

# School of Applied Statistics

- Department of Applied Statistics
  - Howard Grubb, Neil Butler, Derek Pike, Alan Kimber
- Statistical Services Centre (SSC)
  - Roger Stern, Bob Burn, Sandro Leidi, Ian Dale
- Environmental Statistics Study Group of Royal Statistical Society
  - envstat – Environmental Statistics mail list:  
<http://www.jiscmail.ac.uk/files/envstat>

# Collaborative Research

- Climatology
  - Instat (Met Office), CLICOM (WMO)
  - [www/ssc/instat/instat.html](http://www/ssc/instat/instat.html) (+ITS labs) climatic guide, GENSTAT, extremes, Met Office
- Meteorology
  - Experimental Design in GCMs (David Sexton)
  - Rainfall patterns/NAO (Matt Sapiano)
- Remote sensing
  - Cloud sampling (Martine van de Poll, ESSC)

# Collaborative Research 2

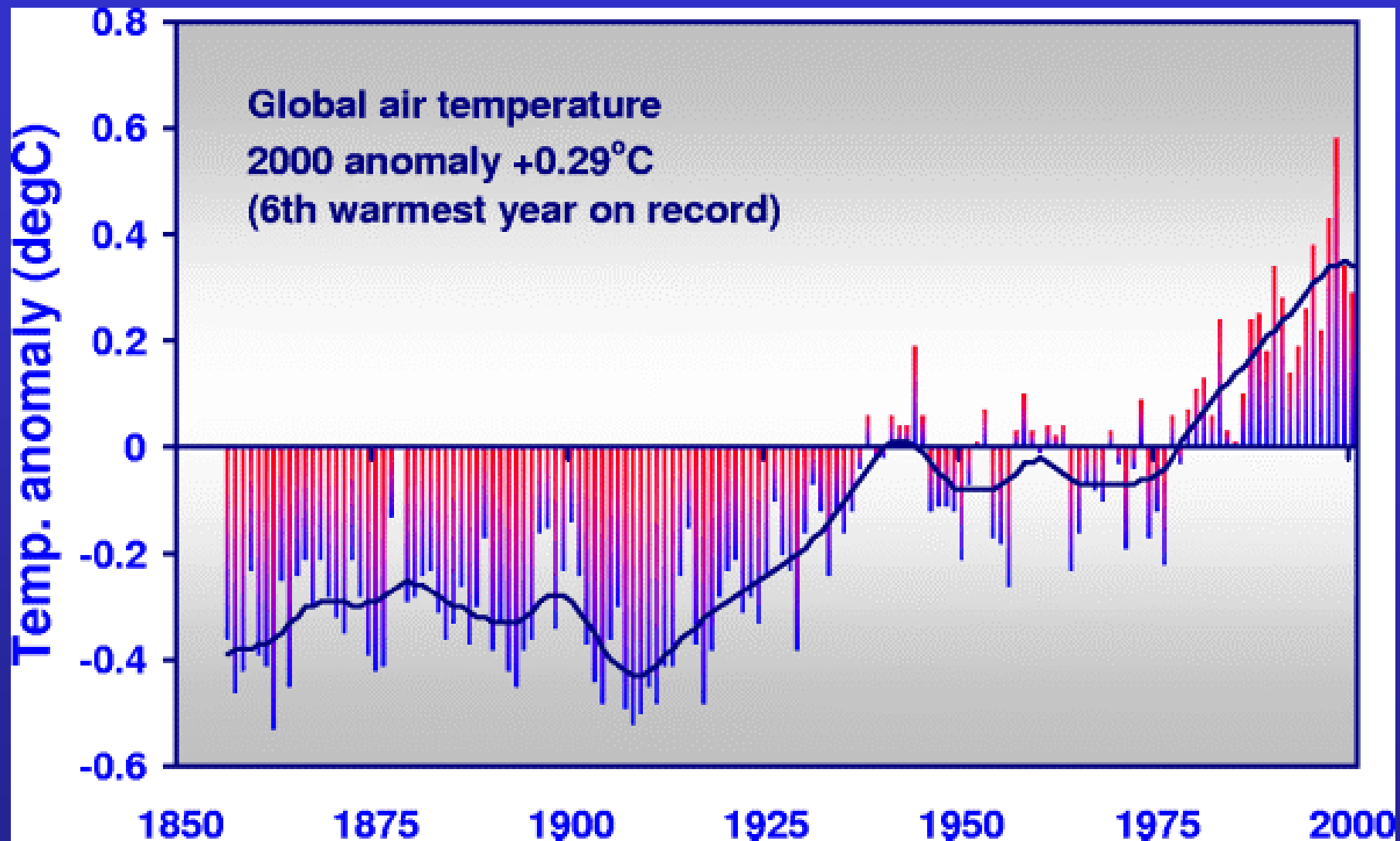
- Ecology
  - Sampling for endangered species (Bob Burn)
- Data Management – SSC-Stat (Excel)
- Environment Agency – statistical modelling
- Statistical Advisory Service
- Training (Short Courses)
- Resources (Good Practice Guides)

# Exploration of trends in atmospheric temperatures

Howard Grubb

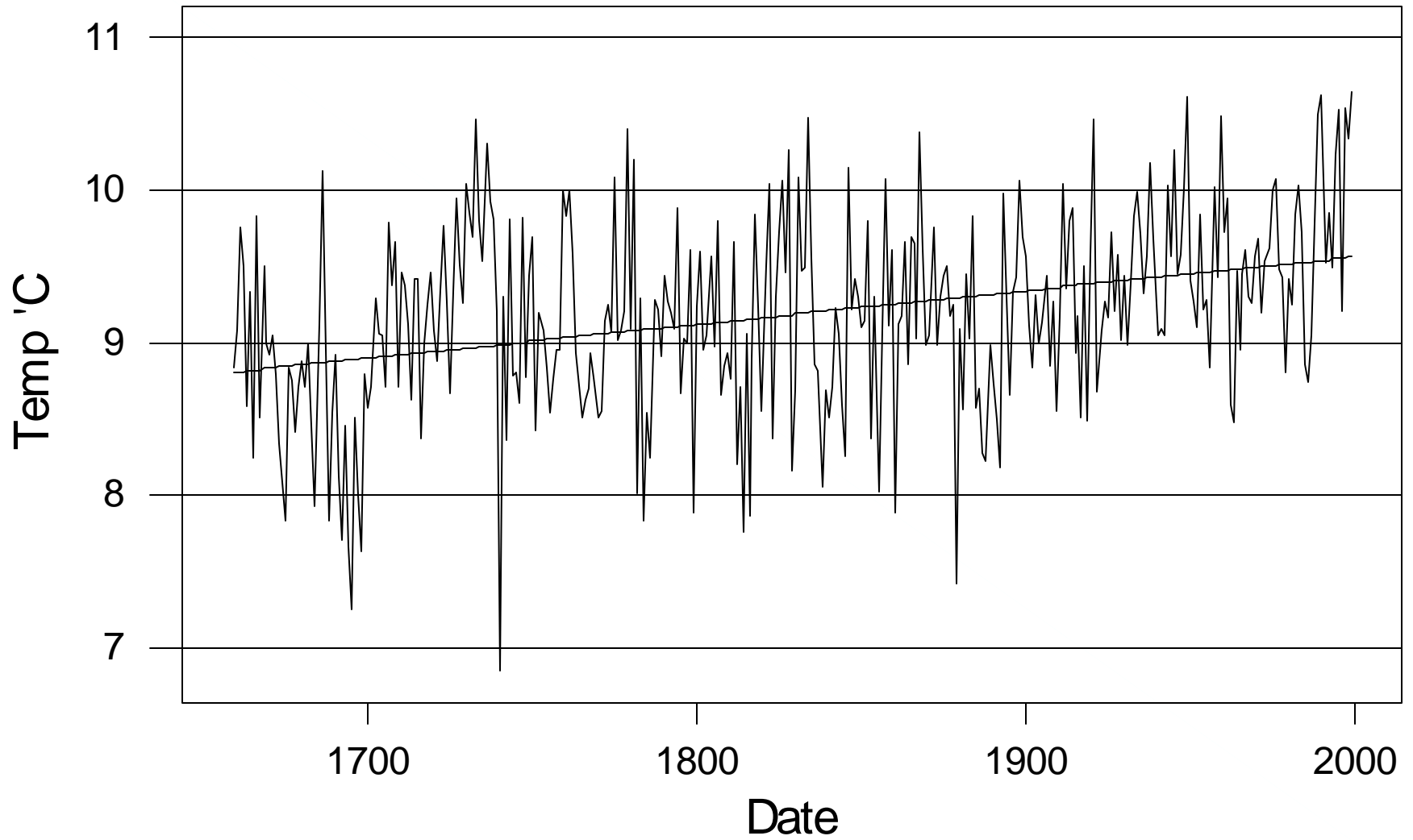
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<http://www.rdg.ac.uk/~snsgrubb>

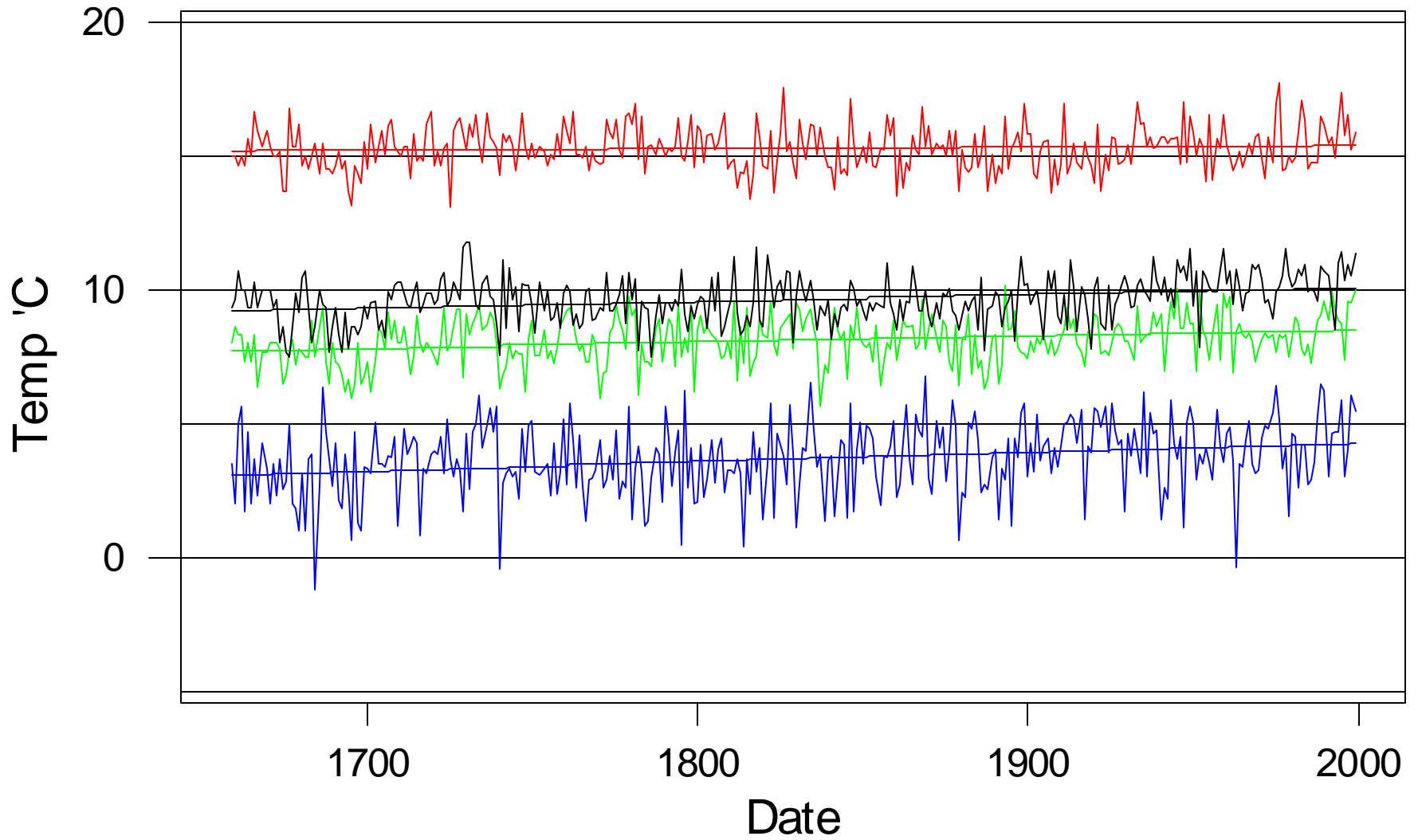


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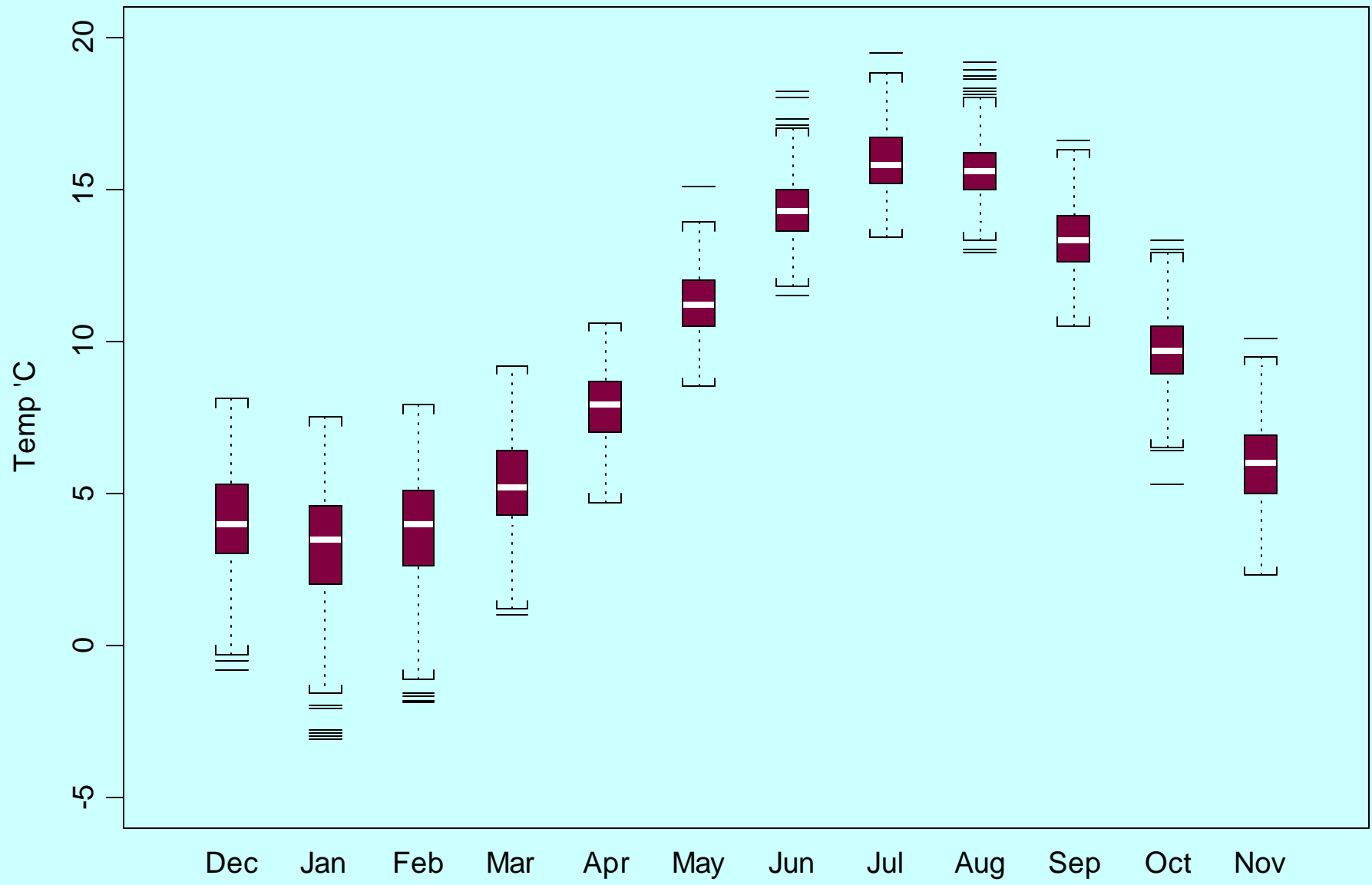
# CET annual (mean)



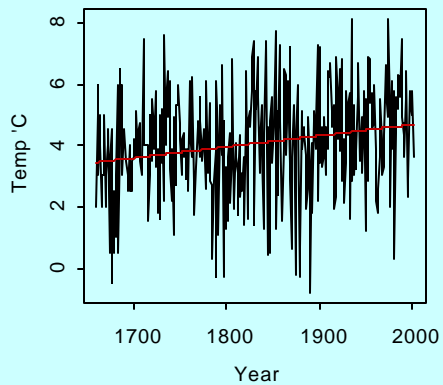
# CET seasons



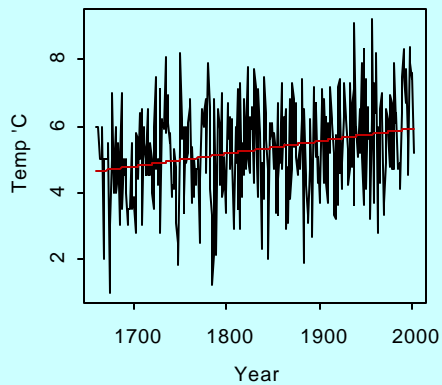
# Months



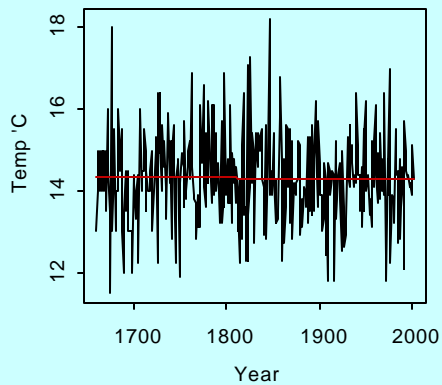
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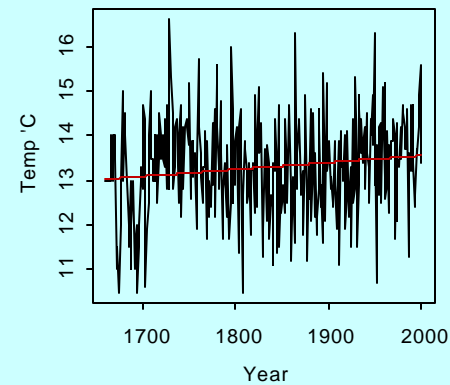
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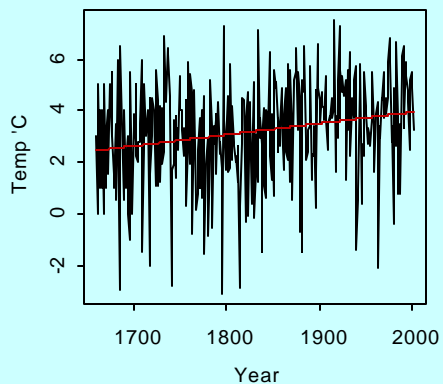
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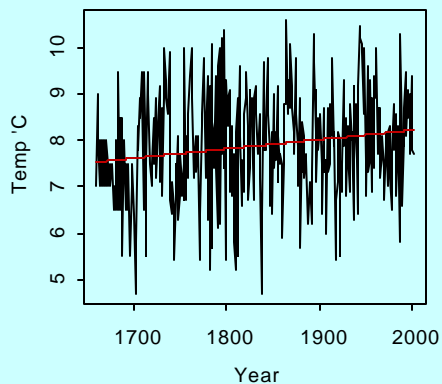
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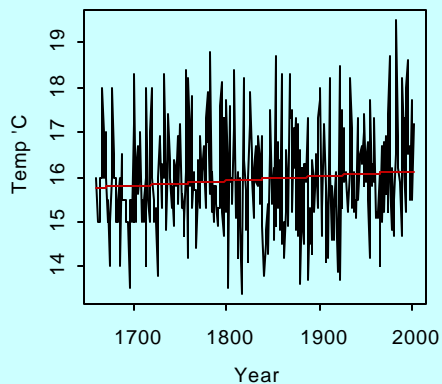
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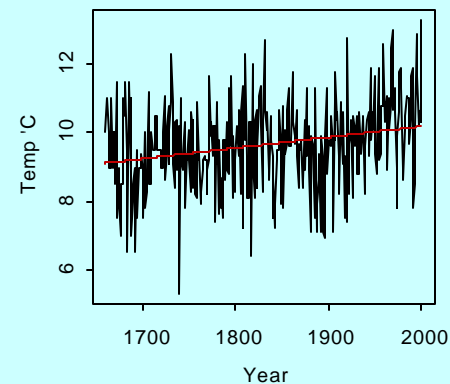
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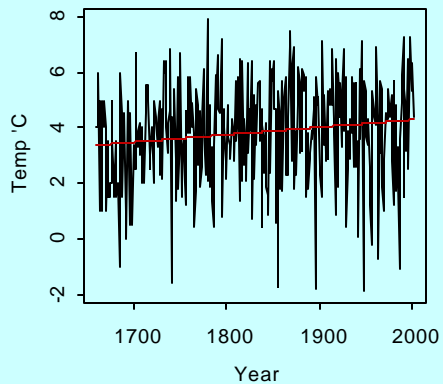
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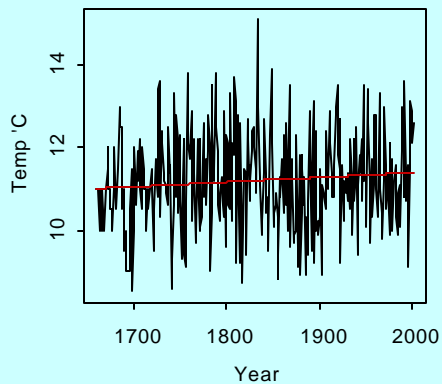
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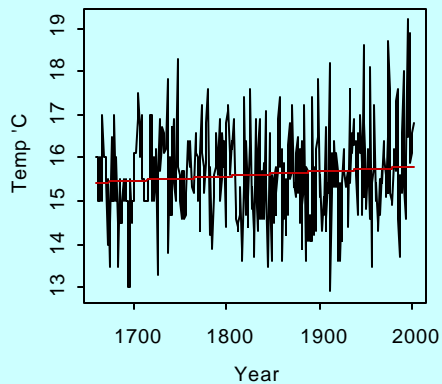
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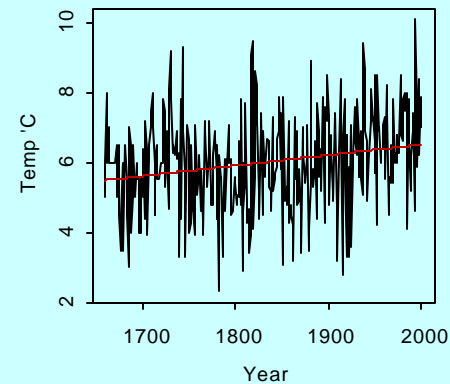
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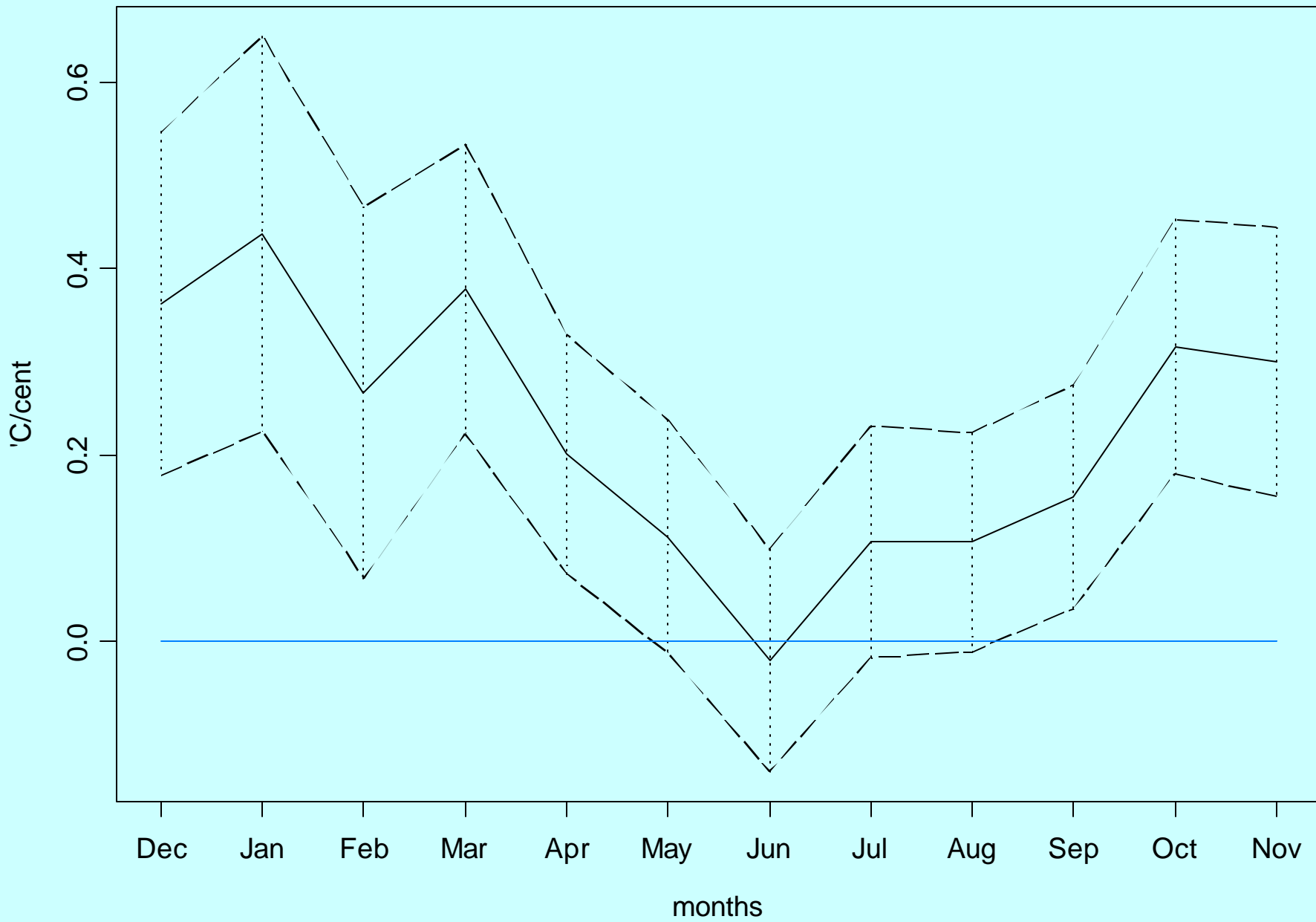
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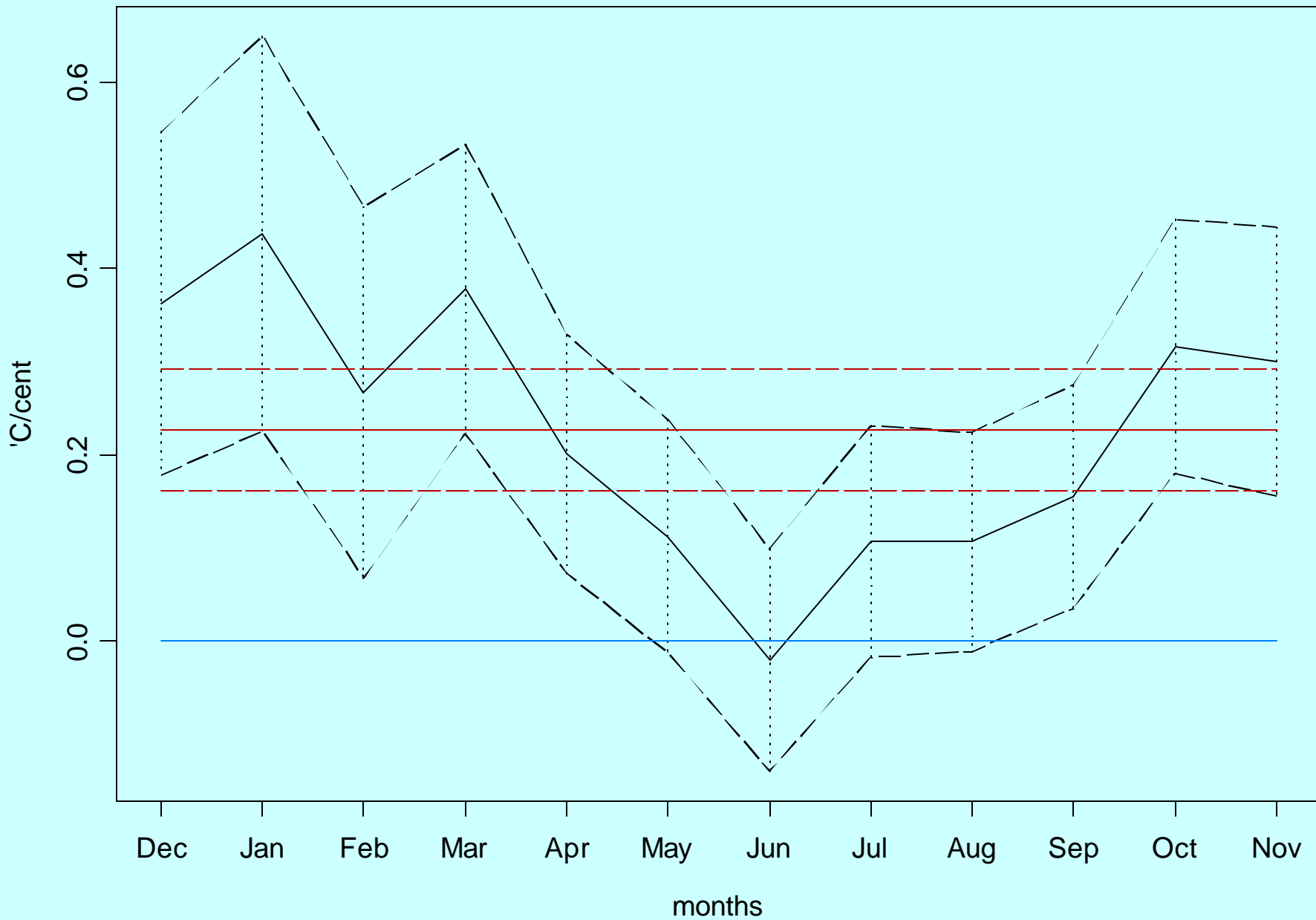
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# Trends

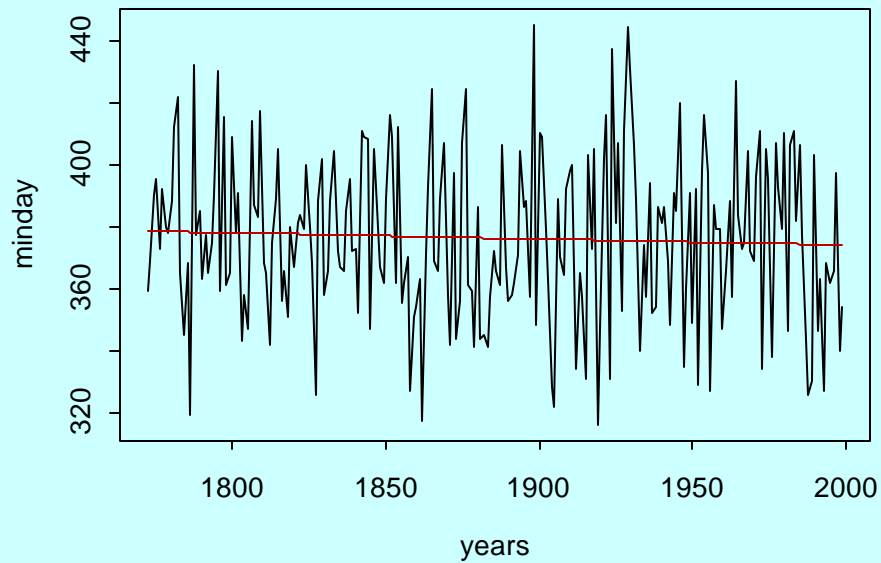
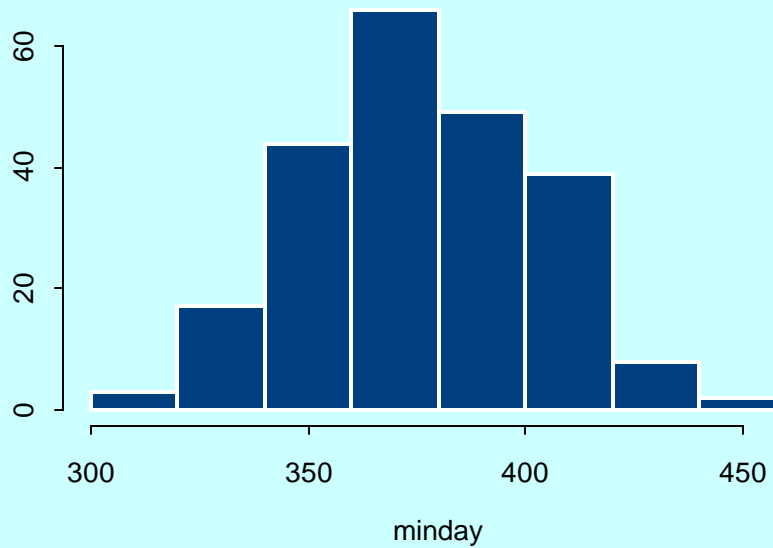
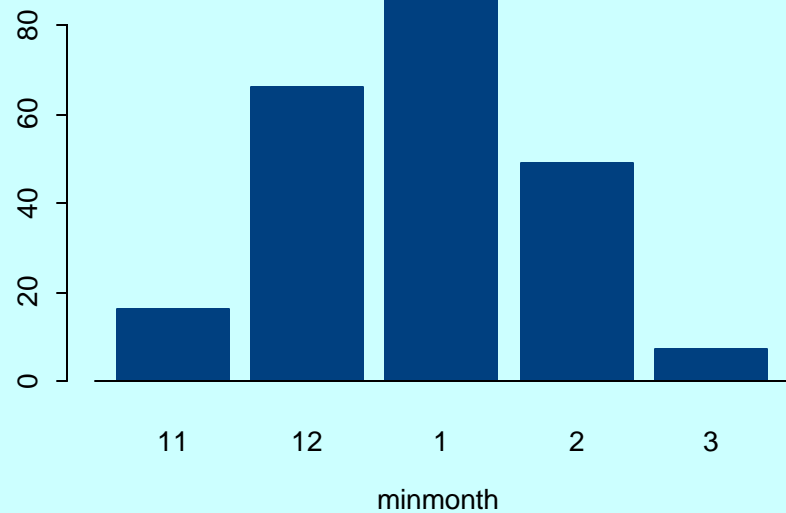
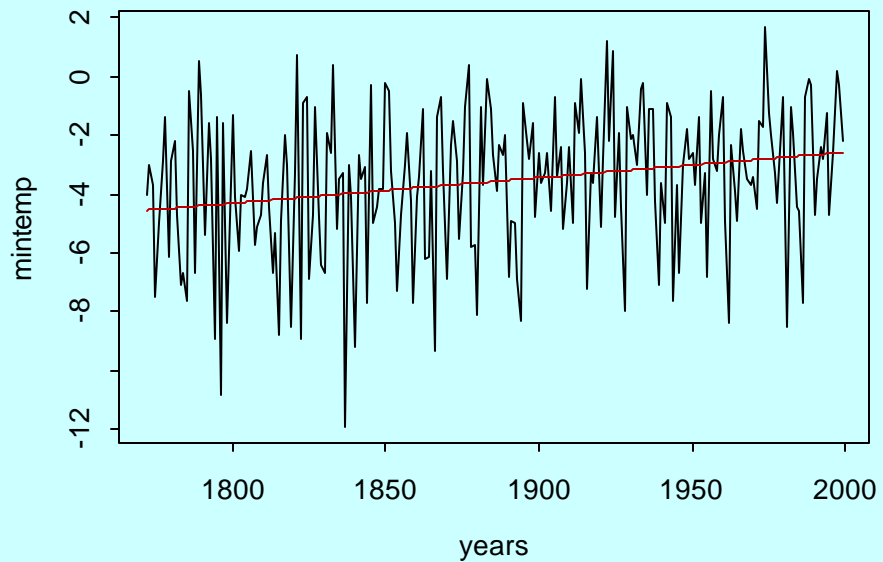


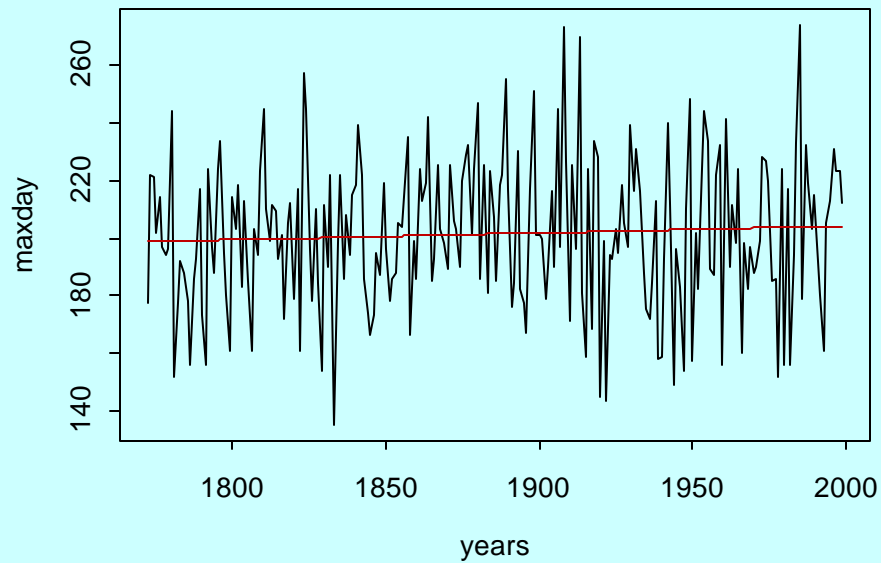
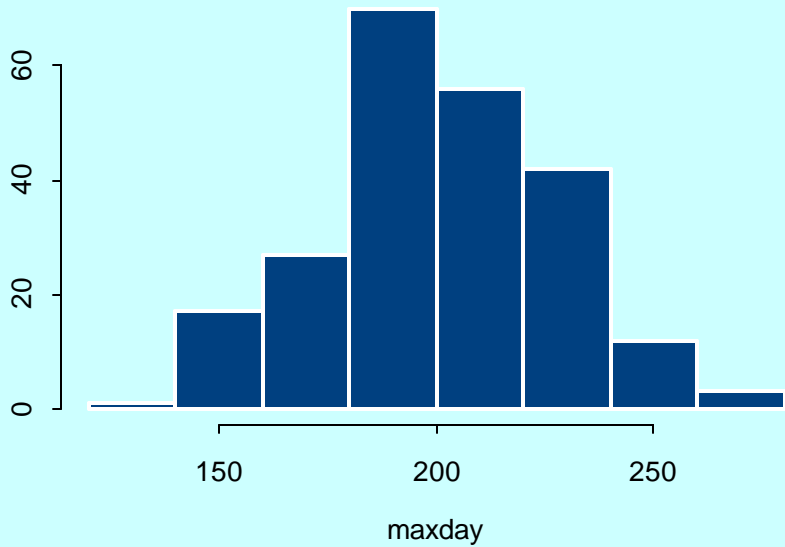
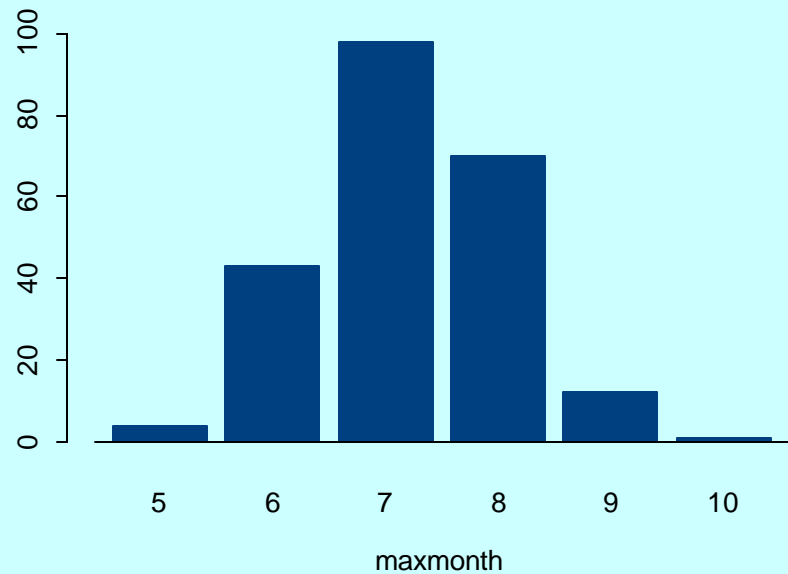
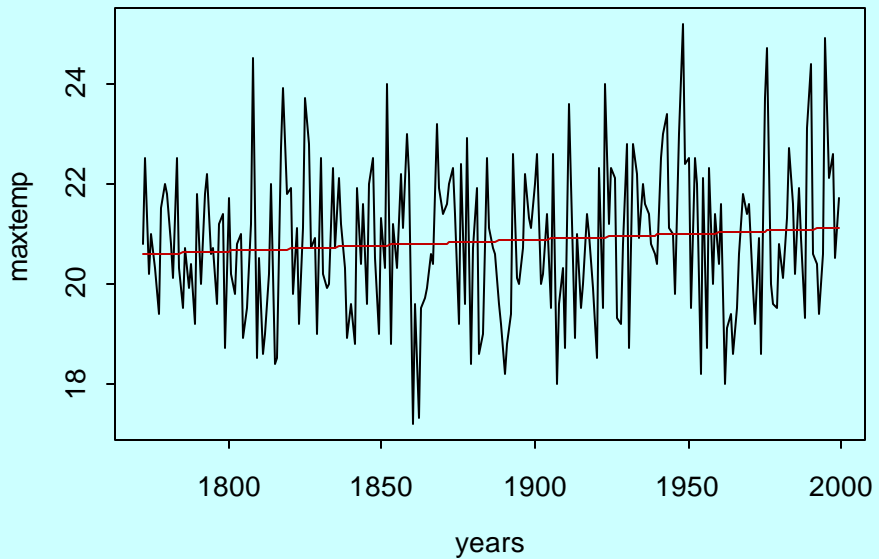
# Trends



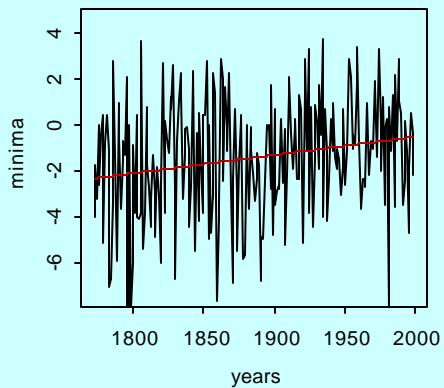
# Extremes (daily)

- 227 annual extremes
  - each of 365+ daily values
  - seasons – around 90 values
  - Generalised Extreme Value distribution
- As well as actual value, consider **timing**:
  - min is usually in January
  - and max is usually in July

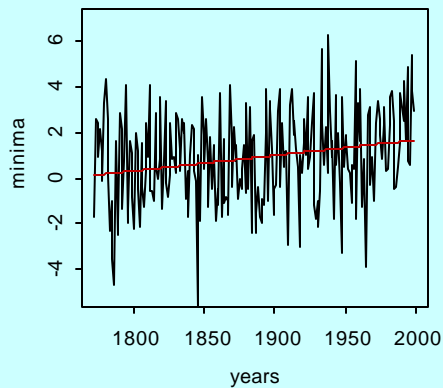




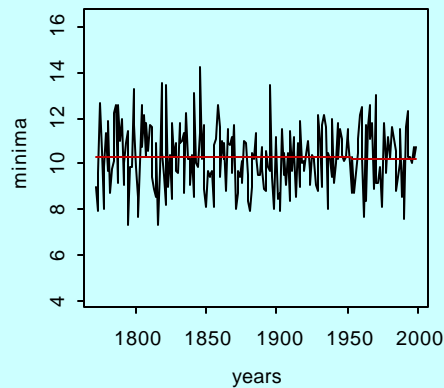
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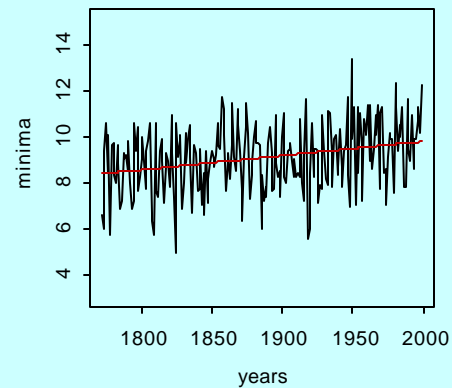
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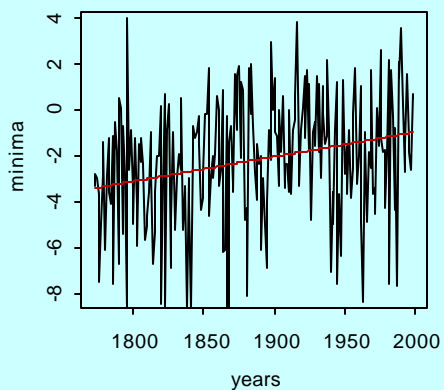
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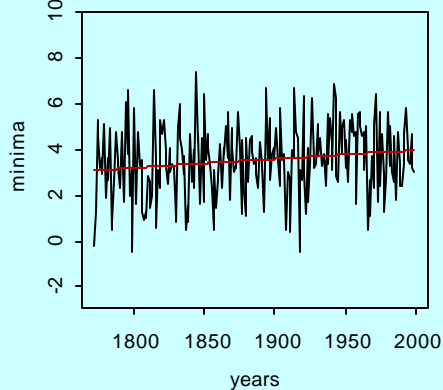
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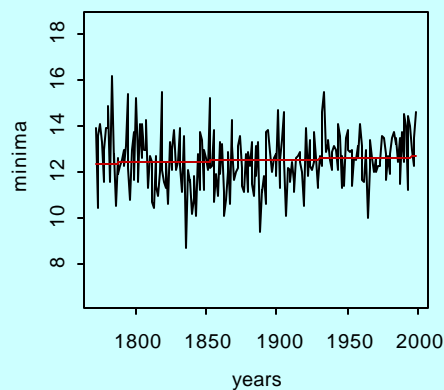
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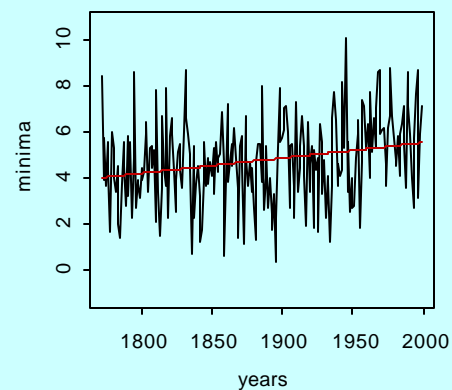
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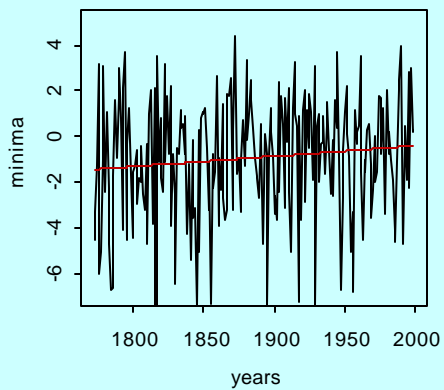
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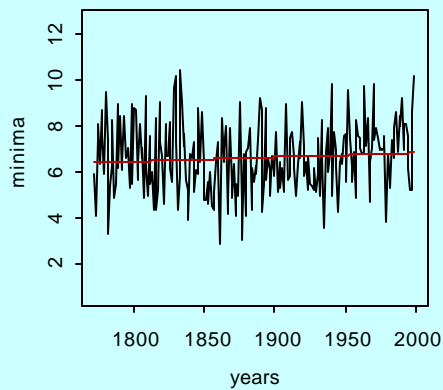
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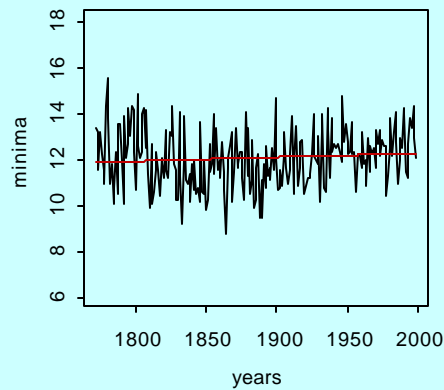
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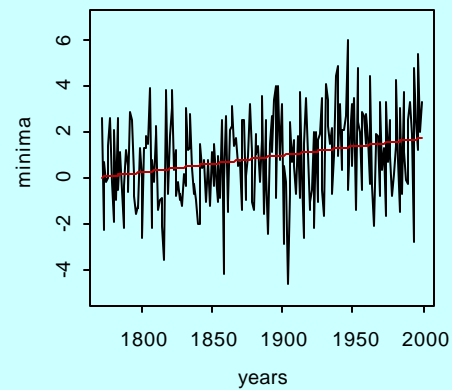
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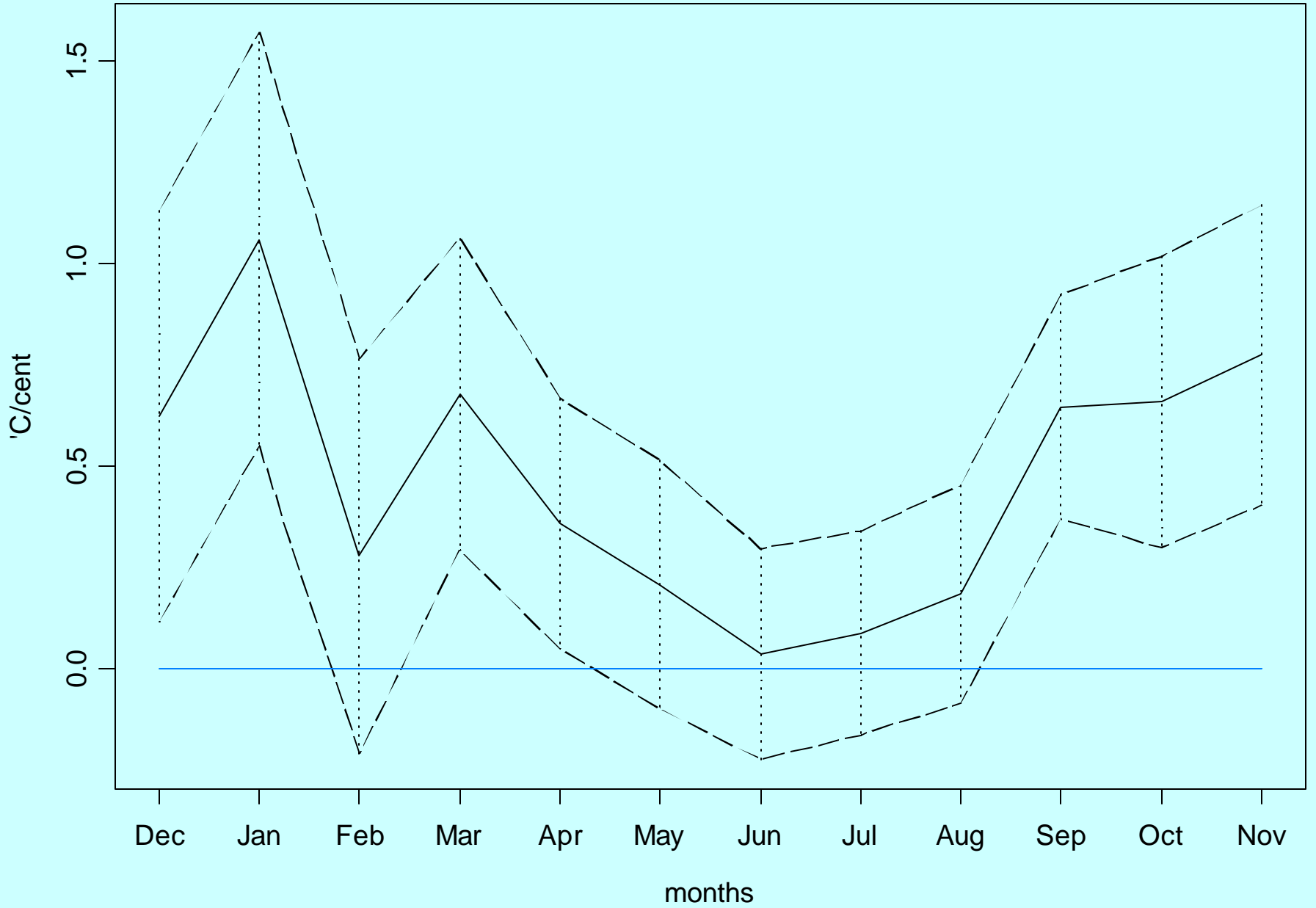
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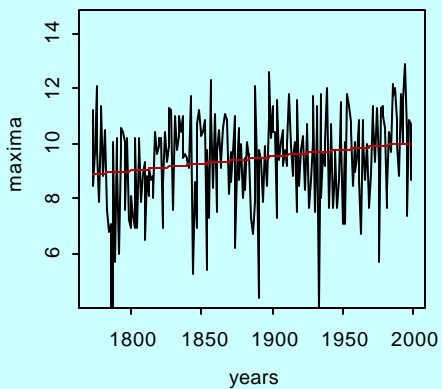
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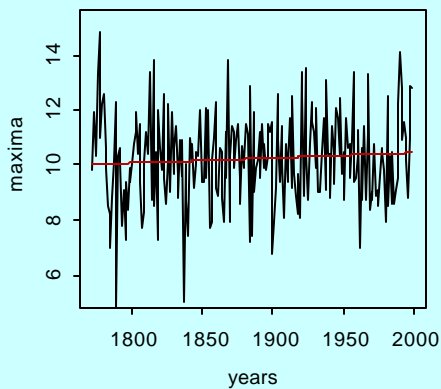
# Trends in minima



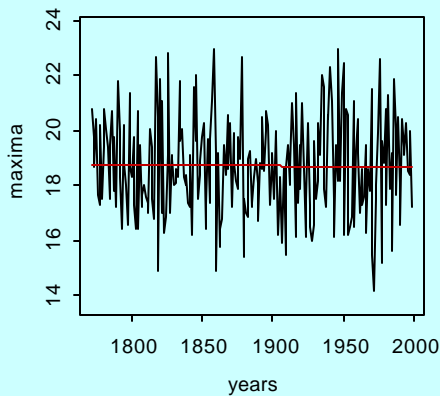
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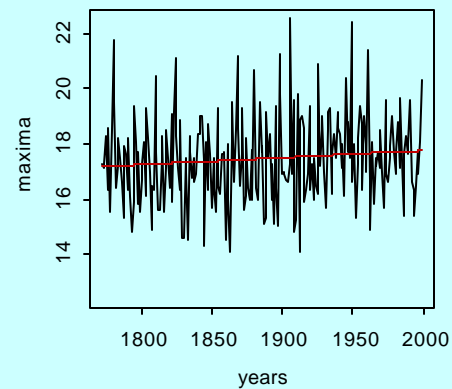
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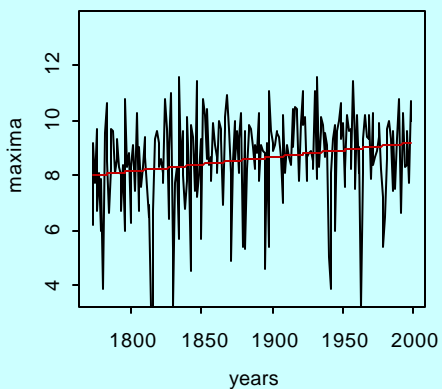
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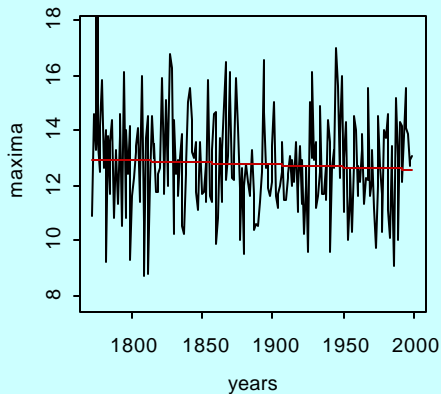
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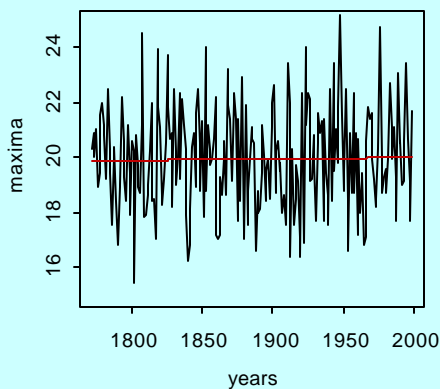
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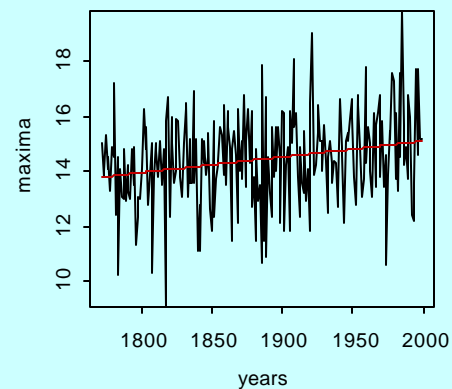
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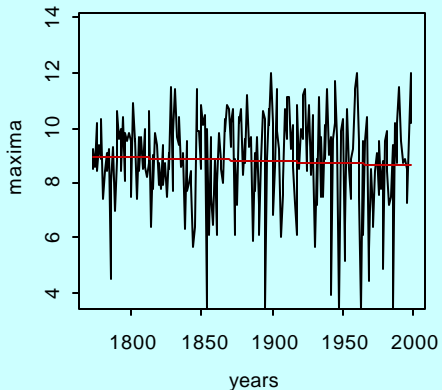
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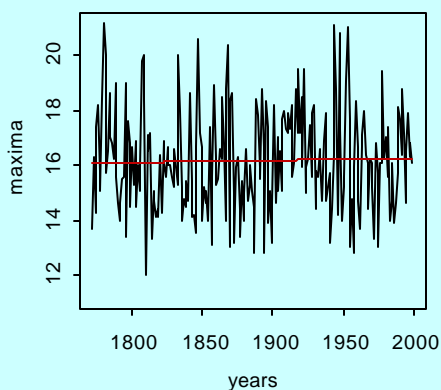
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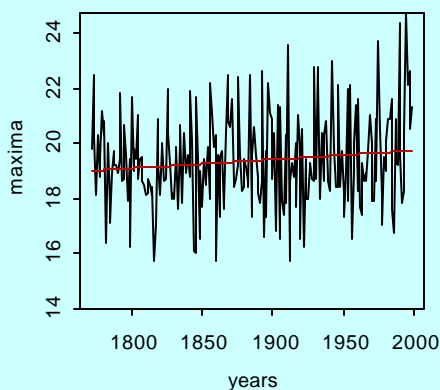
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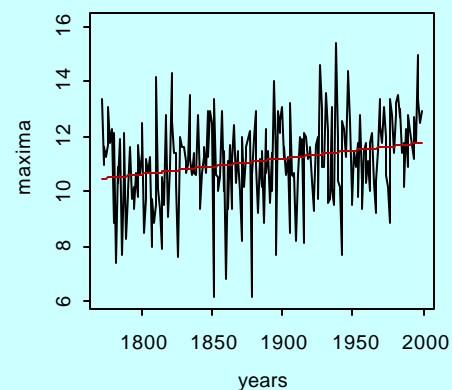
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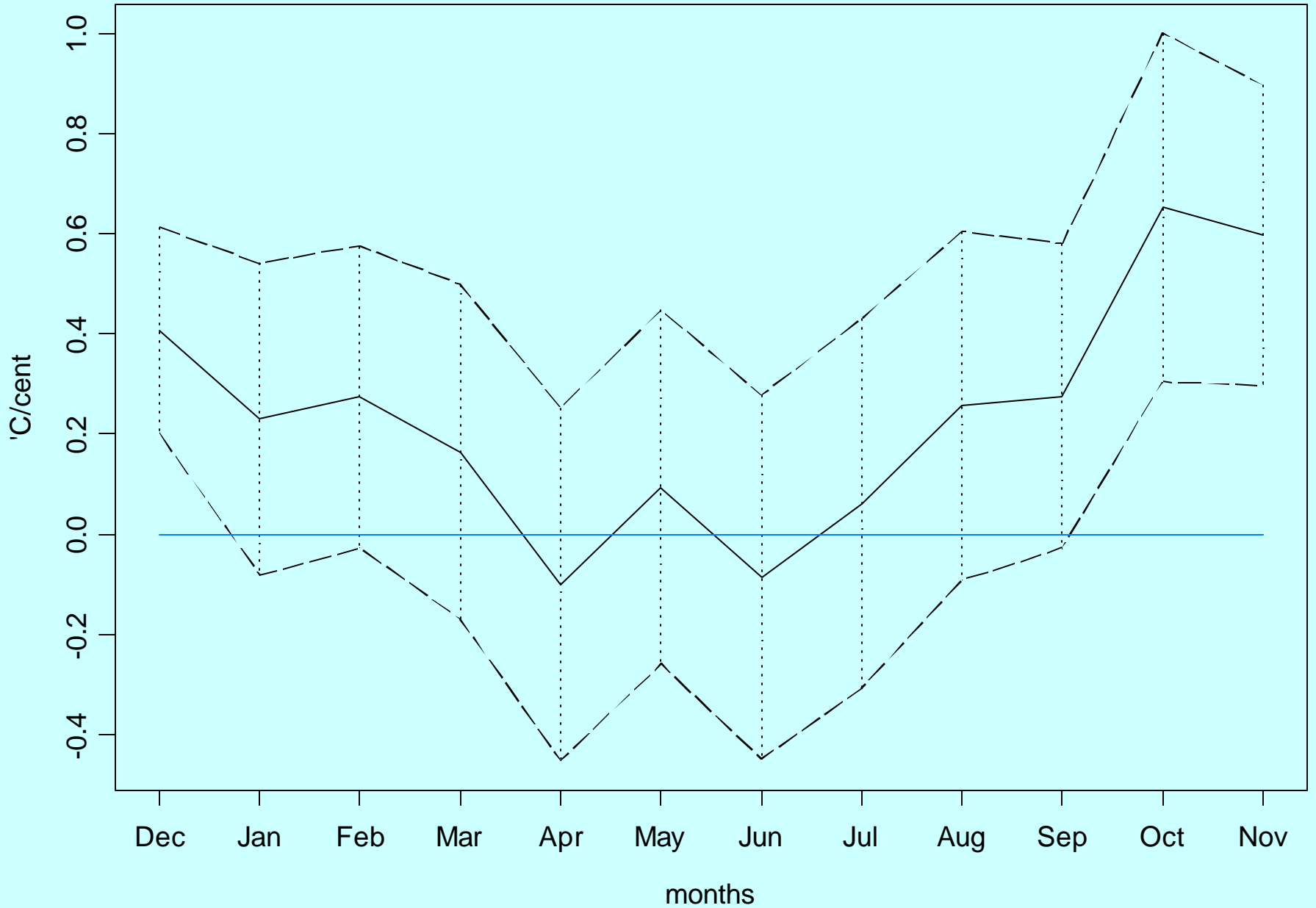
August



November



# Trends in maxima



# Key points

- Consider structure:
  - more data = less variance
  - but pooling inhomog.=less effect
- Simple models can be useful
  - structure may be a bigger effect
  - parameterise feature of interest explicitly
  - residuals may be most “interesting”
- Functionals of the data
  - extremes, other parts of variation