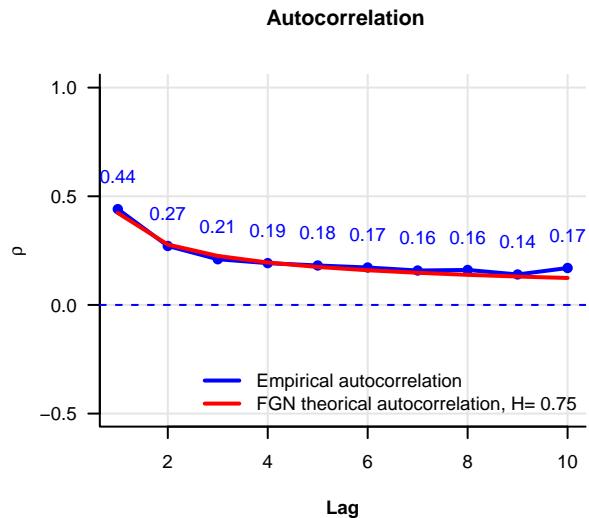
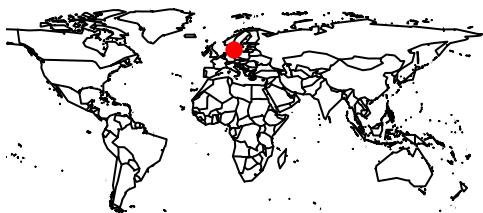
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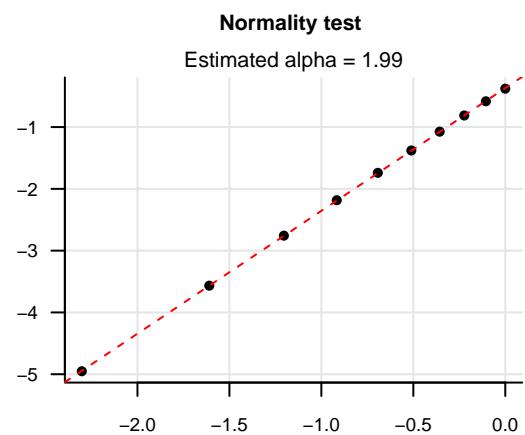
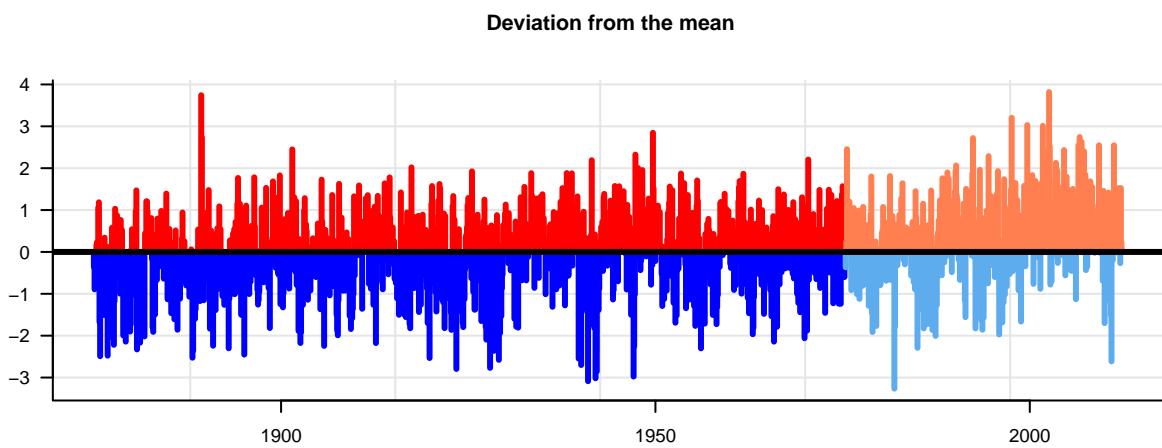
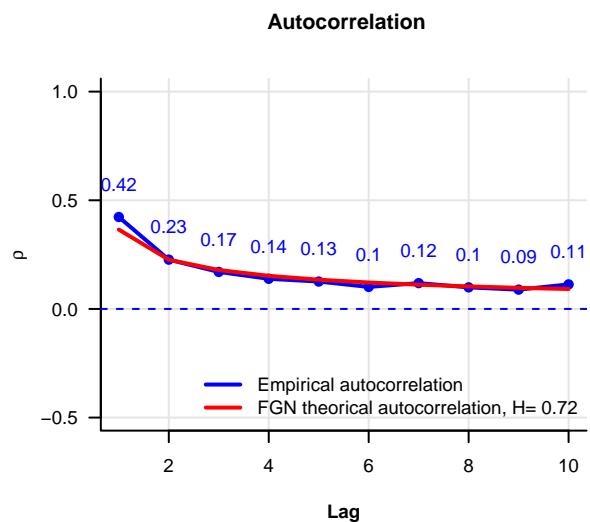
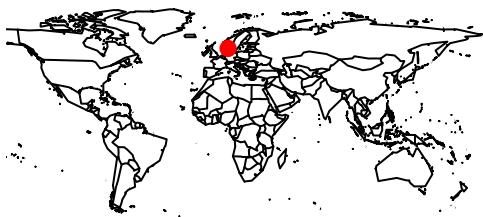
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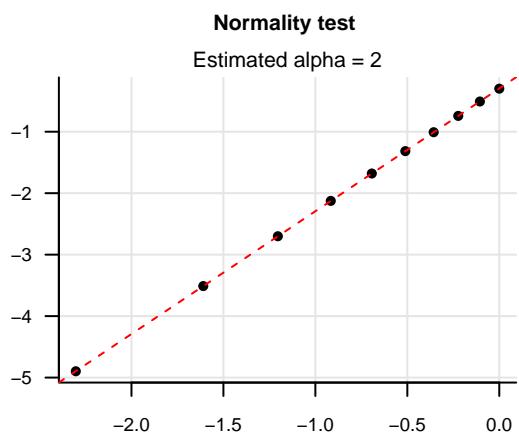
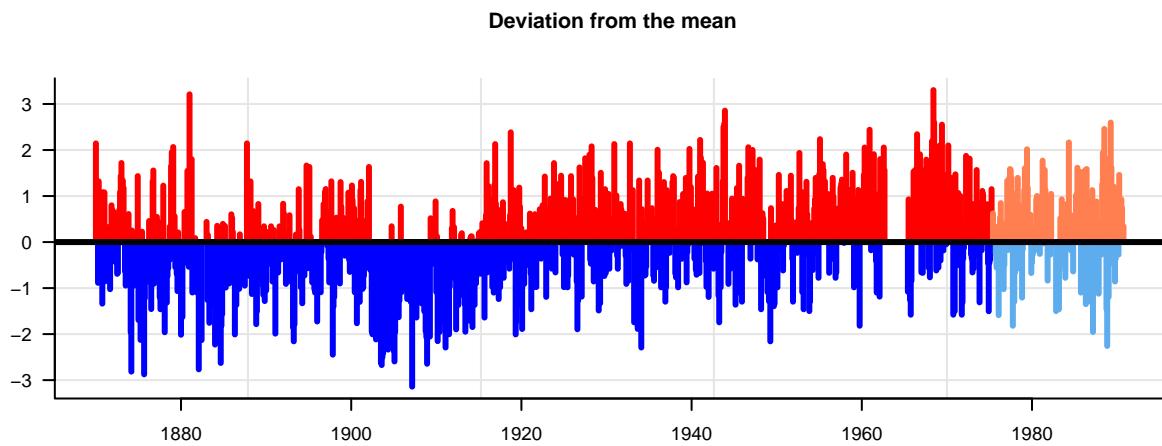
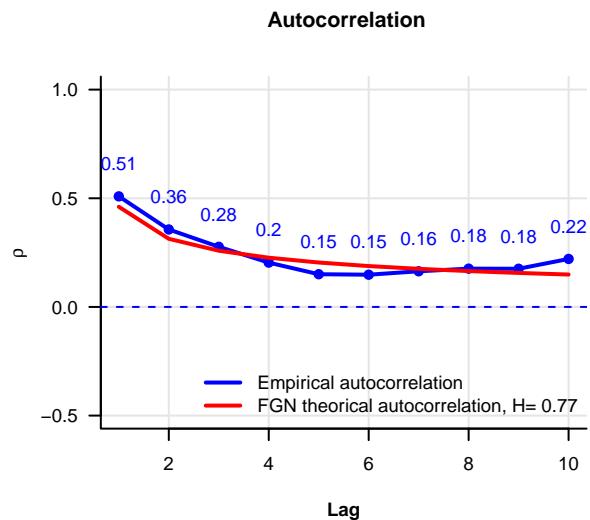
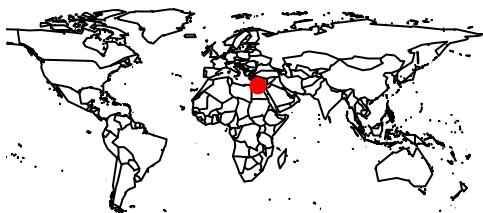
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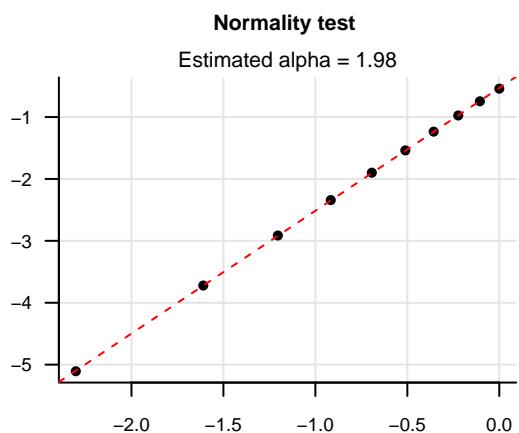
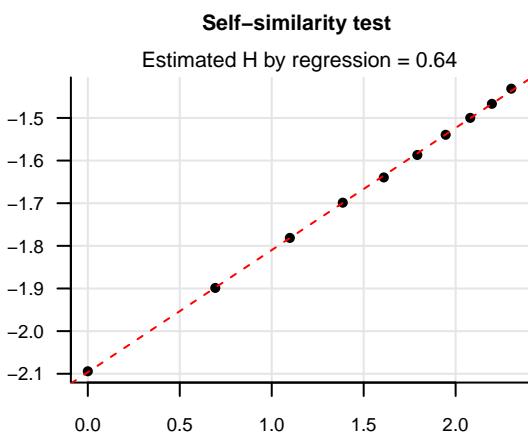
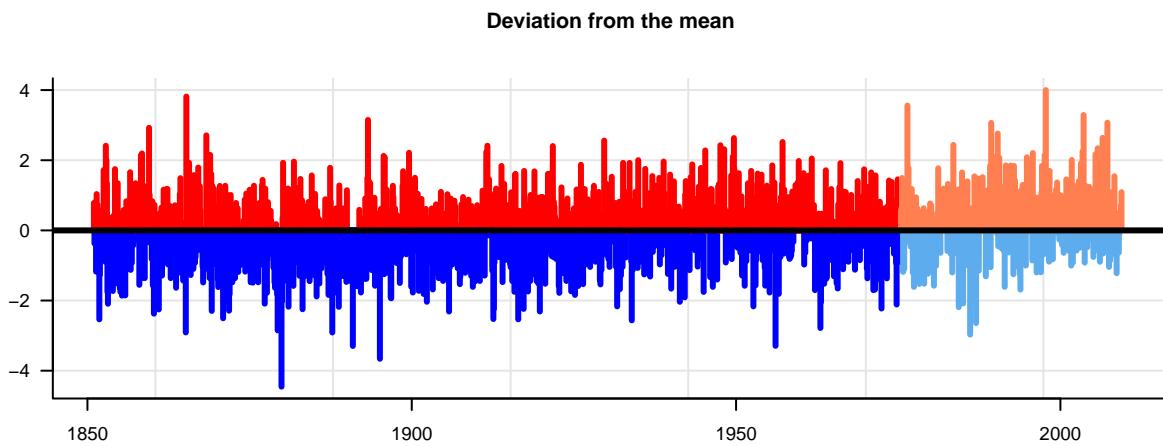
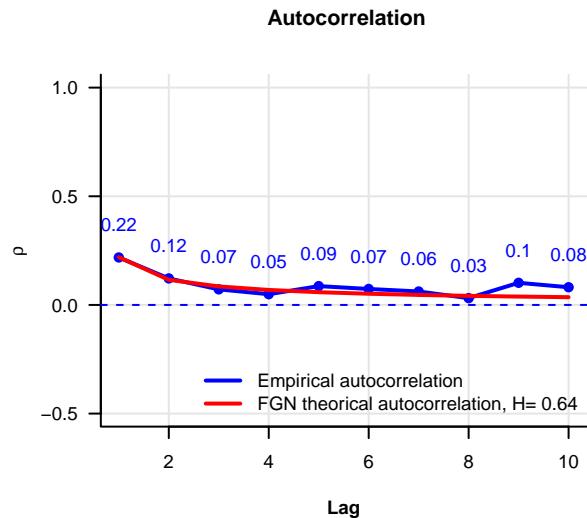
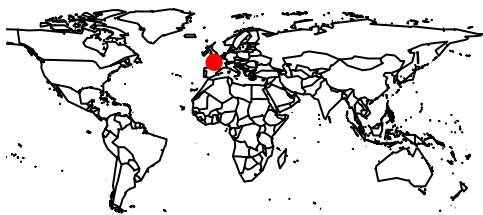
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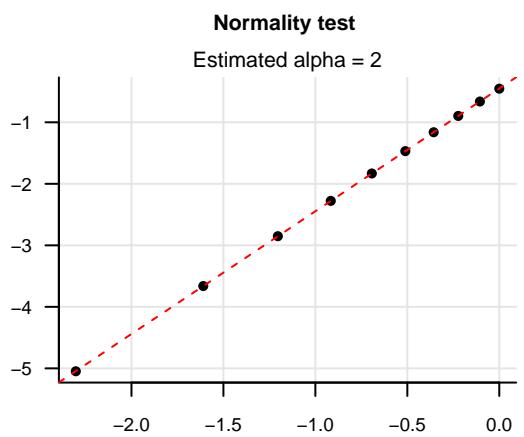
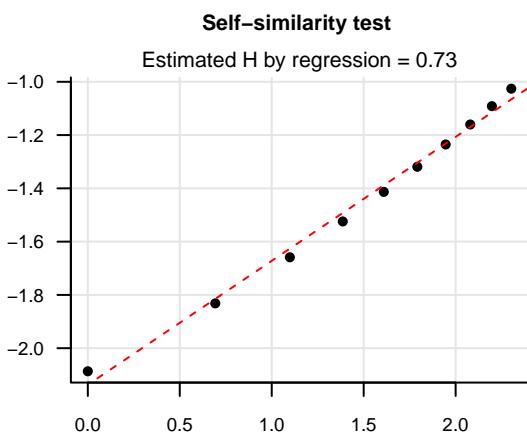
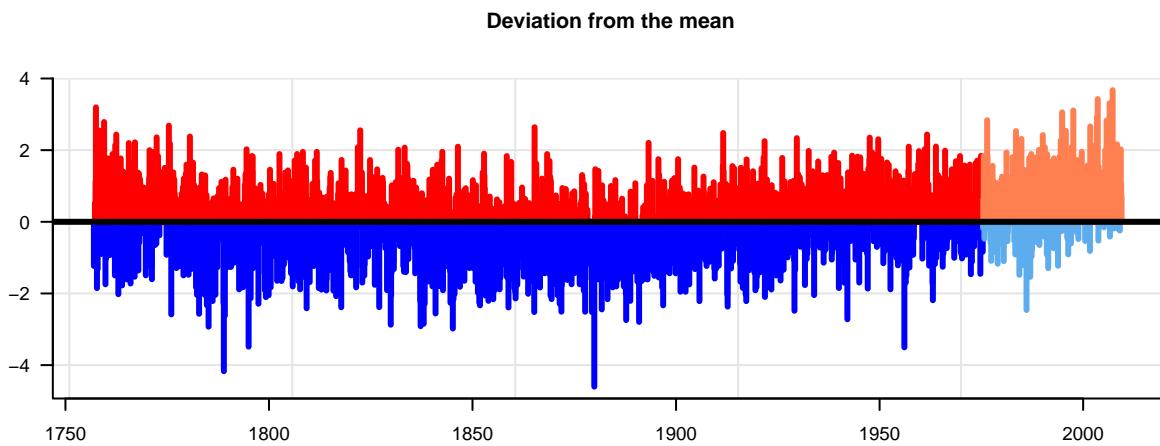
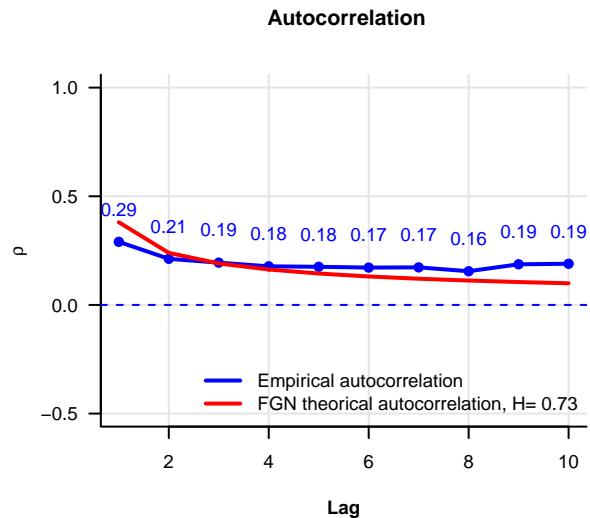
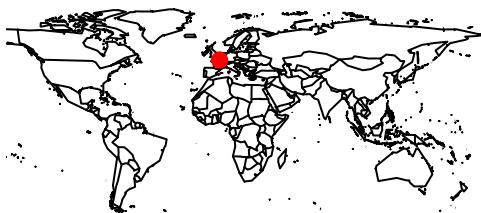
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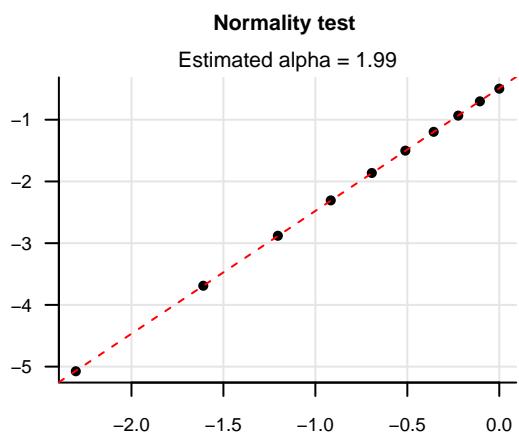
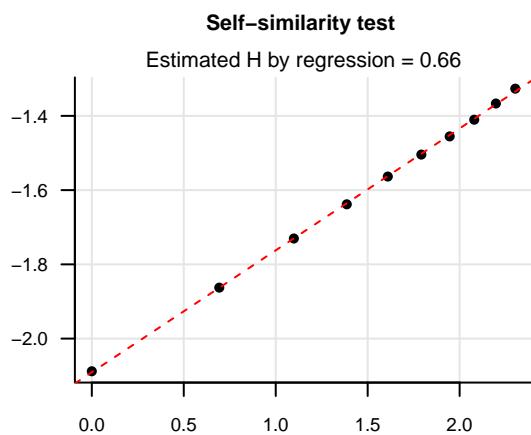
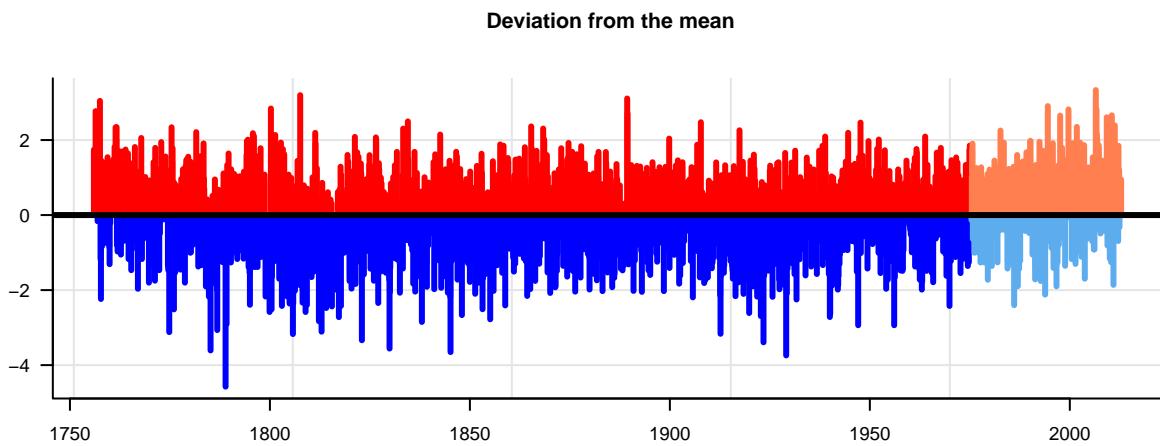
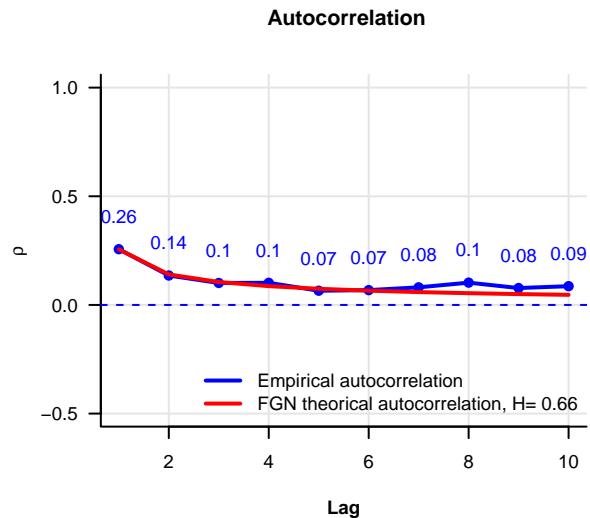
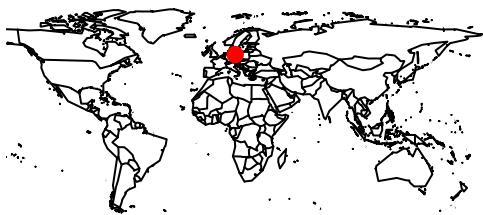
## France, Nantes



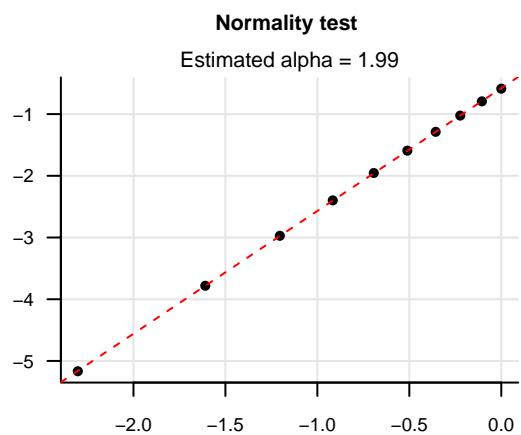
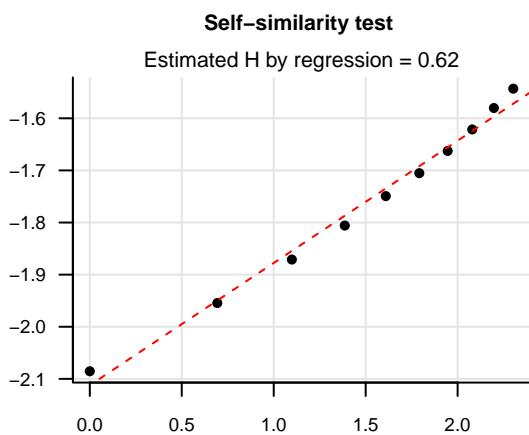
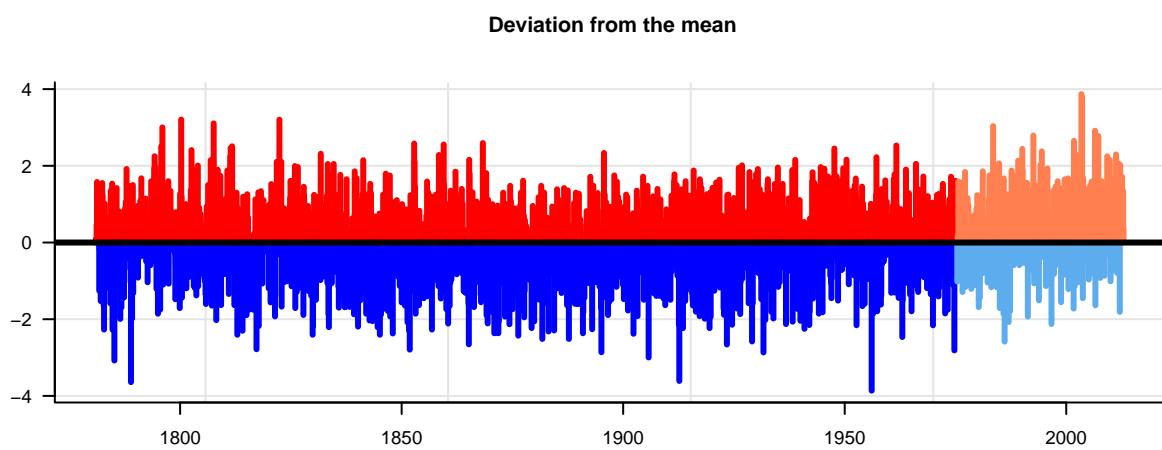
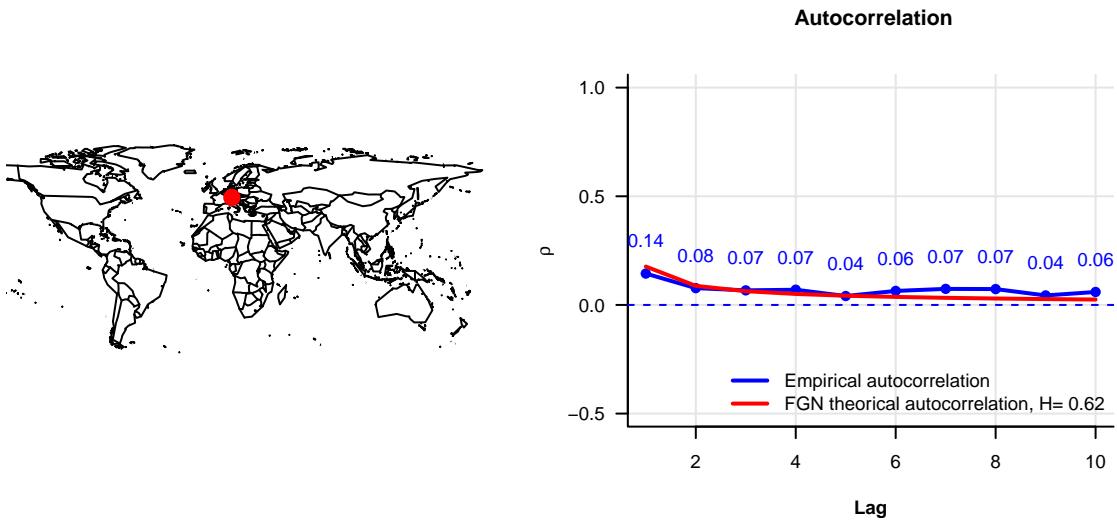
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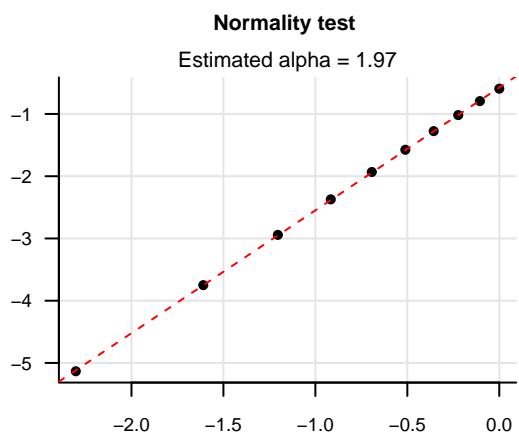
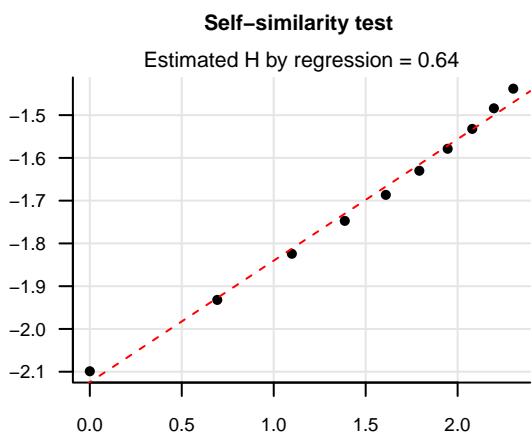
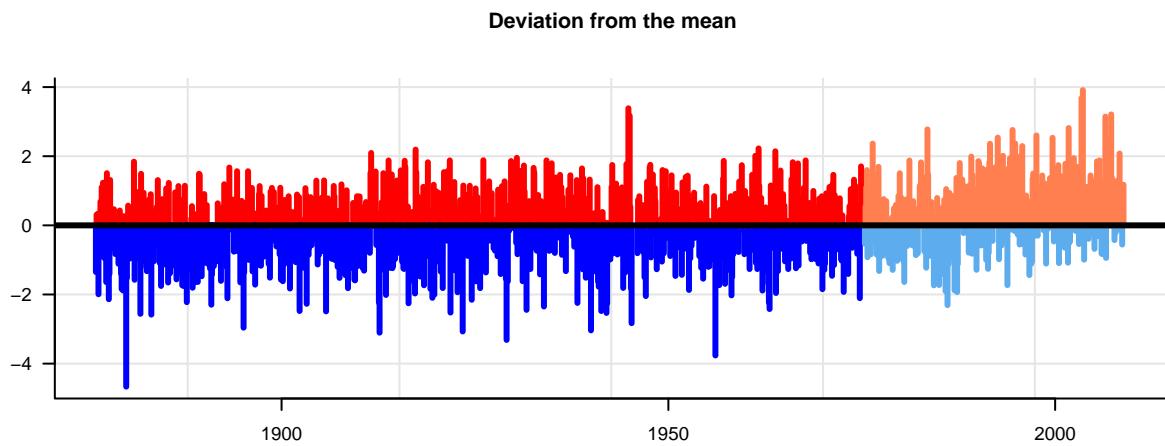
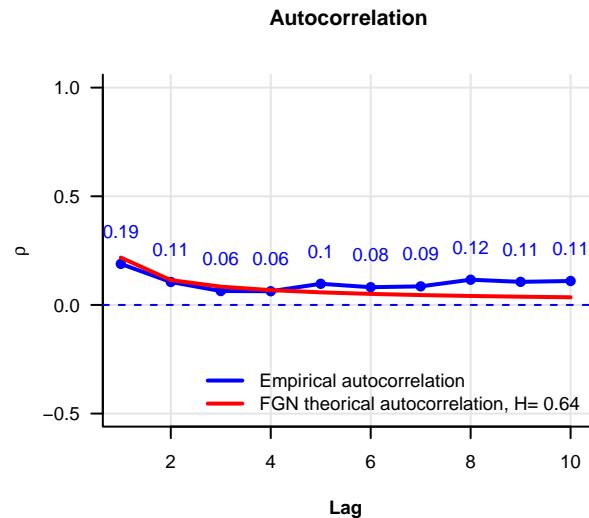
## Germany, Berlin



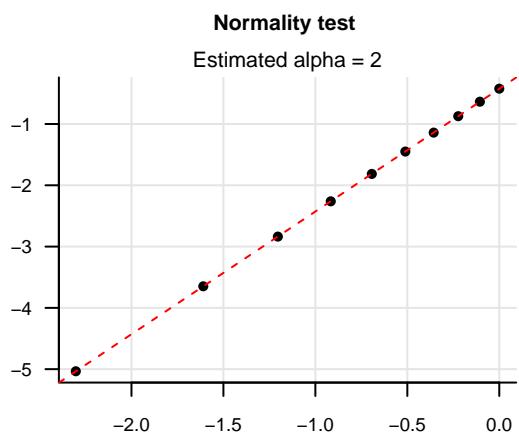
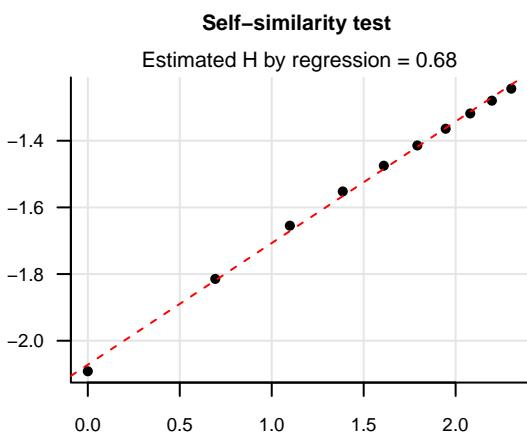
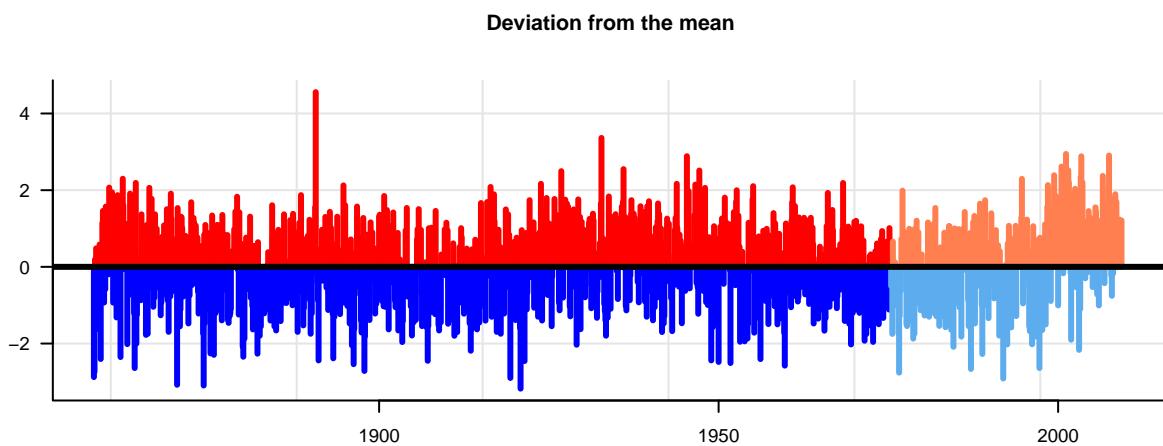
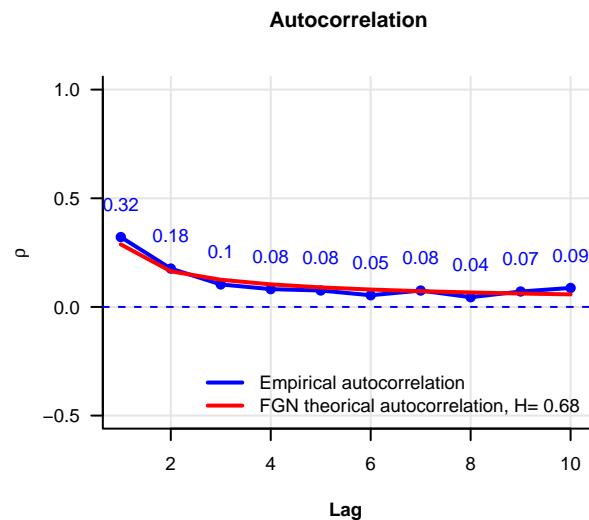
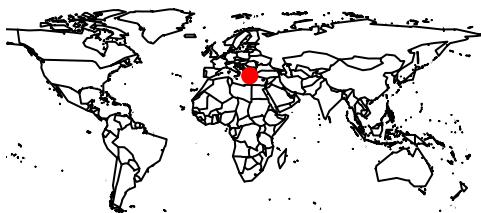
## Germany, Hohenpeissenberg



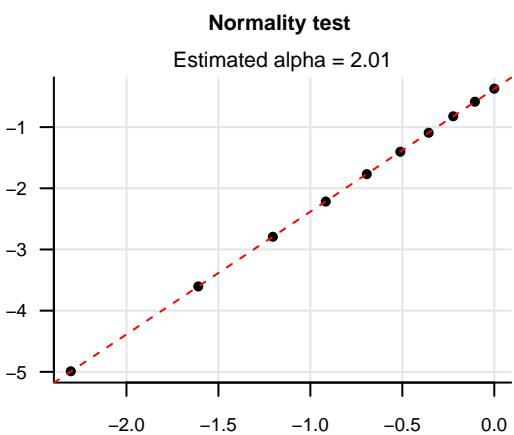
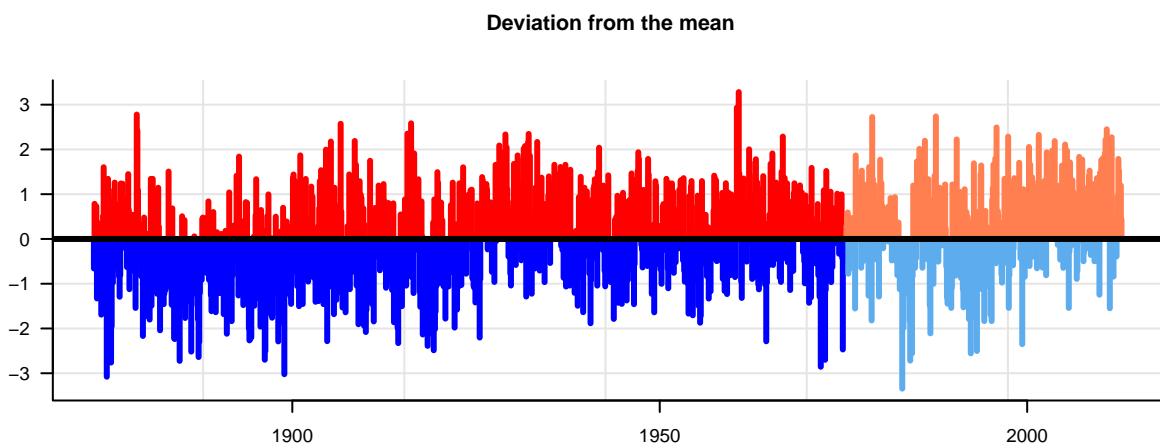
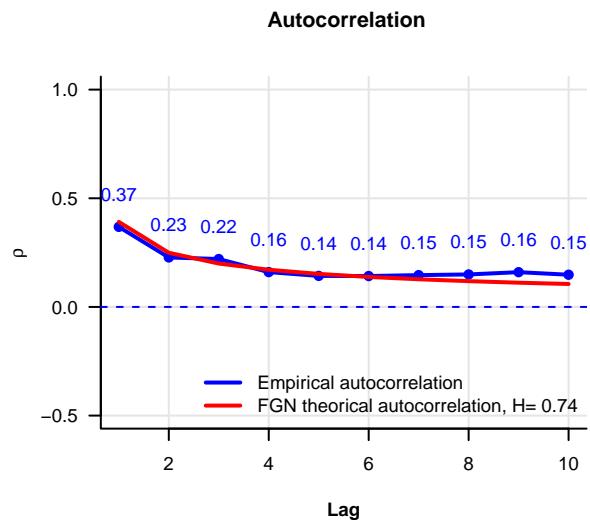
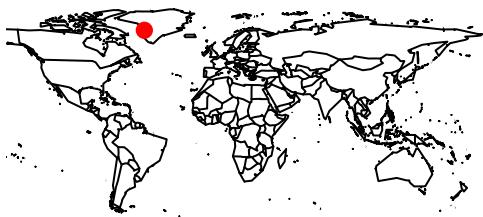
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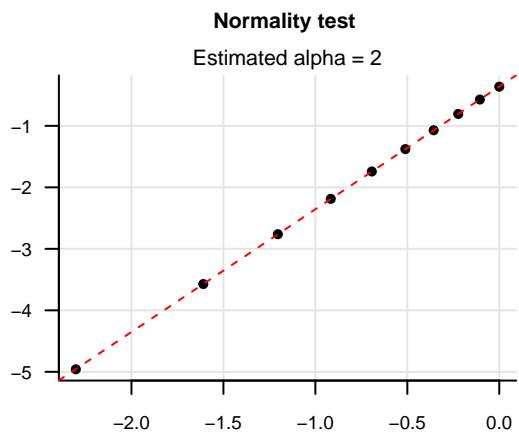
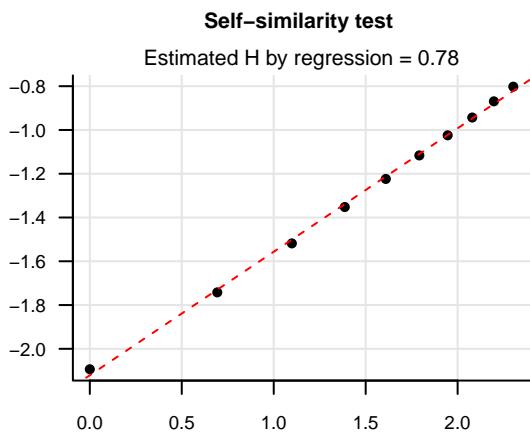
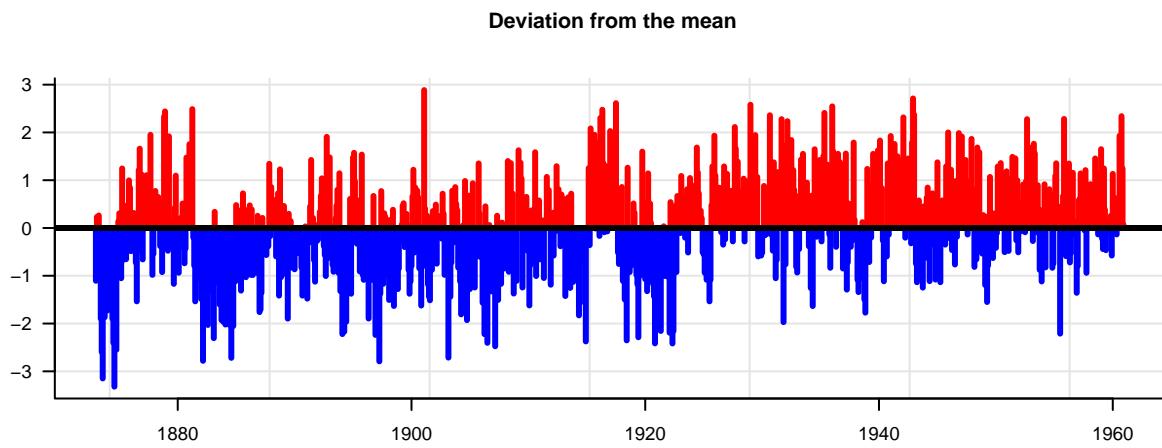
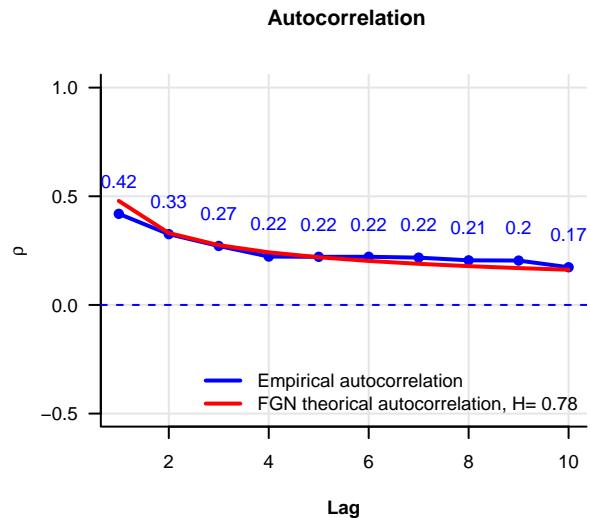
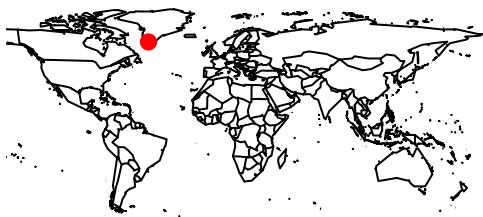
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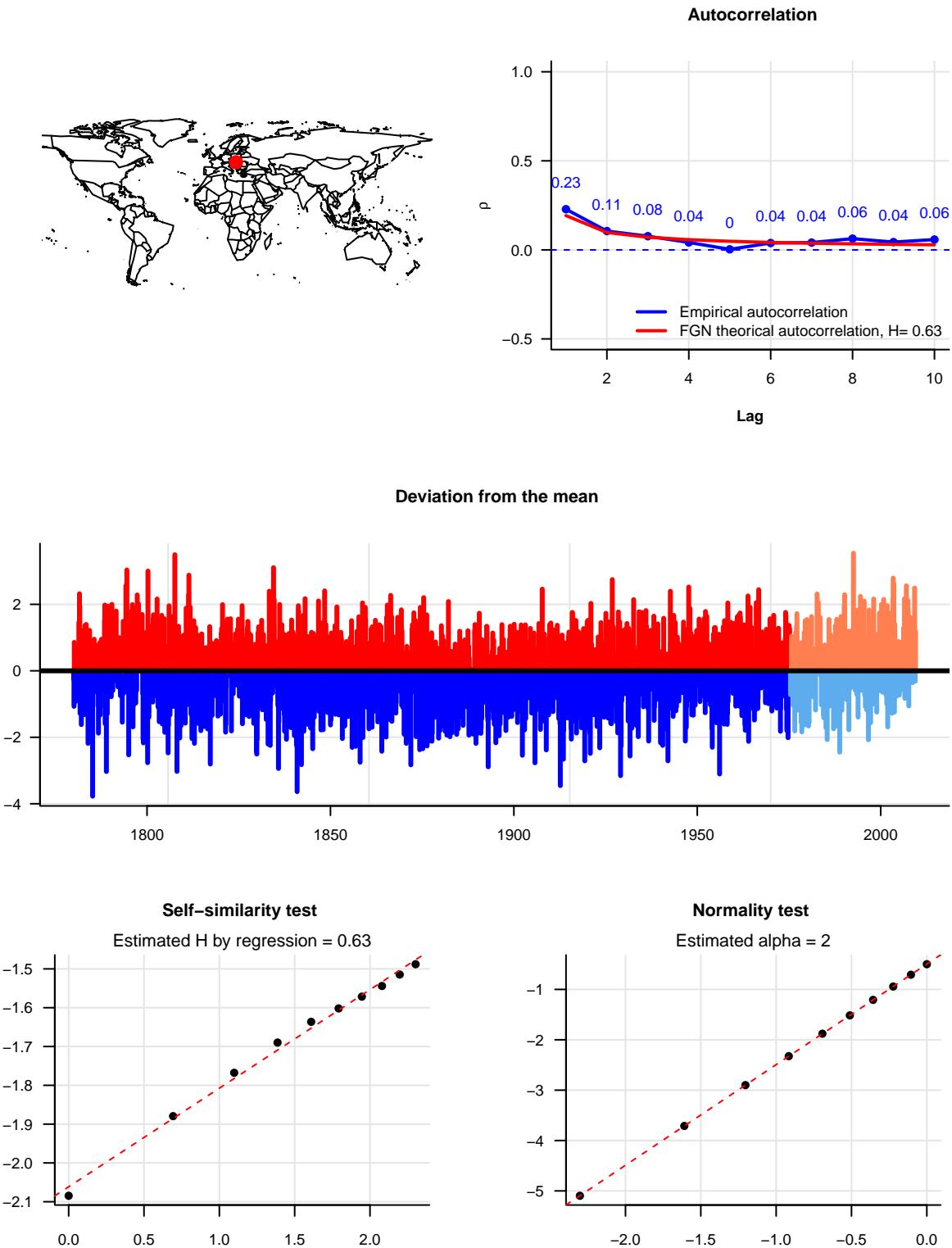
## Greenland, Ilulissat



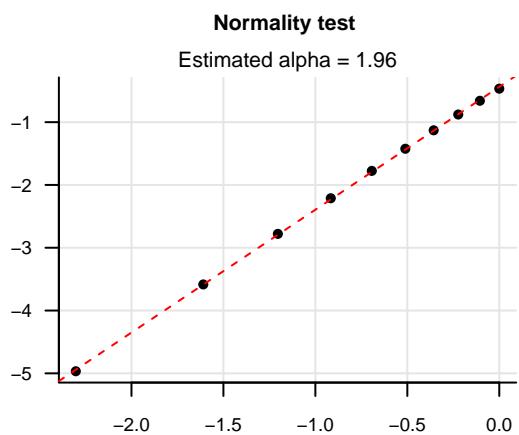
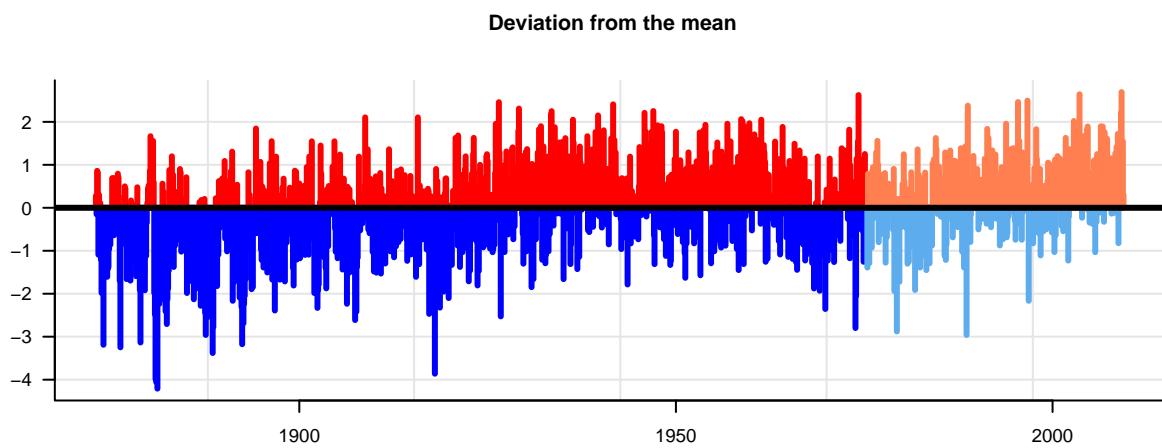
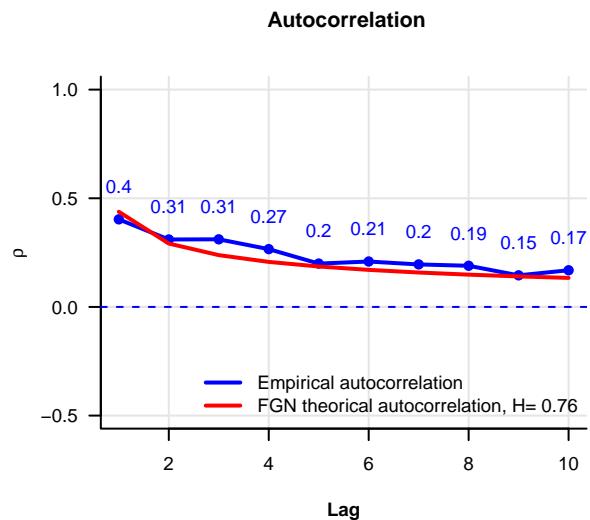
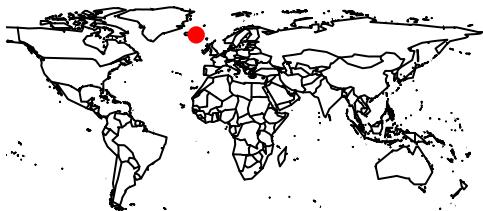
## Greenland, Ivittuut



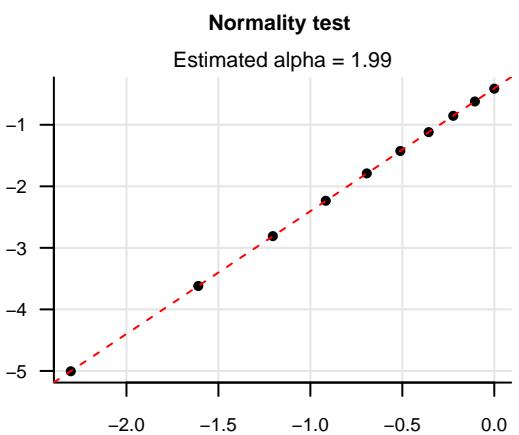
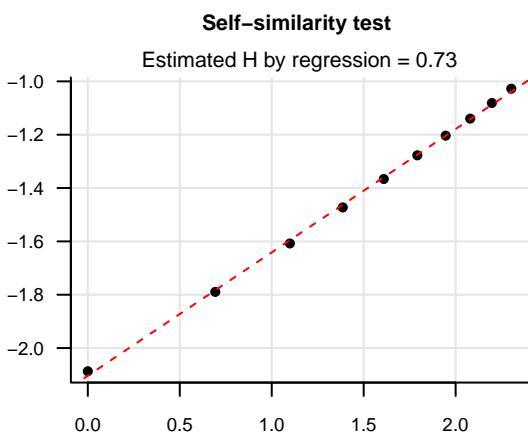
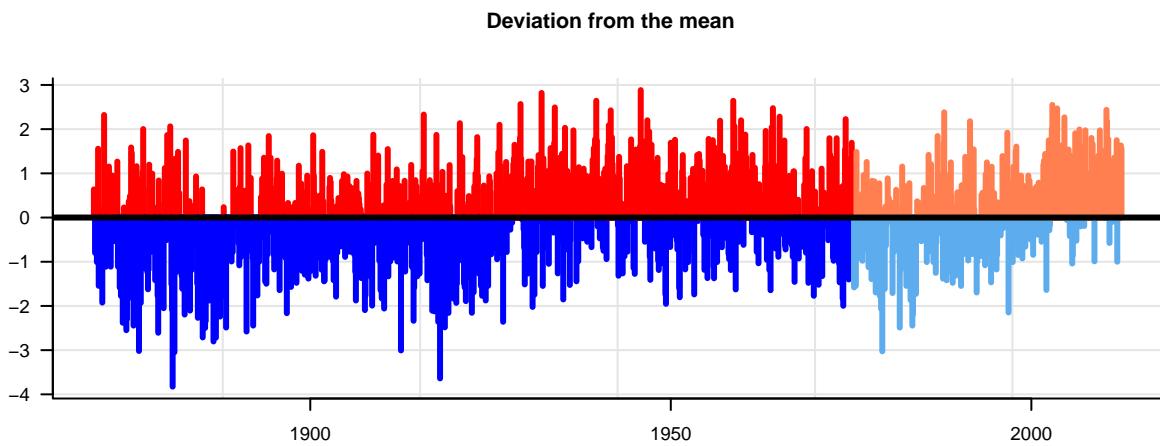
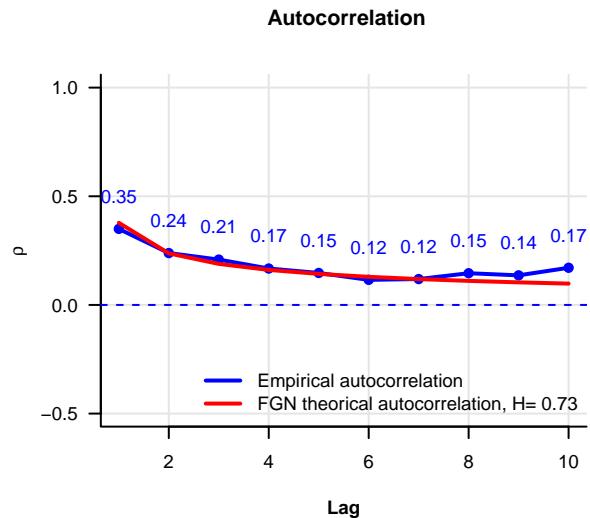
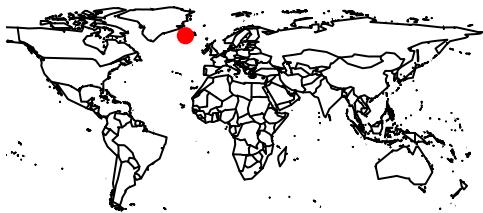
## Hungary, Budapest



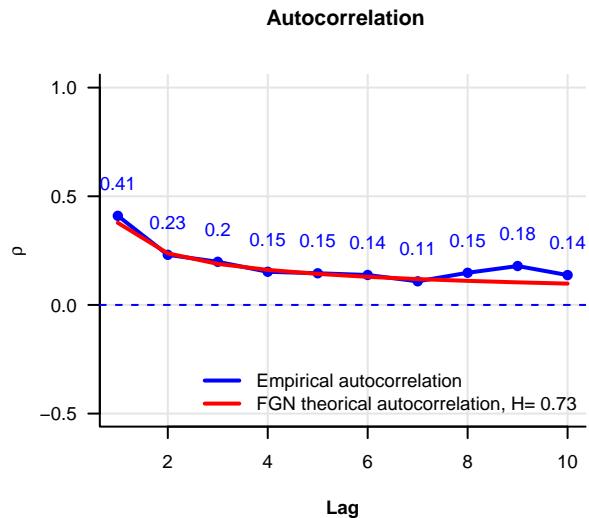
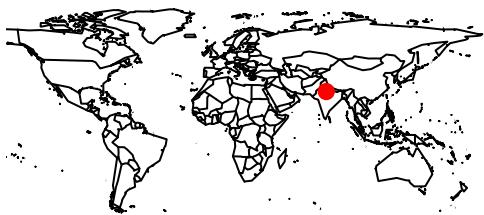
## Iceland, Djupivogur



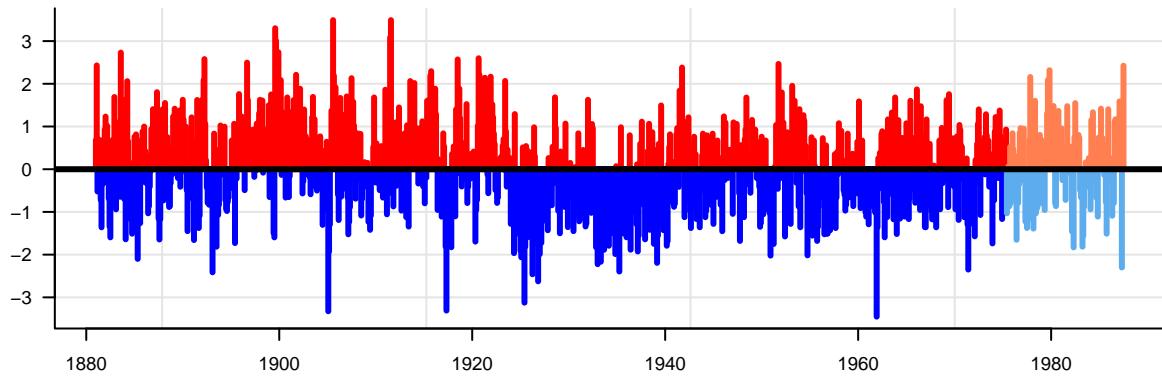
## Iceland, Reykjavik



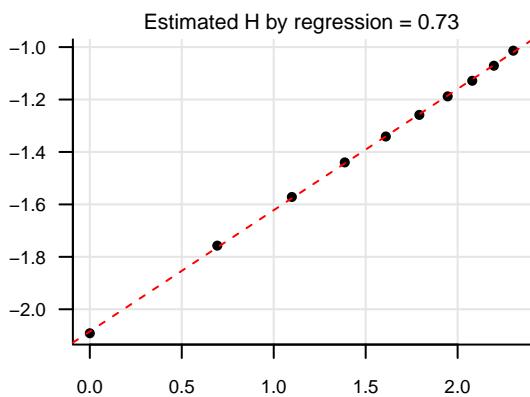
## India, Agra



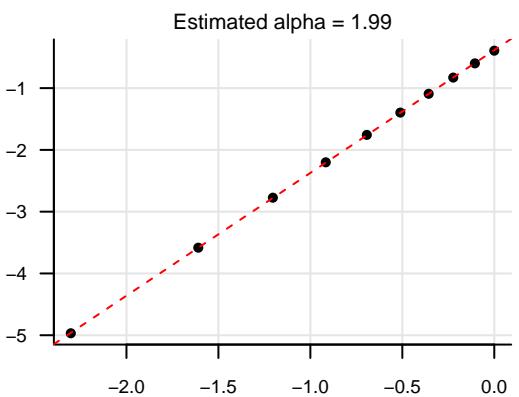
### Deviation from the mean



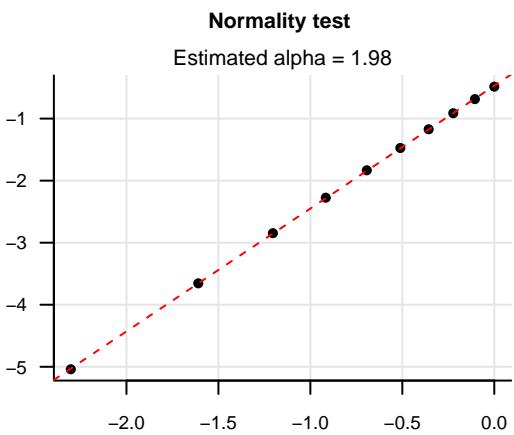
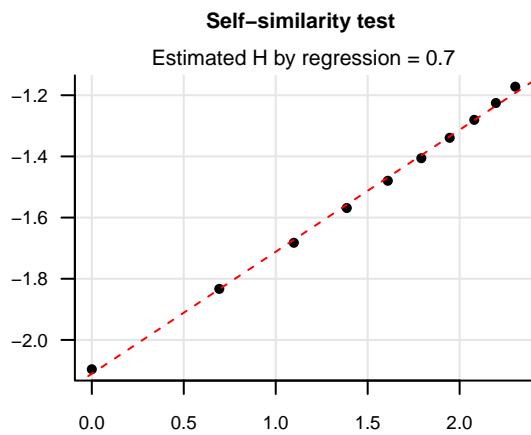
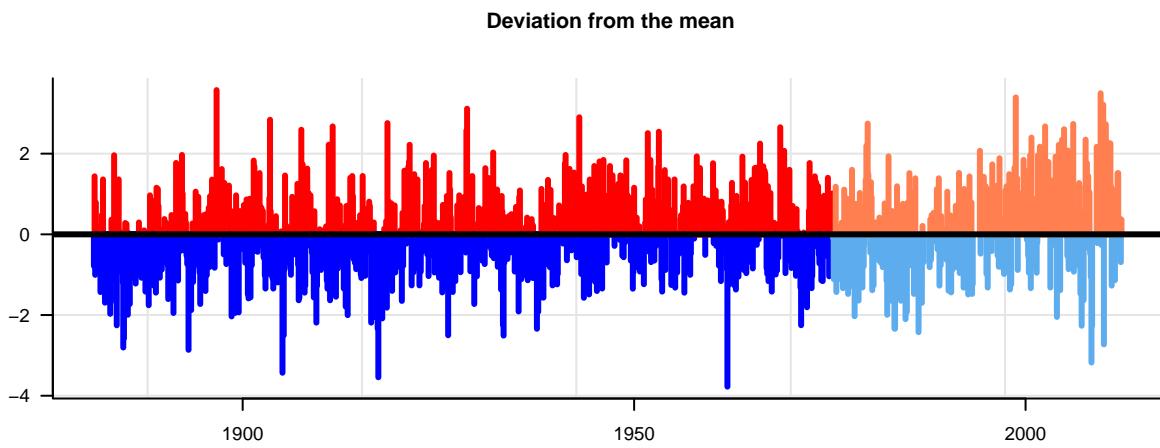
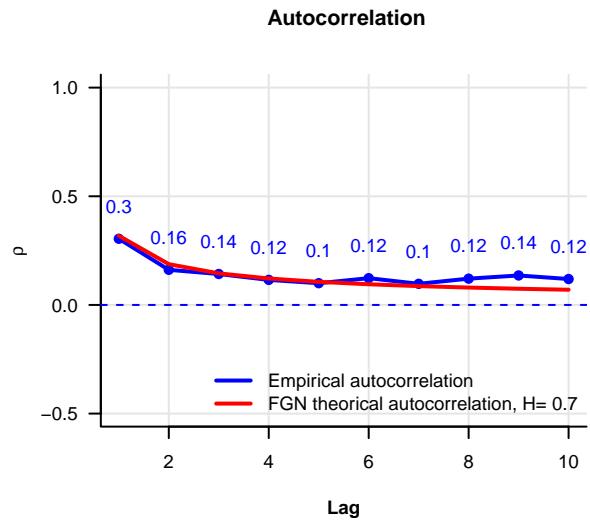
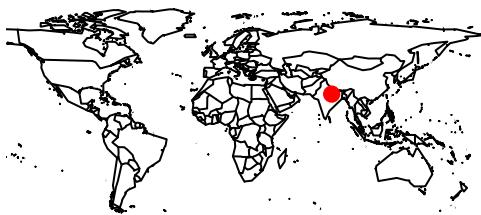
### Self-similarity test



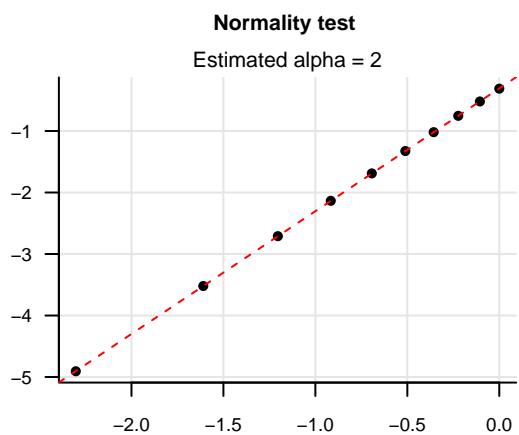
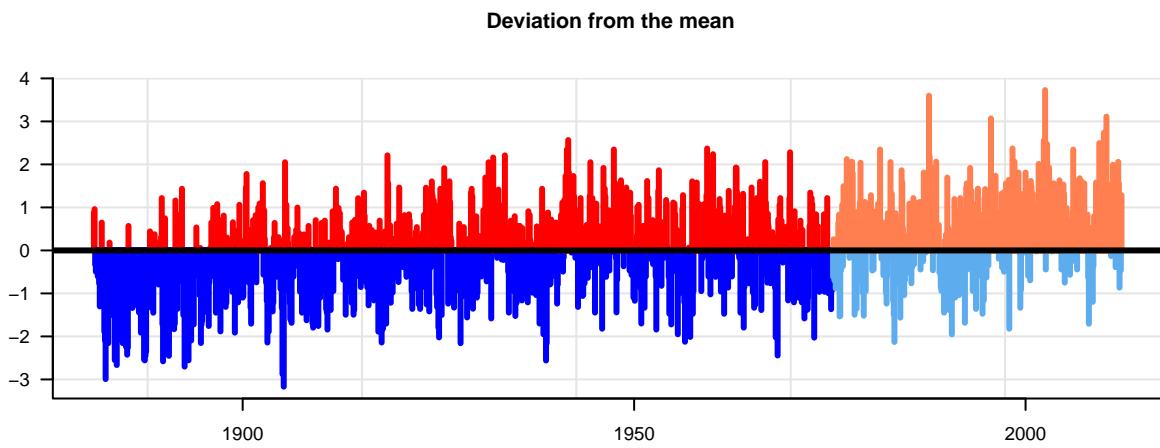
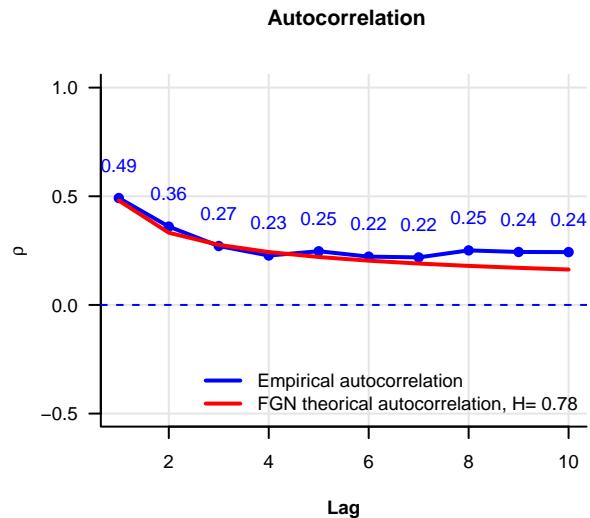
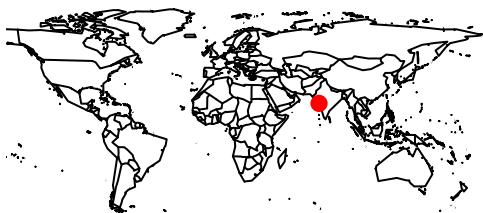
### Normality test



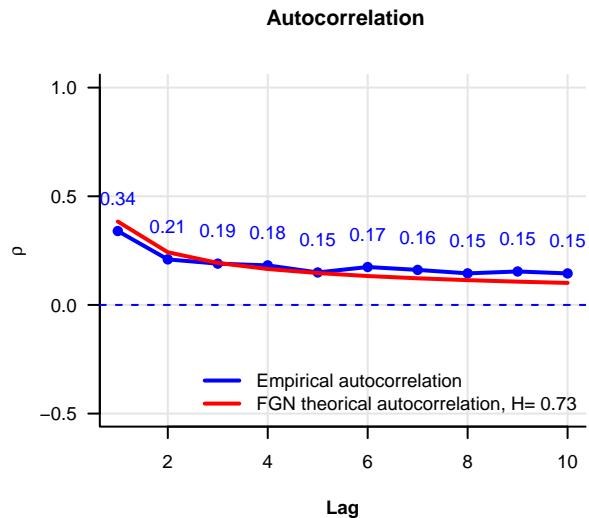
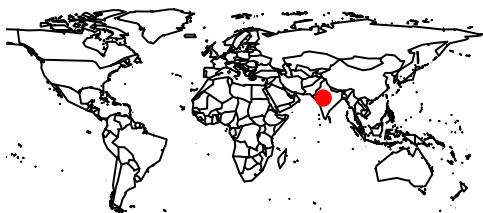
## India, Allahabad



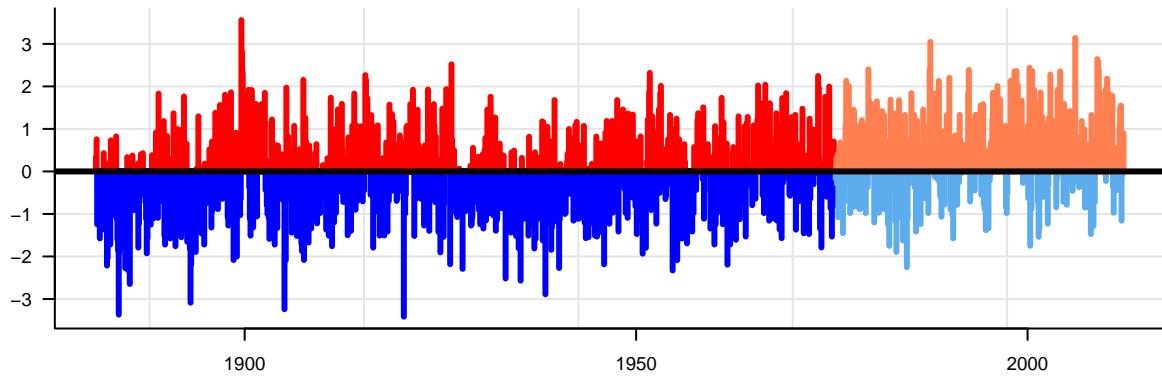
## India, Bombay



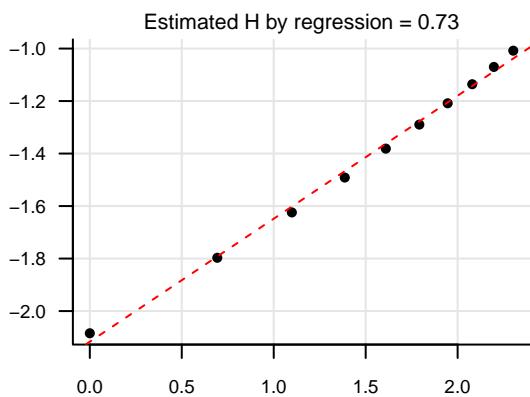
## India, Indore



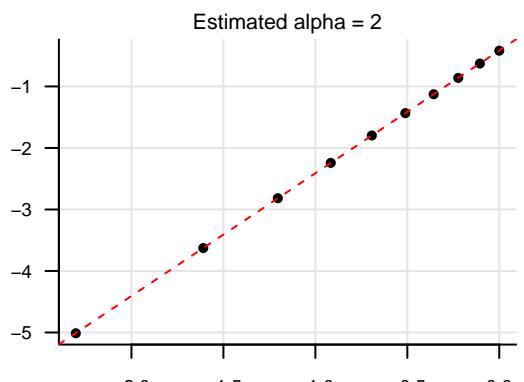
### Deviation from the mean



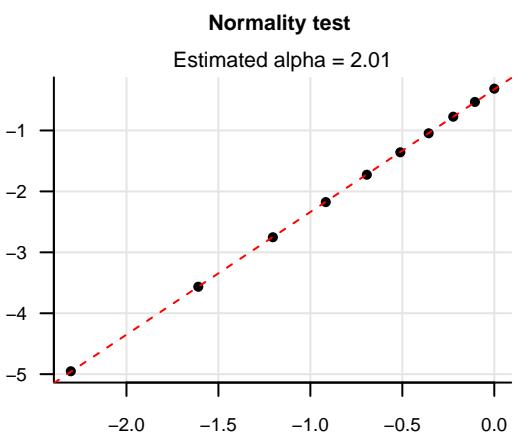
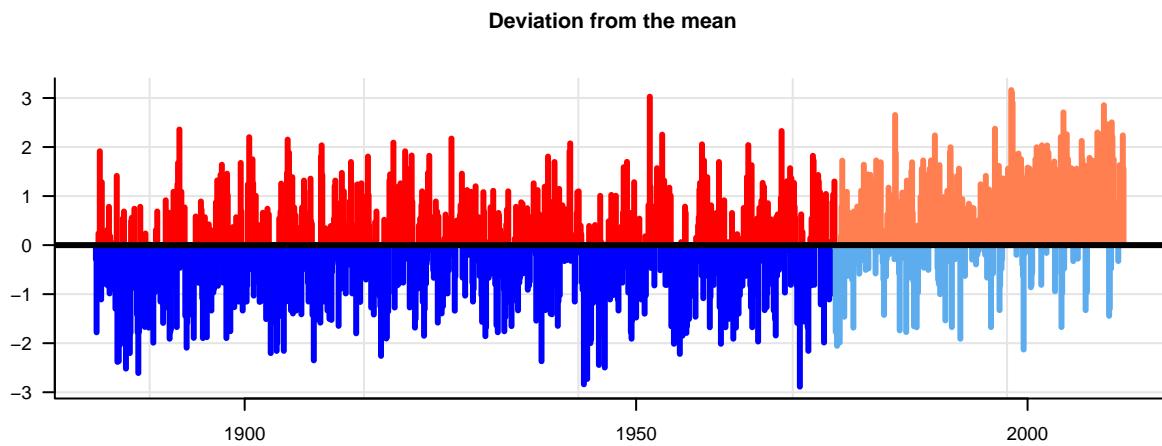
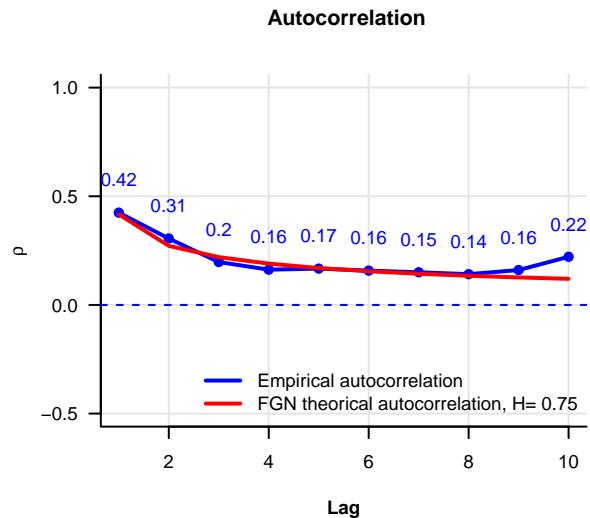
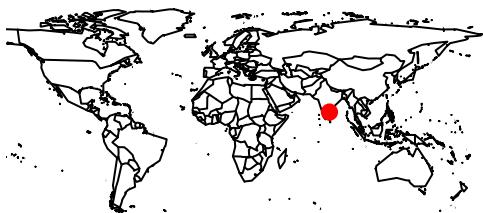
### Self-similarity test



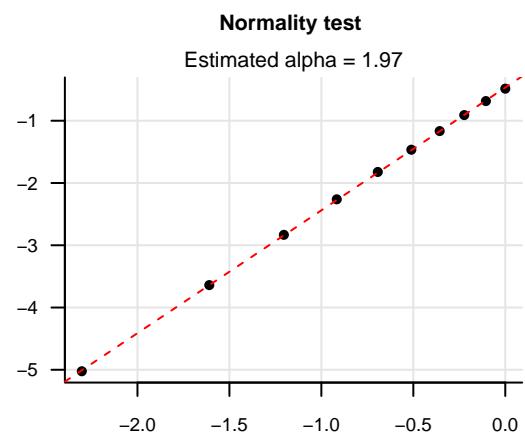
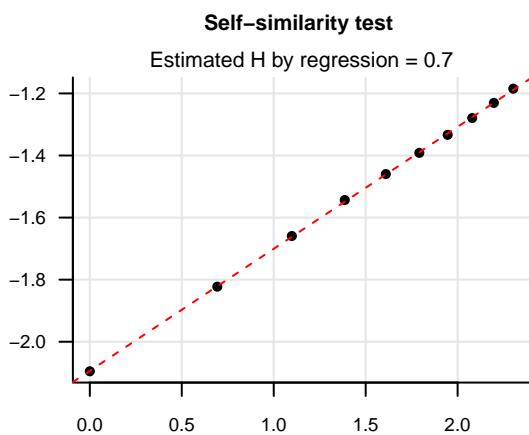
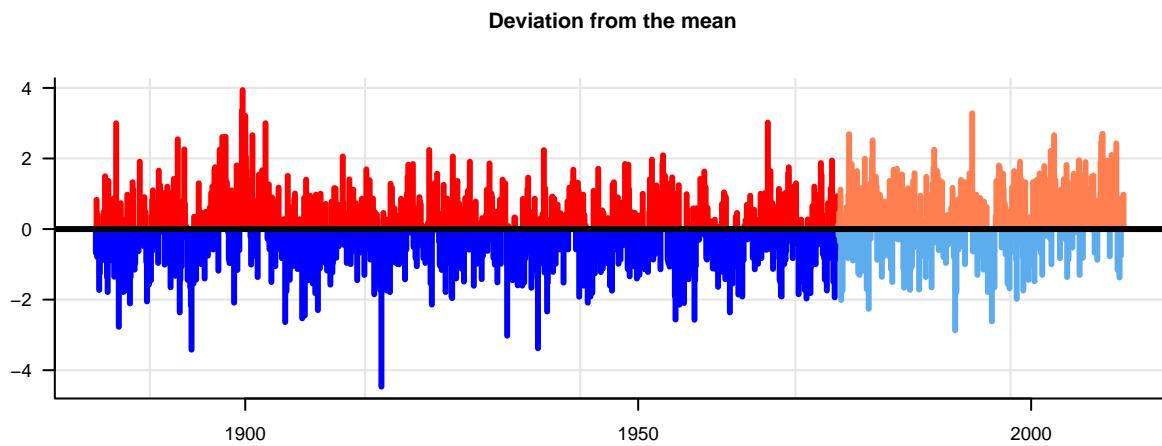
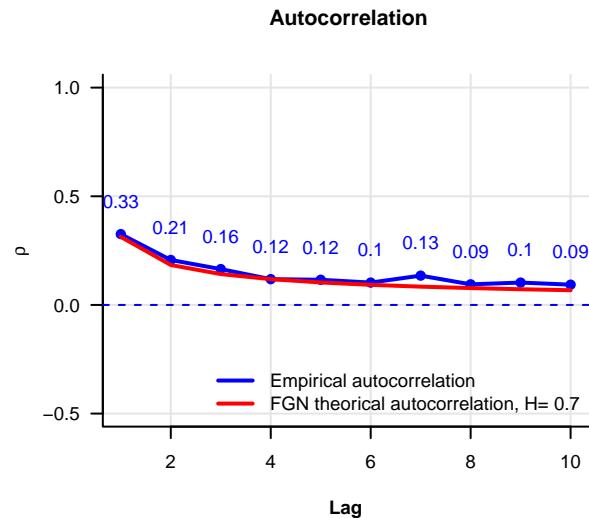
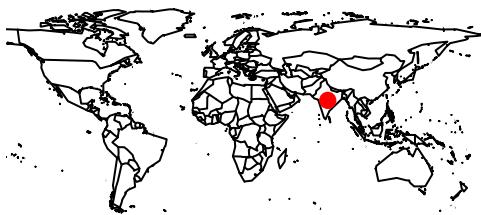
### Normality test



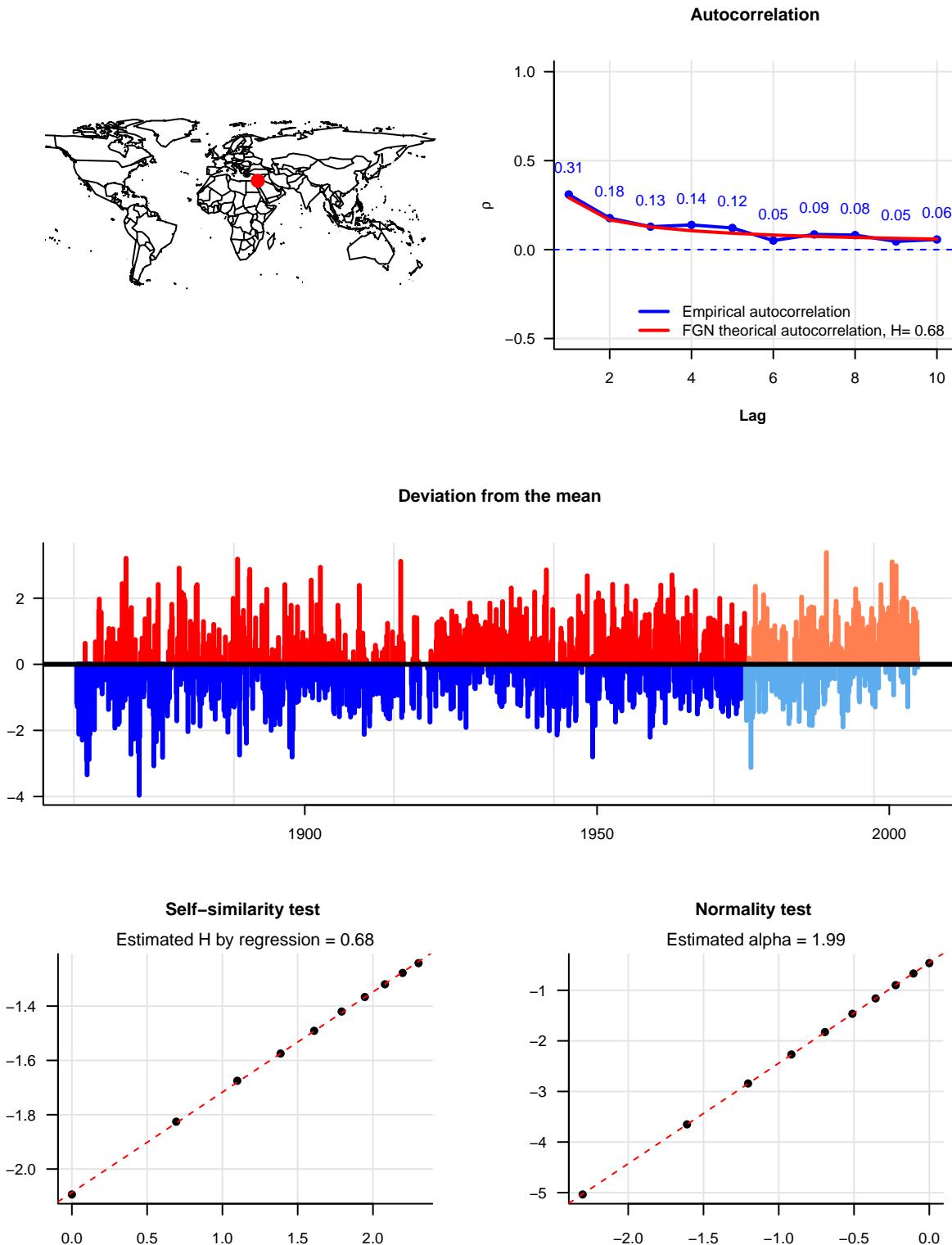
## India, Madras



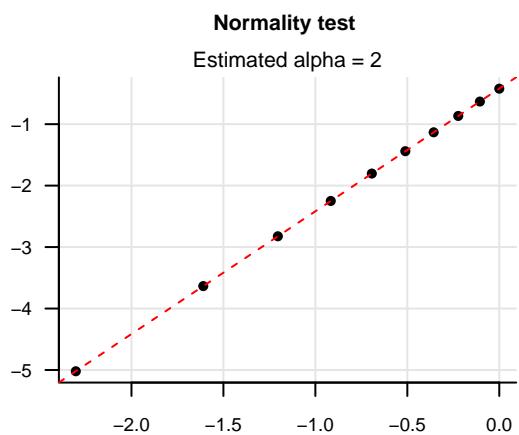
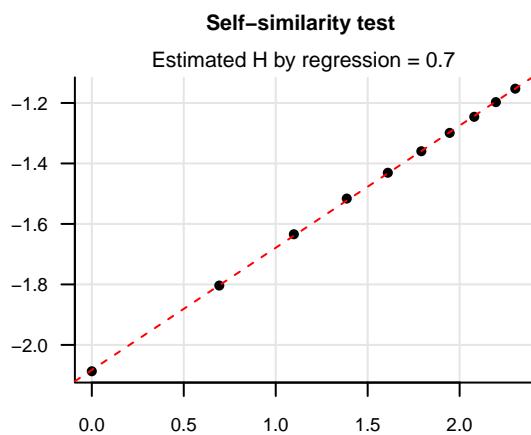
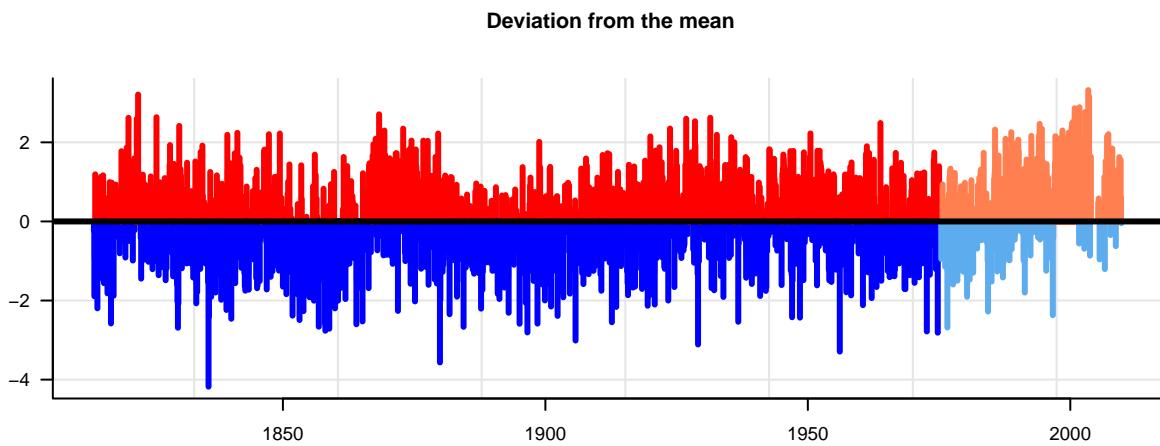
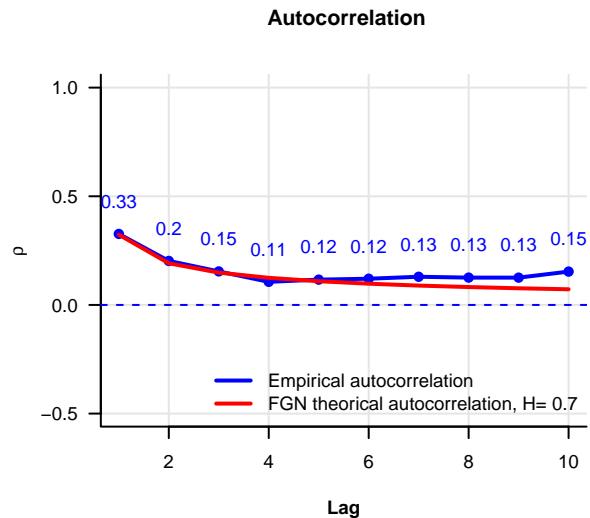
## India, Nagpur



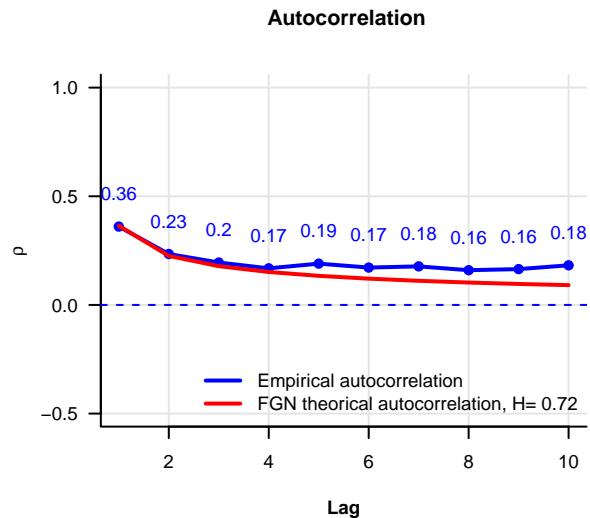
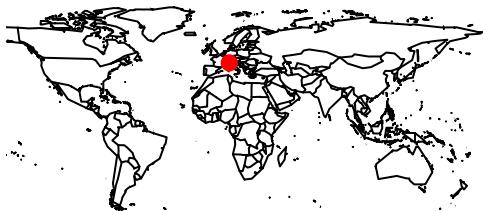
## Israel, Jerusalem



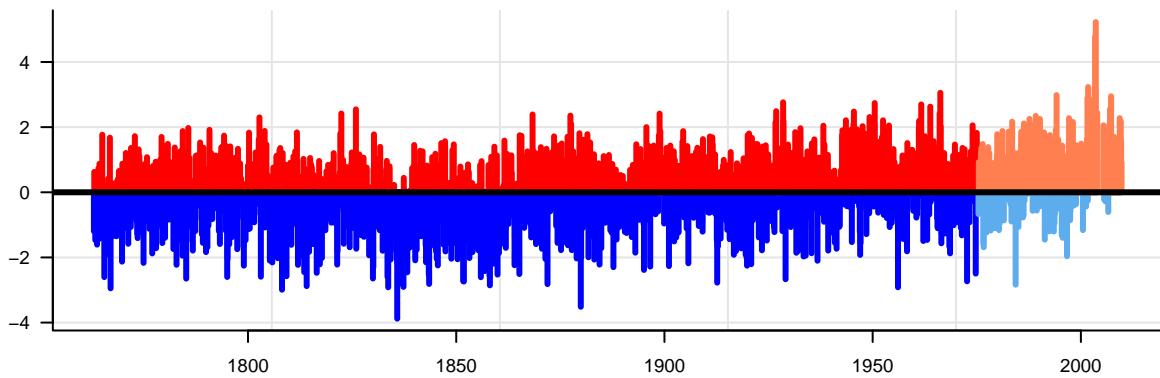
## Italy, Bologna



## Italy, Milan

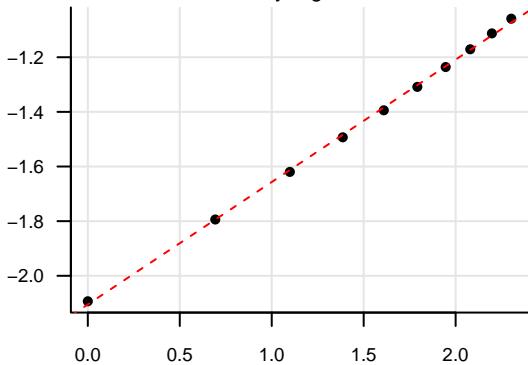


### Deviation from the mean



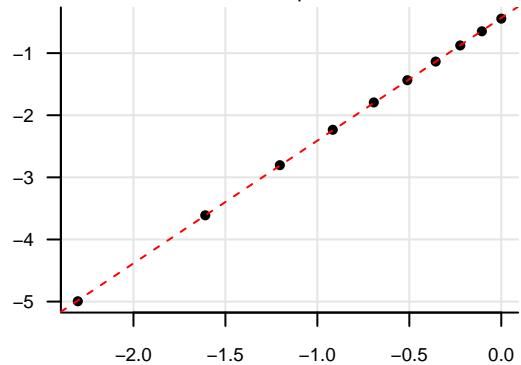
### Self-similarity test

Estimated  $H$  by regression = 0.72

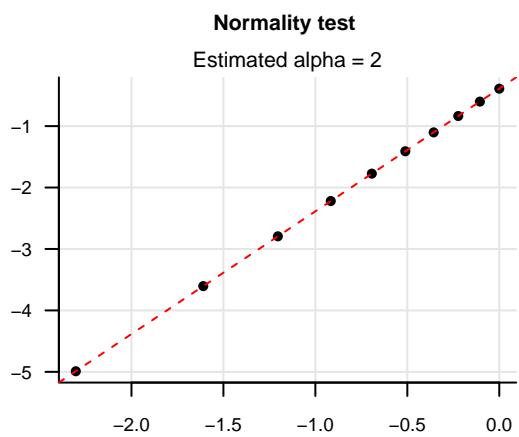
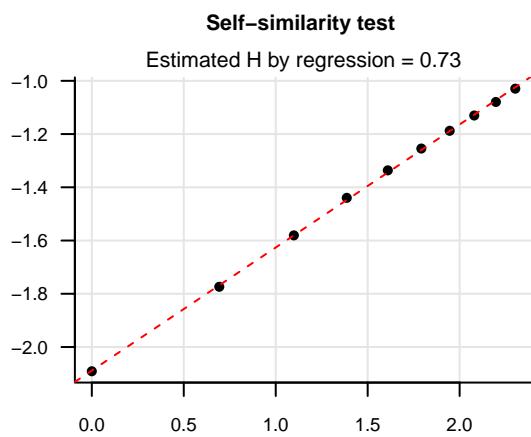
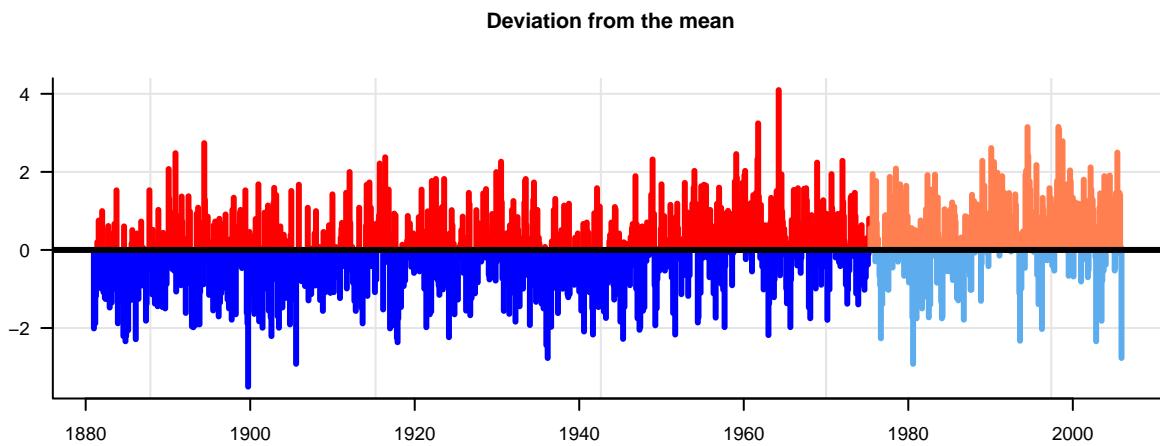
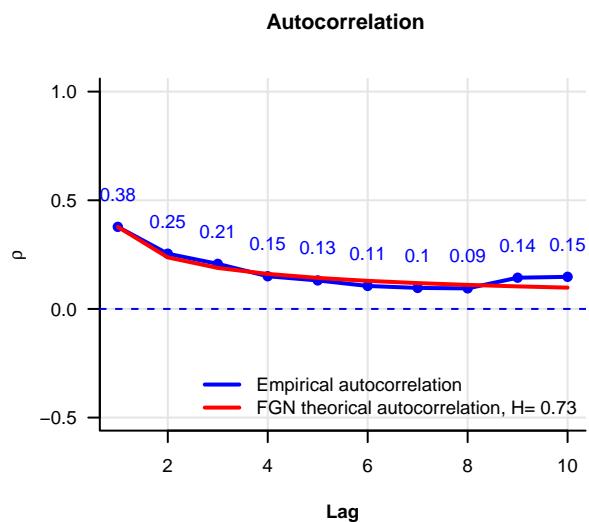
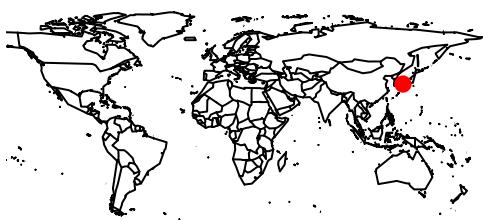


### Normality test

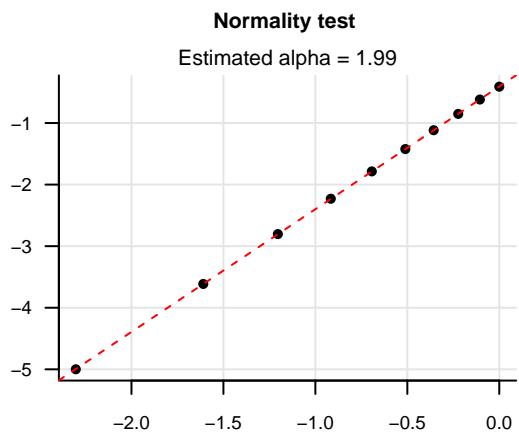
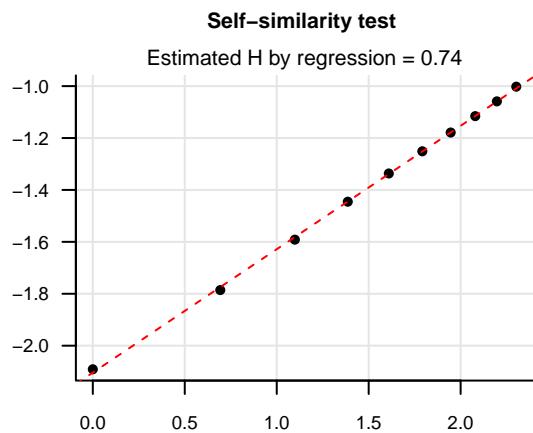
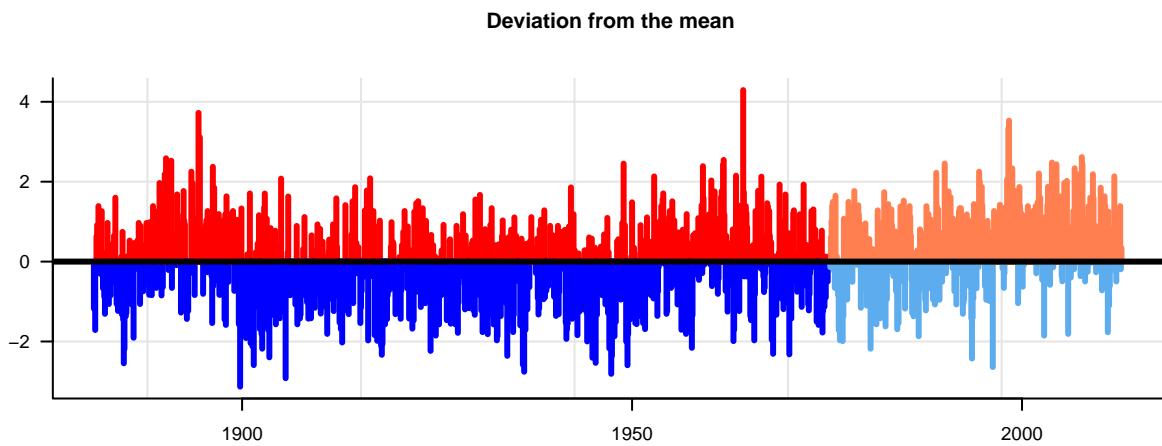
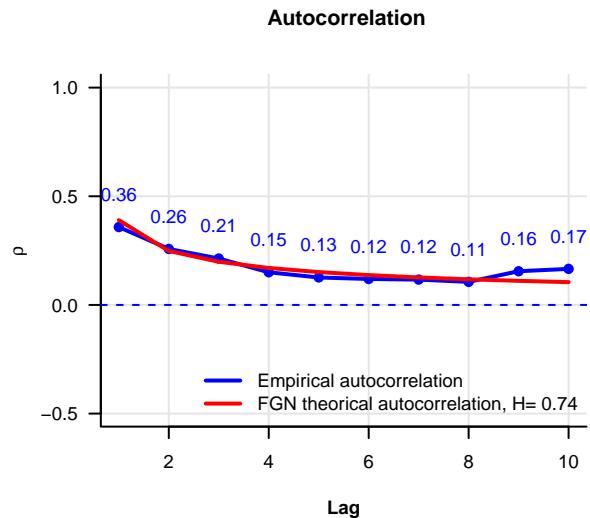
Estimated alpha = 1.98



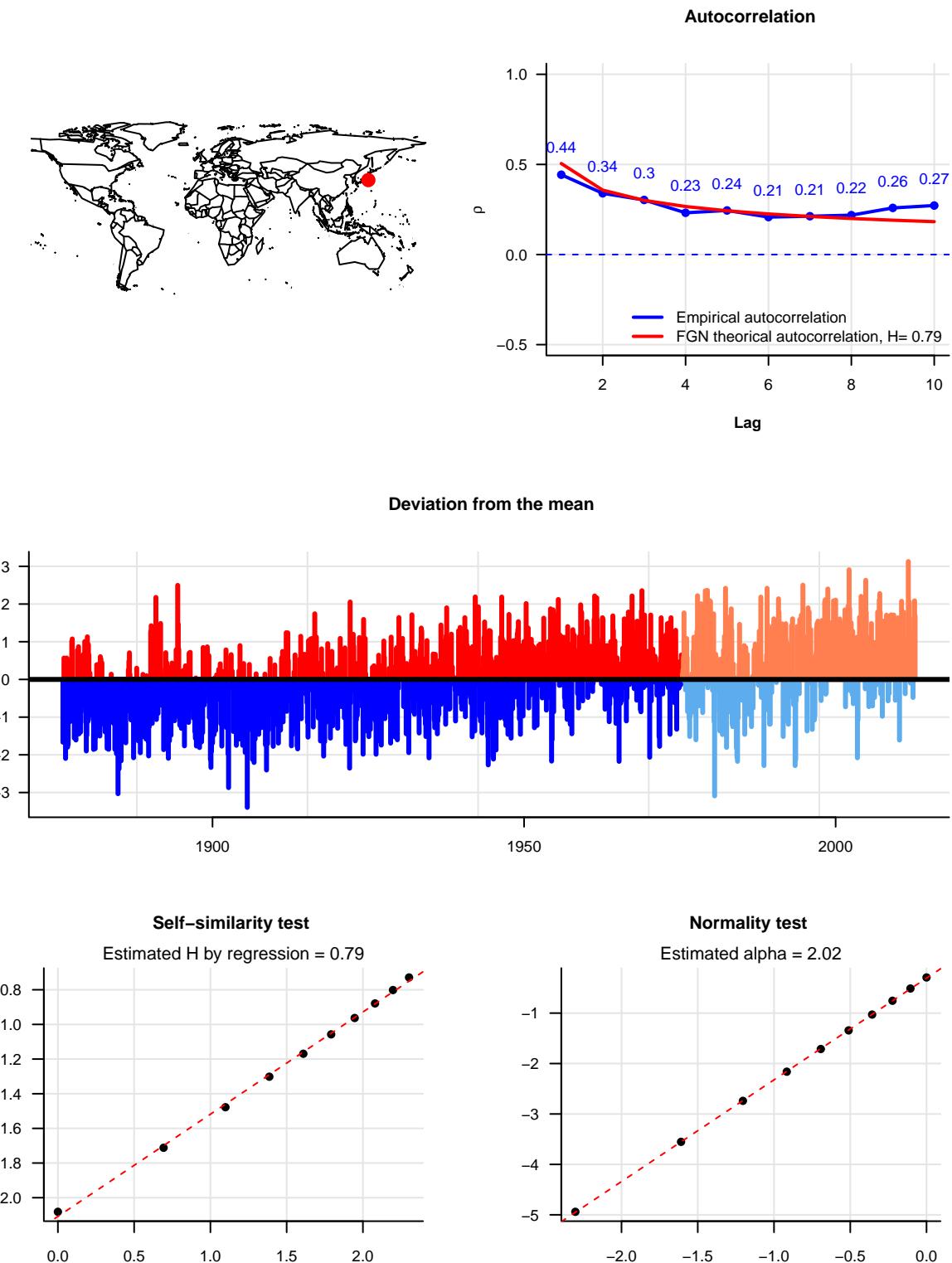
## Japan, Hiroshima



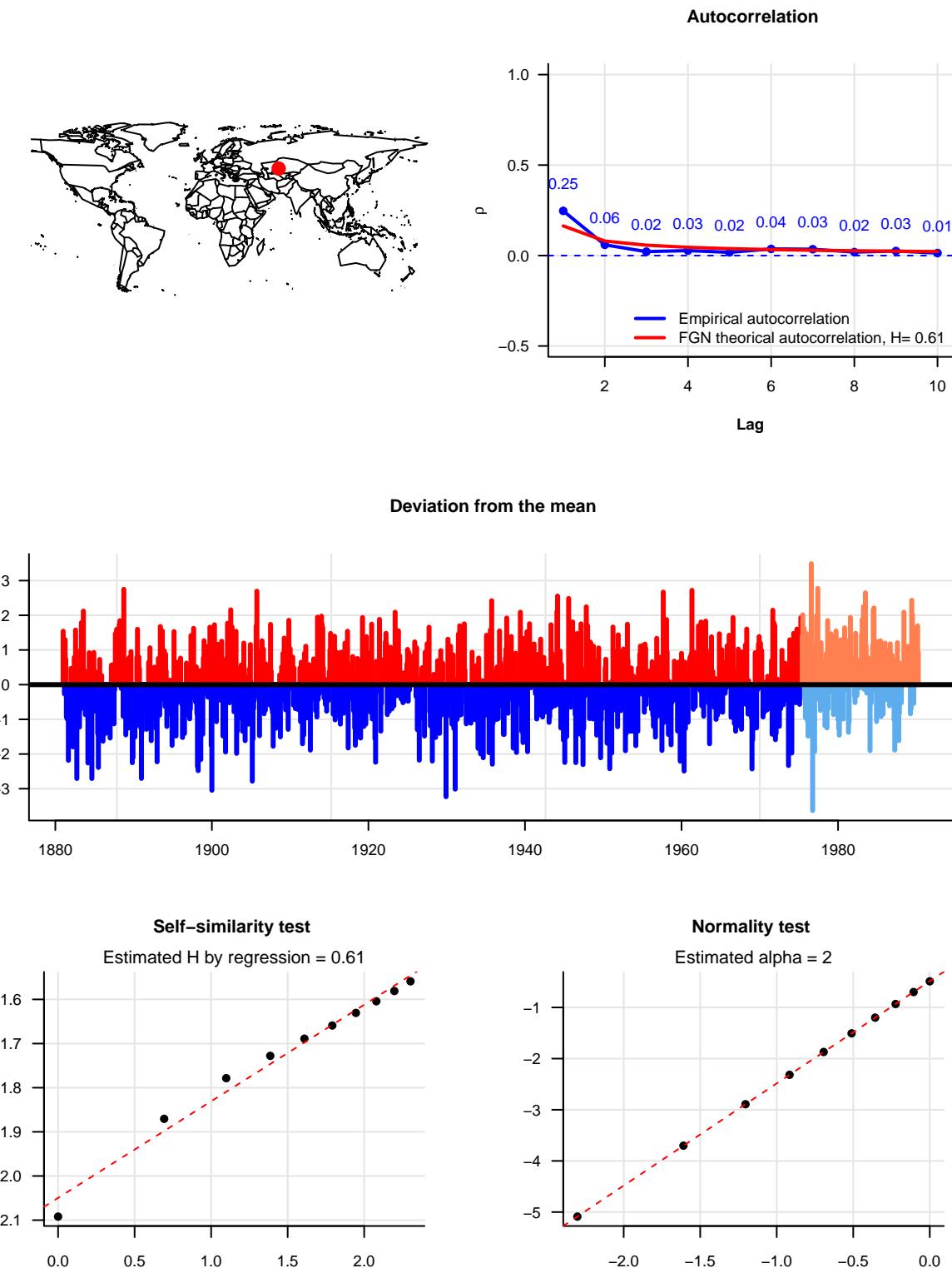
## Japan, Nagasaki



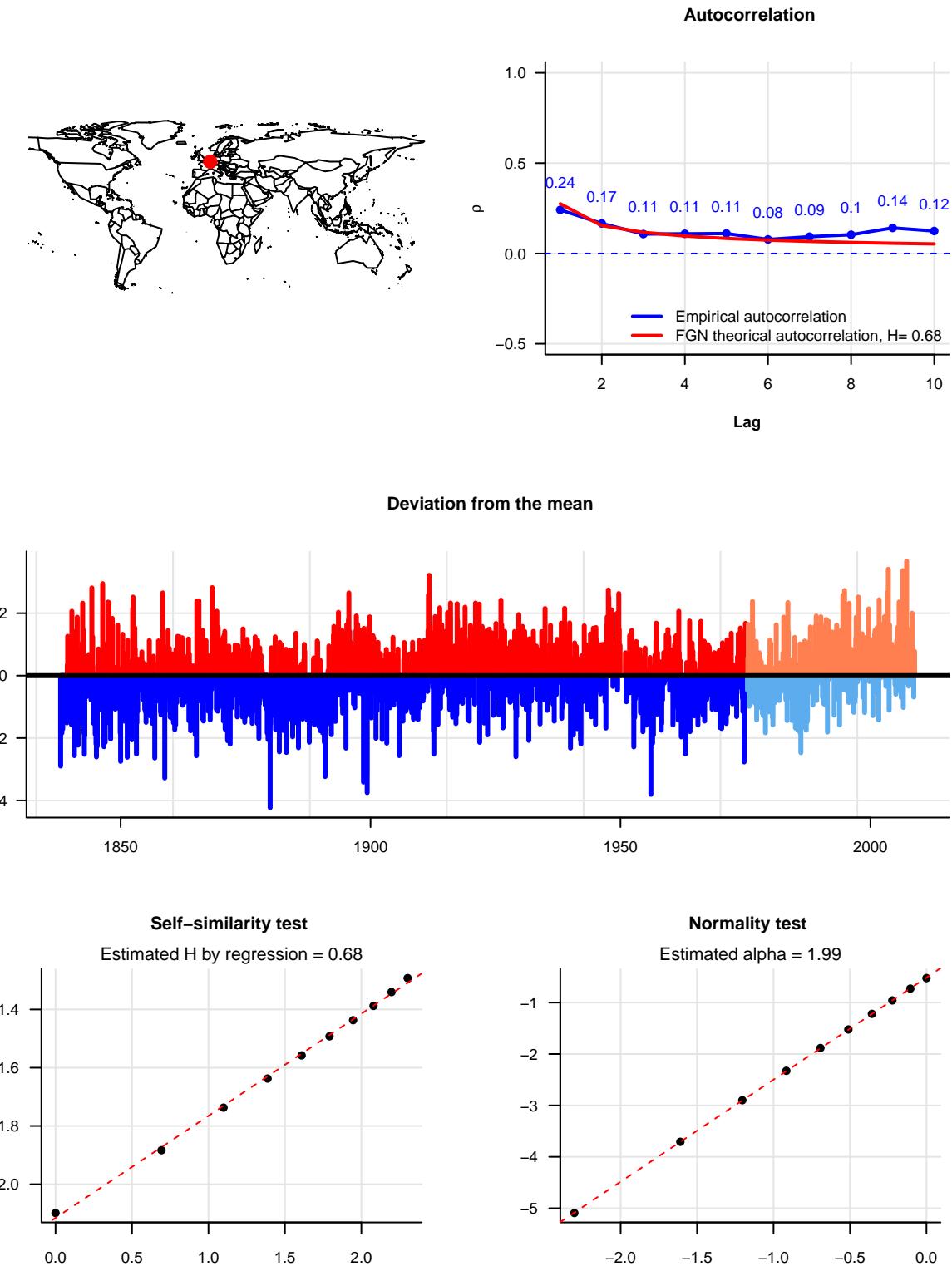
## Japan, Tokyo



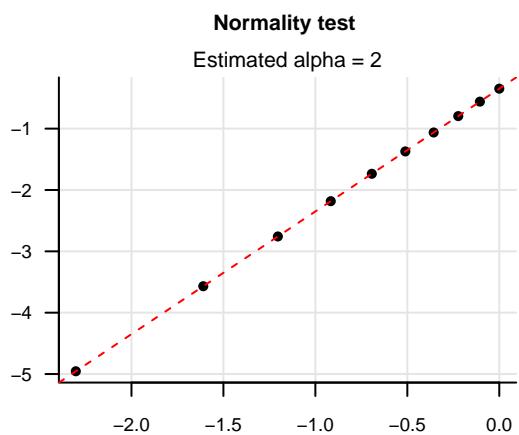
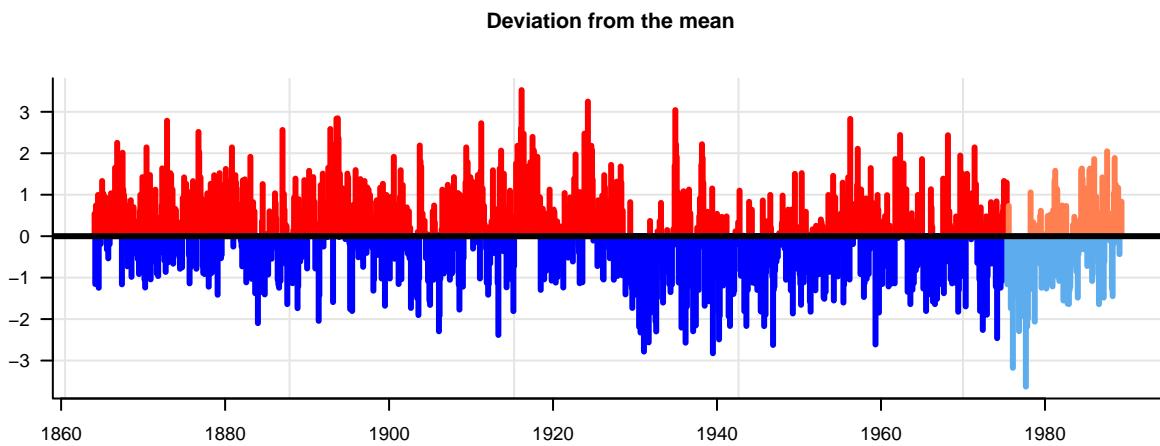
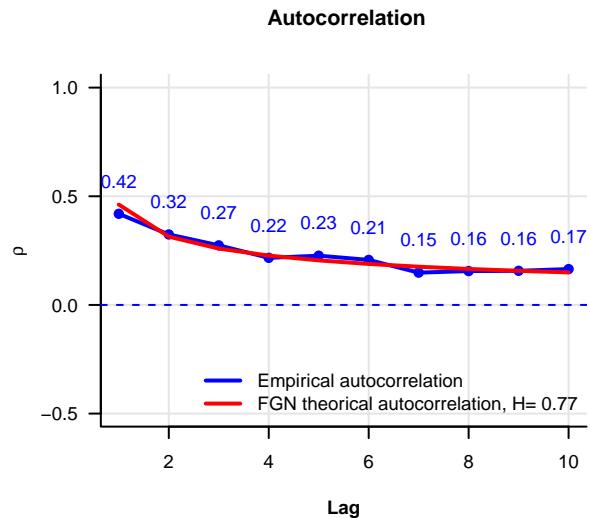
## Kazakhstan, Kazalinsk



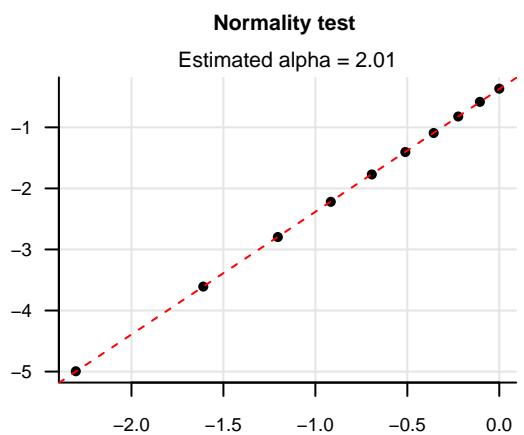
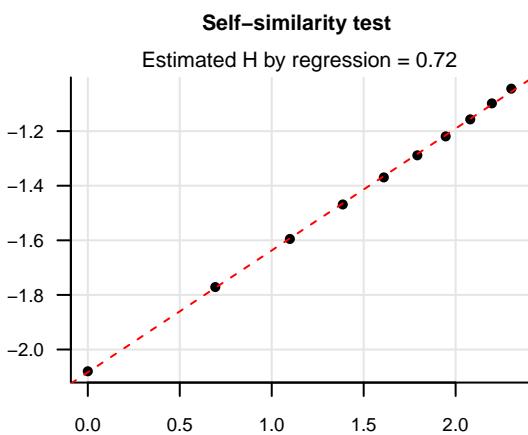
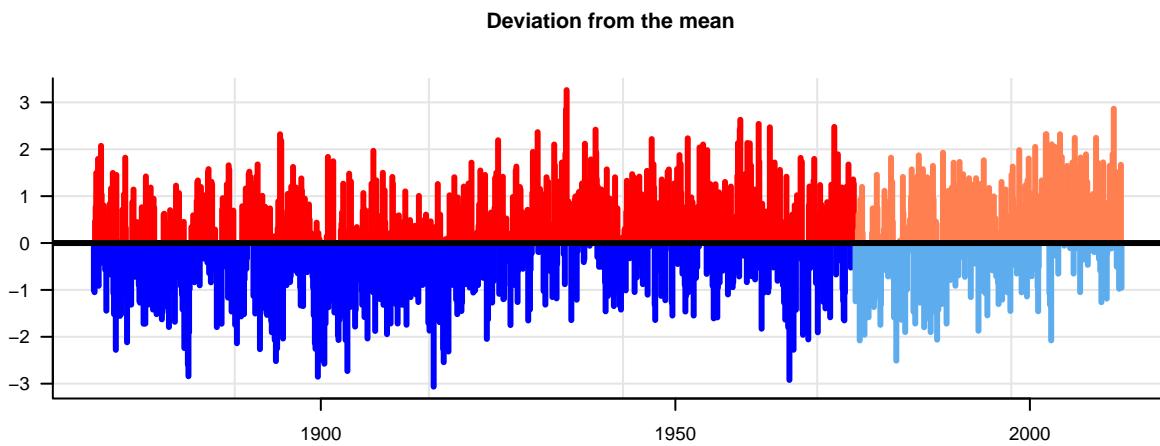
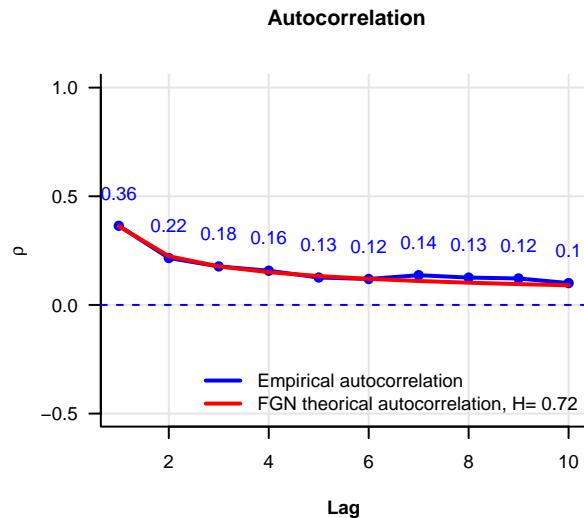
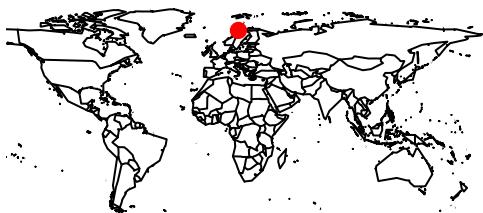
## Luxembourg, Luxembourg



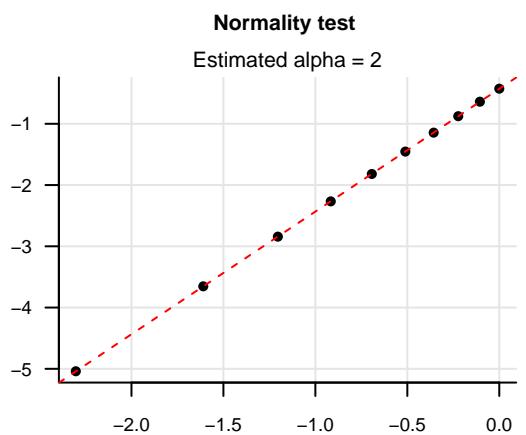
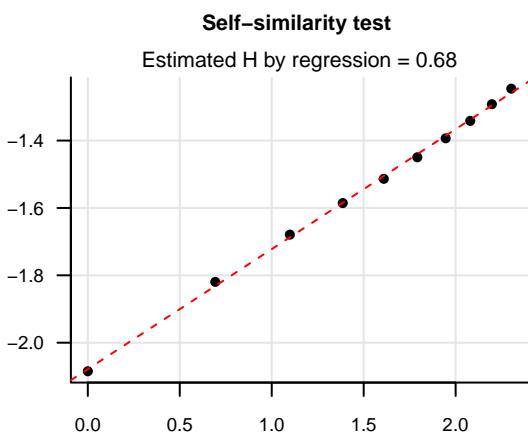
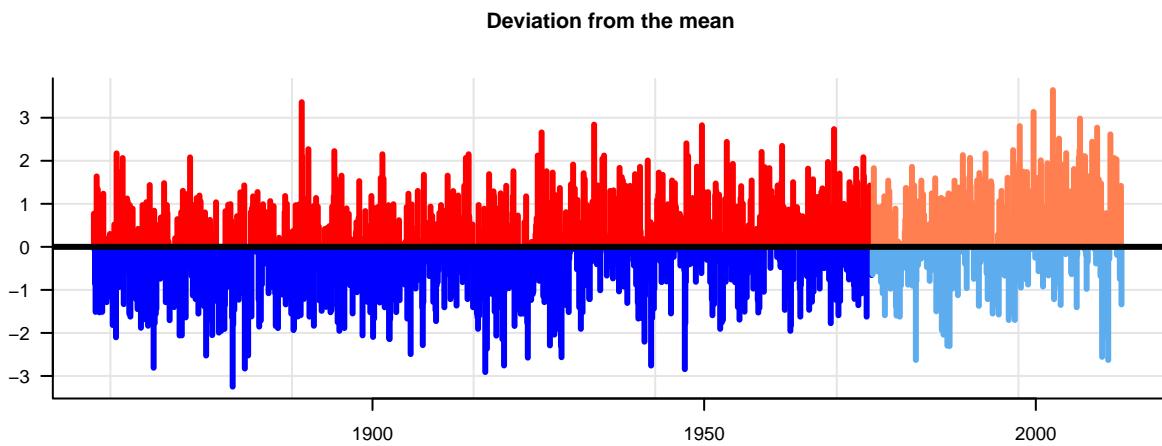
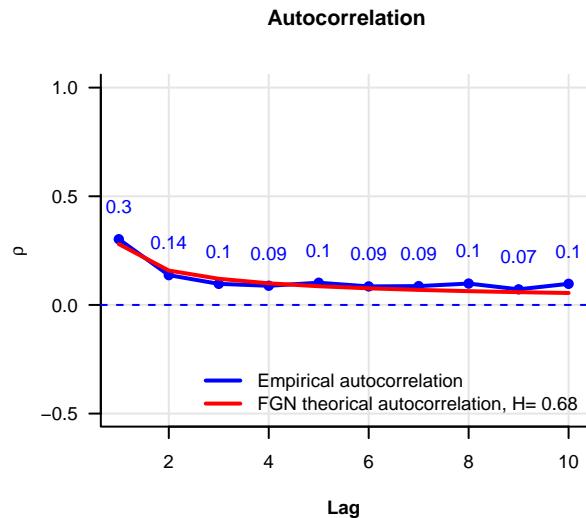
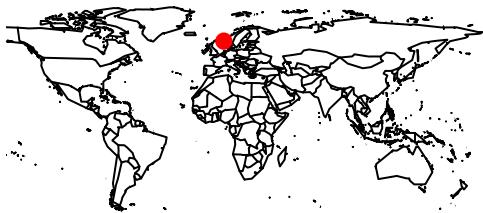
## New Zealand, Wellington



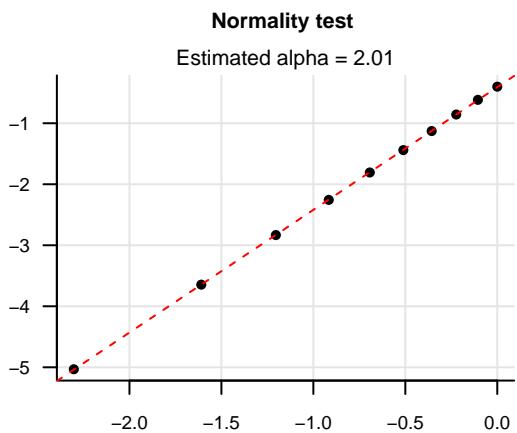
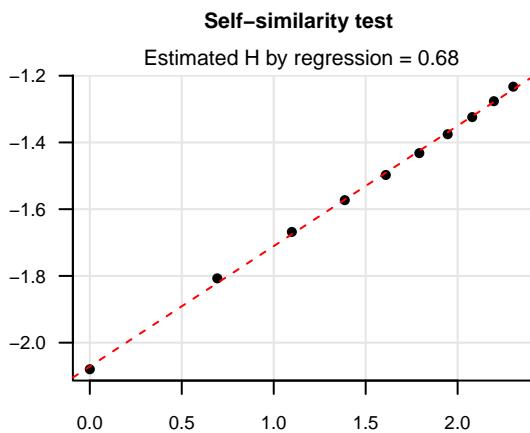
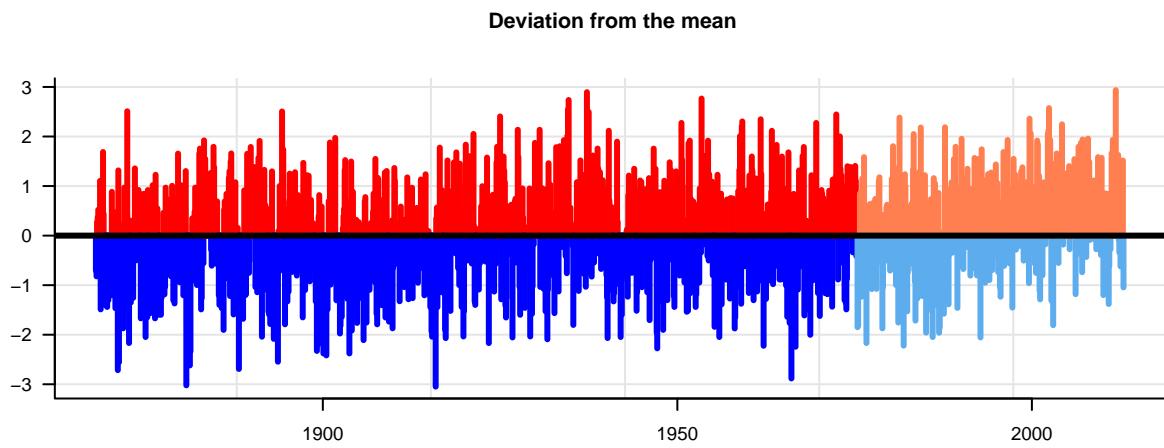
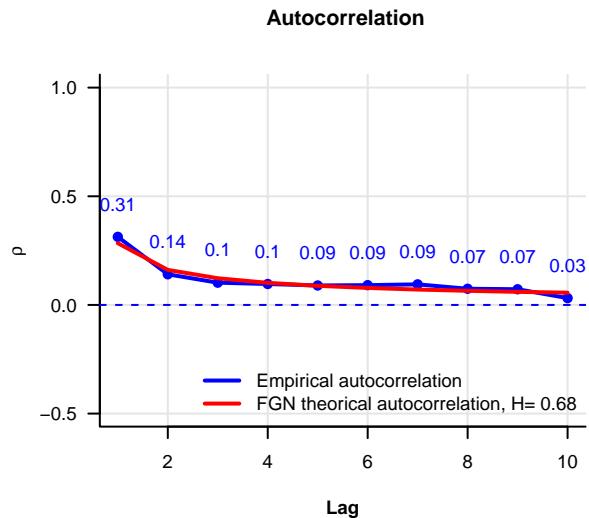
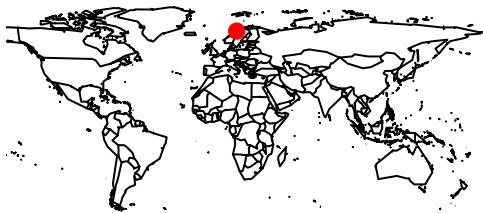
## Norway, Andoya



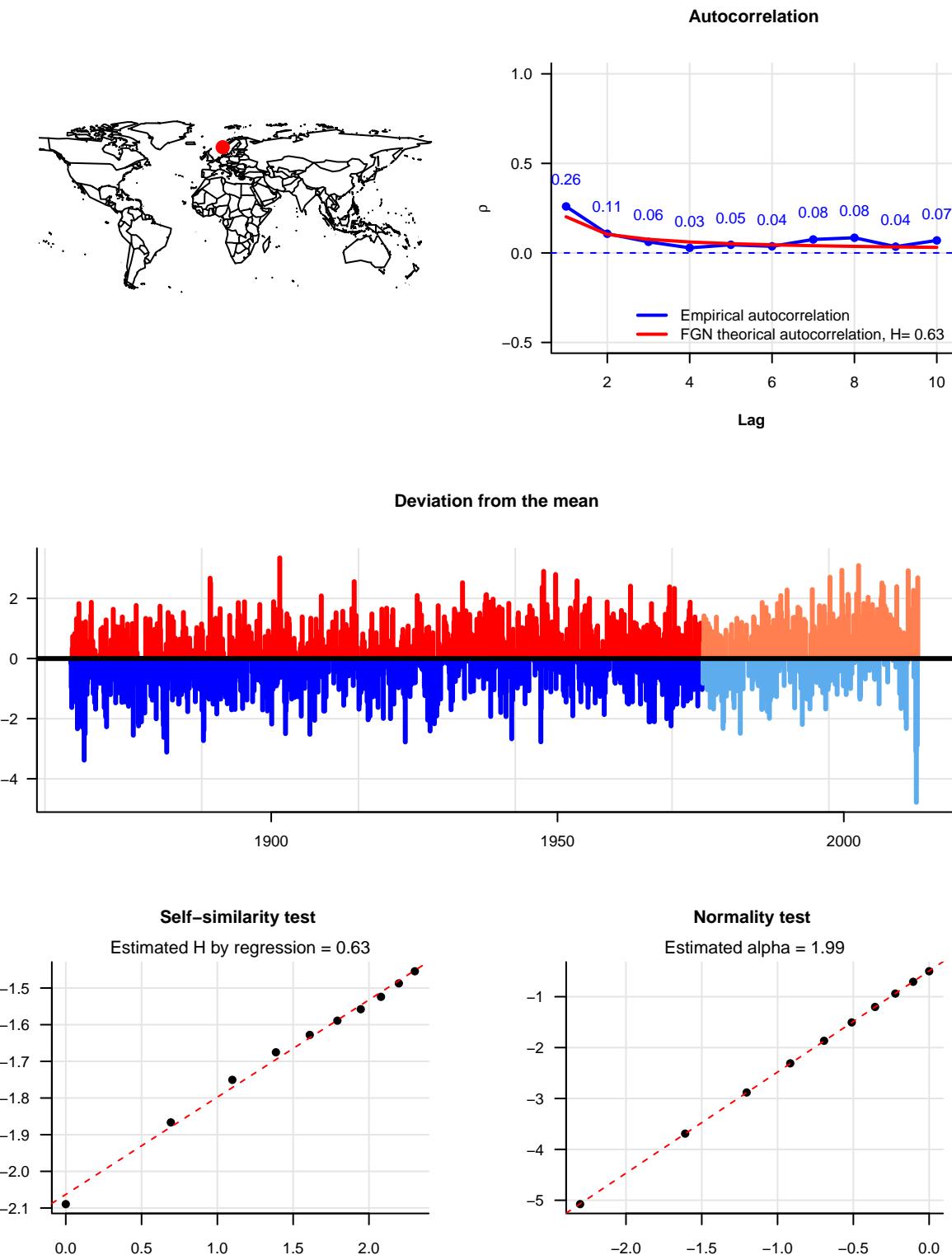
## Norway, Bergen



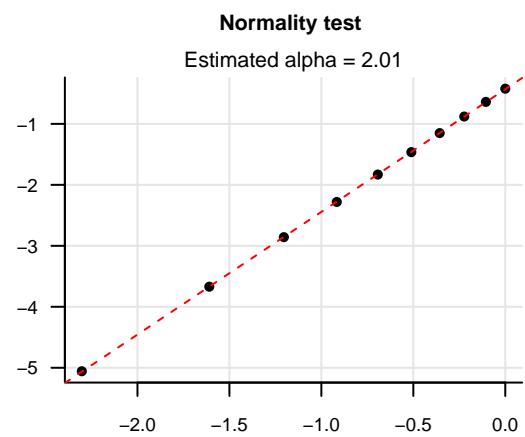
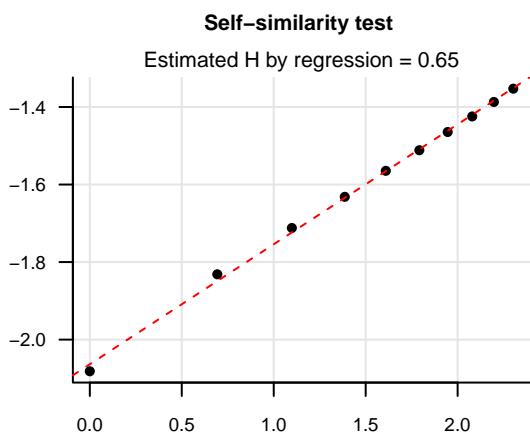
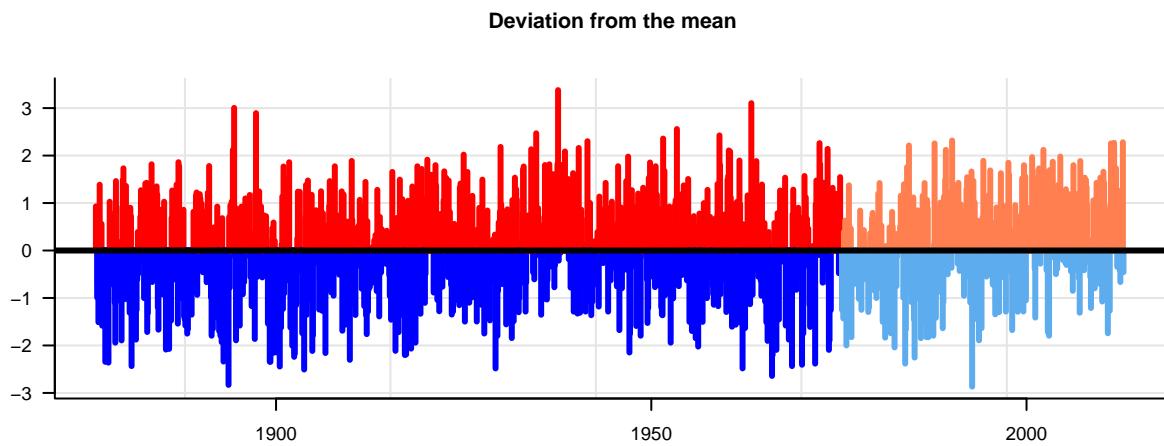
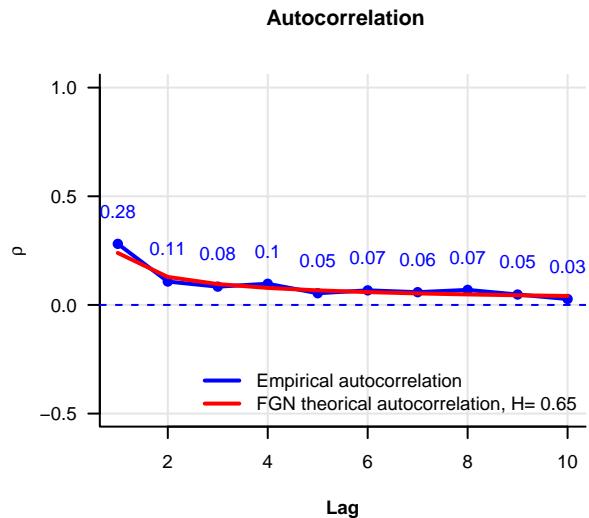
## Norway, Bodo



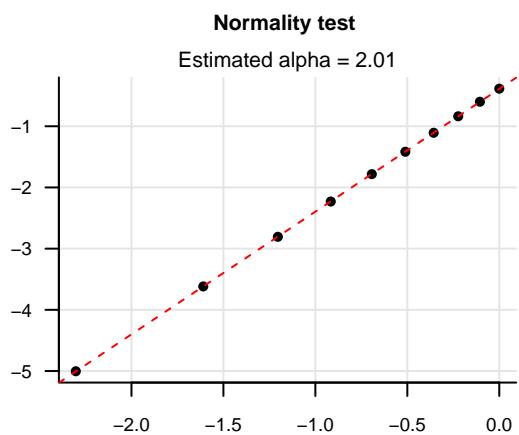
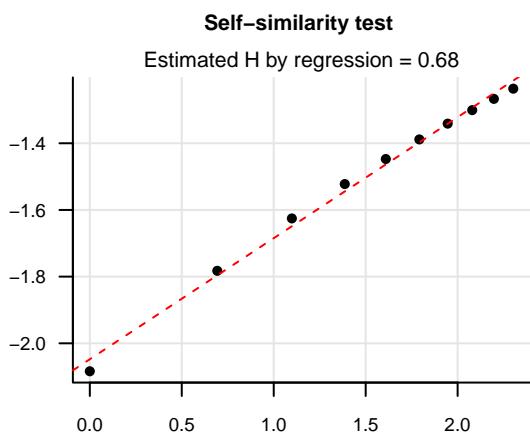
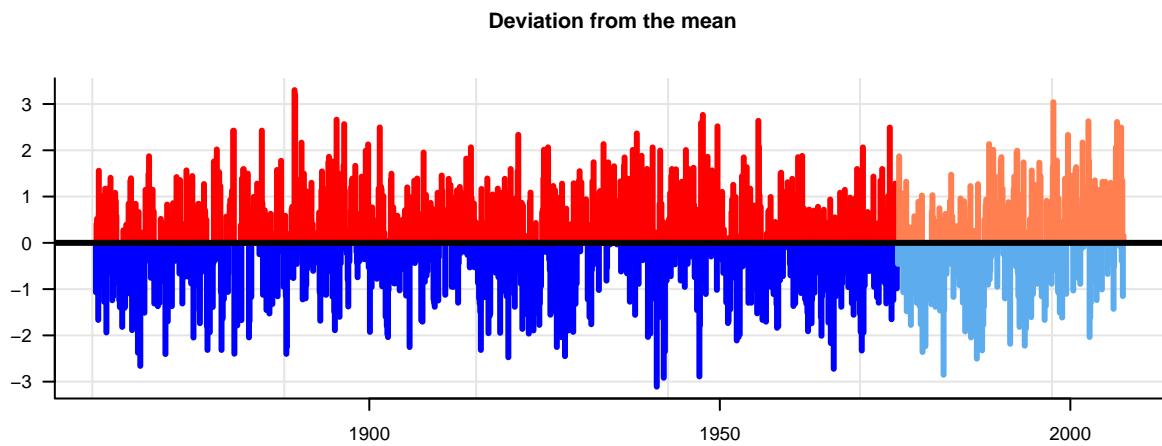
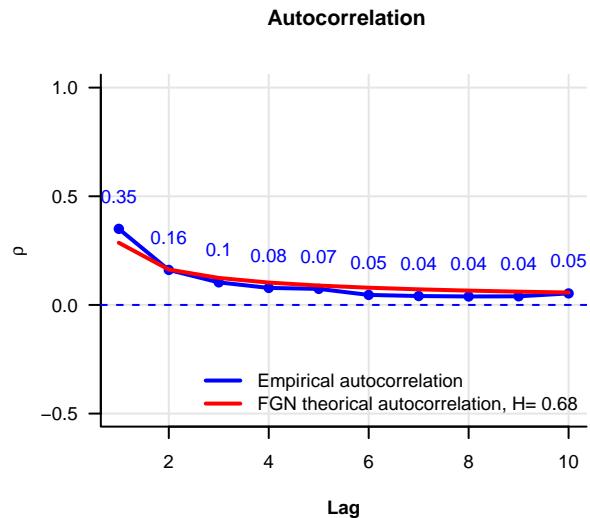
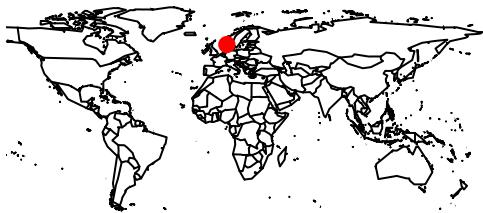
## Norway, Dombas



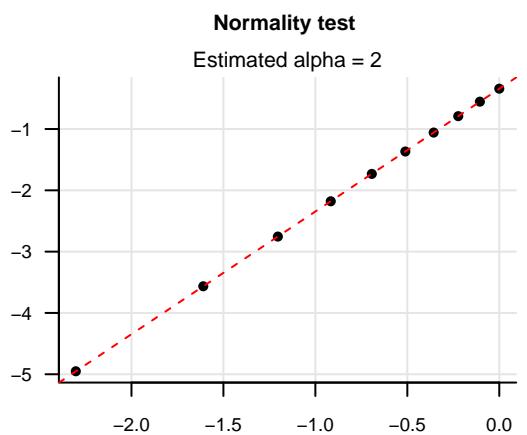
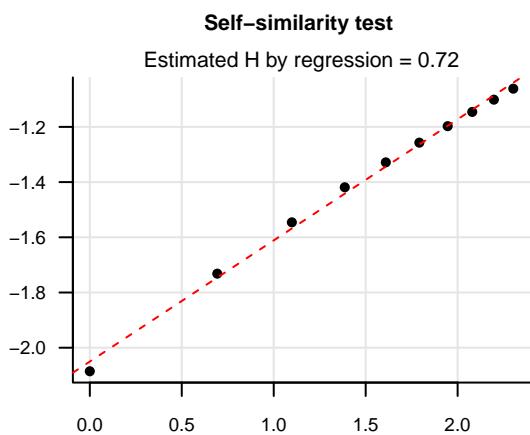
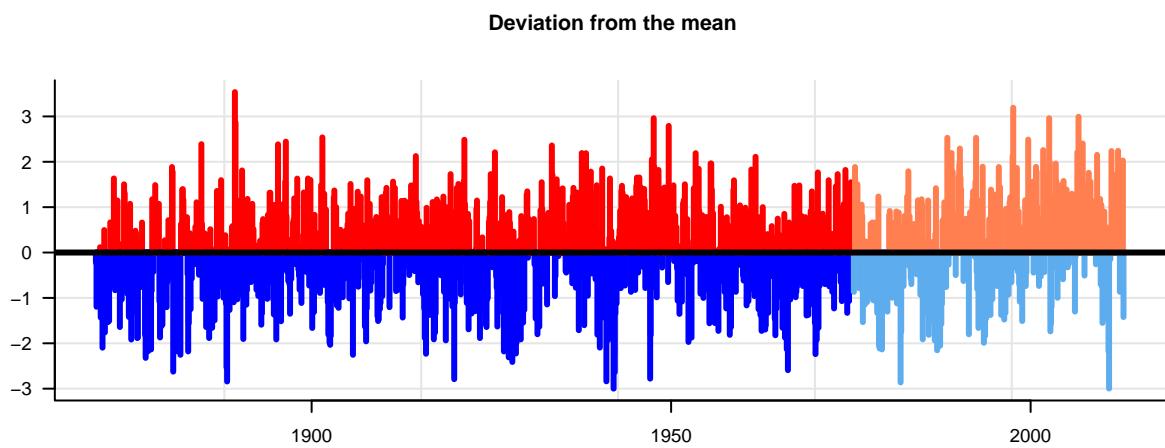
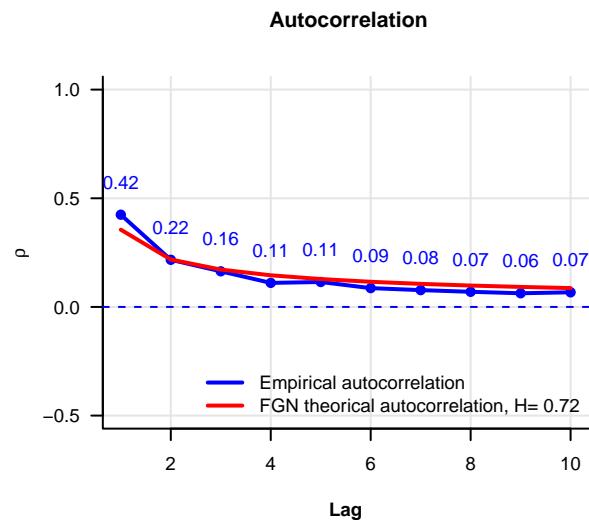
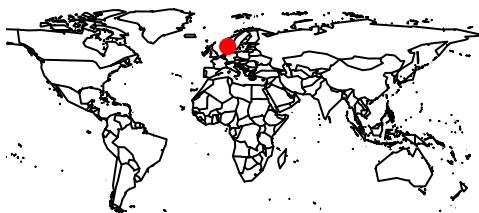
## Norway, Karasjok



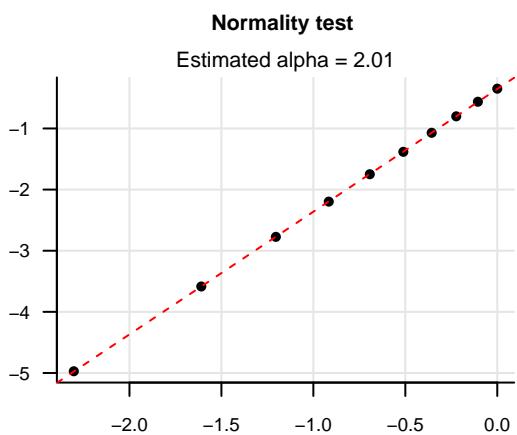
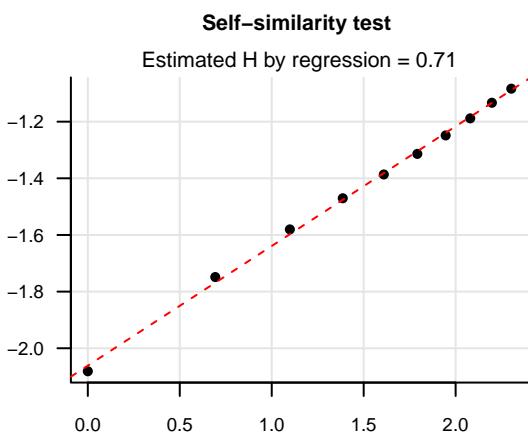
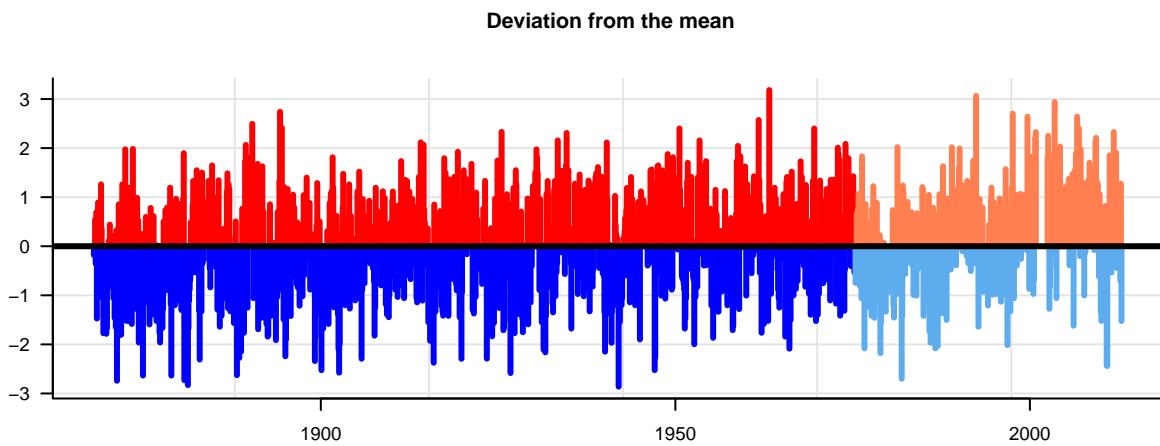
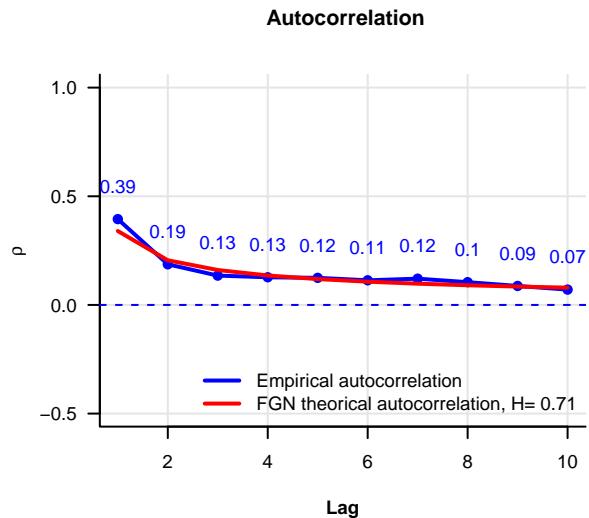
## Norway, Mandal



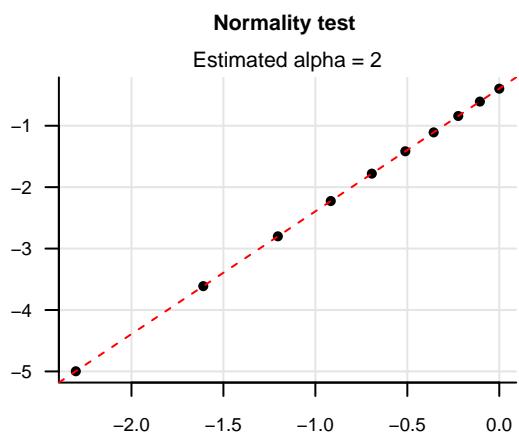
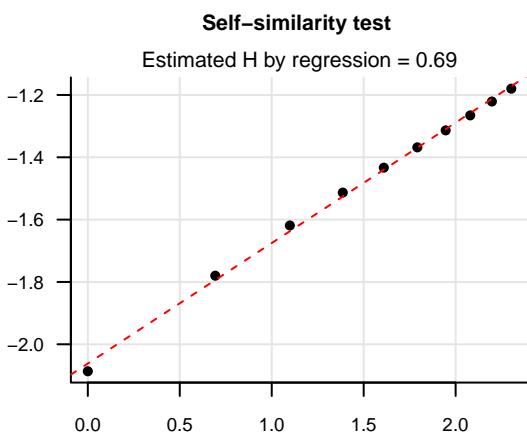
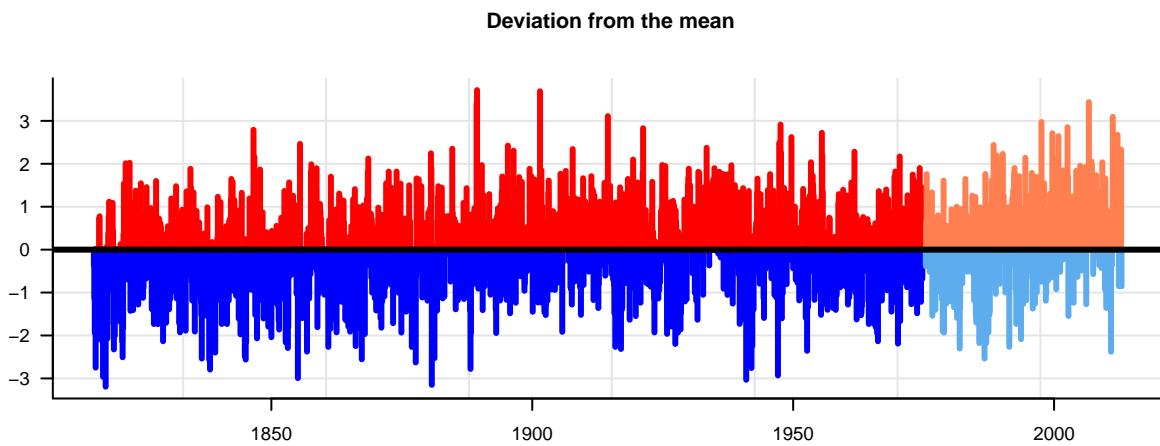
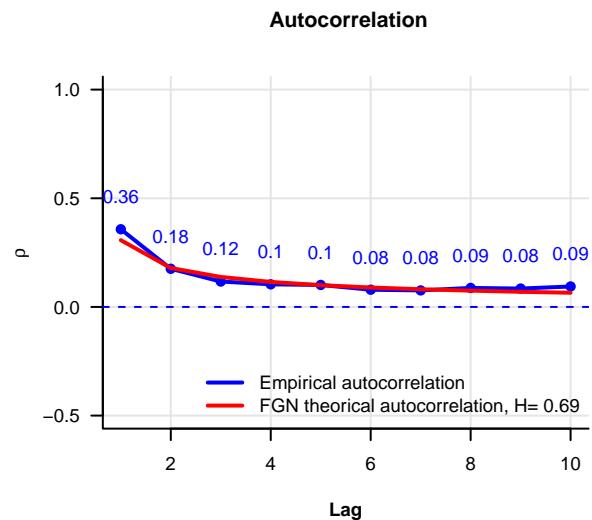
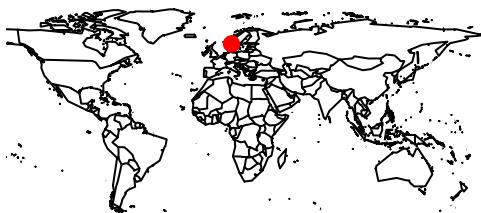
## Norway, Oksoy Lighthouse



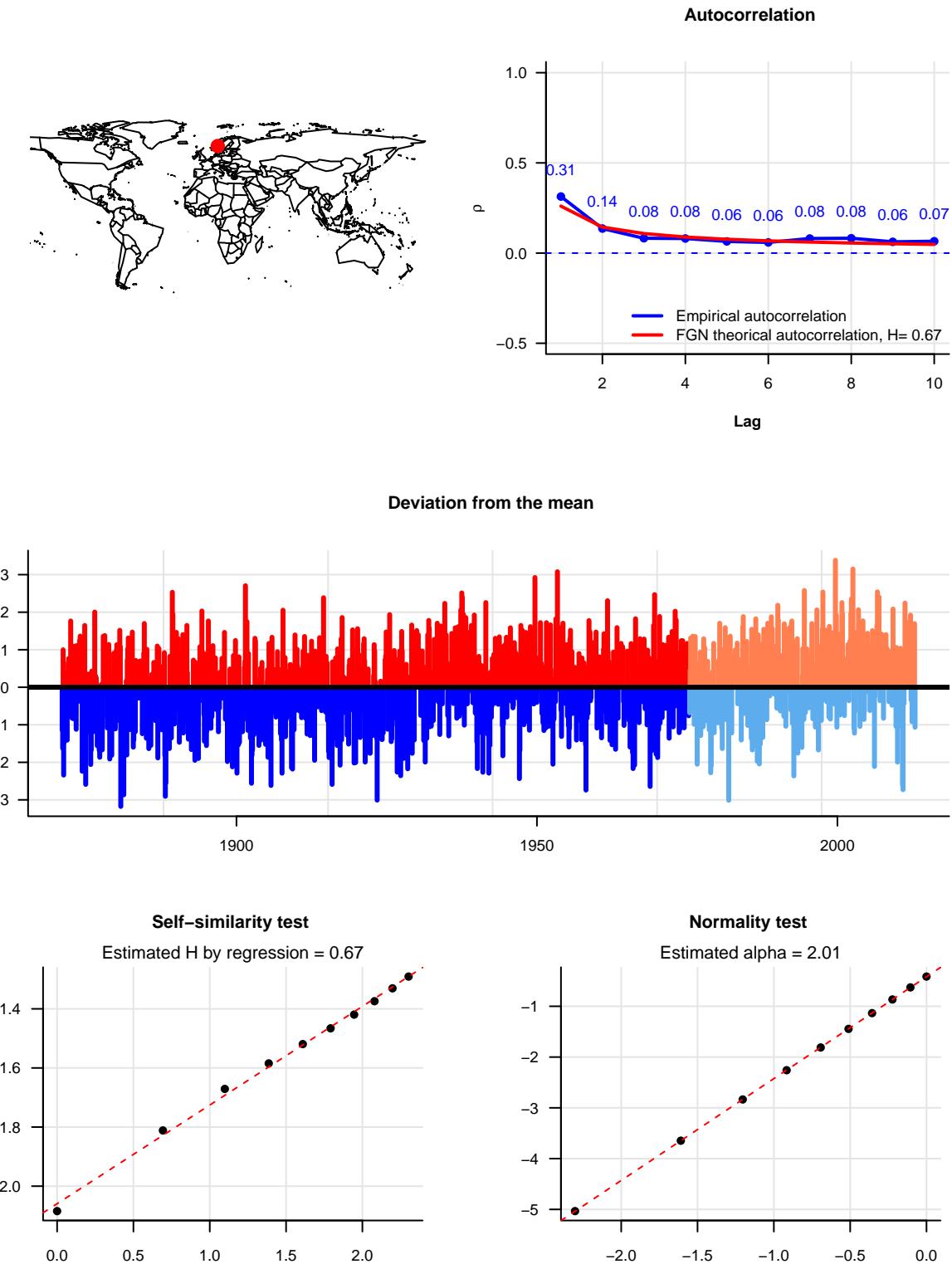
## Norway, Ona



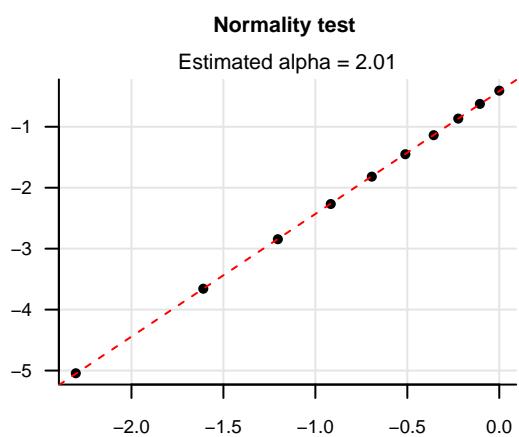
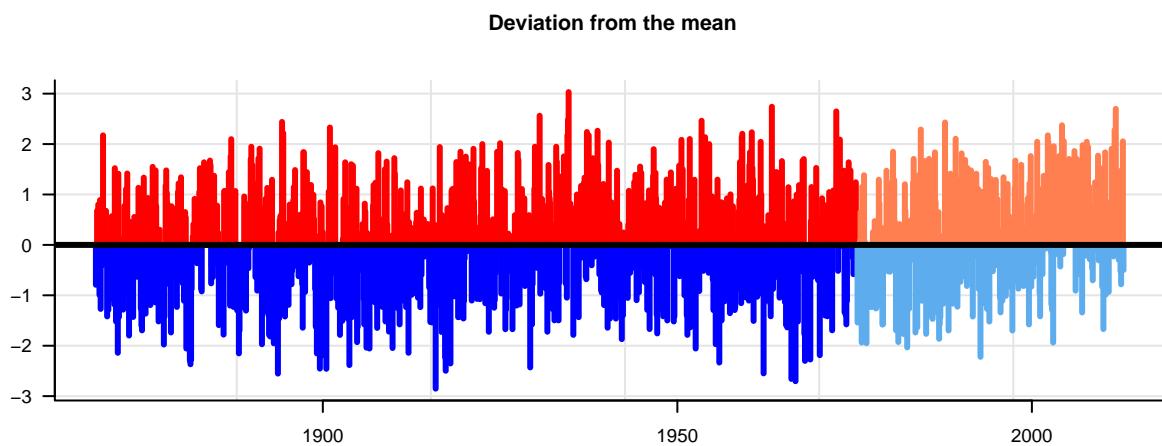
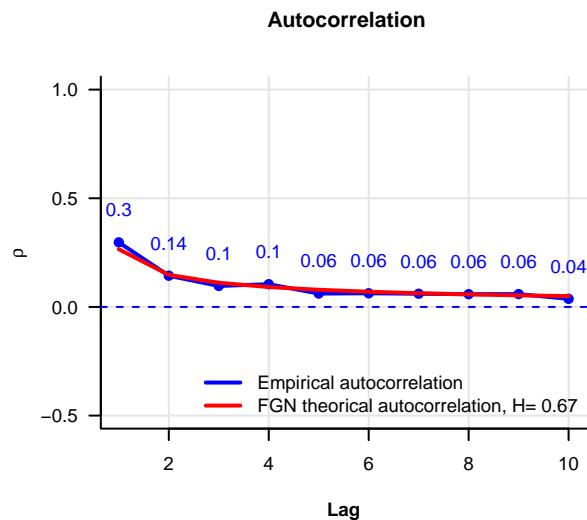
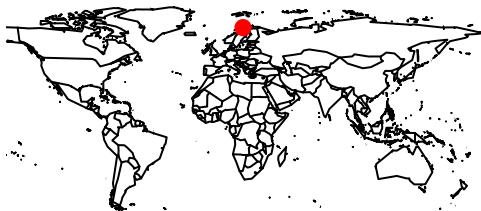
## Norway, Oslo



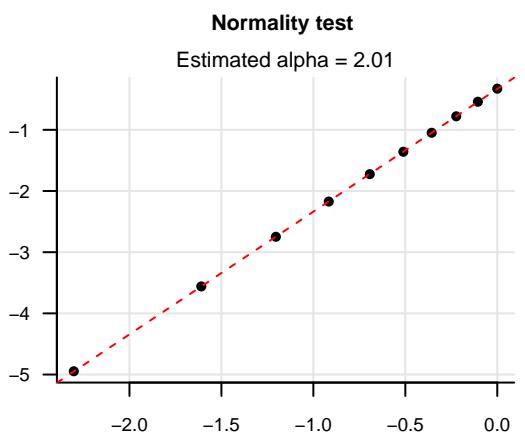
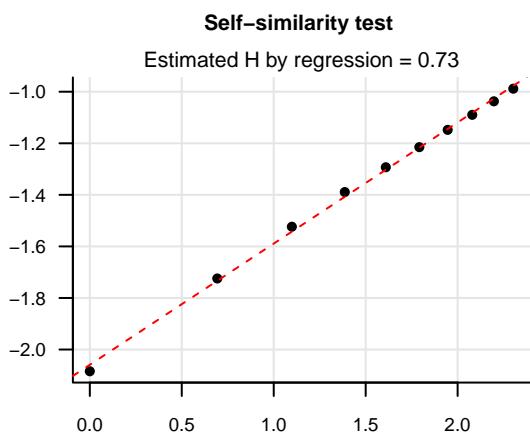
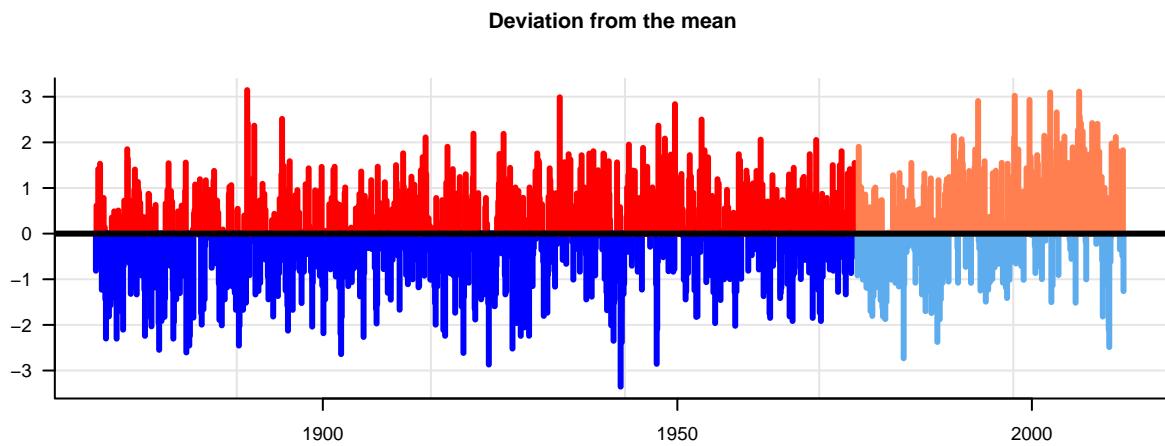
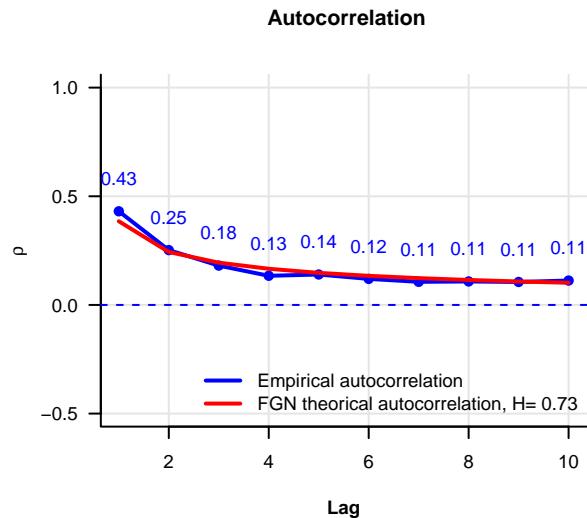
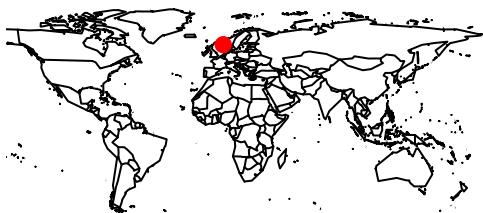
## Norway, Roros



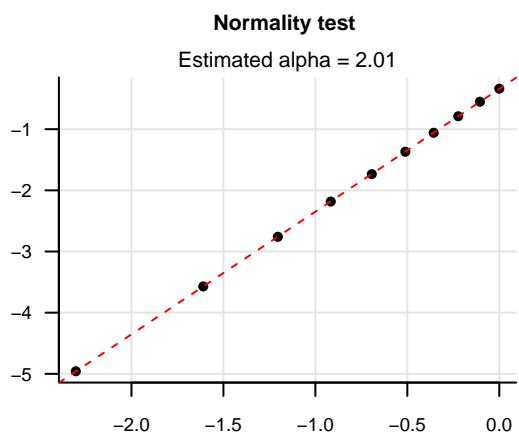
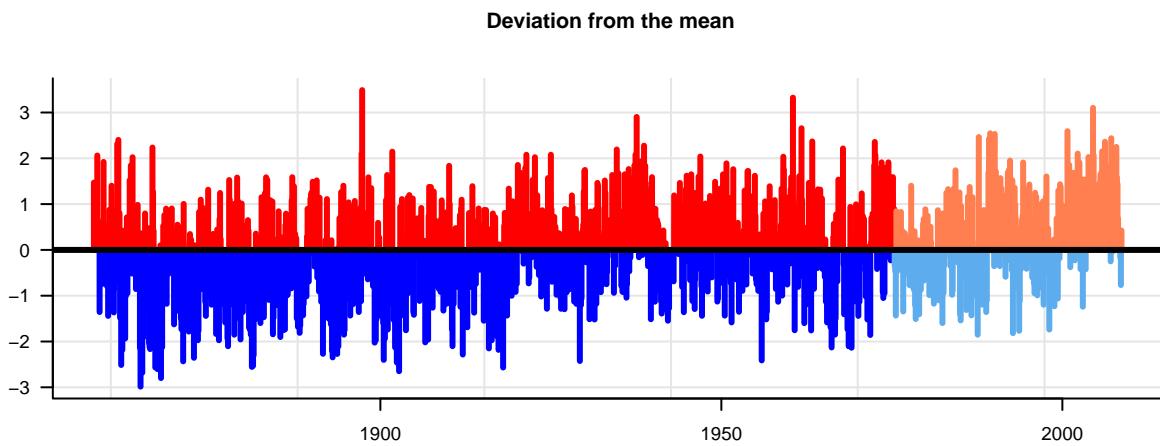
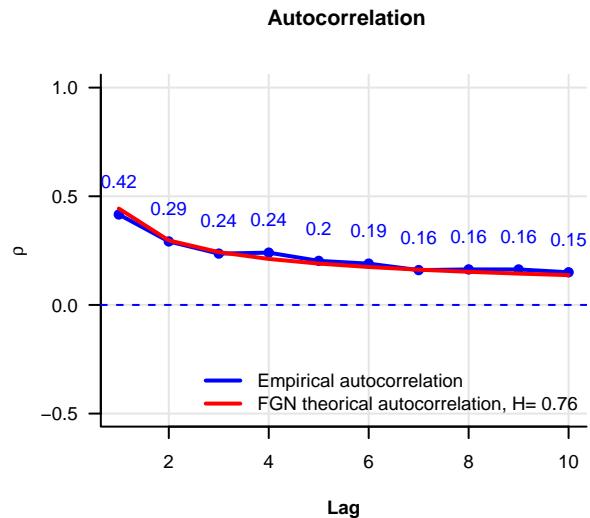
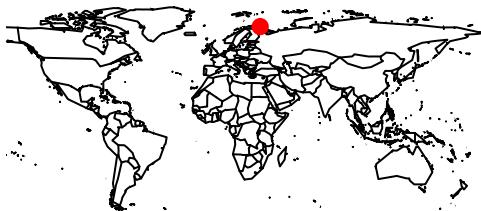
## Norway, Tromso



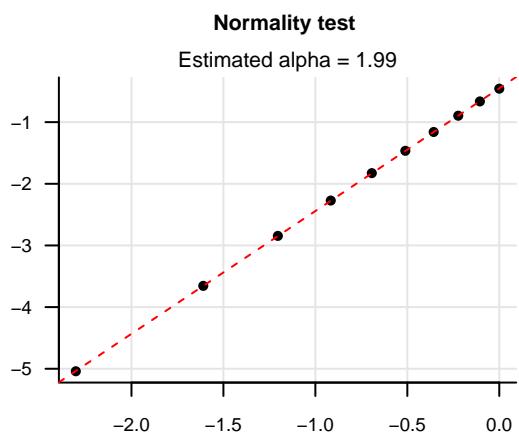
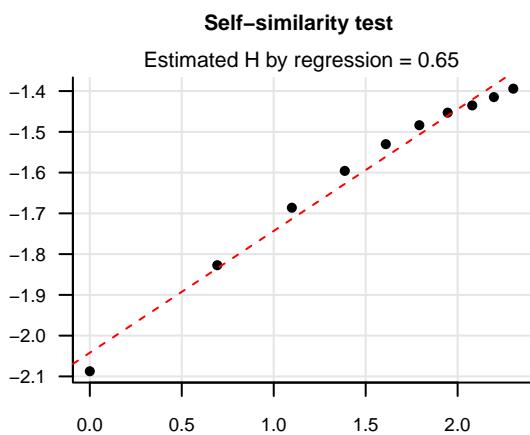
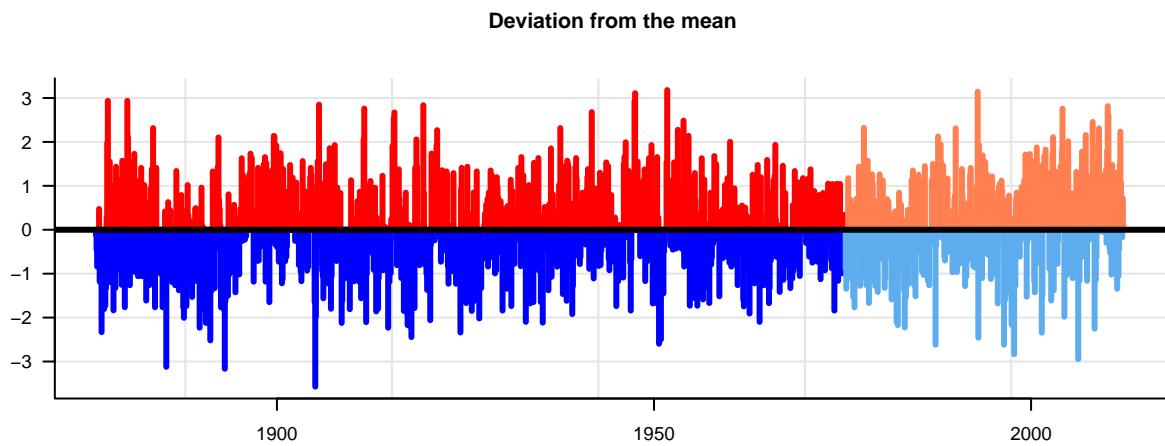
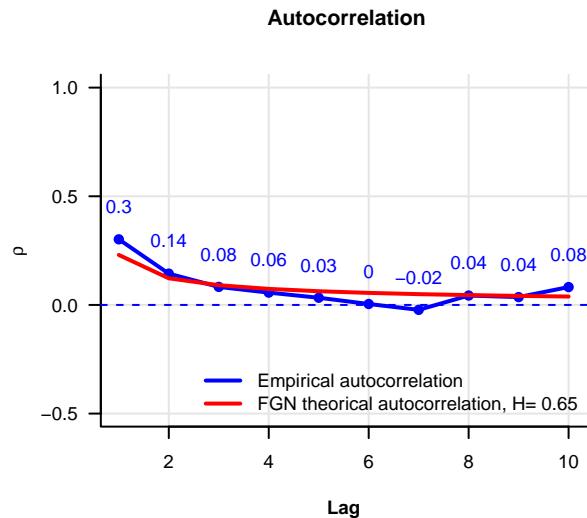
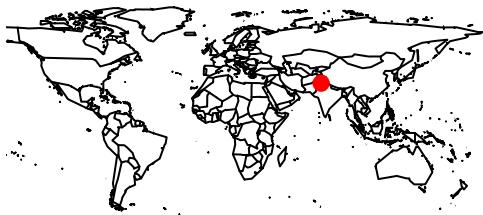
## Norway, Utsira



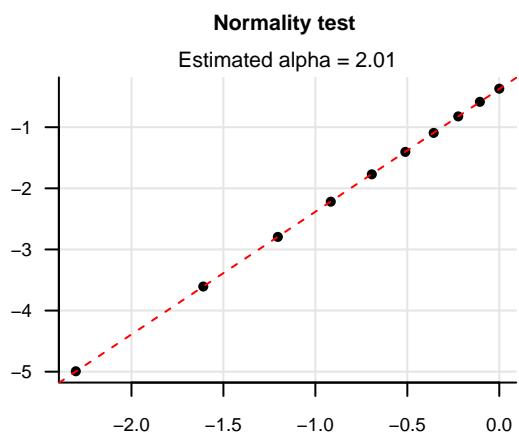
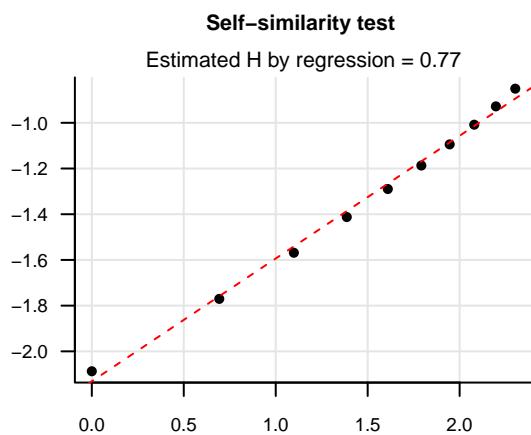
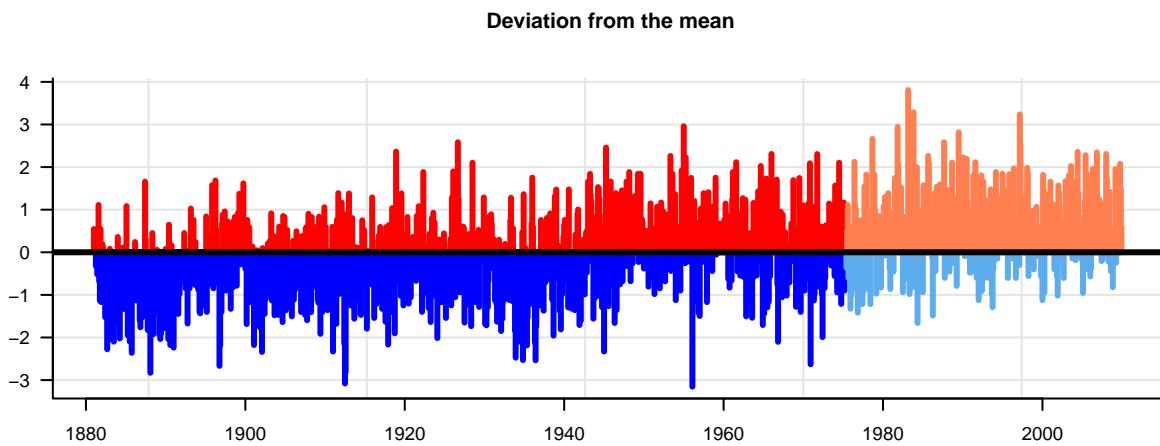
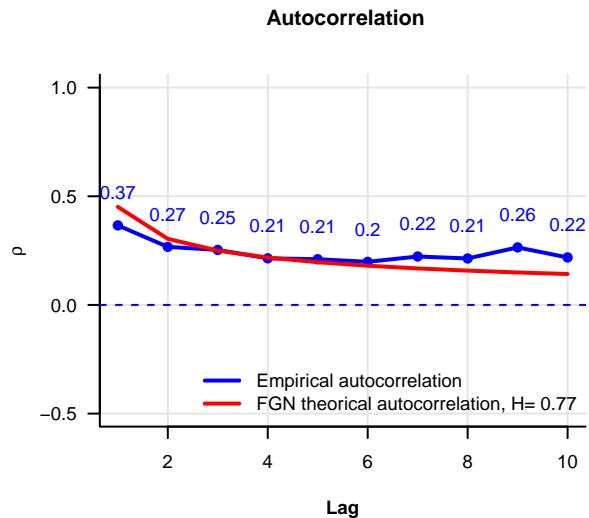
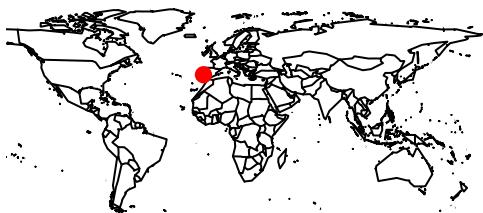
## Norway, Vardo



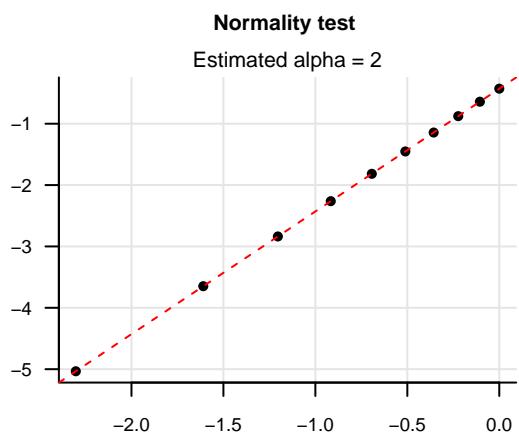
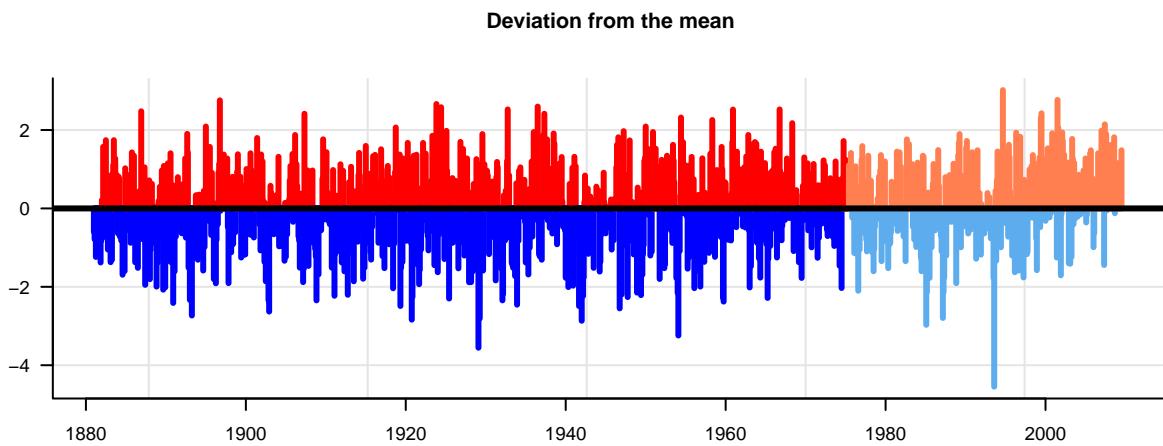
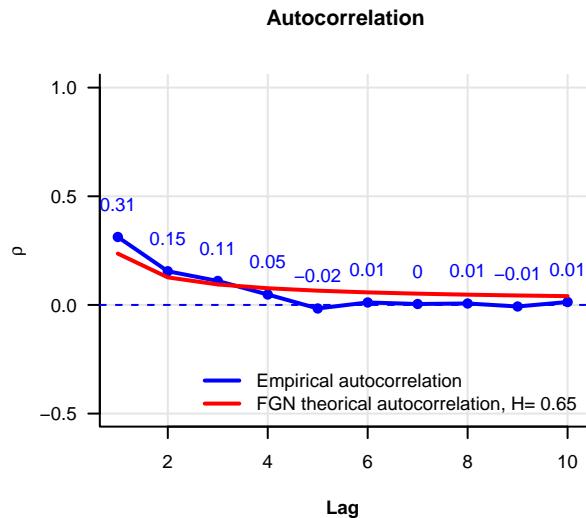
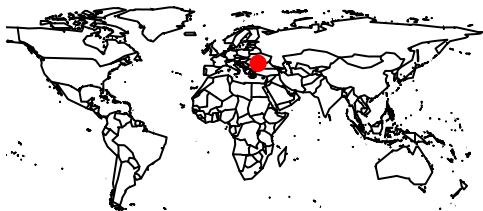
## Pakistan, Lahore



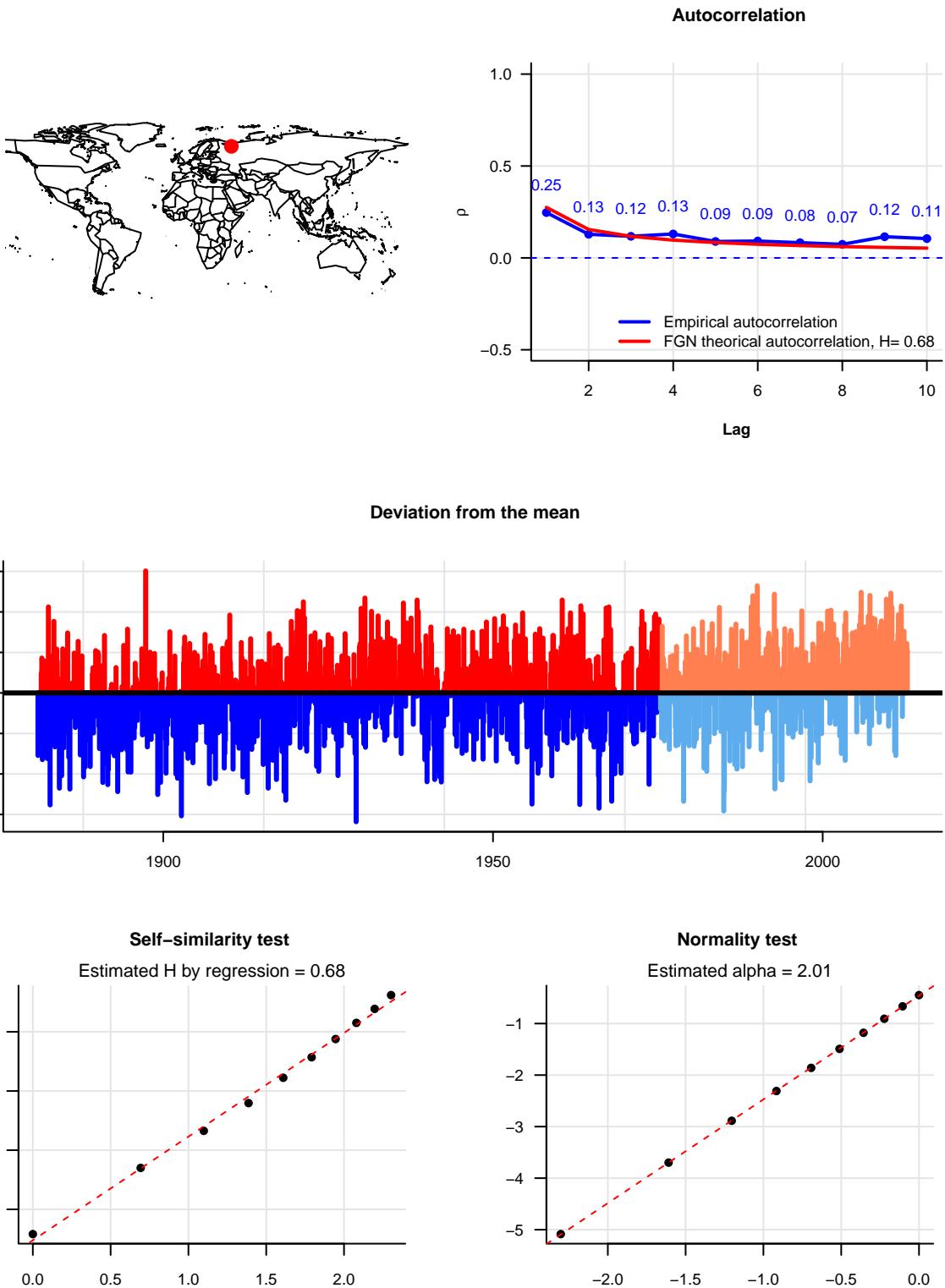
## Portugal, Lisbon



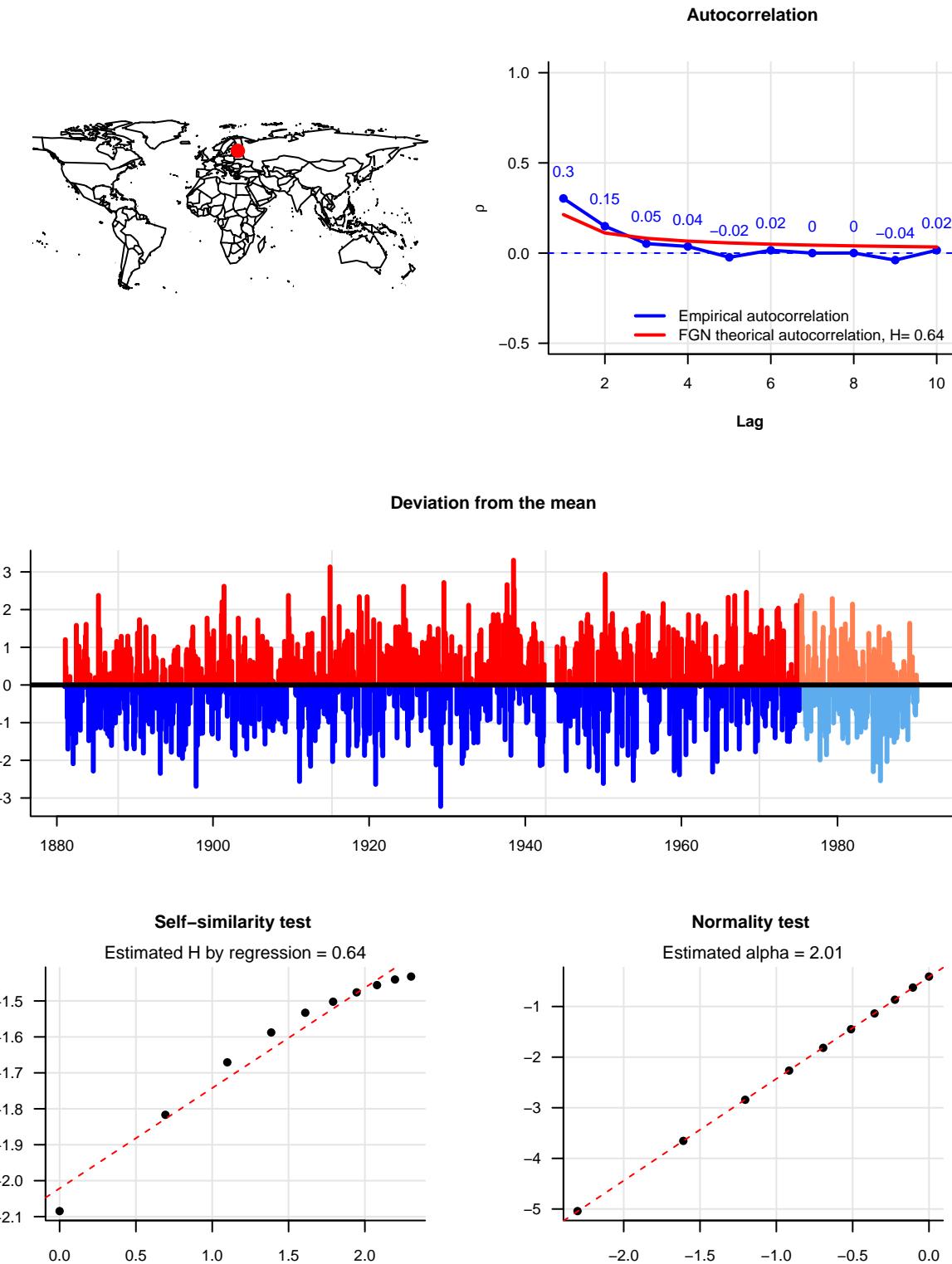
## Romania, Sulina



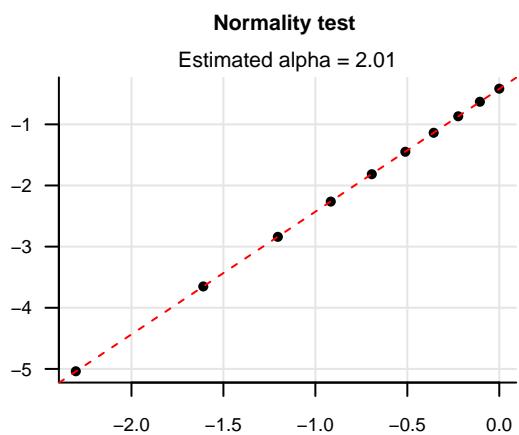
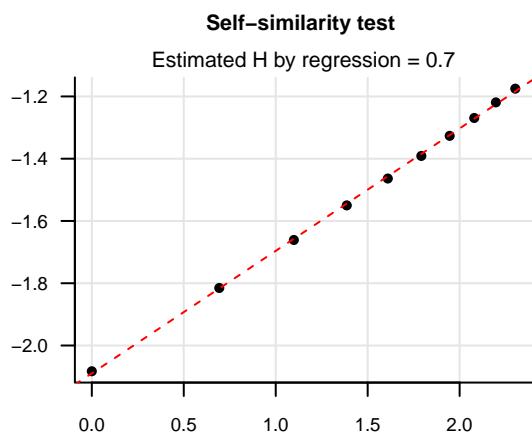
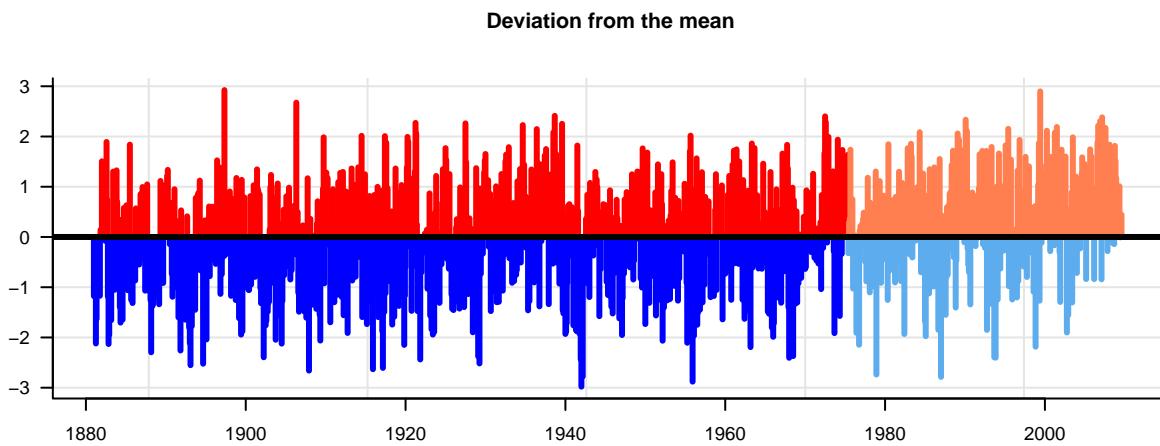
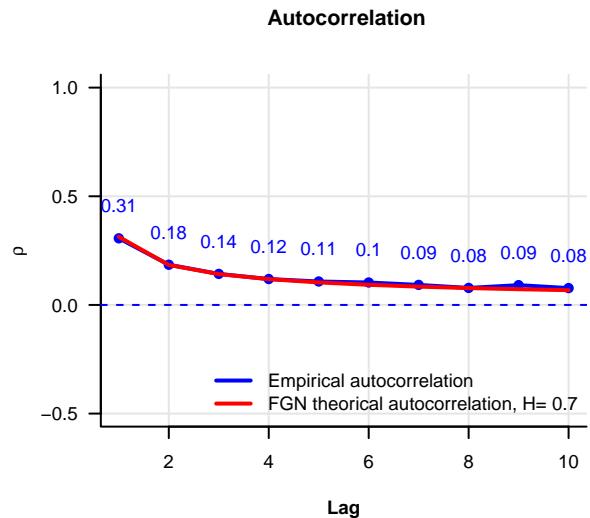
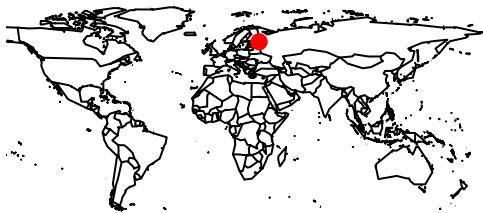
## Russia, Archangelsk



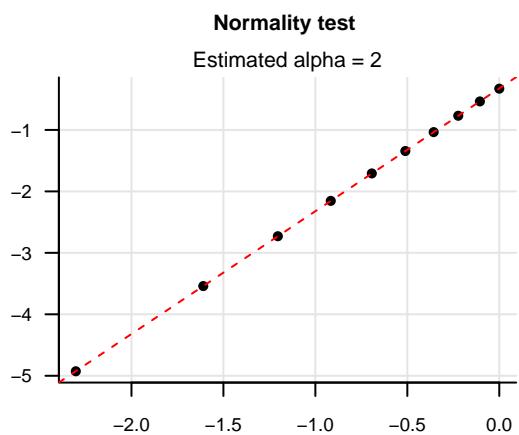
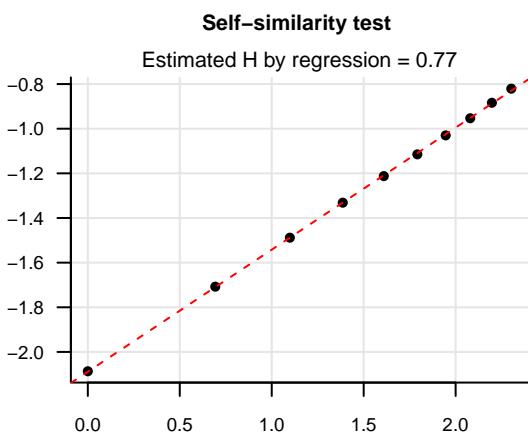
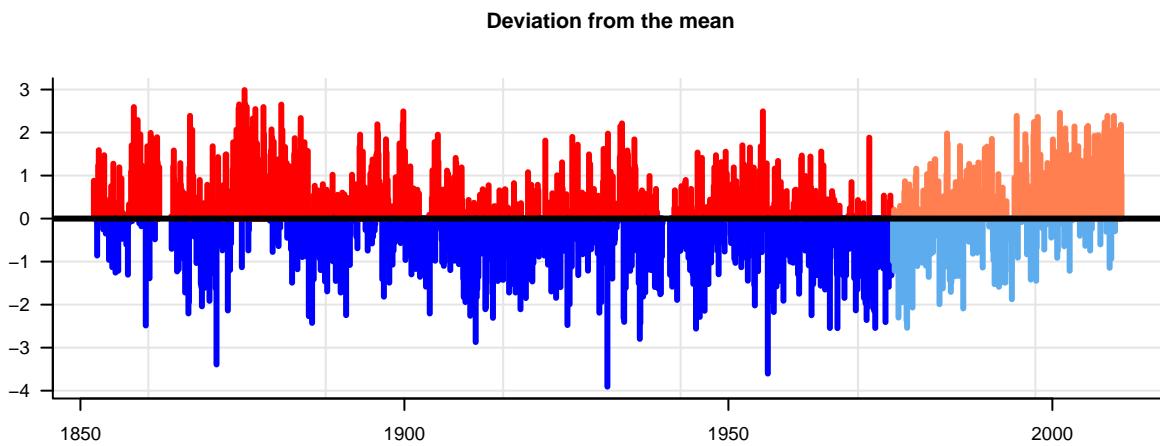
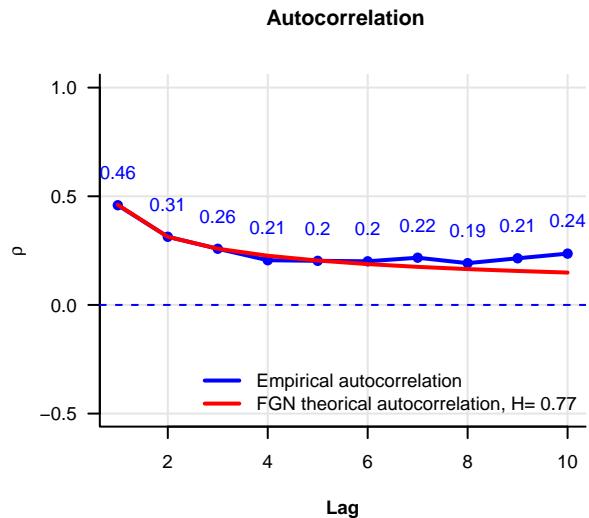
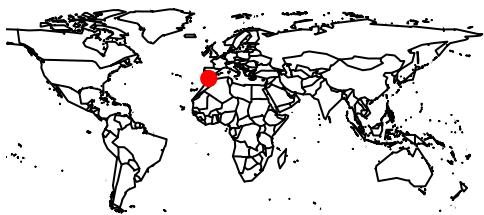
## Russia, Sort



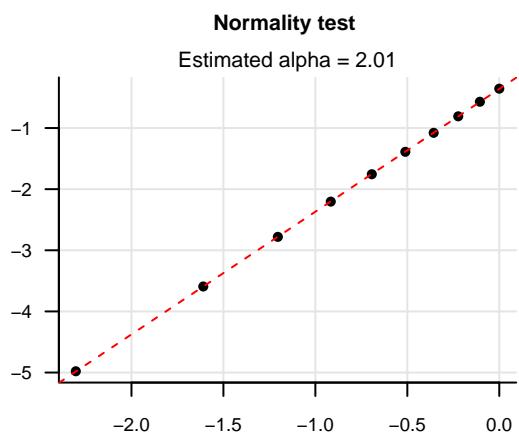
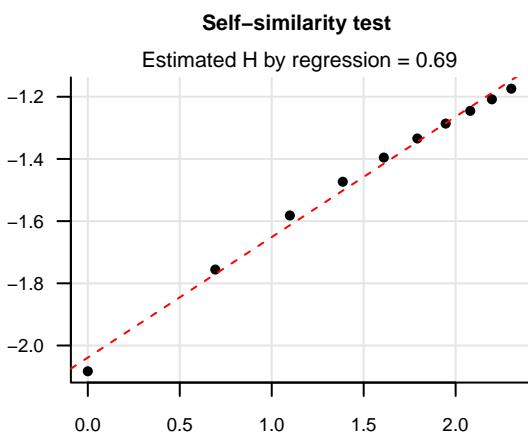
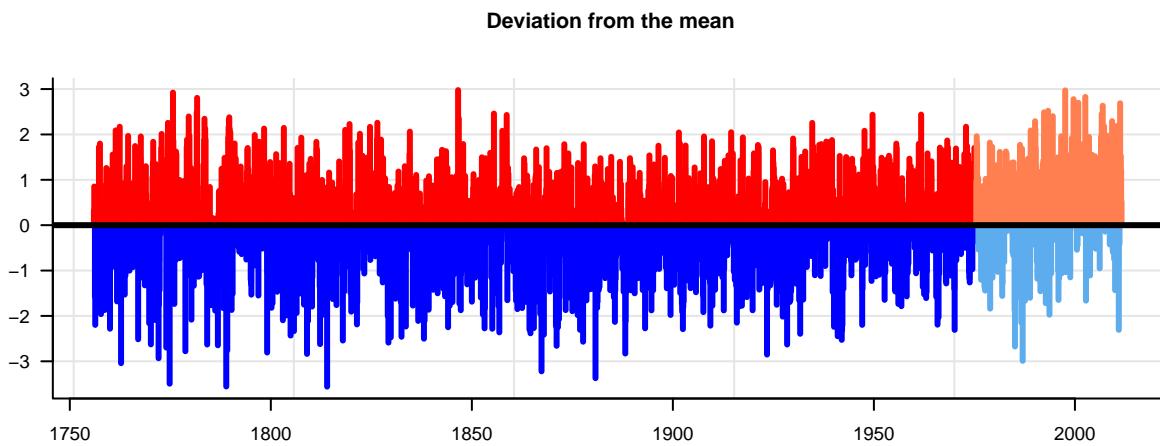
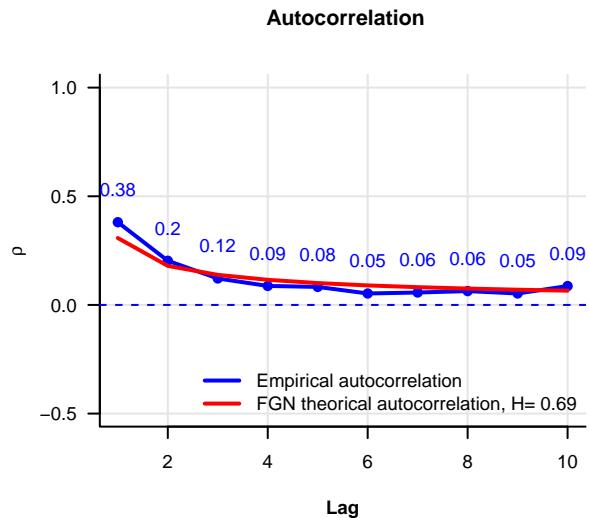
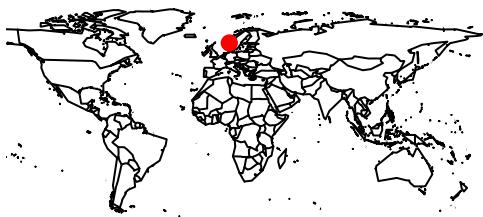
## Russia, St Petersburg



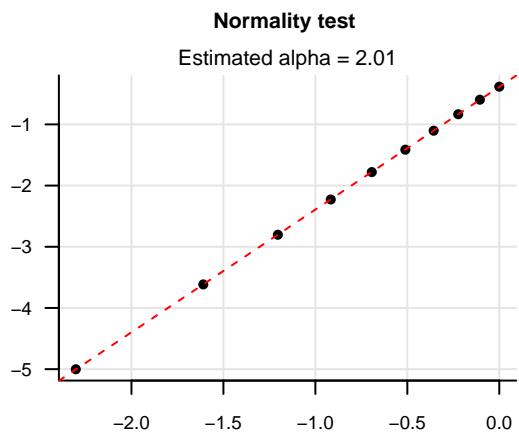
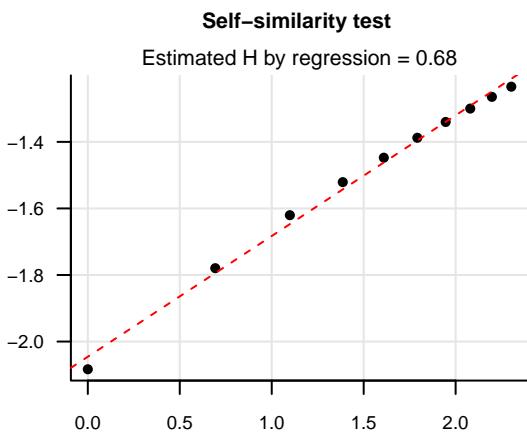
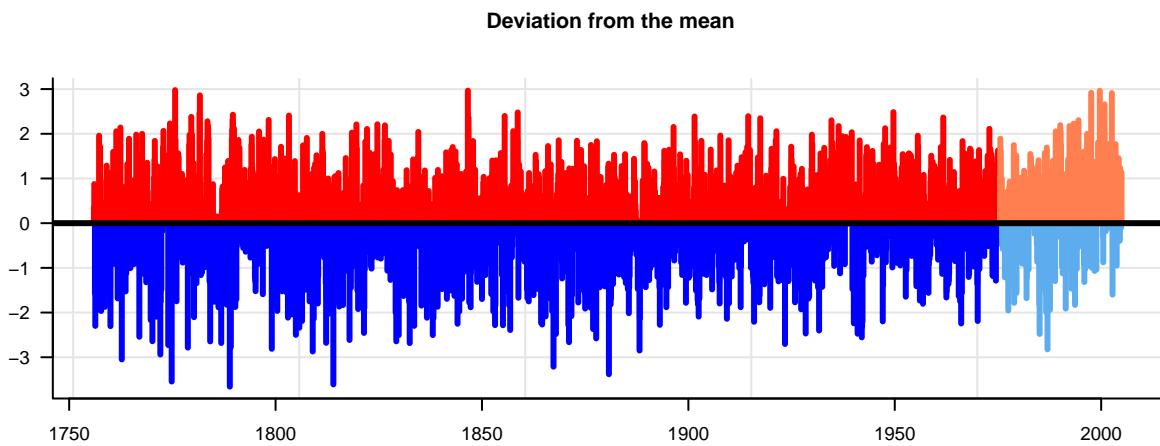
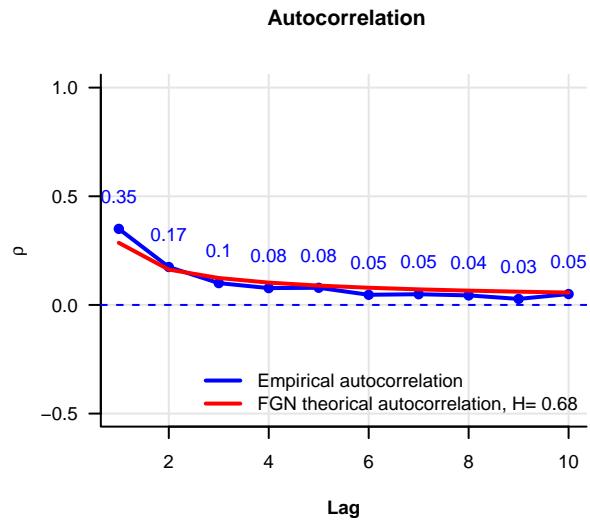
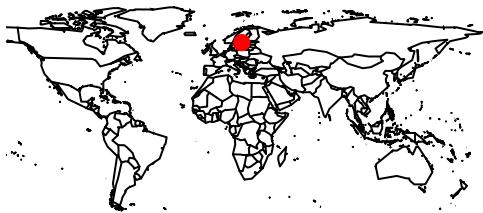
## Spain, Gibraltar



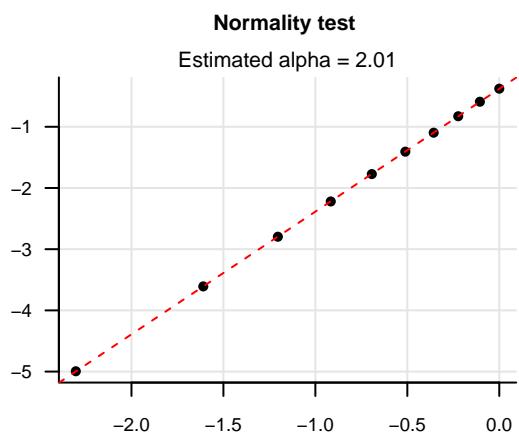
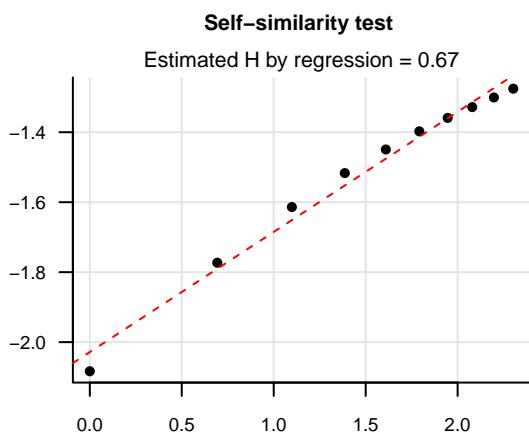
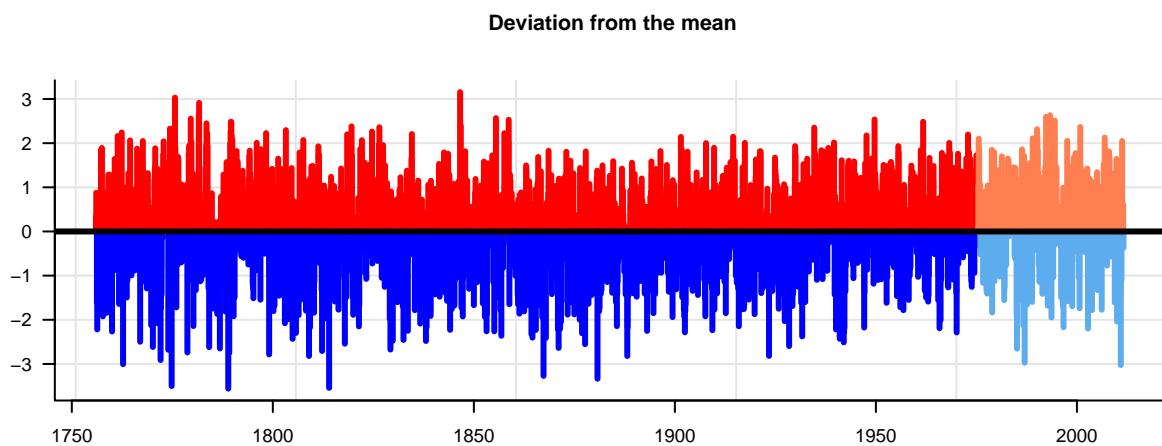
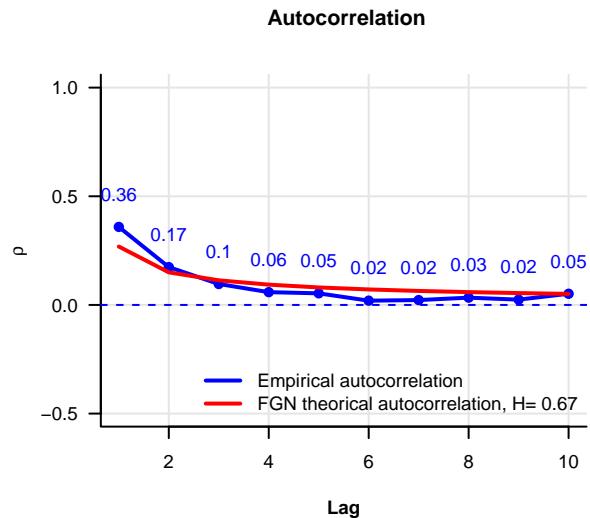
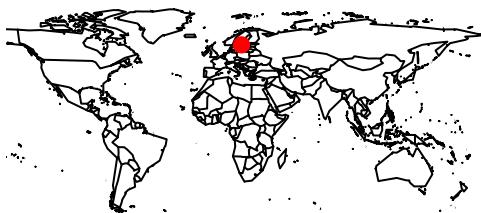
## Sweden, Bromma



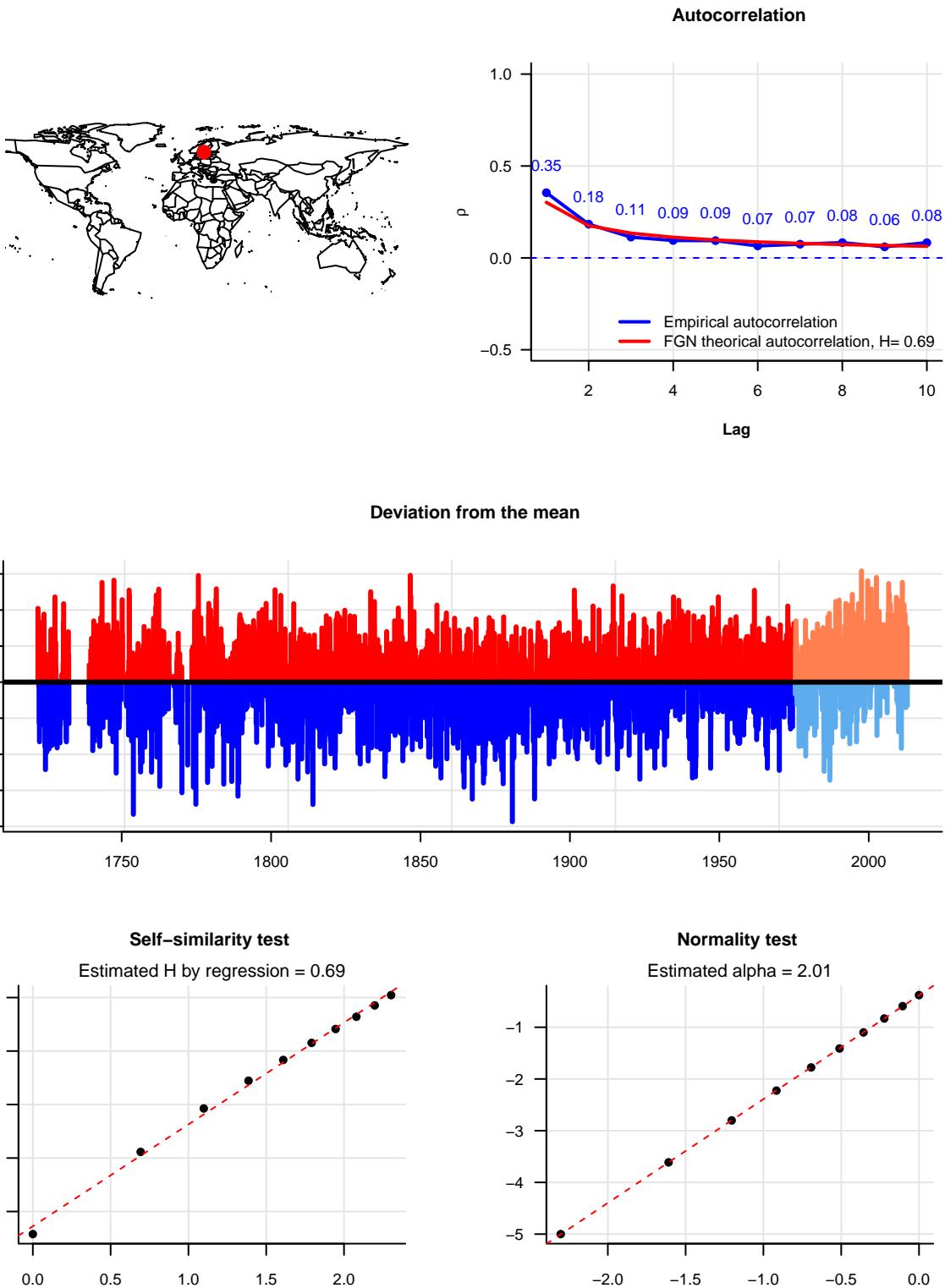
## Sweden, Stockholm



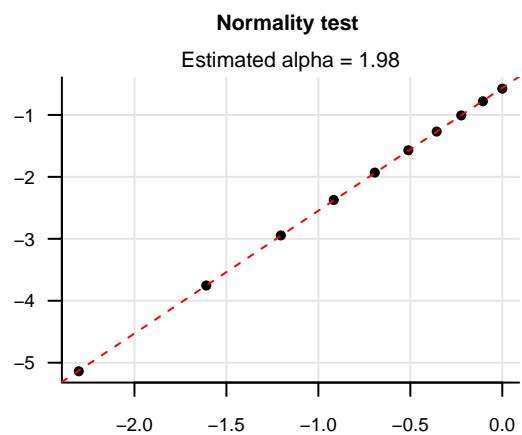
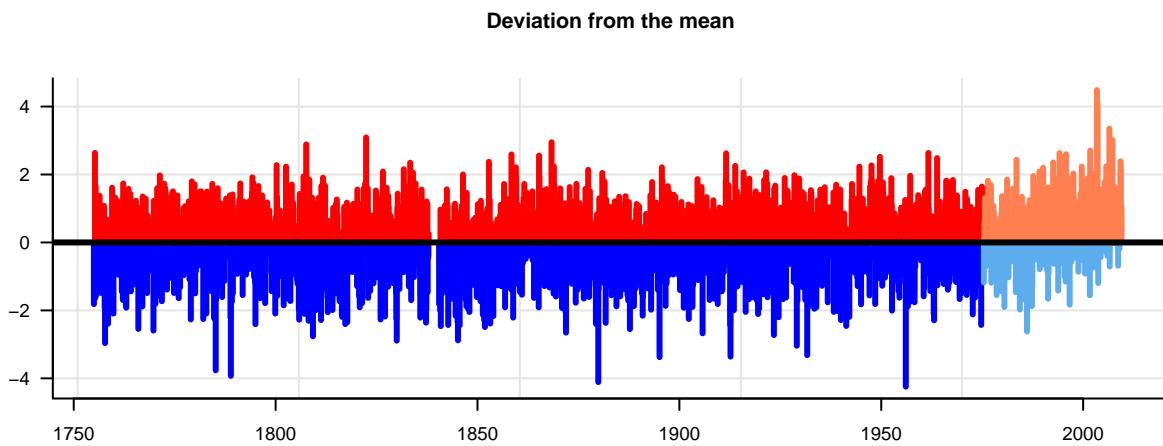
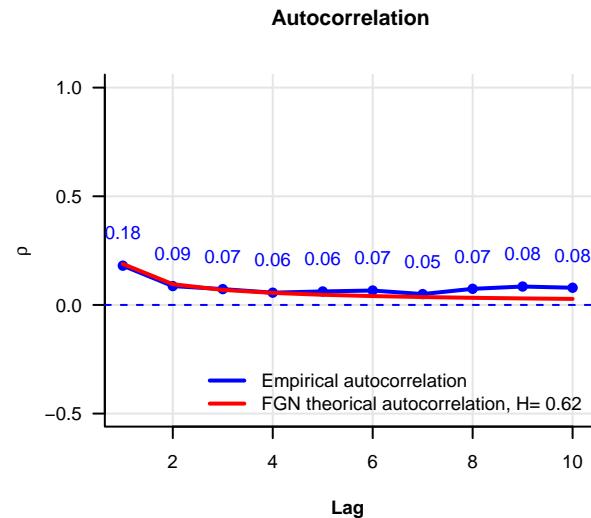
## Sweden, Tullinge



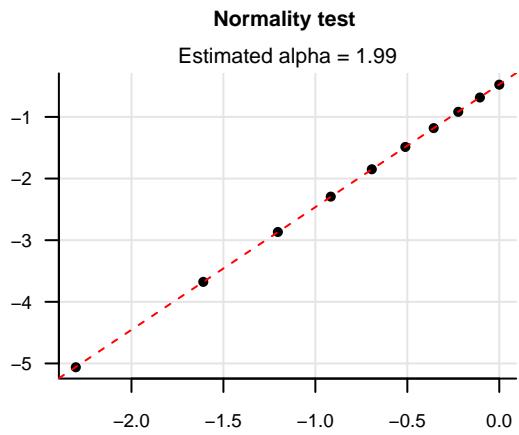
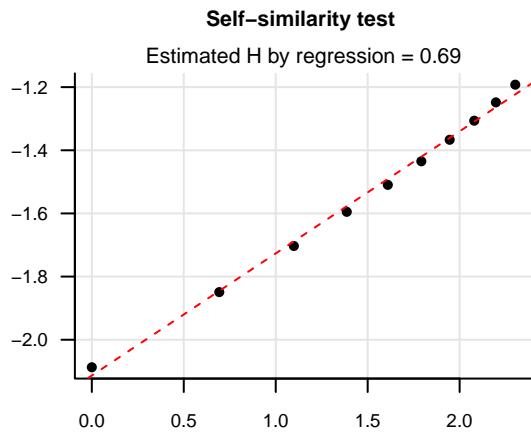
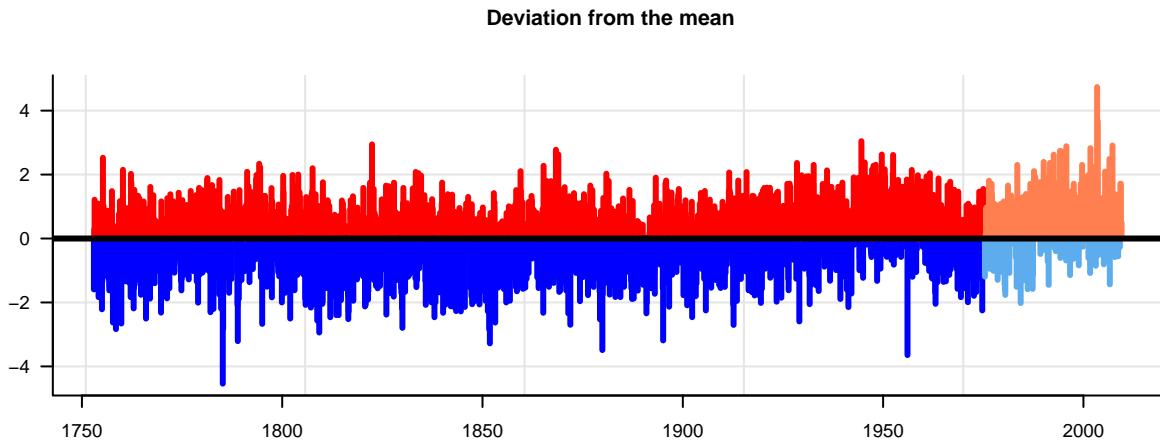
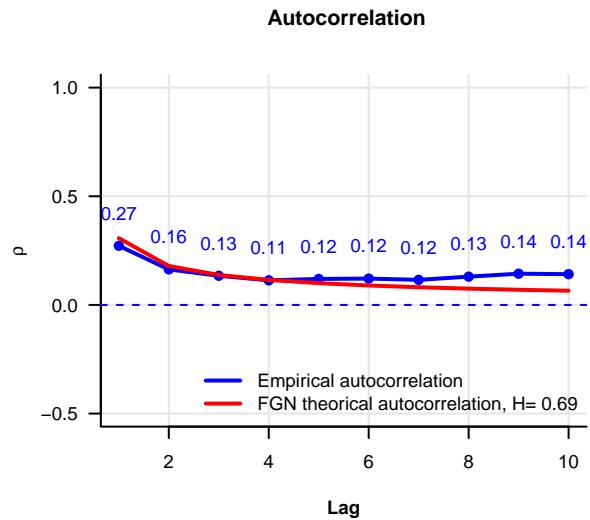
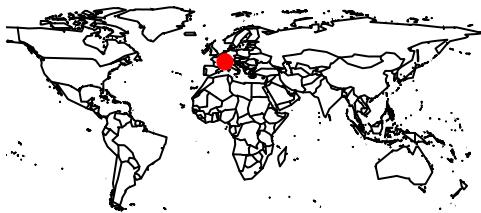
## Sweden, Uppsala



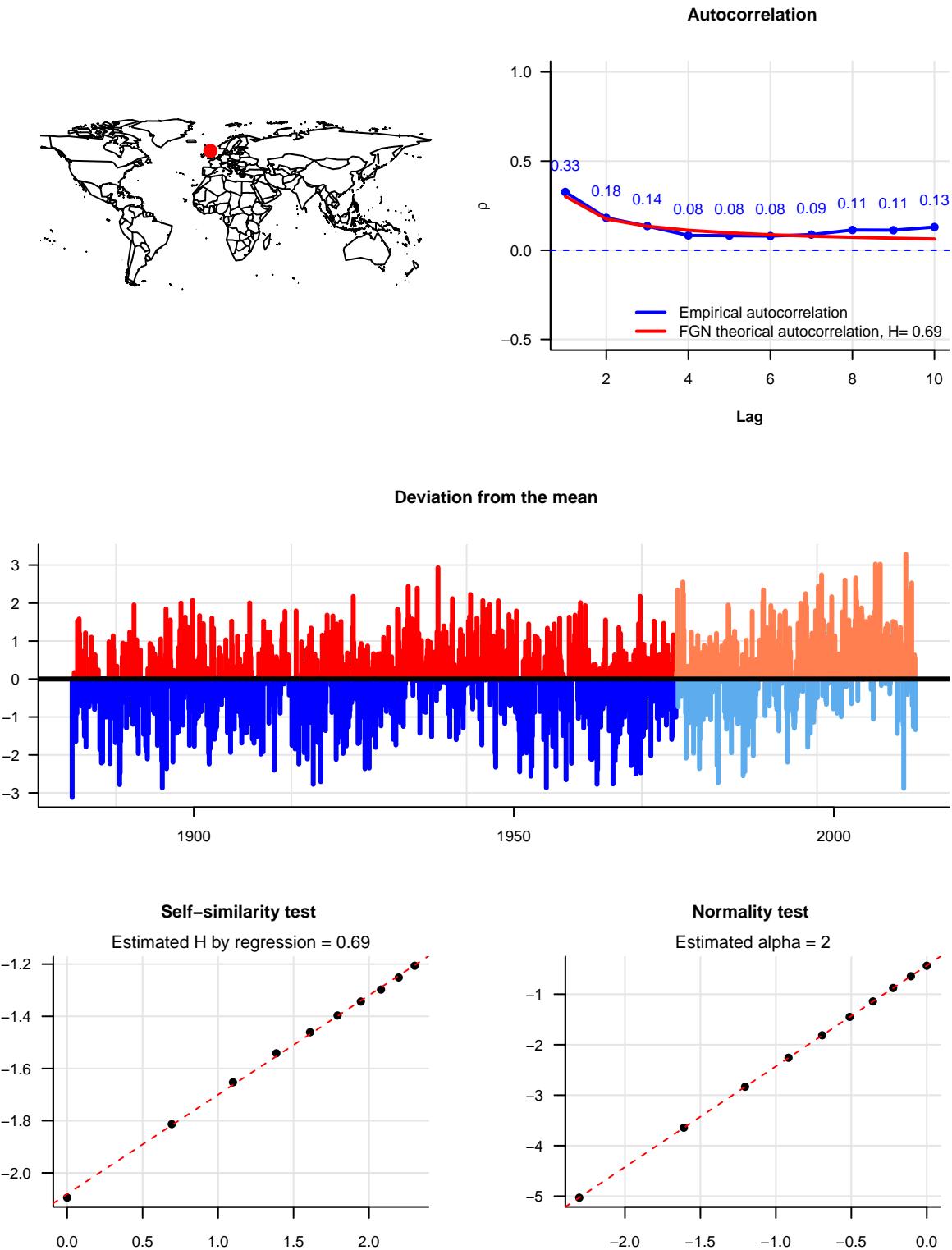
## Switzerland, Basel



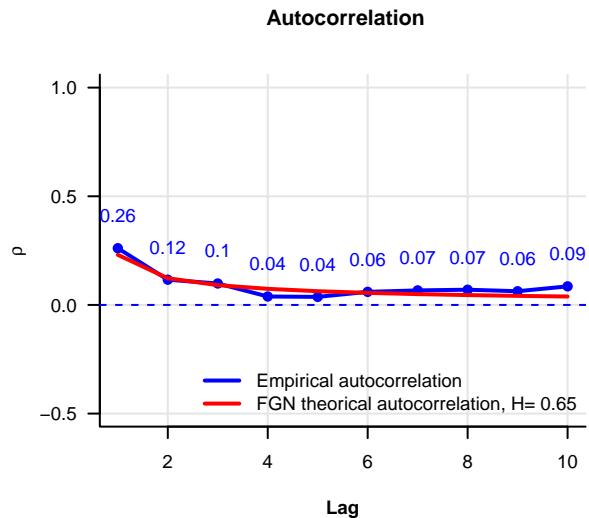
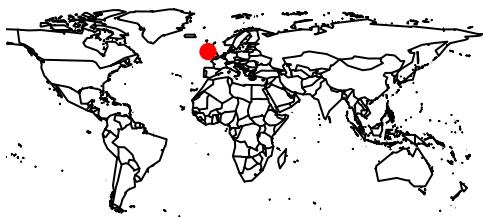
## Switzerland, Geneva



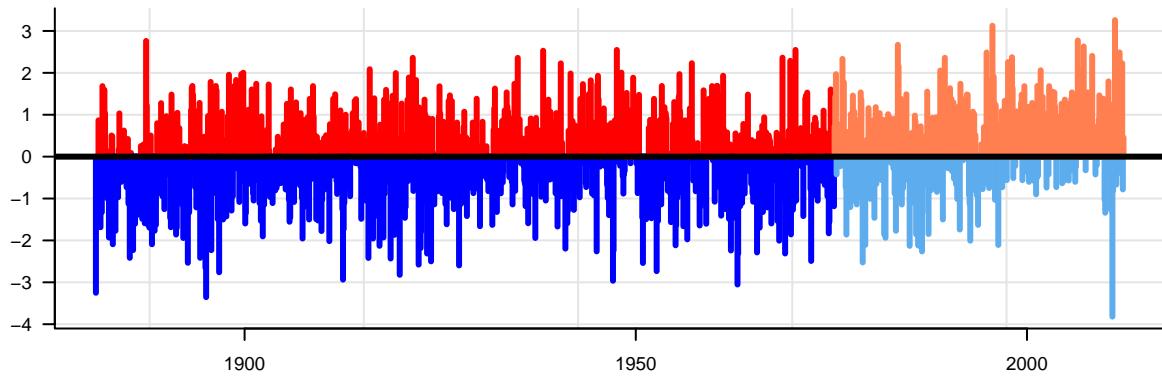
## UK, Aberdeen



## UK, Belfast

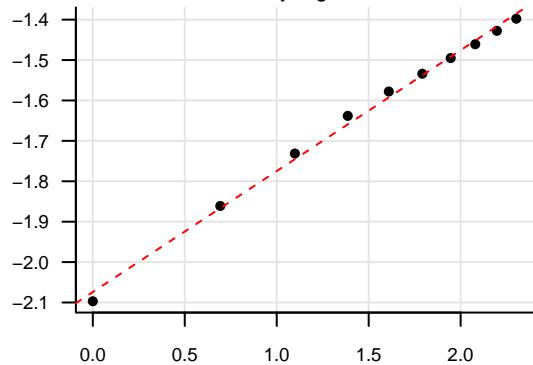


### Deviation from the mean



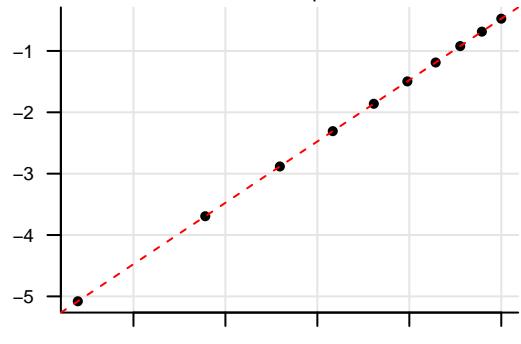
### Self-similarity test

Estimated  $H$  by regression = 0.65

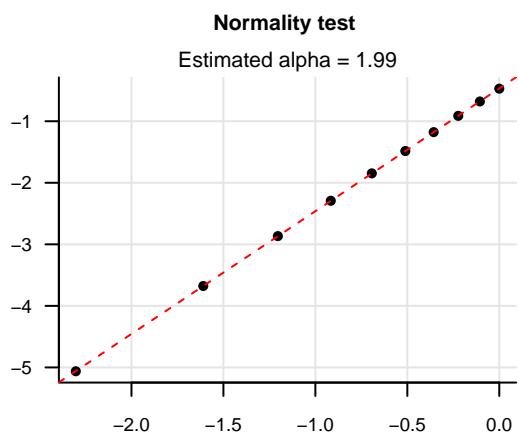
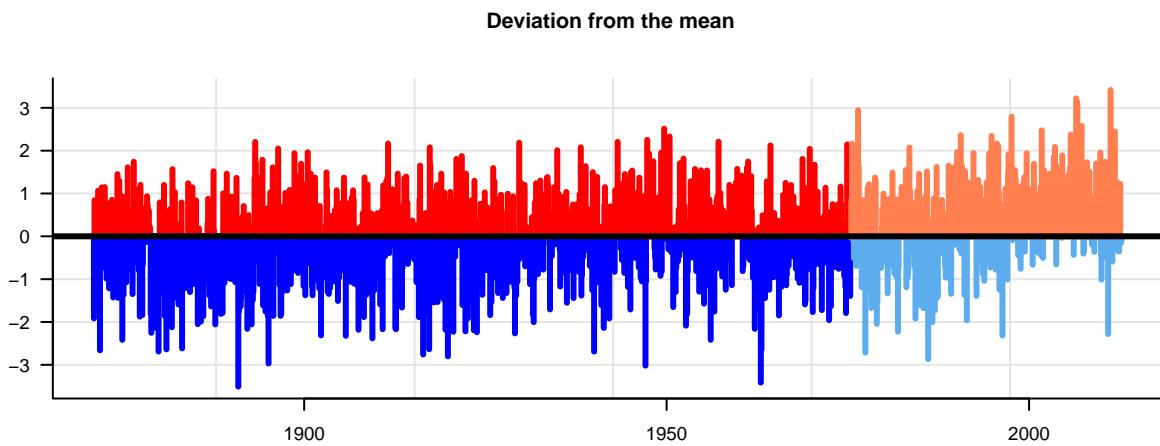
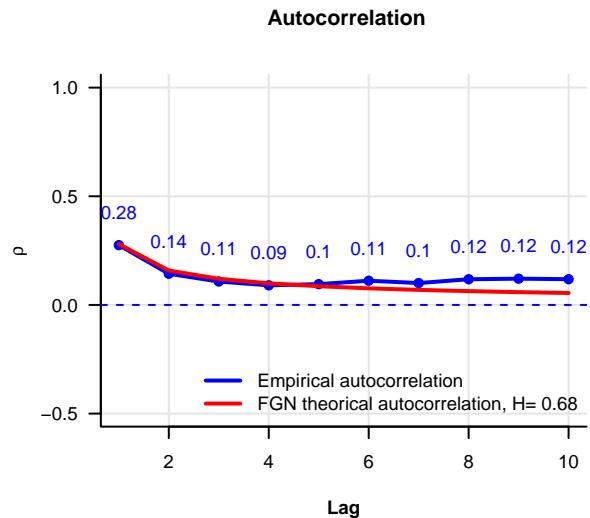
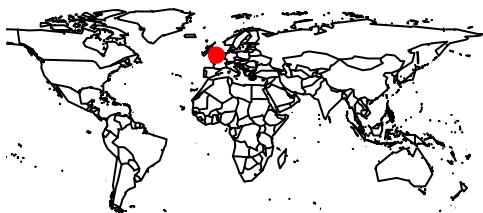


### Normality test

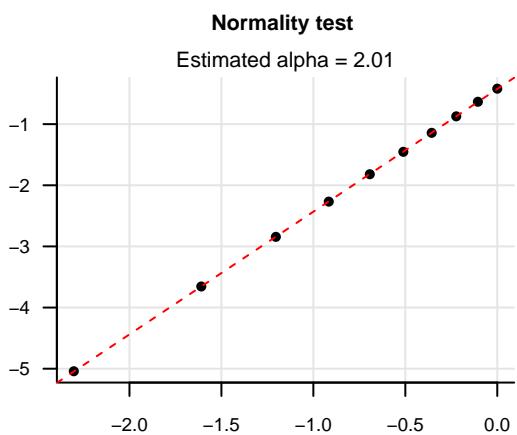
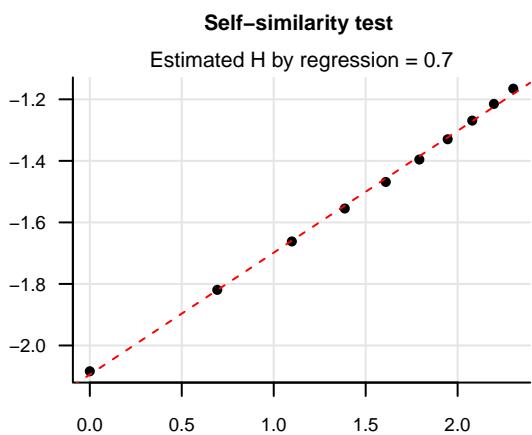
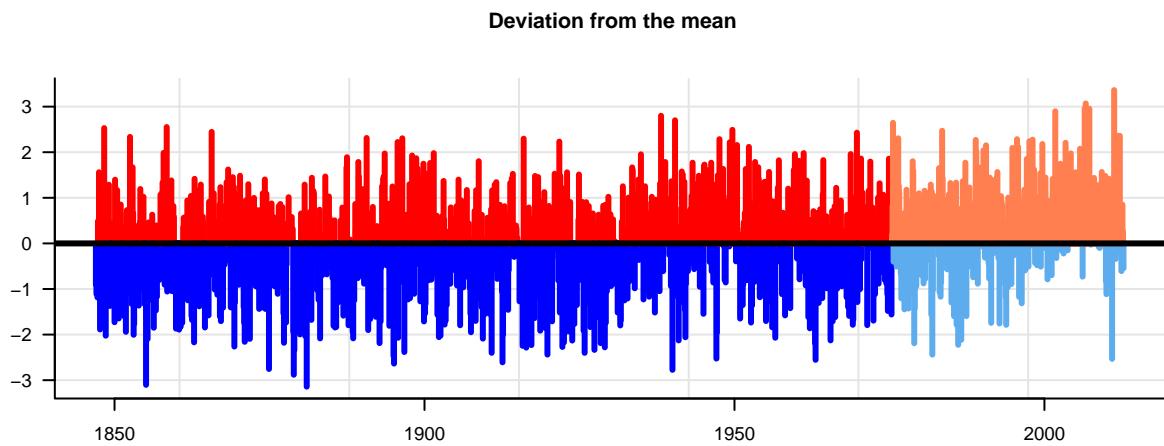
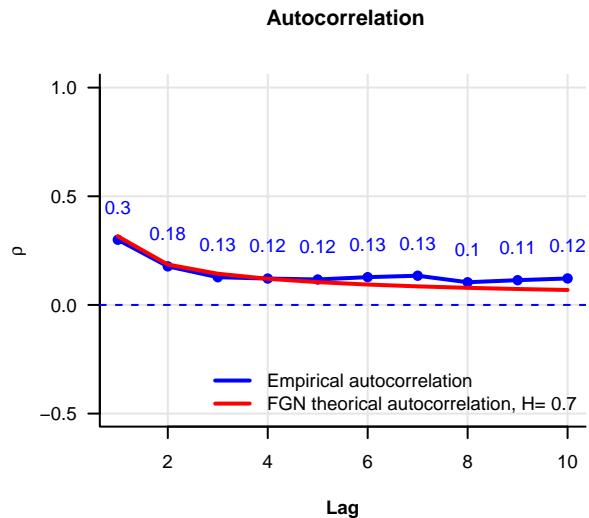
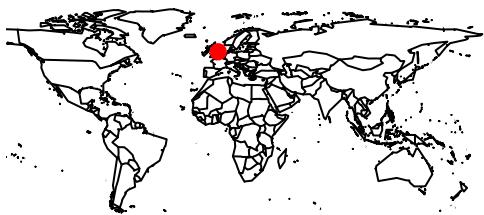
Estimated alpha = 2



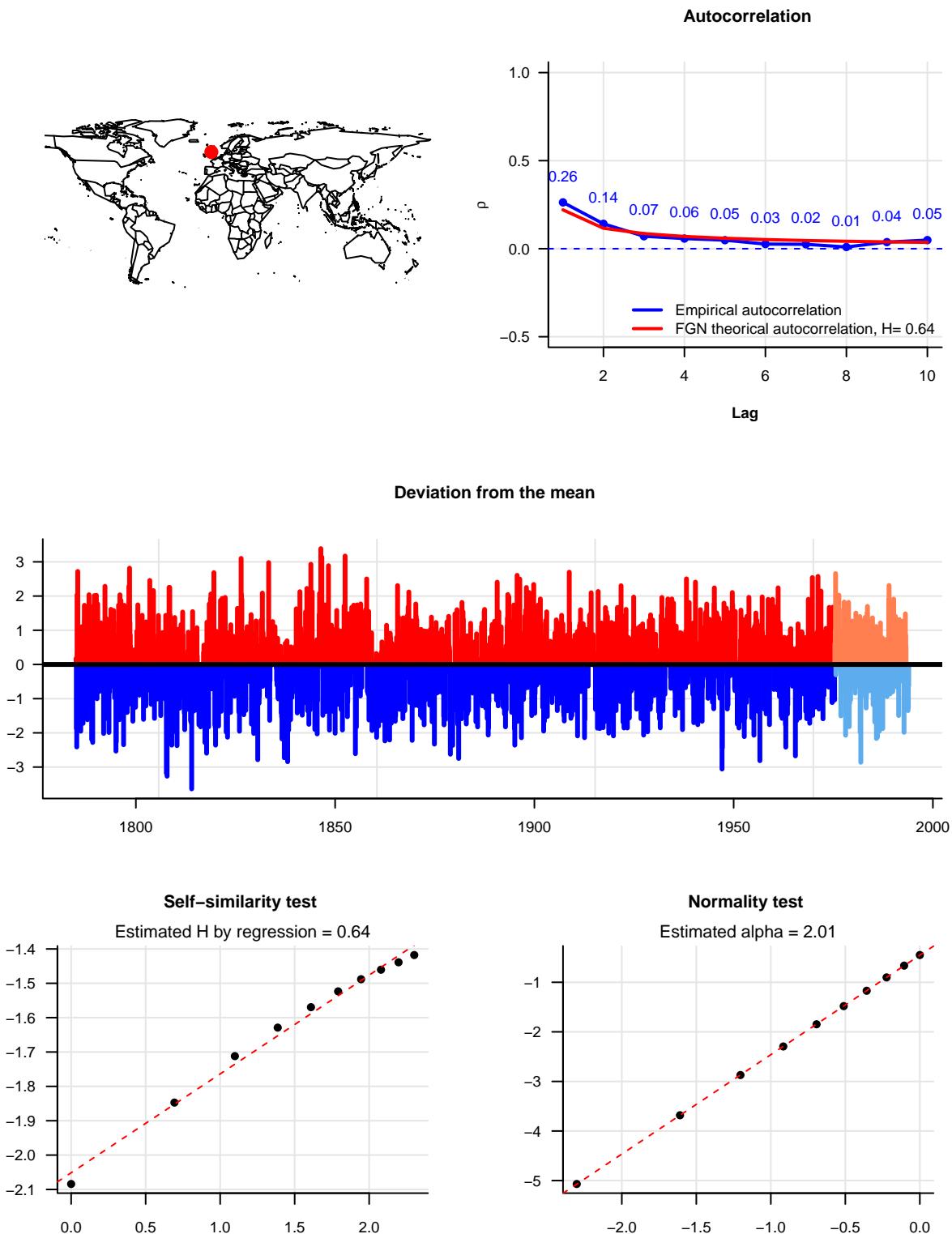
## UK, Cambridge



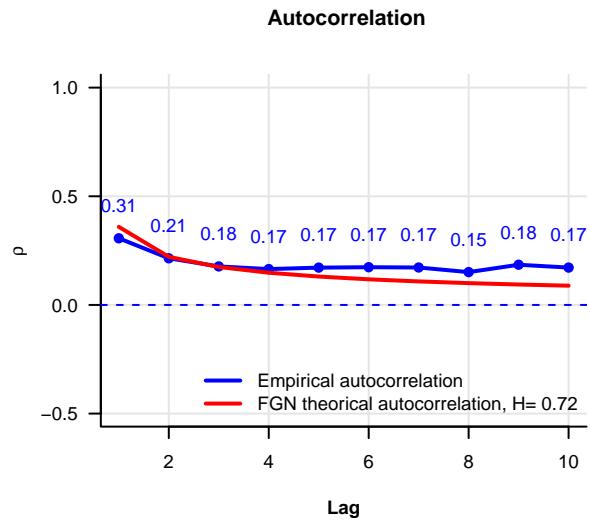
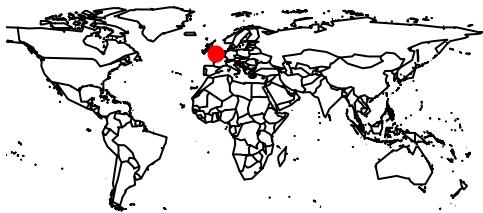
## UK, Durham



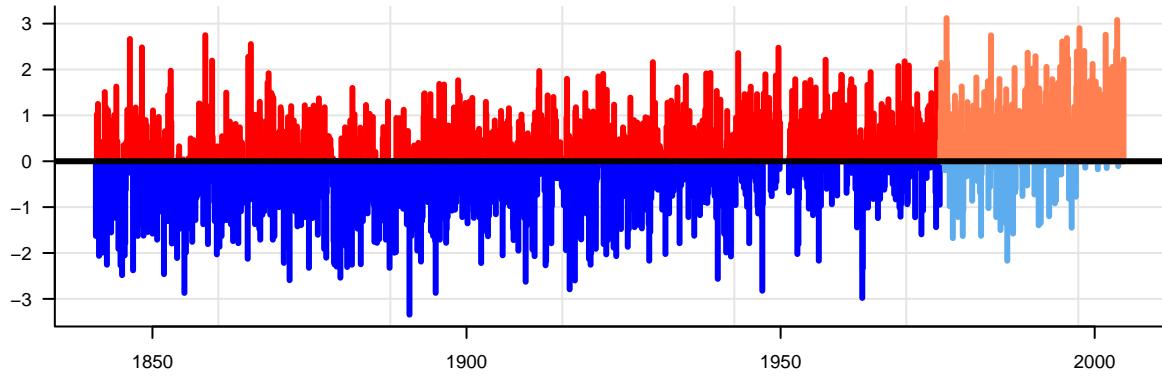
## UK, Edinbourg



## UK, London

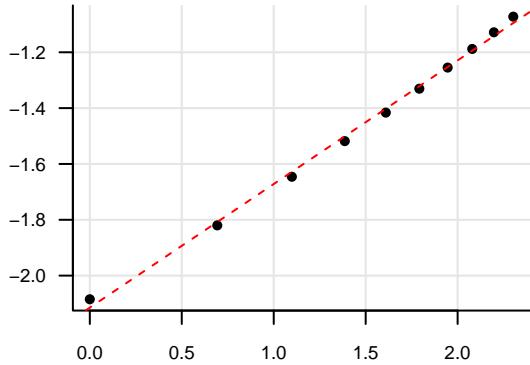


### Deviation from the mean



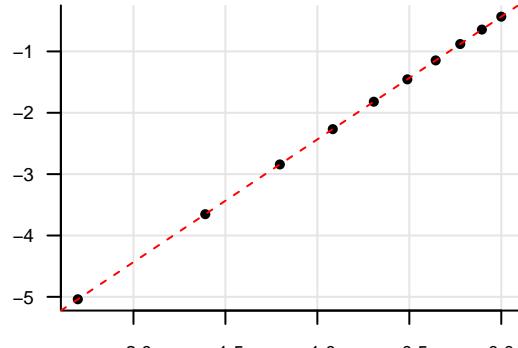
### Self-similarity test

Estimated  $H$  by regression = 0.72

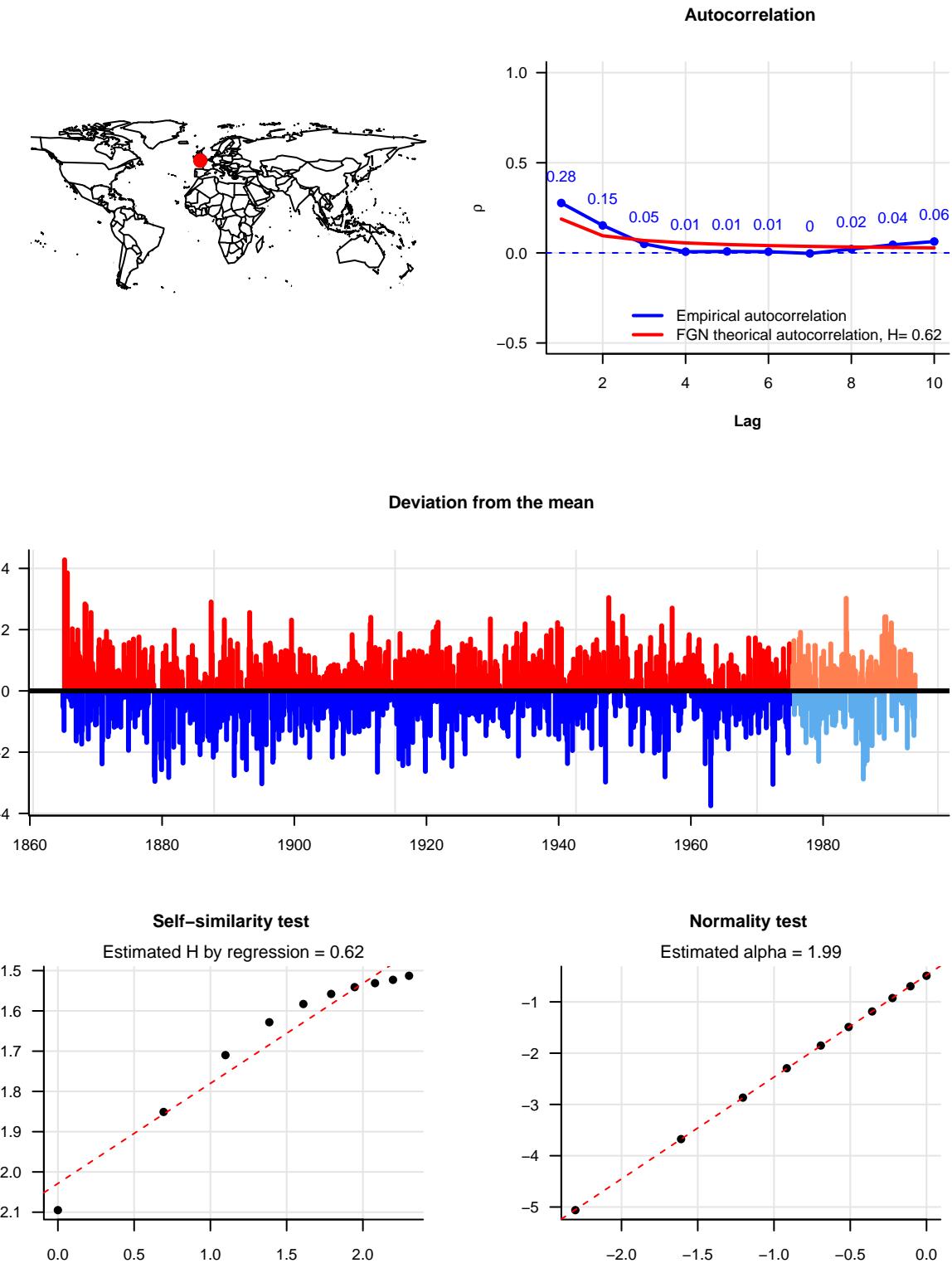


### Normality test

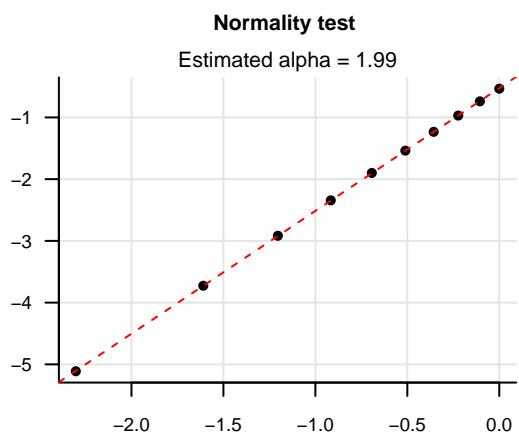
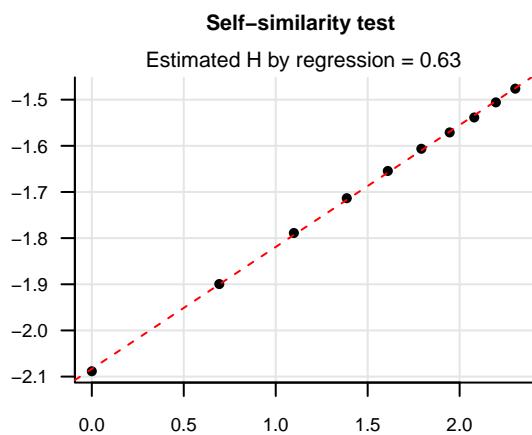
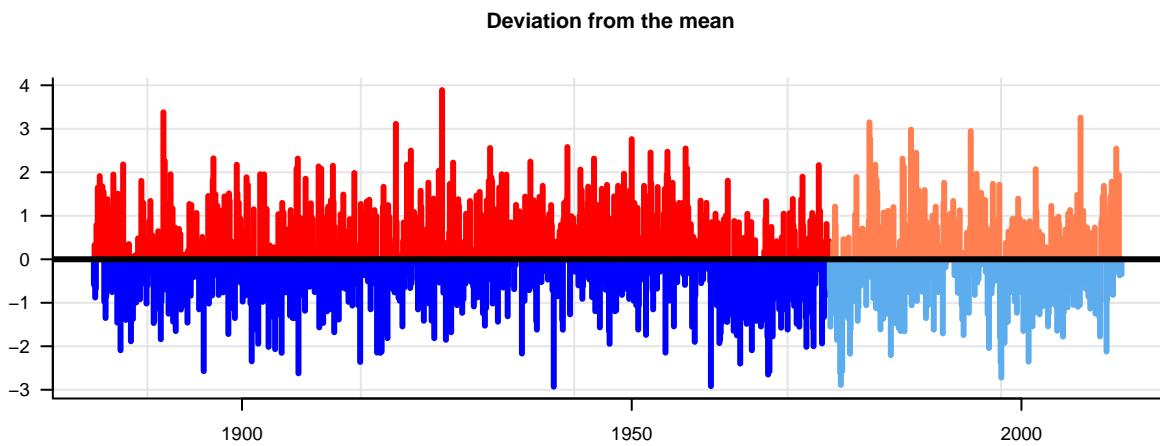
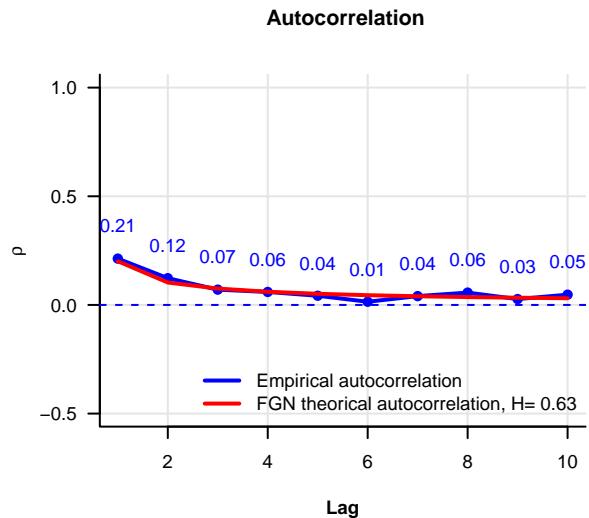
Estimated alpha = 2



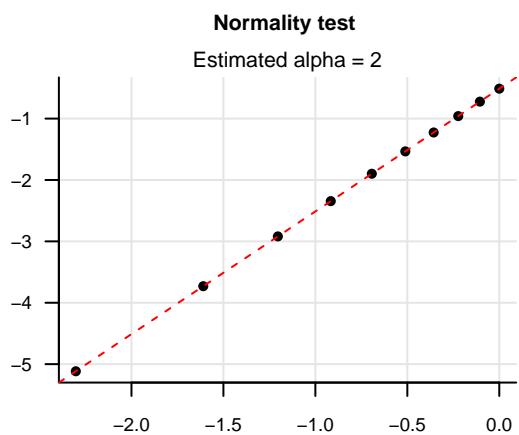
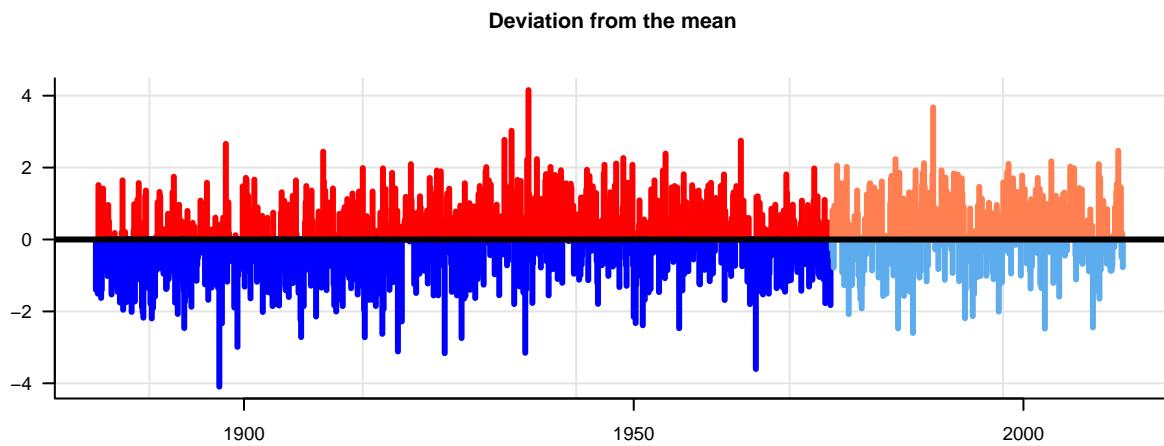
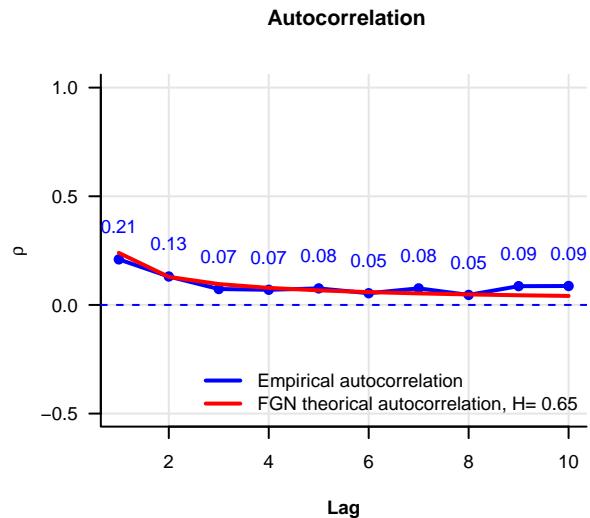
## UK, Plymouth



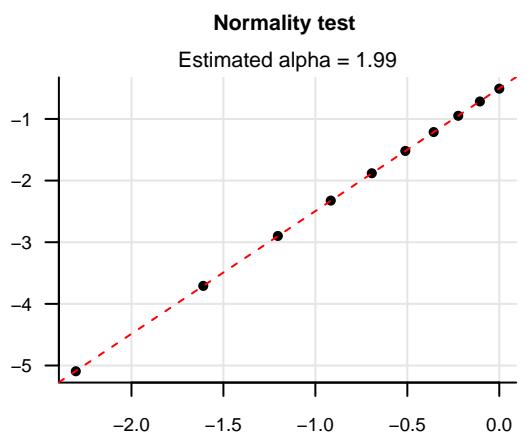
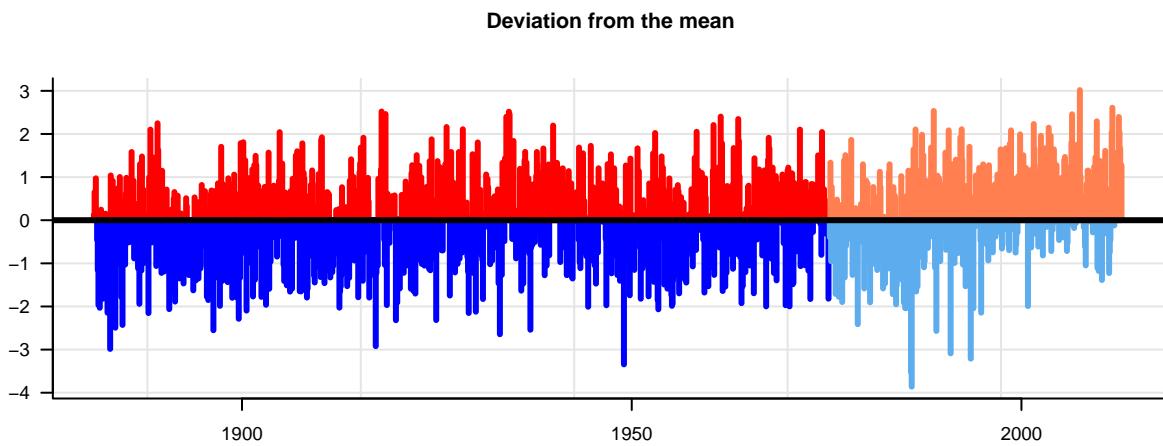
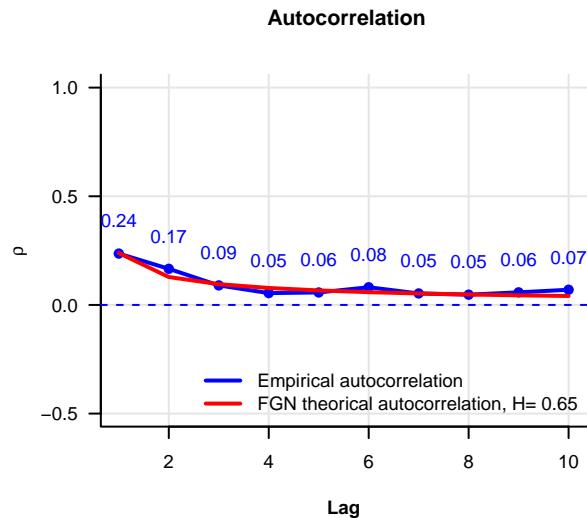
## USA, Atlanta



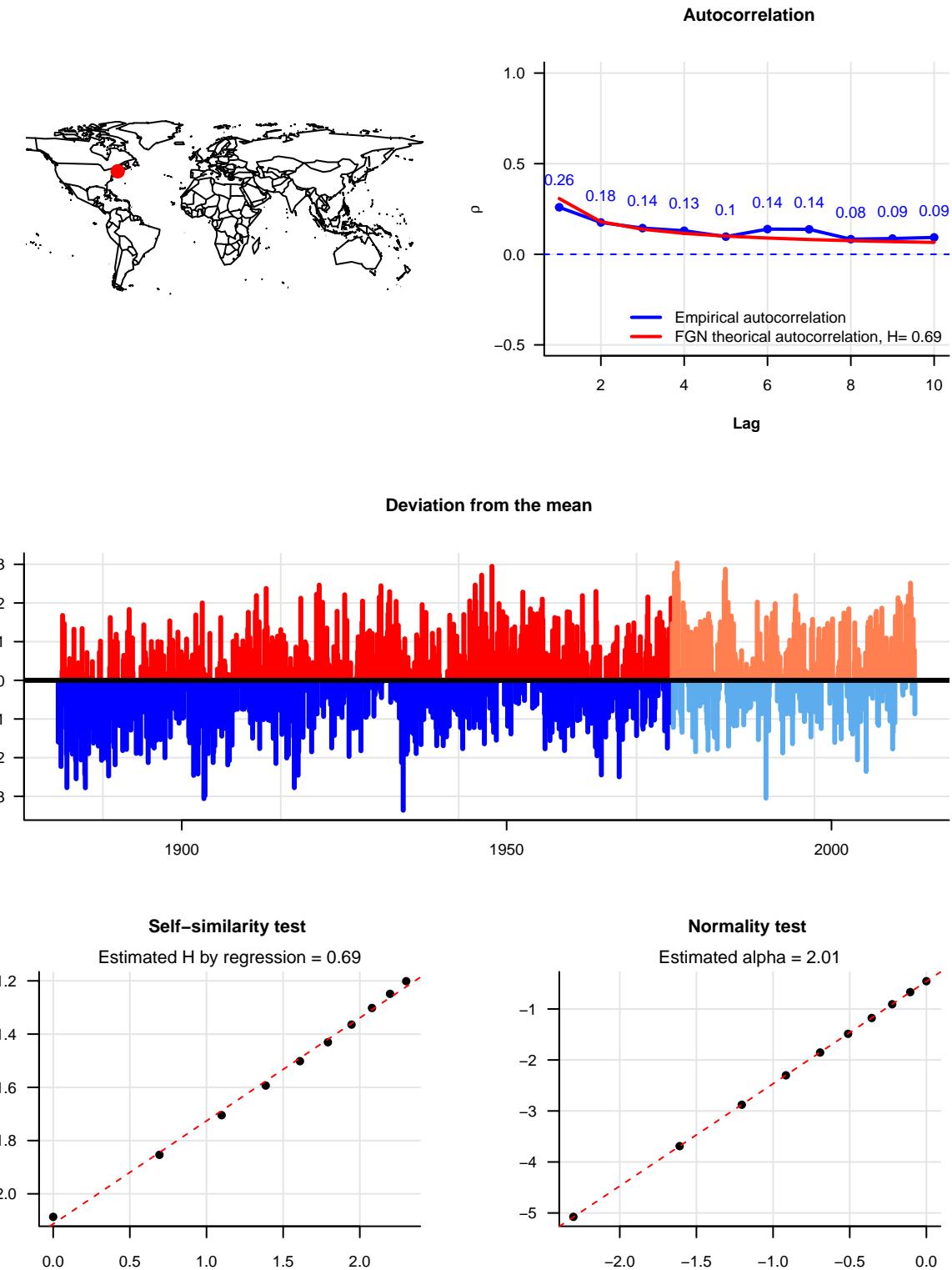
## USA, Bismarck



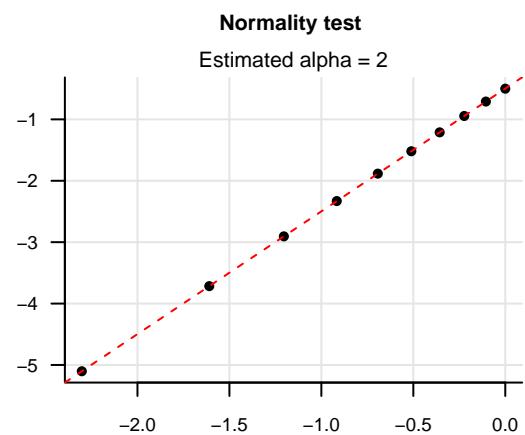
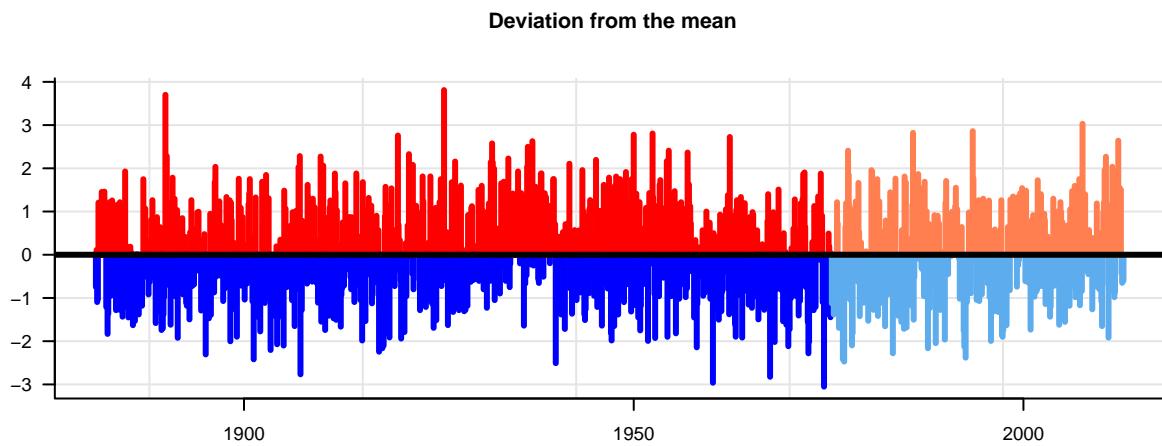
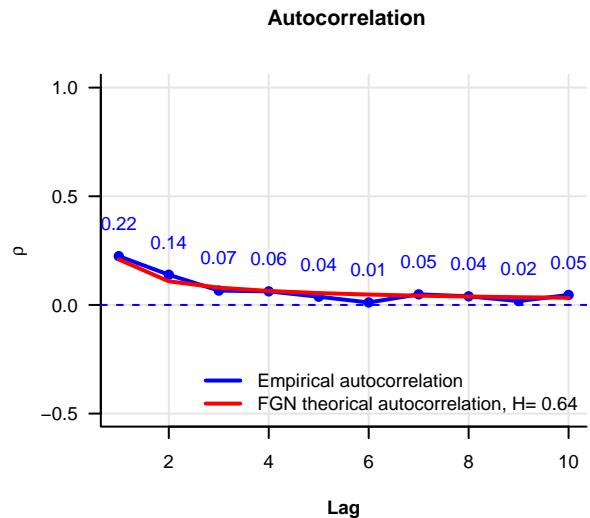
## USA, Boise



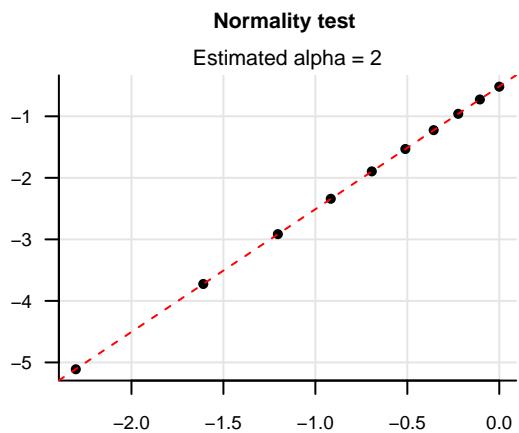
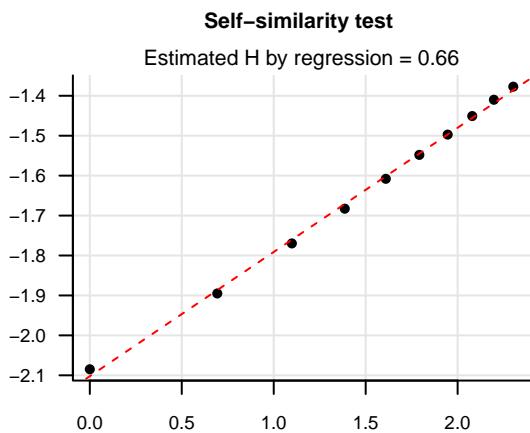
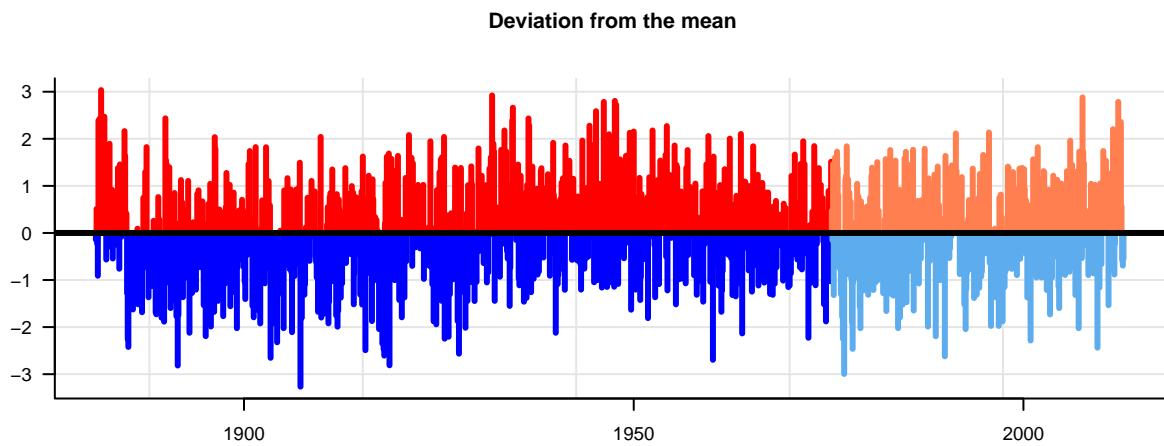
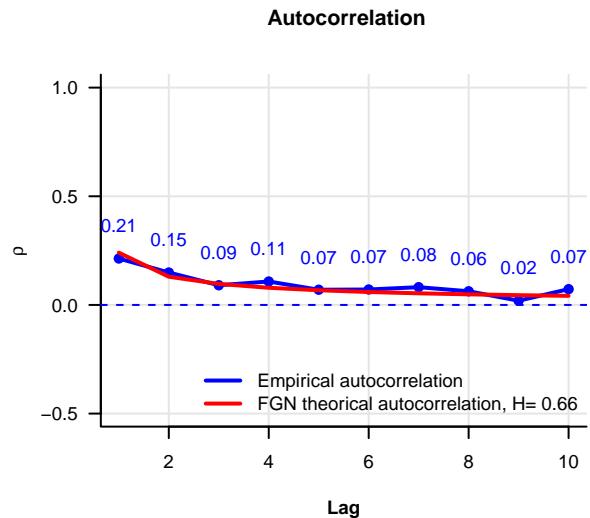
## USA, Boston



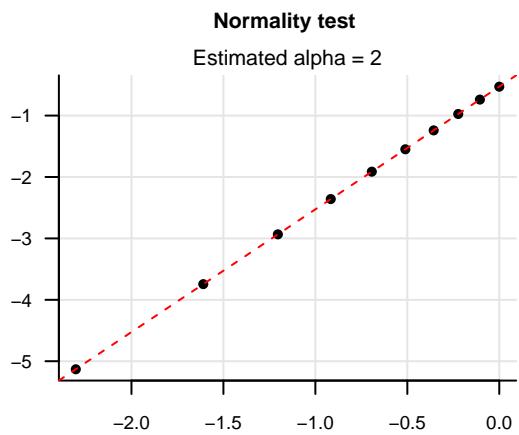
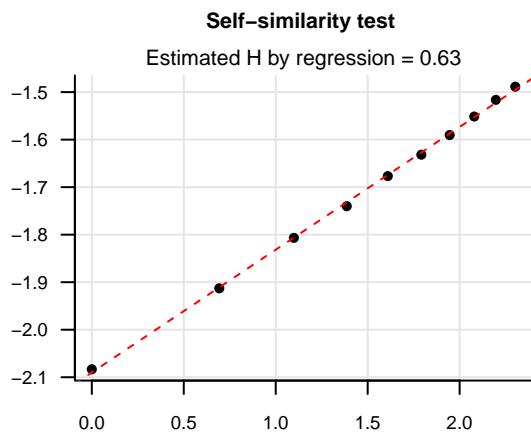
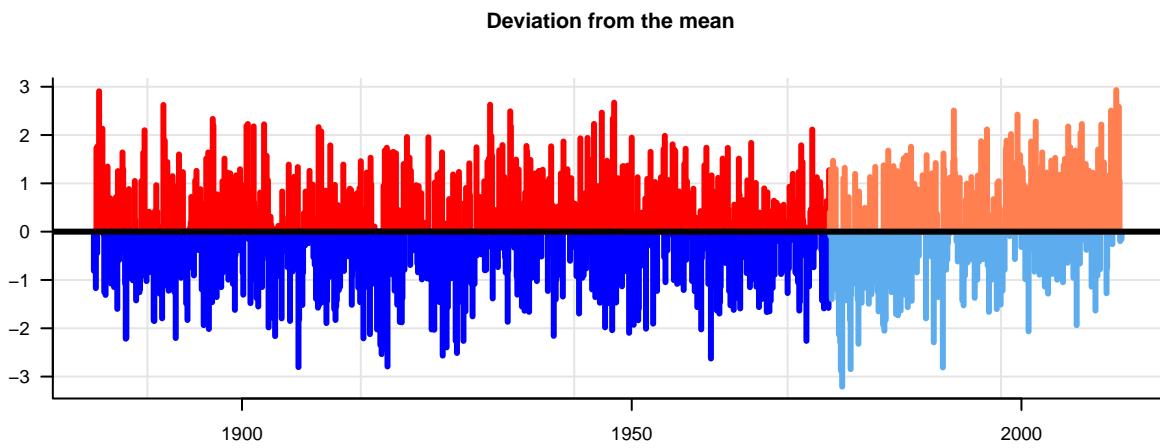
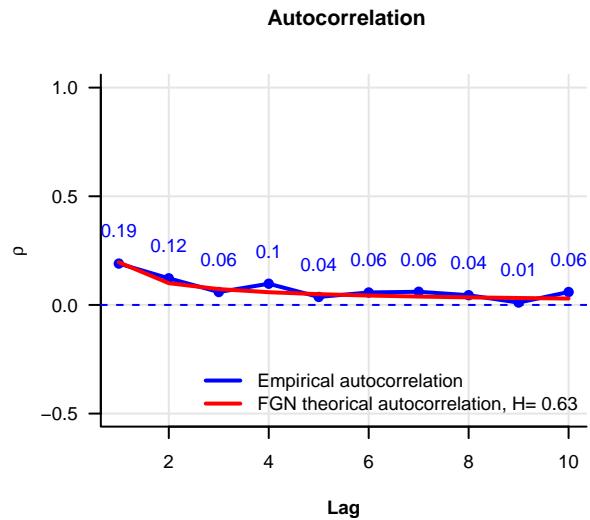
## USA, Chattanooga



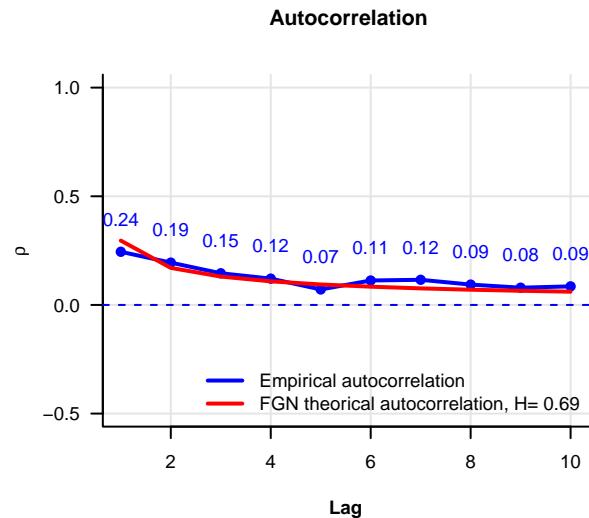
## USA, Cincinnati



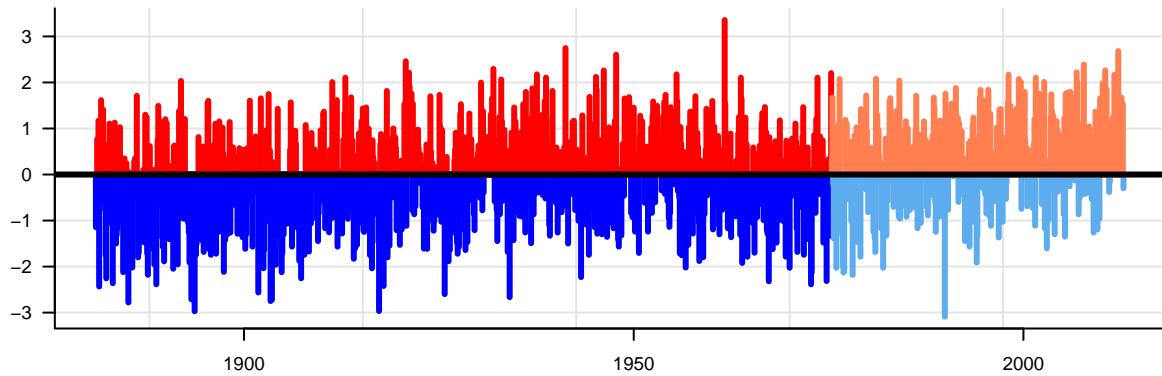
## USA, Columbus



## USA, Concord

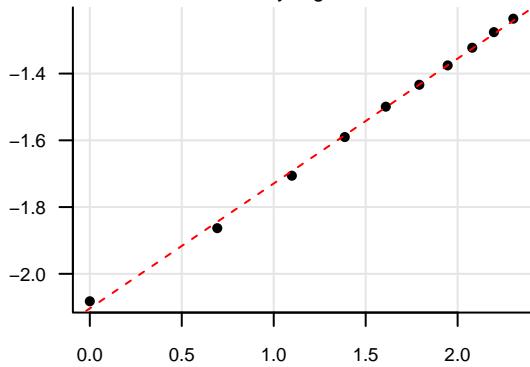


### Deviation from the mean



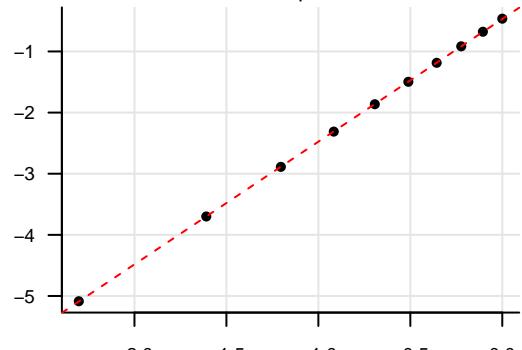
### Self-similarity test

Estimated  $H$  by regression = 0.69

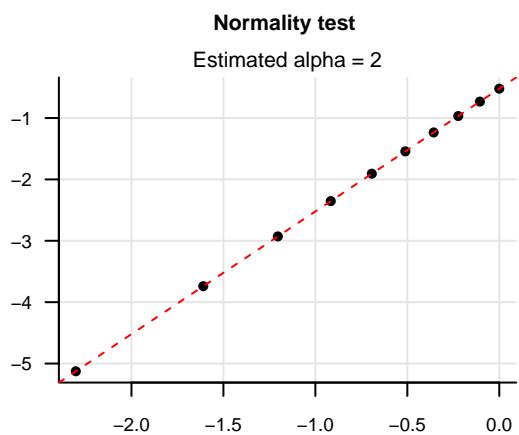
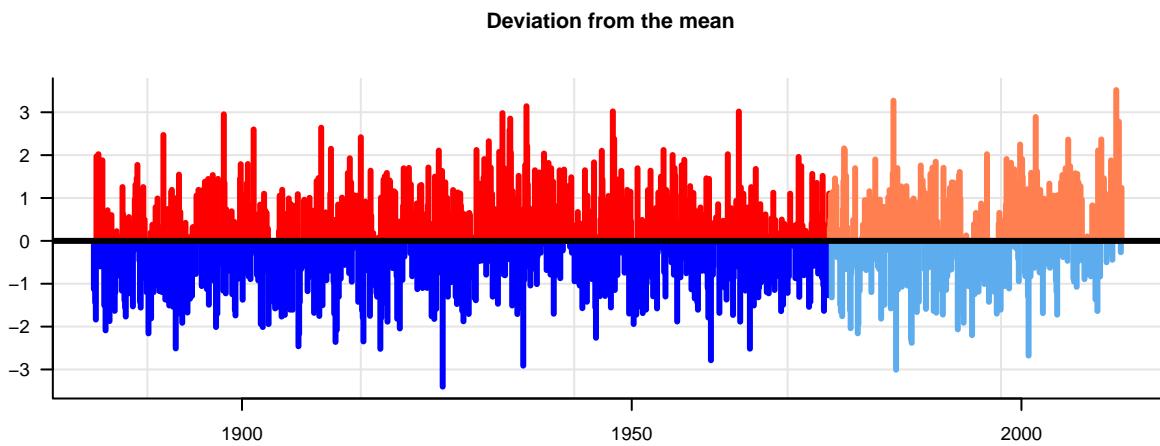
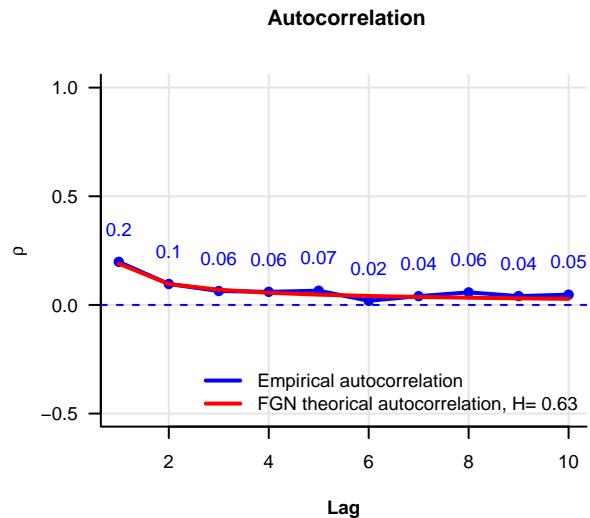


### Normality test

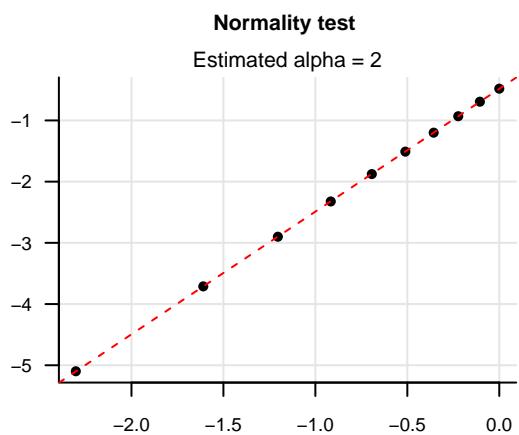
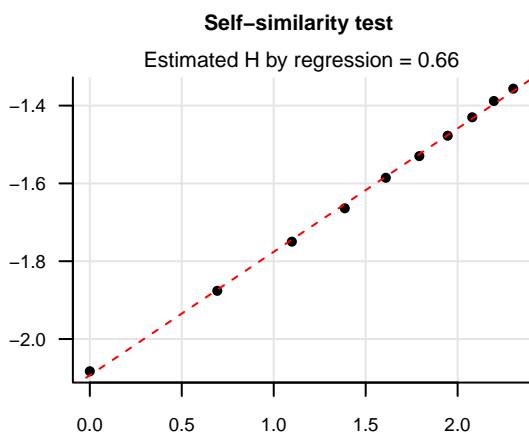
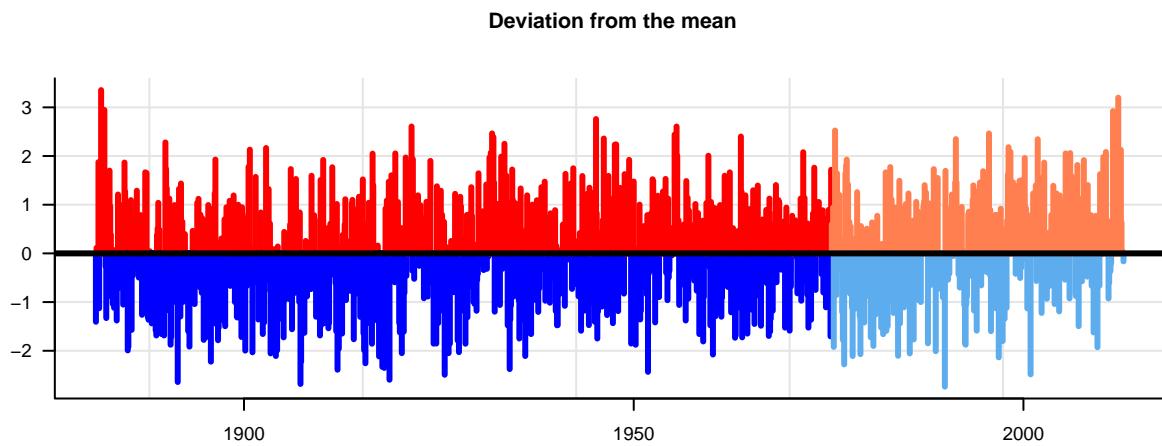
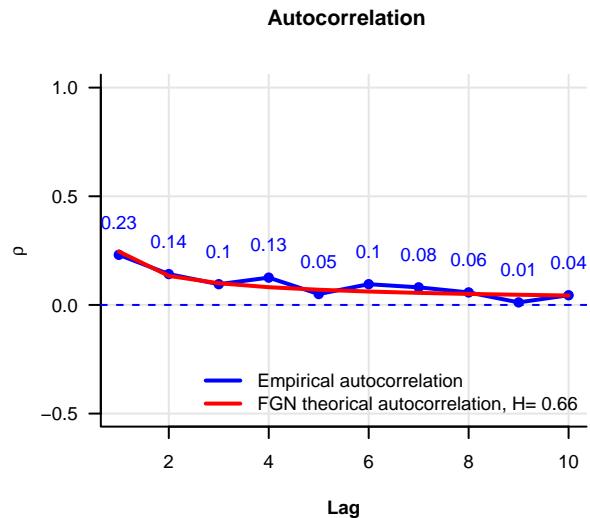
Estimated alpha = 2.01



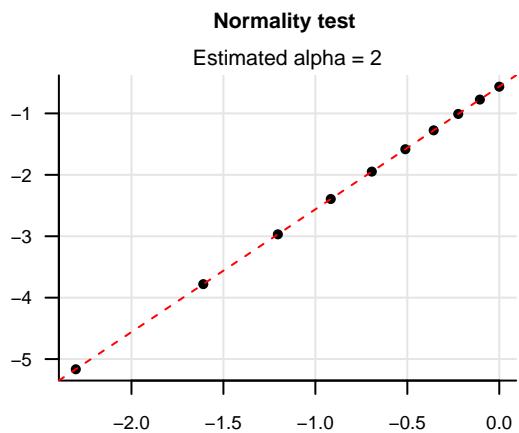
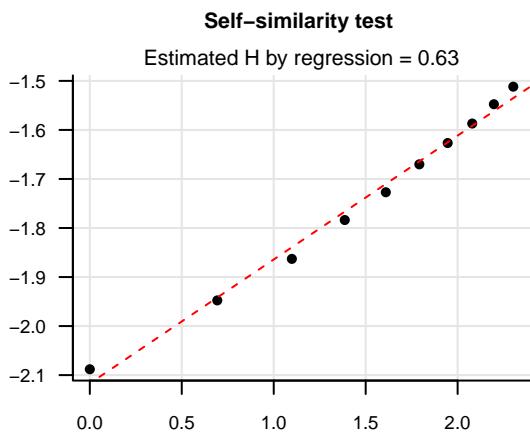
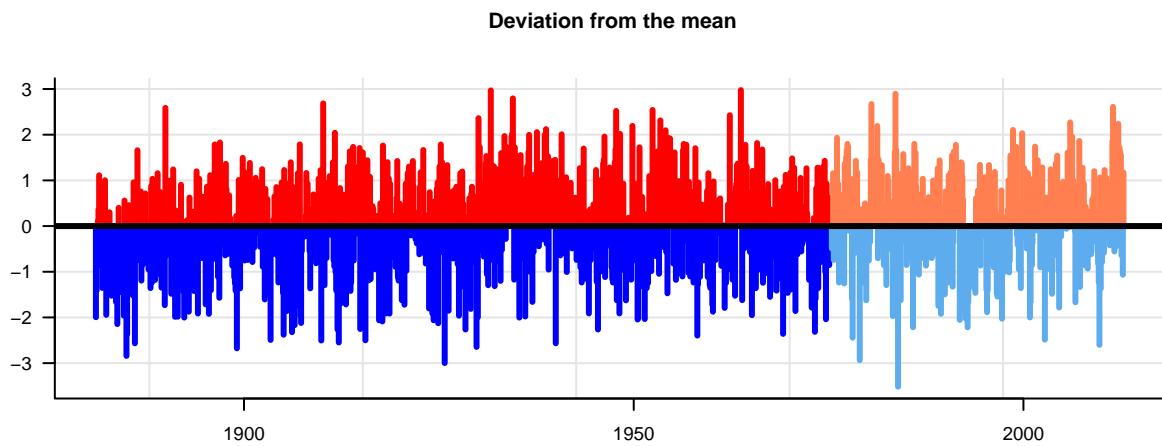
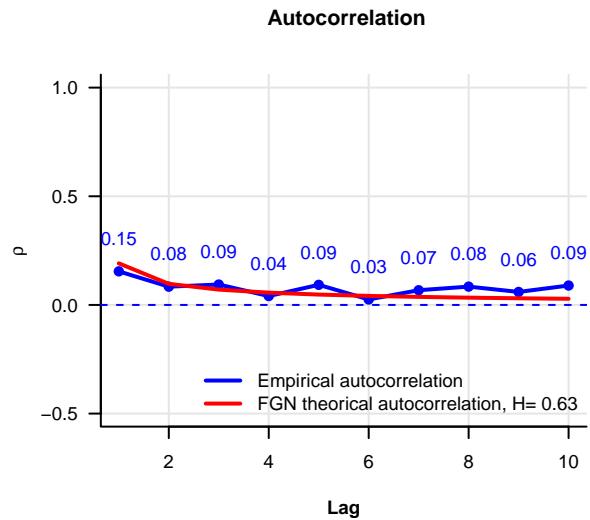
## USA, Des Moines



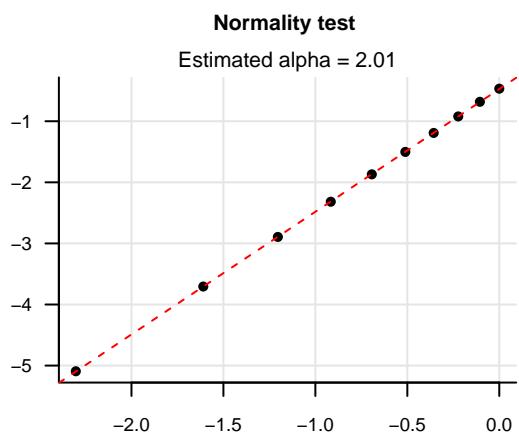
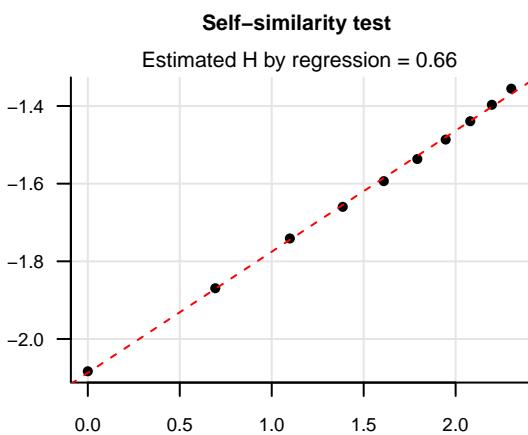
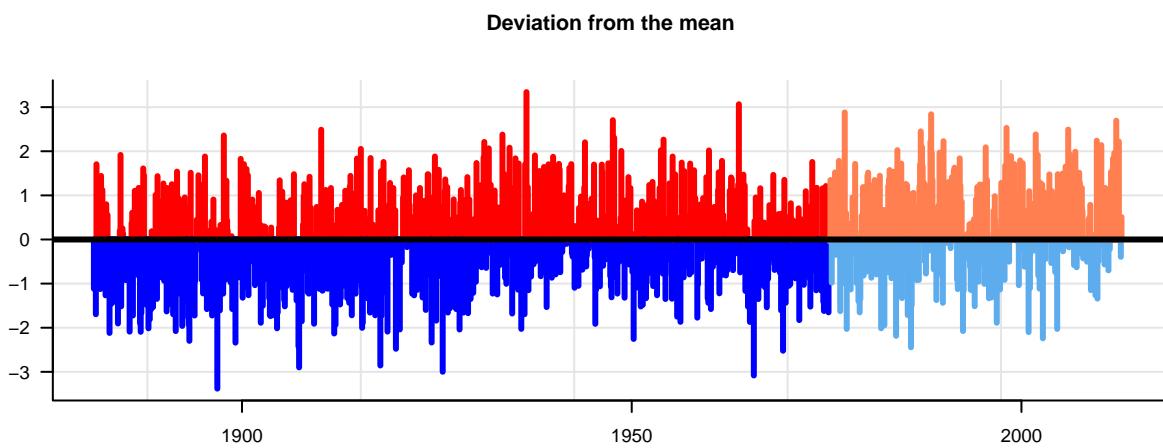
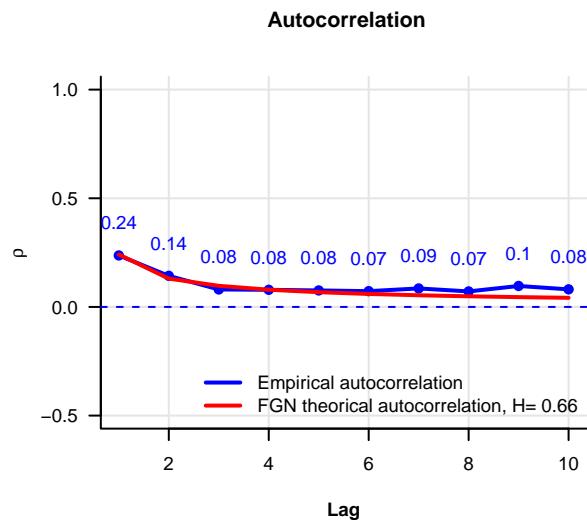
## USA, Detroit



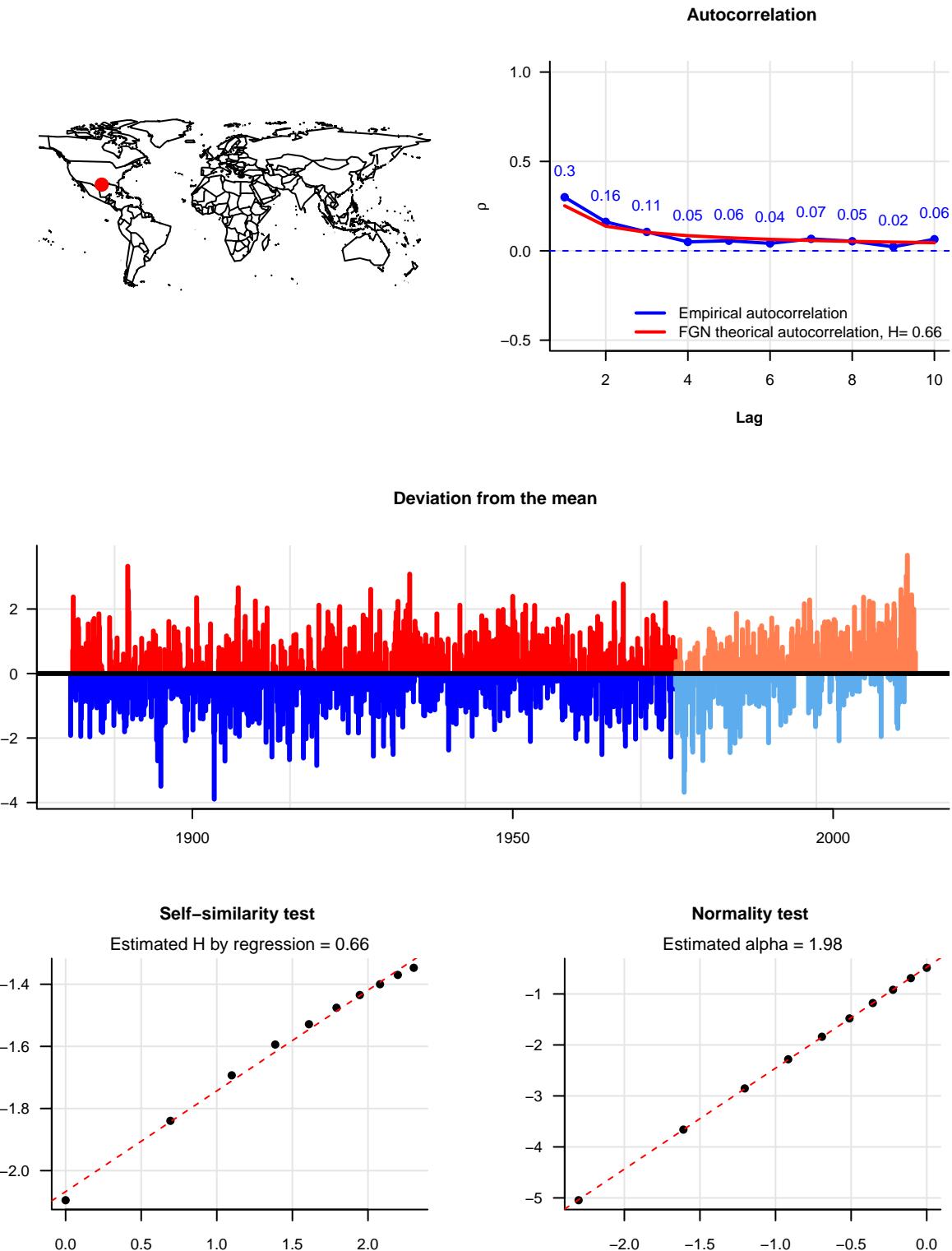
## USA, Dodge City



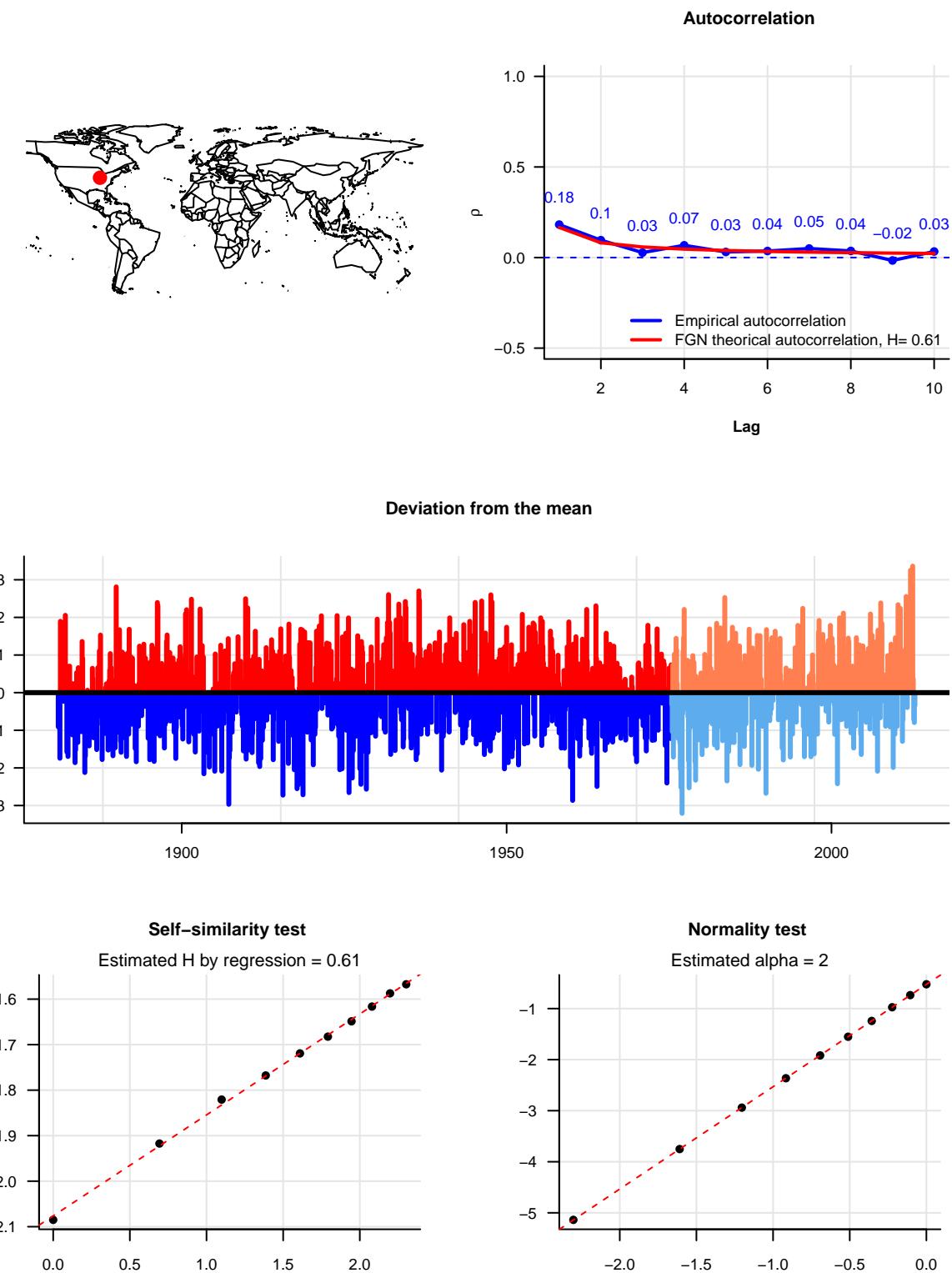
## USA, Fargo



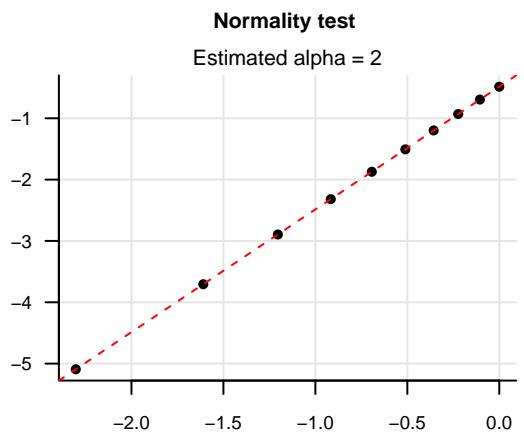
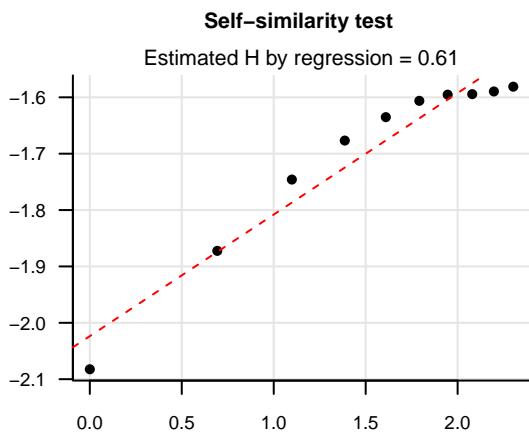
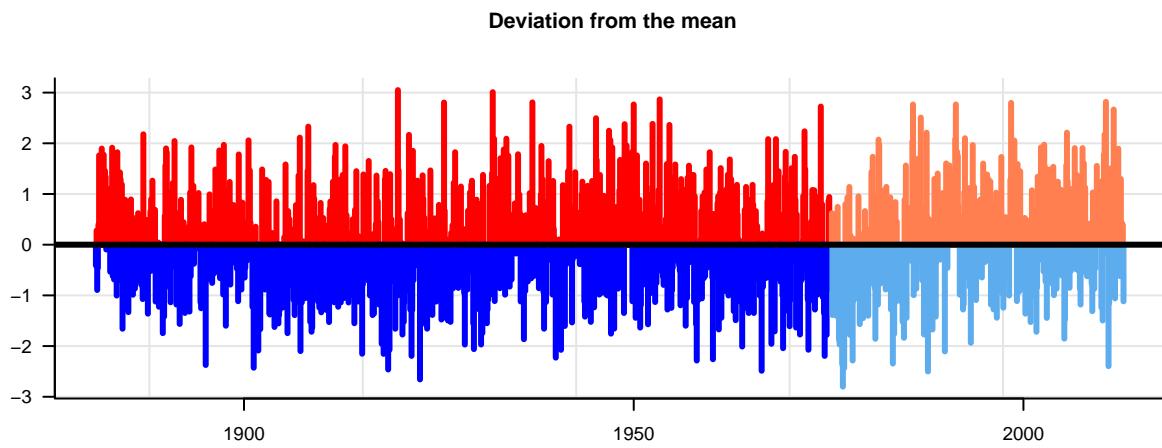
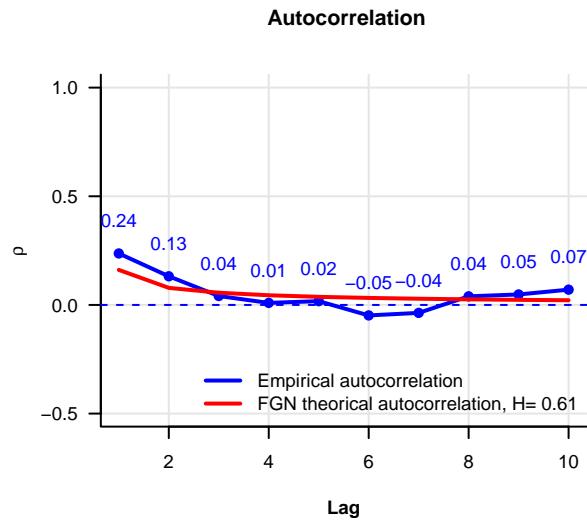
## USA, Galveston



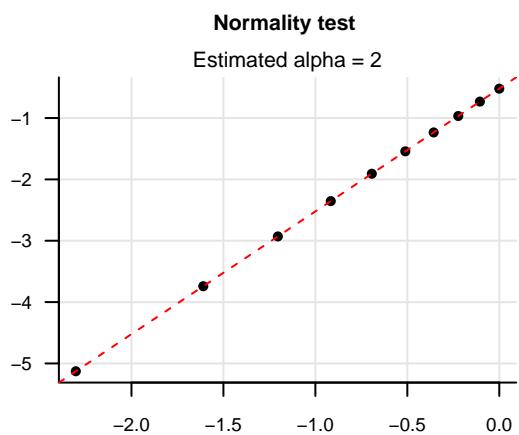
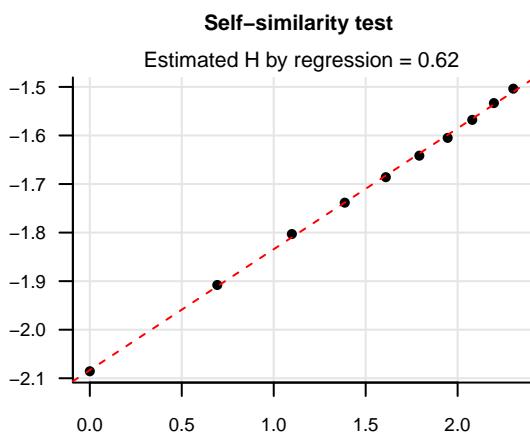
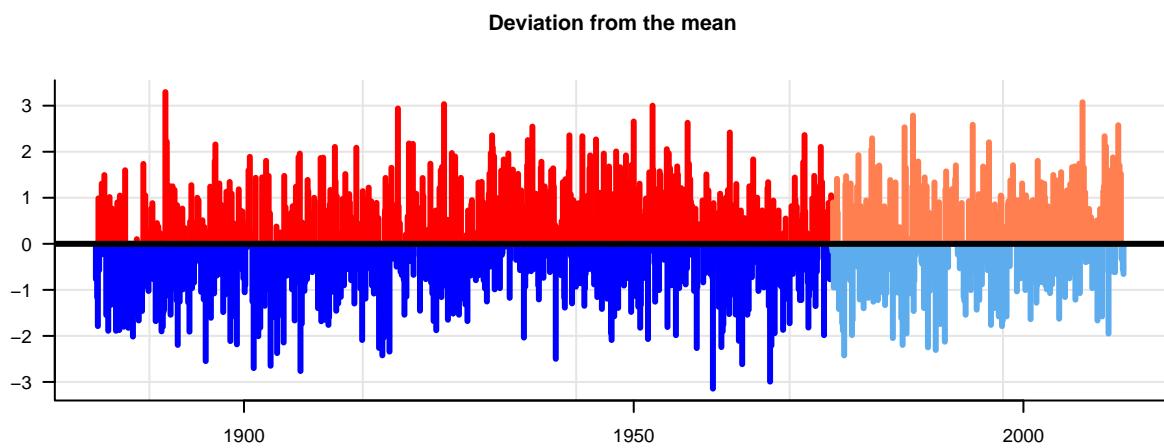
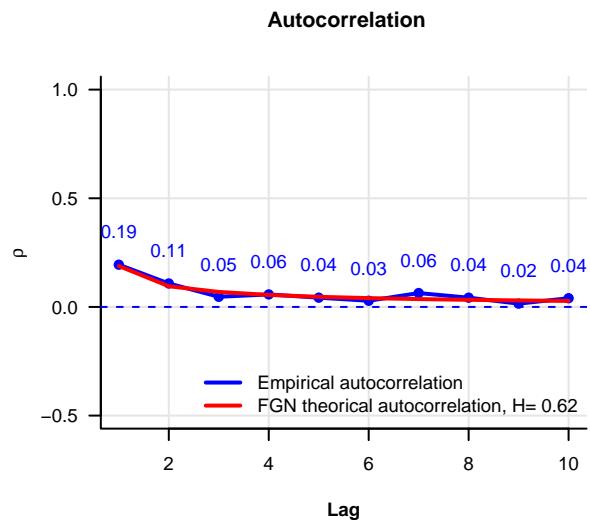
## USA, Indianapolis



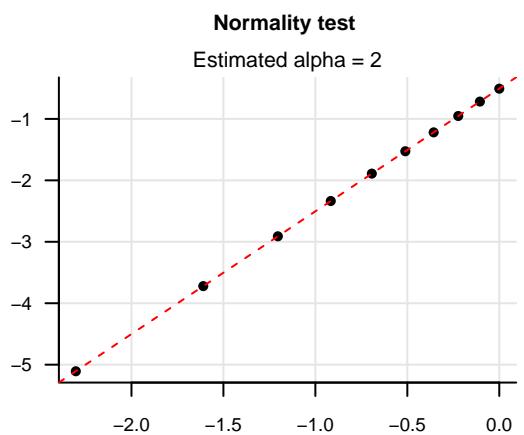
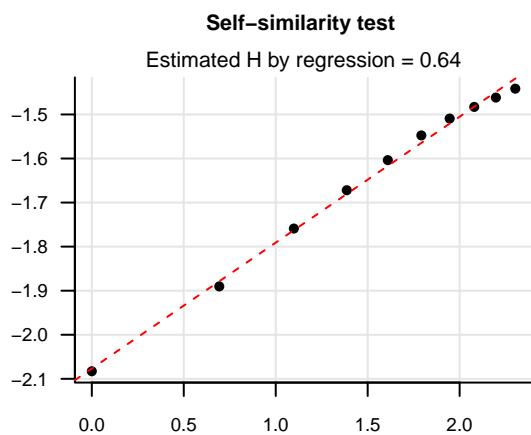
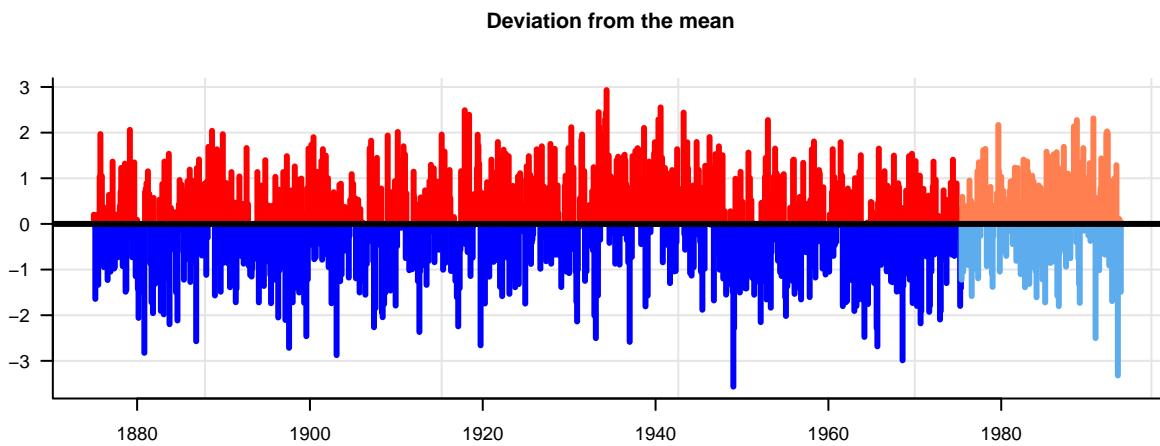
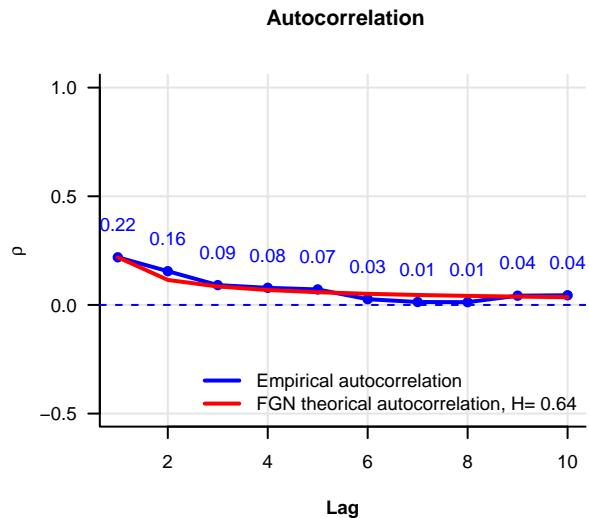
## USA, Jacksonville



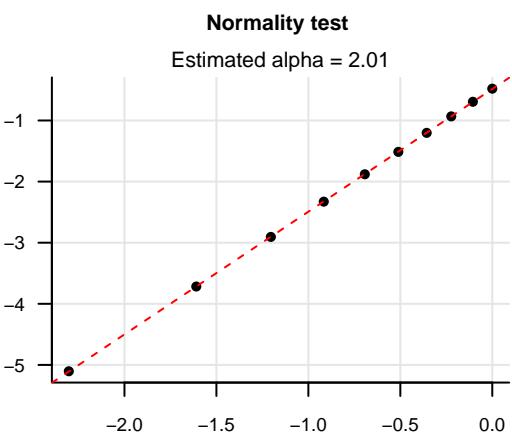
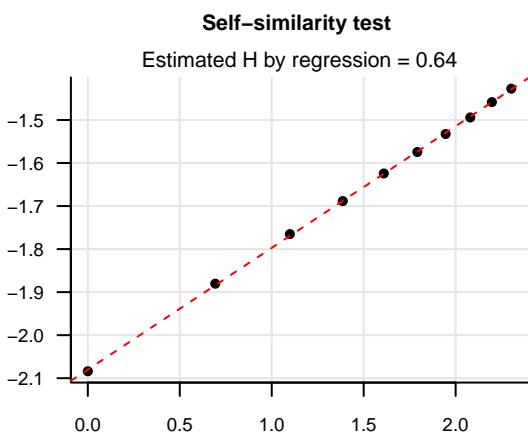
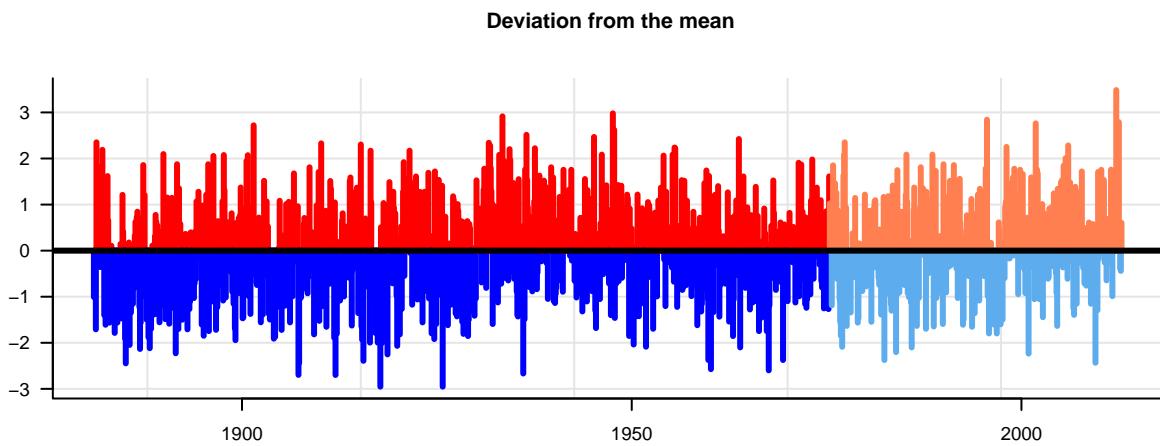
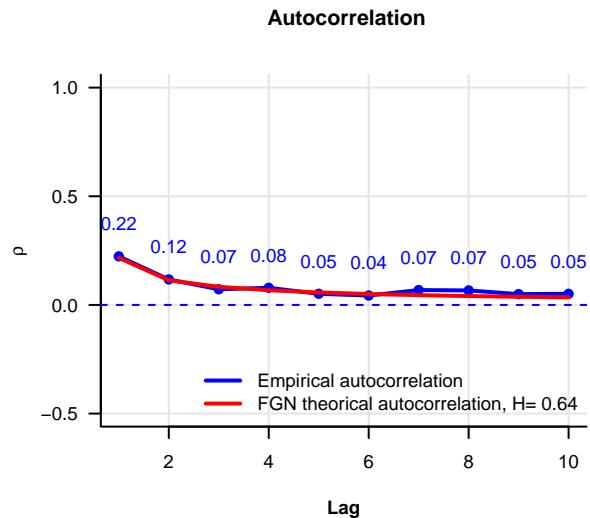
## USA, Knoxville



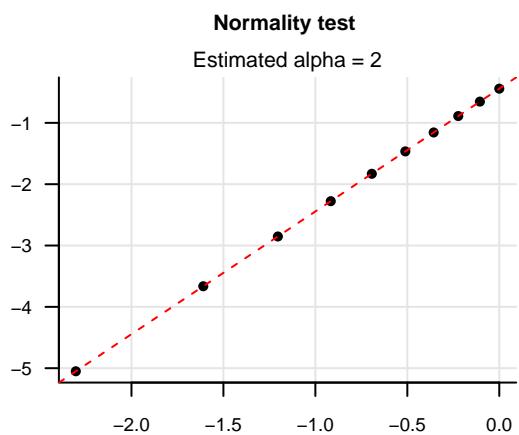
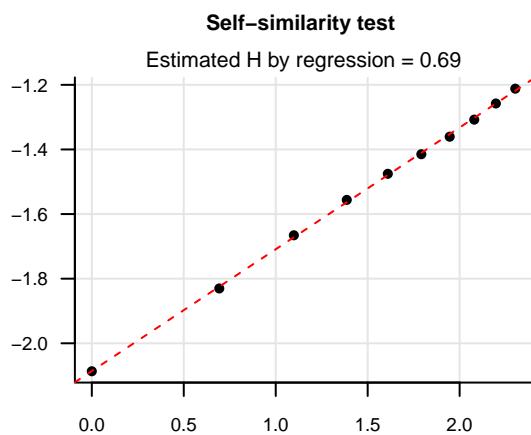
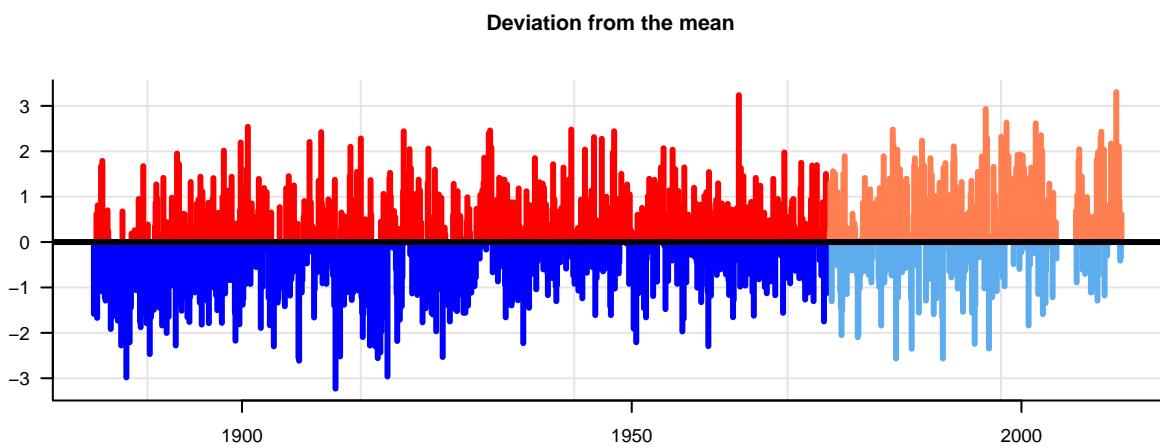
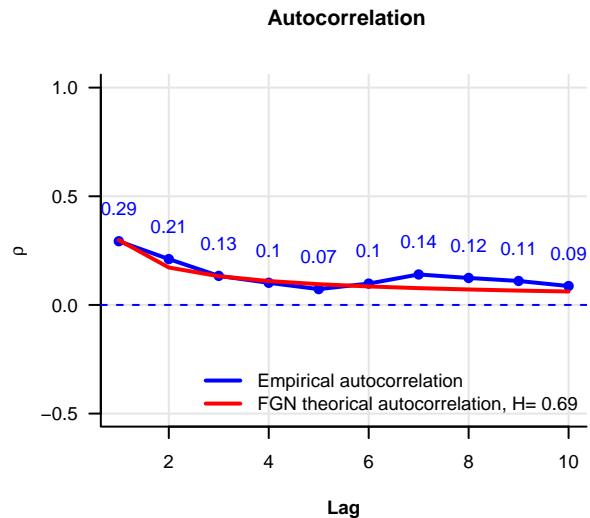
## USA, Las Vegas



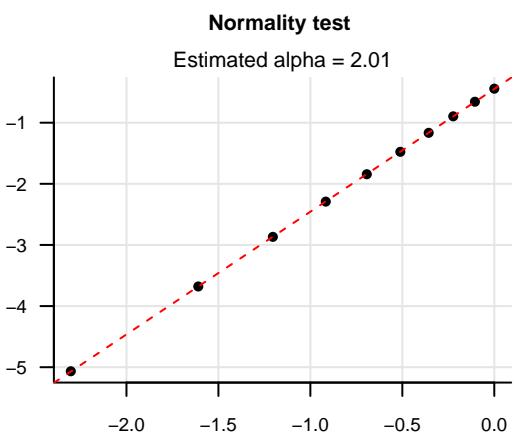
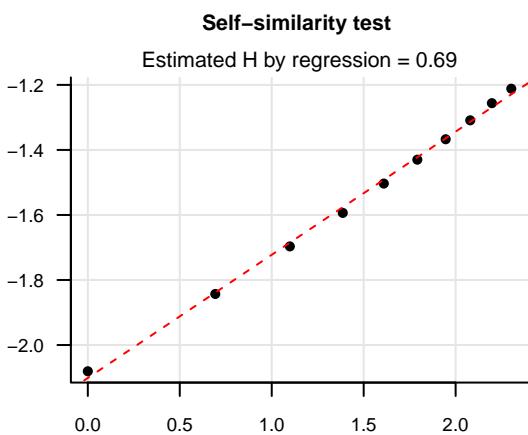
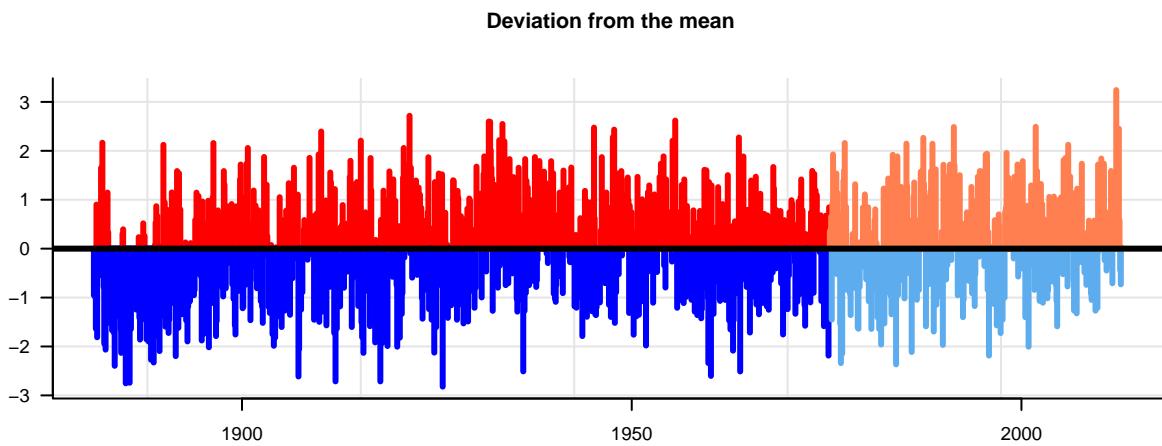
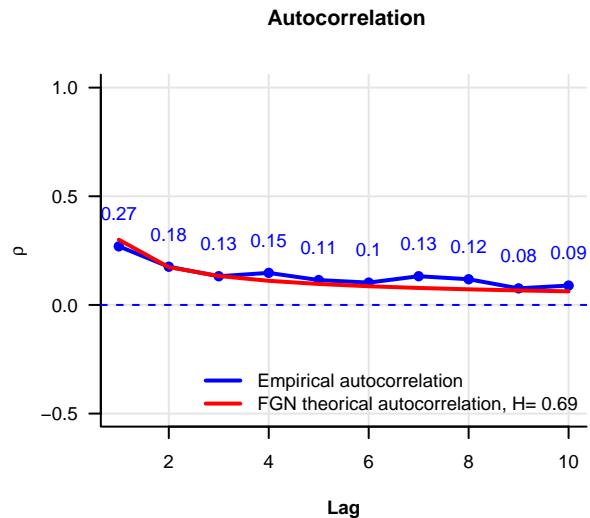
## USA, Madison



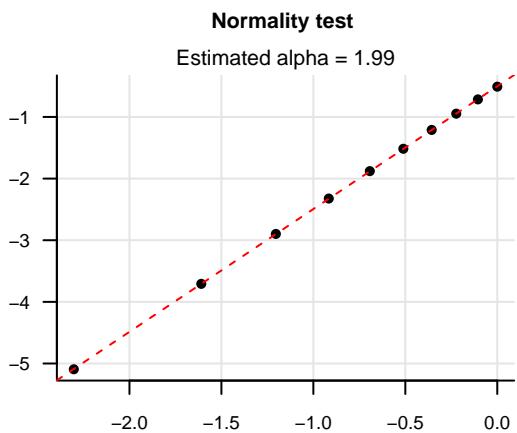
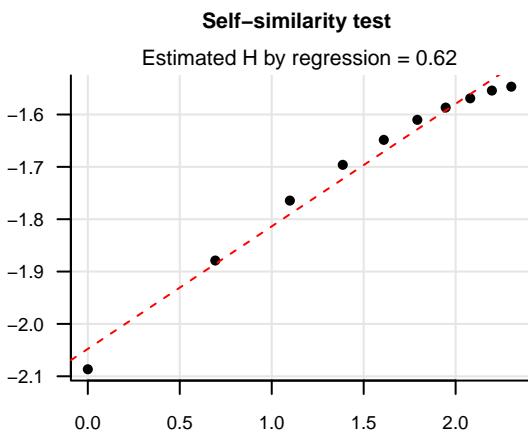
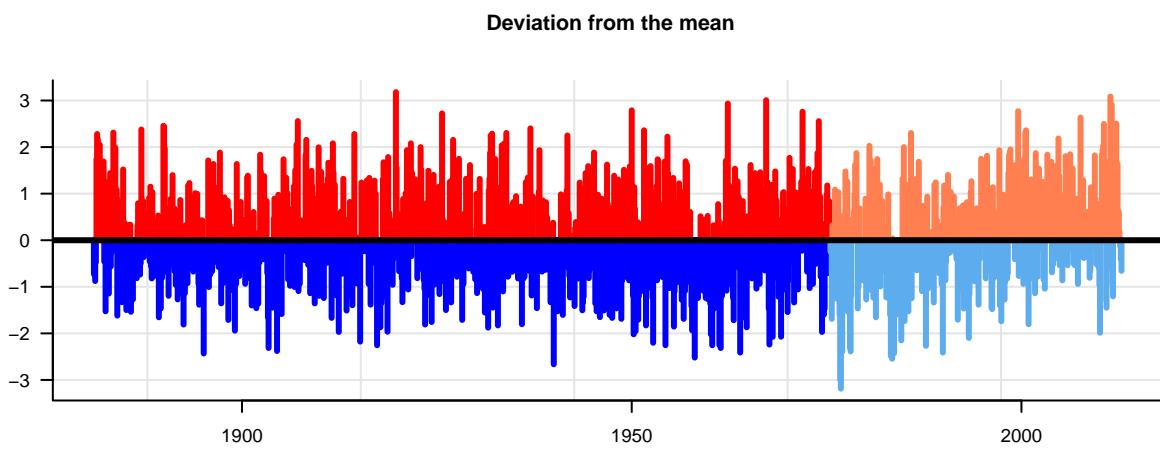
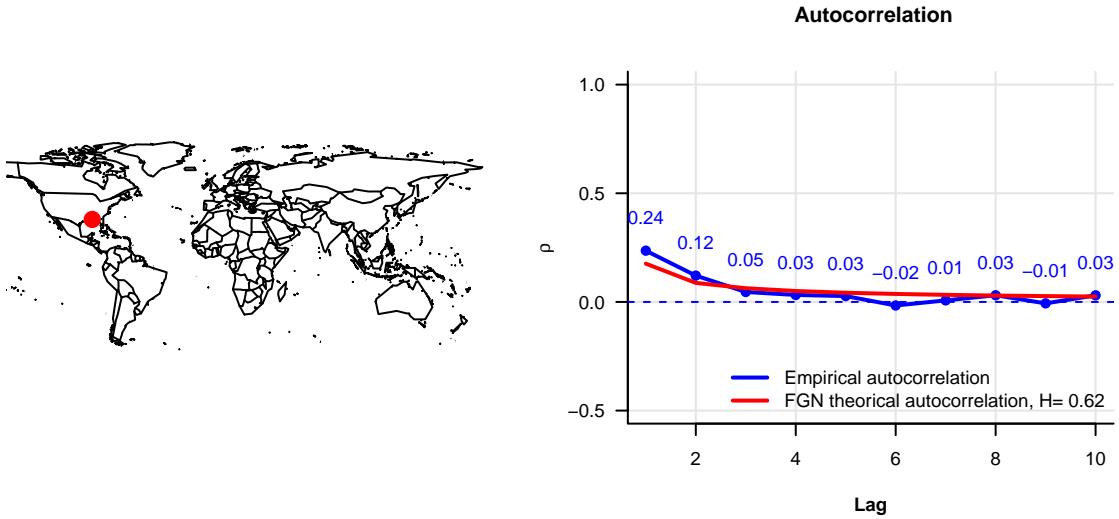
## USA, Marquette



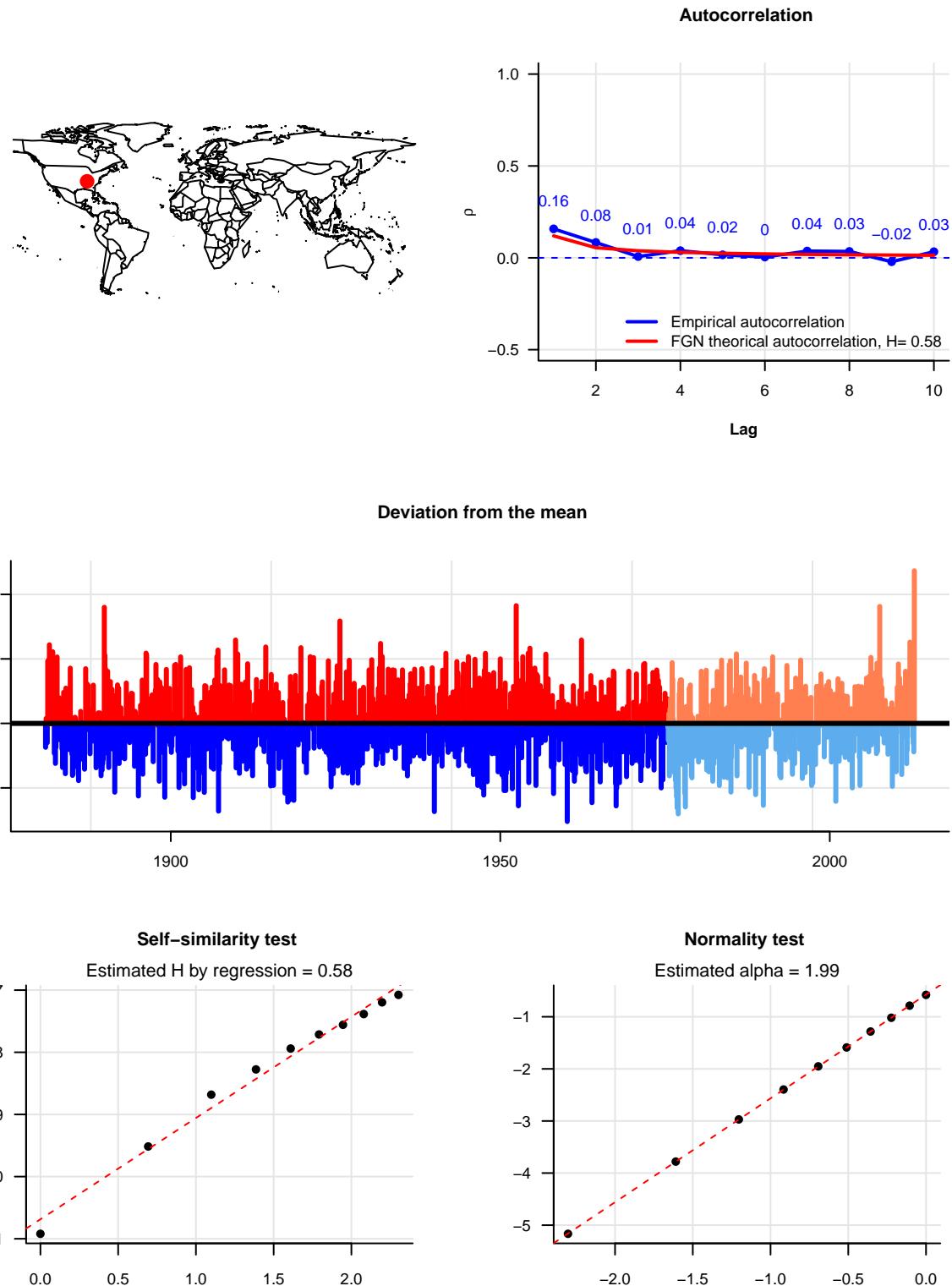
## USA, Milwaukee



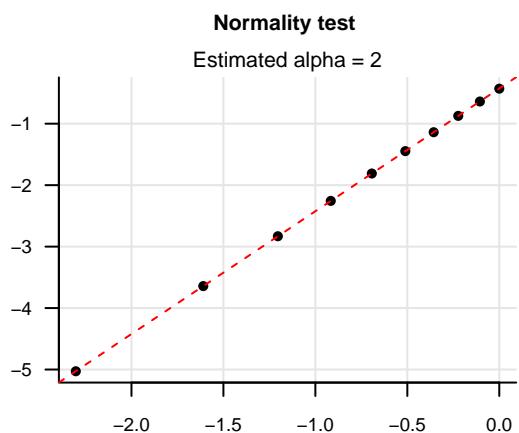
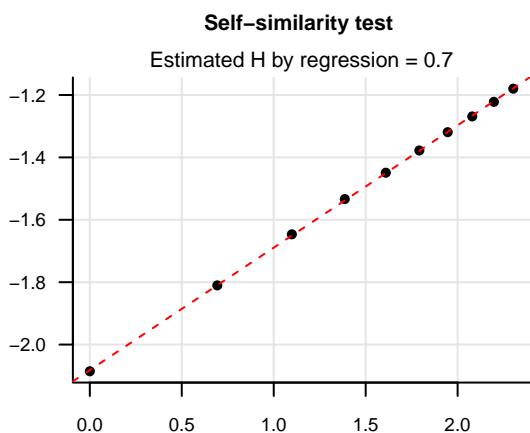
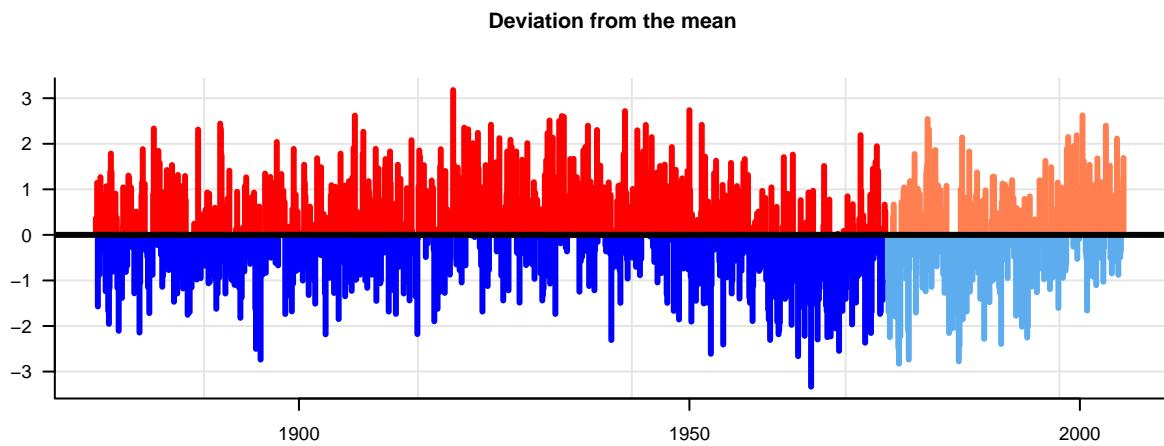
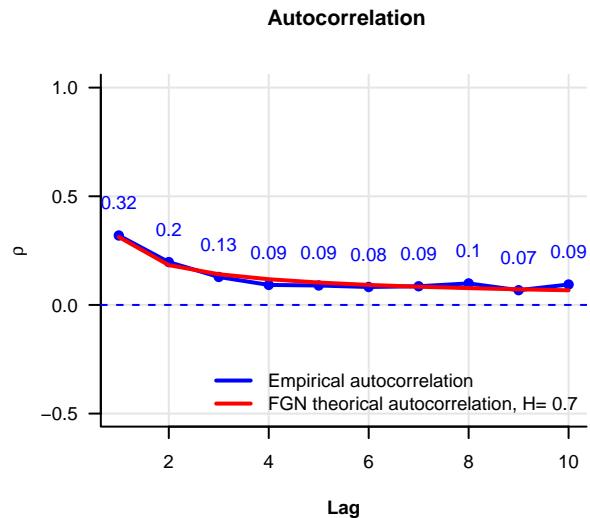
## USA, Mobile



## USA, Nashville



## USA, New Orleans



## USA, New York

