Thoughts on data availability and indices

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Summary

- Data availability (re CRUTEM3/4)
- CRUTEM4 and HadSST3
- Screen Adjustments
- CRUTS3
- Variance adjustment and indices and D&A
- Greenland
- Robustness of global averages

The extra Russian data

- Dispels the myth that they are closing stations
- There are likely many more for the more southern parts also
- Why do some countries not release more data?
- WMO or GCOS has just not asked them to release more
- Since early 2010 Germany and Spain are releasing ten times what they used to
- AOPC is going to ask more countries to release more. In many cases it is just a matter of changing switches
- Canada could probably do this……

- Even if not over the CLIMAT system then via web sites
- Much of our 'new' Russian data stops in 2008 or 2009. It will take some efforts to get this in near real time

Data availability

- There will be requests for the *as measured* (i.e. raw) data as well as the adjusted data
- NCDC says that GHCNv2/3 has both 'adjusted' and 'unadjusted', but the issue is that in many parts of the world the 'unadjusted' often isn't

Screen Adjustments

- Problem is that the introduction of 'Stevenson' type screens changed the annual cycle of temperatures – making summers in particular cooler
- The only way to determine how important this is – to take modern parallel measurements
- Examples from Spain and the Alpine countries, but much of Europe (especially Fennoscandia) might be affected
- Parts of Australia are affected before about 1910
- Is CET affected? Possible – but can't check with De Bilt, as that was partly adjusted using CET. Once we have all the extra British SST data digitized this ought to be able to help

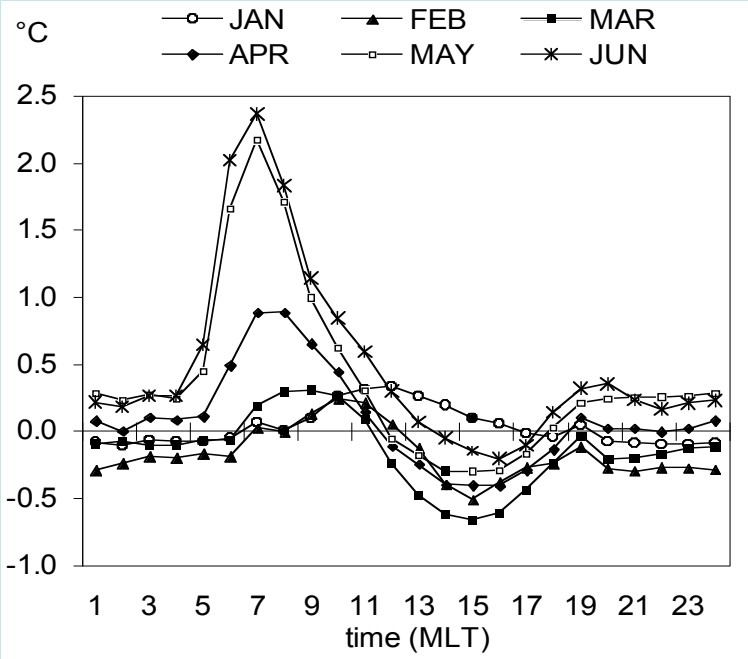
Kremsmünster - Austria

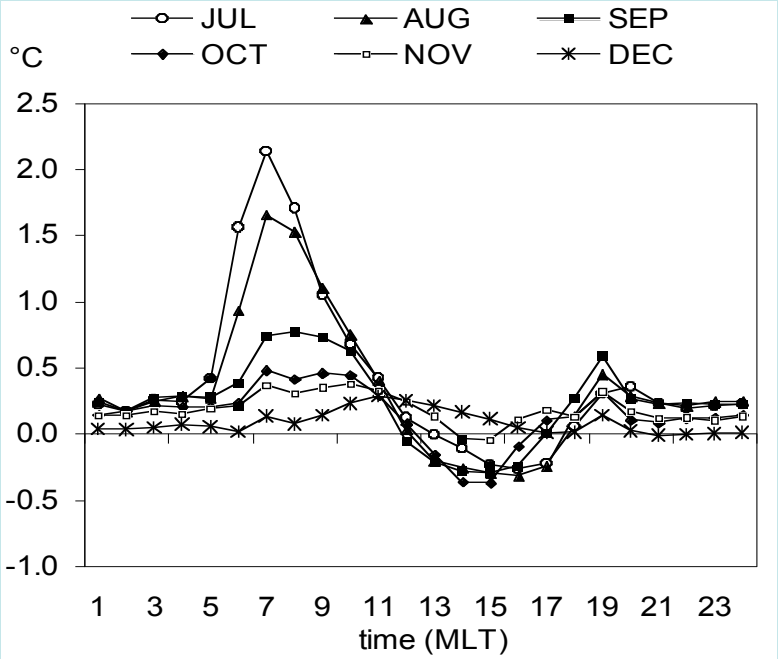
Böhm, R., Jones, P.D., Hiebl, J., Frank, D., Brunetti, M. and Maugeri, M., 2010: The early instrumental warm-bias: a solution for long Central European temperature series, 1760-2007. *Climatic Change* **101**, 41-67.

Kremsmünster - Austria

When built in the 1770s, this monastery was the tallest in Europe for the time

Kremsmünster – historic minus modern diurnal cycles NNE exposure

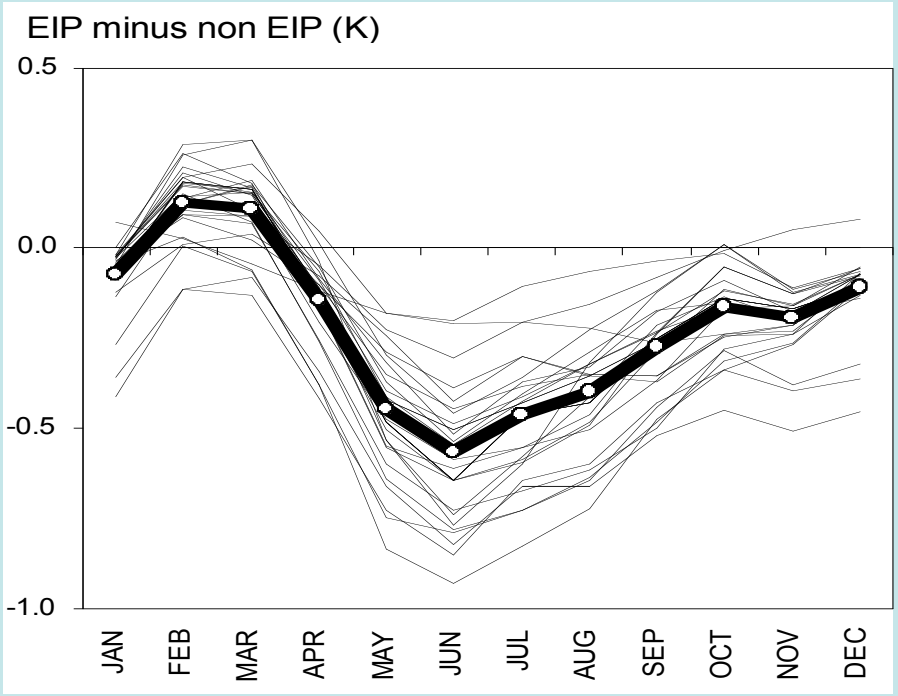




Work undertaken by Reinhard Böhm *et al* (ZAMG, in *Climatic Change*)

8 complete years of overlap between the 'window' and the modern Austrian observing site

Adjustment across all 32 sites in the Greater Alpine Region (GAR)

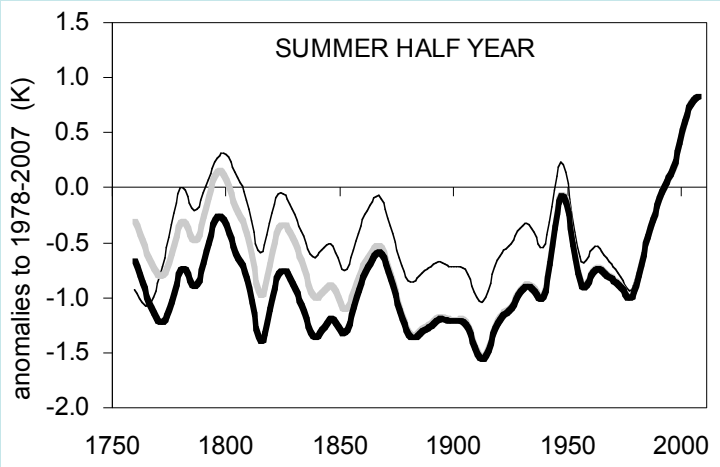


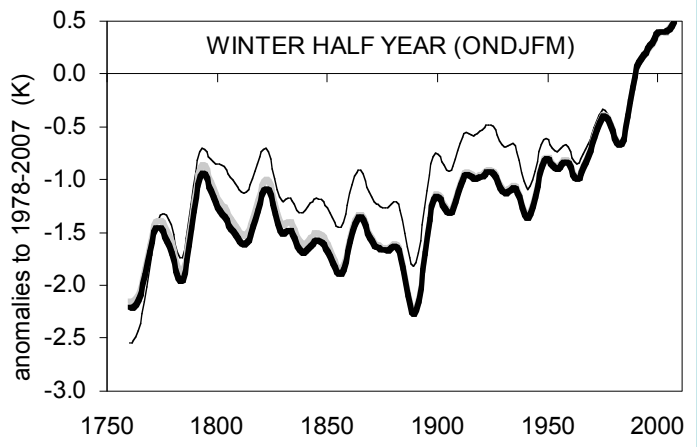
GAR is 4-19°E by 43-49°N

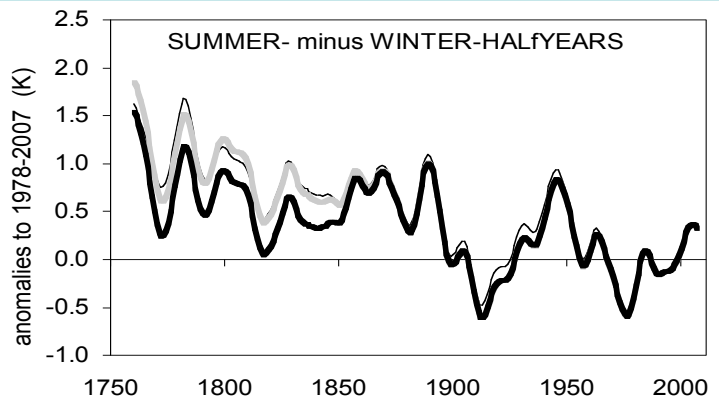
To apply adjustments need to know the NW-to-NE direction each site faced

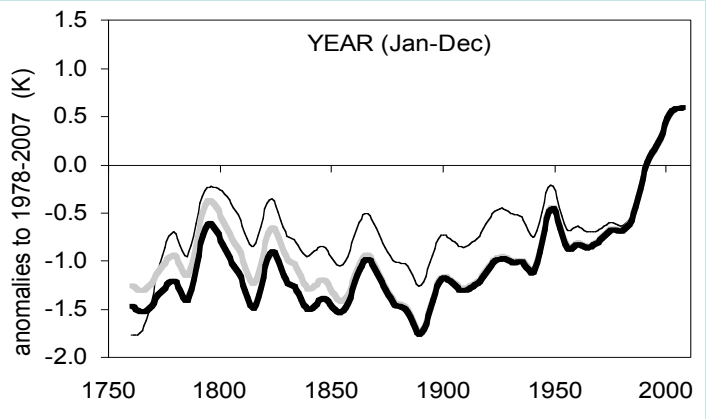
Effect of changes across the GAR

Thin is raw data. Grey is after adjustment for site moves and observation time changes. Thick shows the effect of exposure issues (thick black overlies grey since about 1860.









Applying Adjustments to Daily

- Austrians can't do this, as they lost most of their archive in 1945
- Apart from a couple of sites they don't have the original 'daily' data. The ones they have were published in year books
- Long European daily series need these adjustments applied
- Should E-OBS try to adjust the daily data to stop poor papers being written

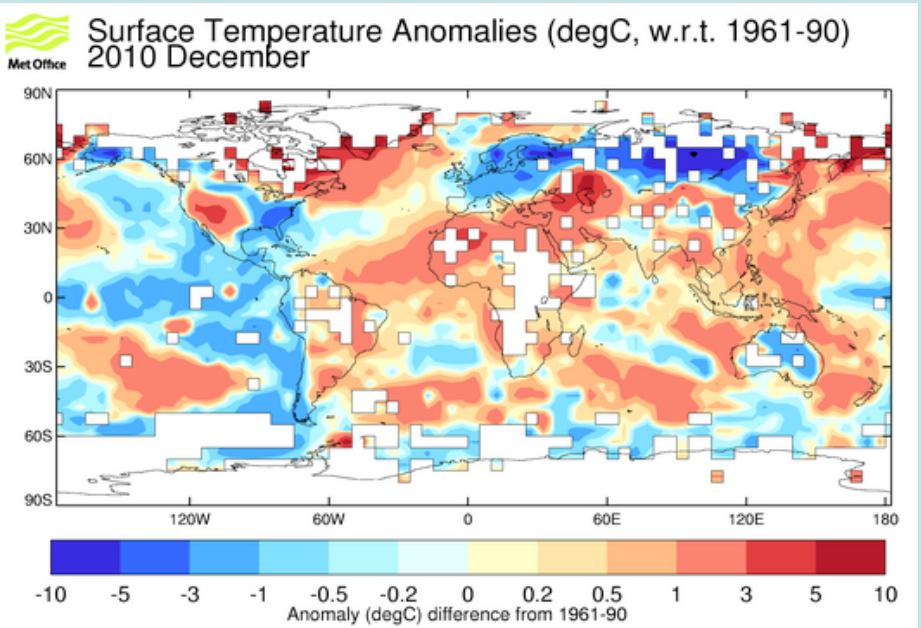
Variance Adjustment

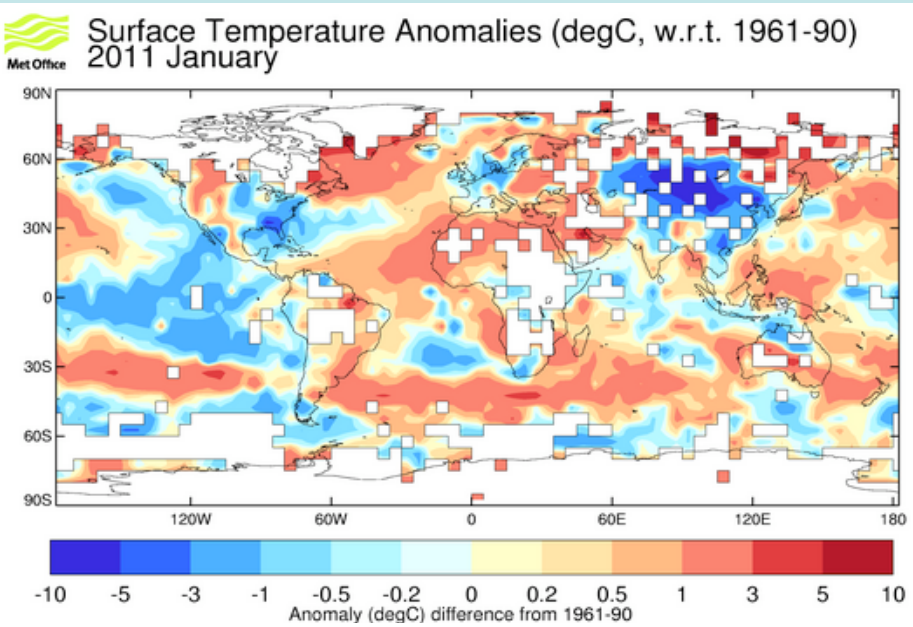
- Will continue to do this for CRUTEM4 and HadSST3
- Aim of this is reduce the influence of station numbers on both the land and marine components of the datasets. Doesn't change the mean but alters the variance
- Aim has been to make time series of individual grid boxes not have clear changes in variance in due to reductions in station numbers
- Mention as this has importance for some of the indices suggested

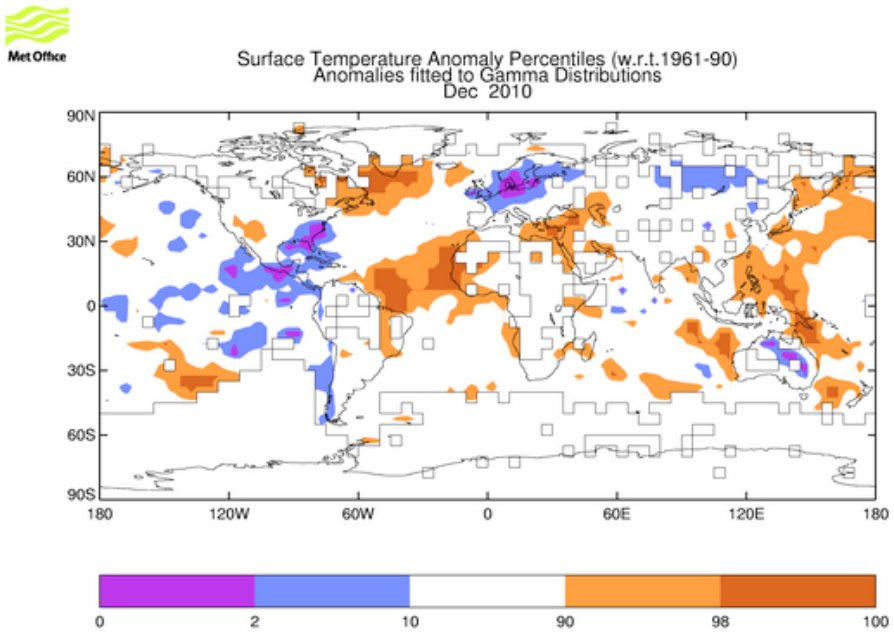
Extreme/Variability Indices

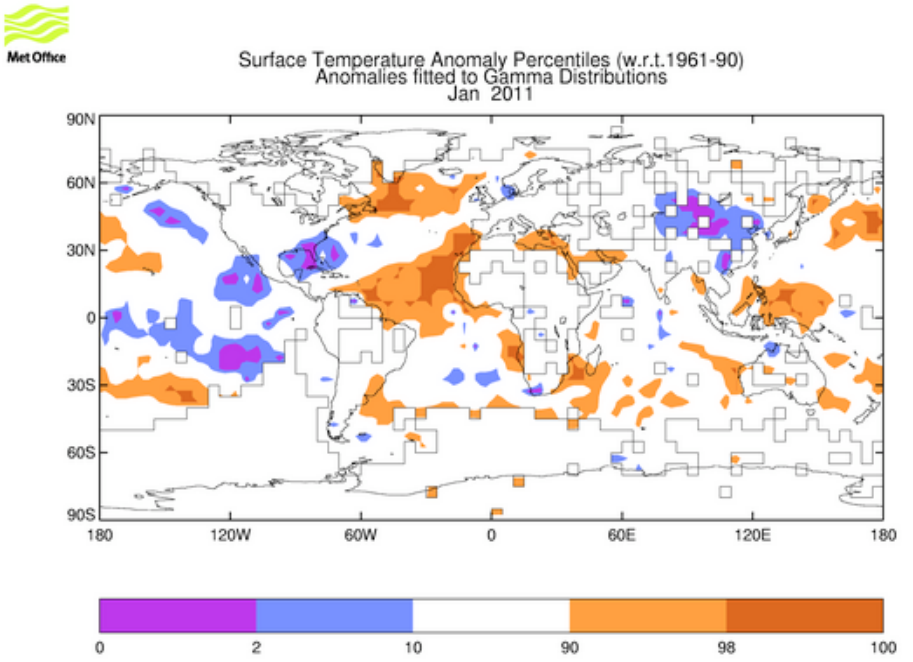
- Lots of station-based indices (station extremes 1-5 days average)
- Longer extremes available through normal seasonal averages, GSDD, GSL, PDSI, but all station or single grid-box based
- R90T is good in this respect
- Can we devise one to look spatially?
- Variance of daily data within a month?
- Is daily data more variable/extreme?
- % area greater/lesser than 90/10th percentile (monthly) – with extension of this to daily data
- Whatever is done, variance adjustment in gridded datasets (E-Obs, CRUTEM4 etc) needs to be addressed
- Do we need a Tg90T or Tx90T or Tn90T?

Percentiles from a gamma distribution

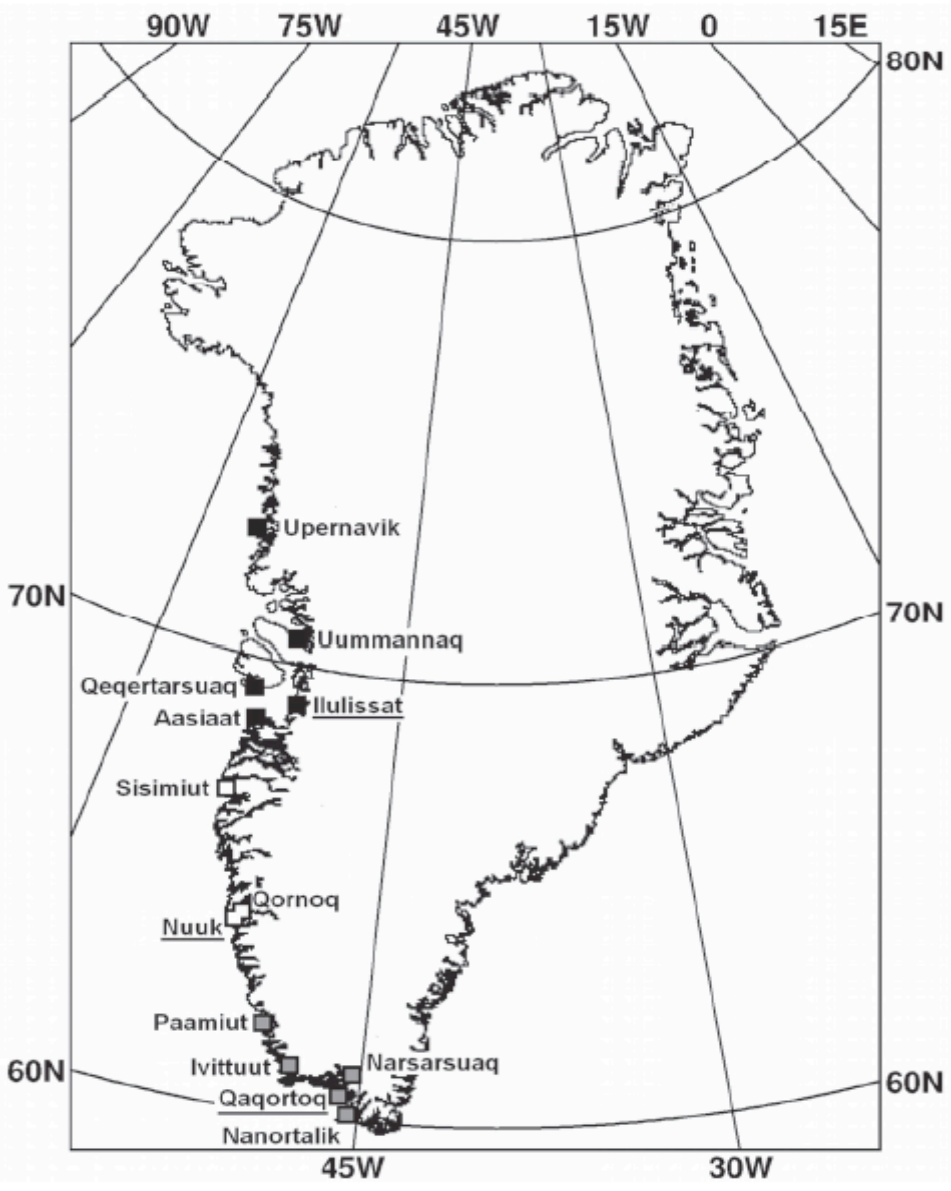








Greenland - **Kalaallit Nunaat**



SW Greenland winter T and PC1 of winter isotopes – the only long winter proxy outside Europe

r = 0.71 (0.83) for interannual (decadal smoothed) – based on 1829-1970 period

First PC has been used by some dendroclimatologists as a way of standardization.

PCs 2/3 uncorrelated with W. Greenland temperature

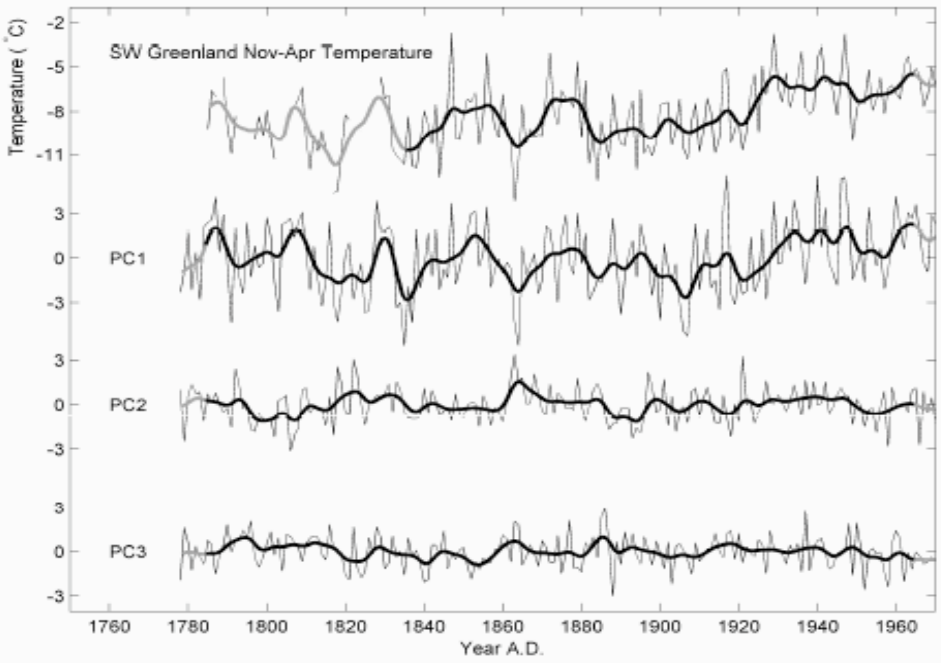


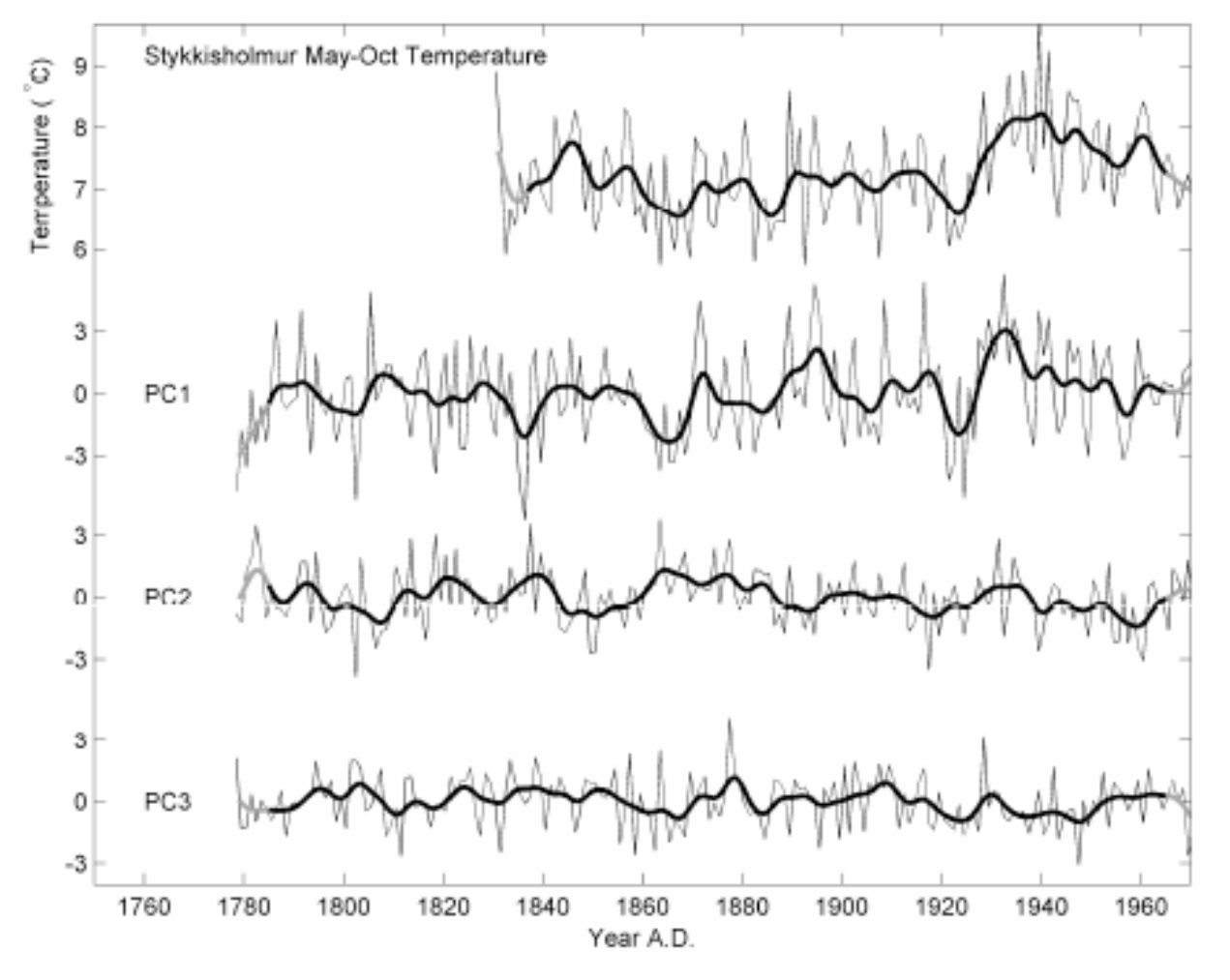
Figure 11:
SW Greenland Nov-Apr temperatures and the time series for the first, second and third winter season $\delta^{18}O$ principal components. Thick lines are decadally filtered data (shown are grey if the filtered values are based on incomplete data).

Note the length of the Greenland instrumental record. Longer records often exist and enhance confidence in lower-frequency components

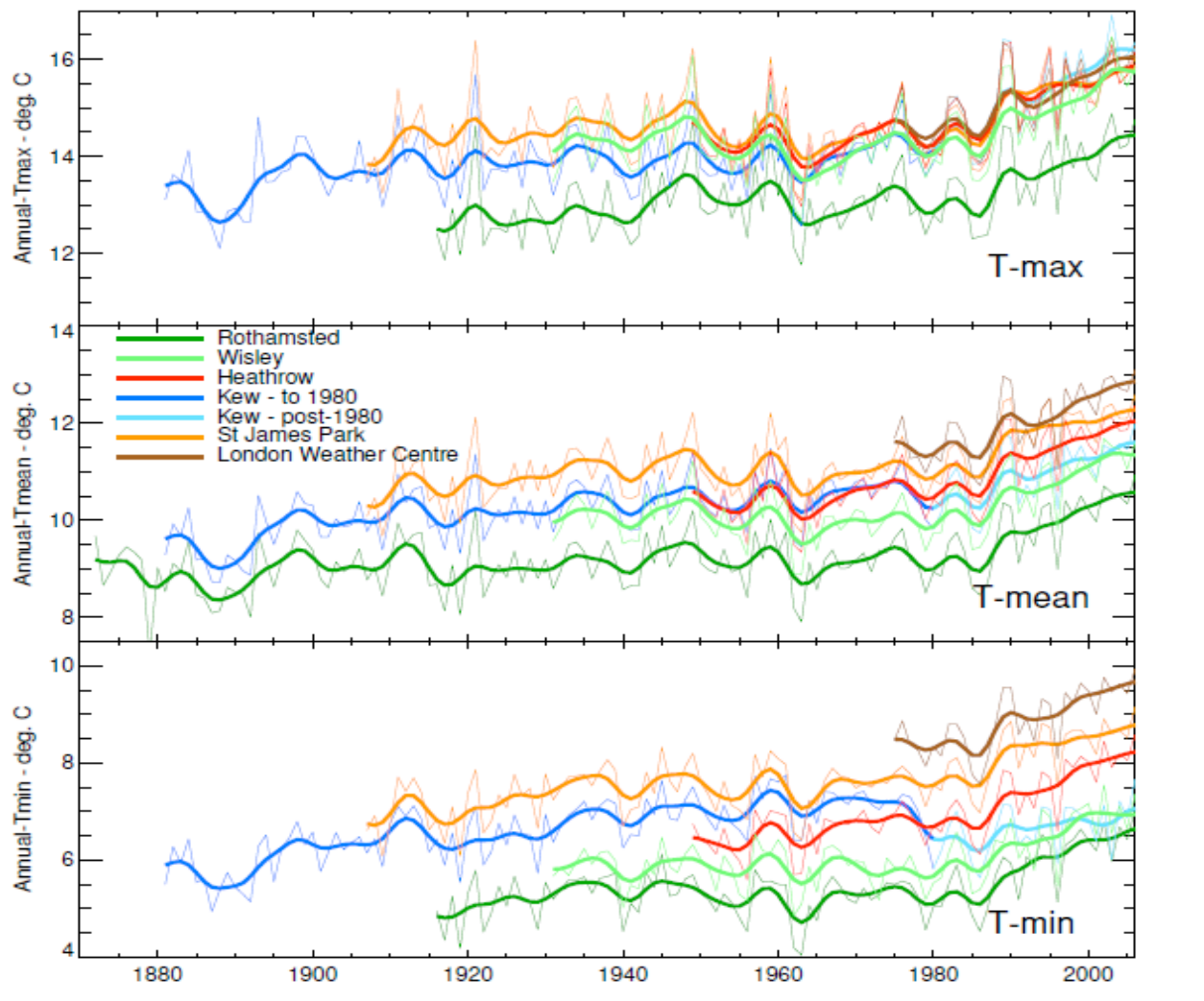
Stykkisholmur (NW Iceland) summer T and Greenland PC1 summer isotopes

r = 0.56 (0.66) for interannual (decadal) timescales over the 1830-1970 period

With air temperatures and isotopes 2-4 times more variable in winter compared to summer, annual temperatures for more distant periods in Greenland dominated by winter variability



London



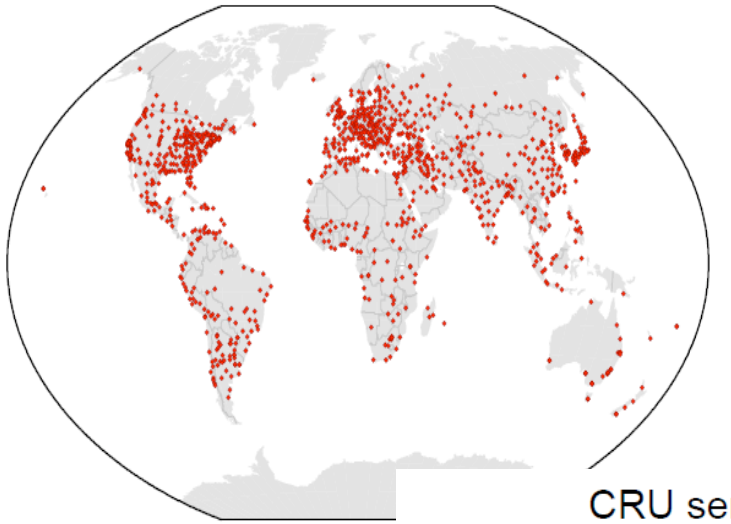
UHI greater for Tn than Tx. Central London sites always warmest at night, but warmer during the day west of London

London has an Urban Heat Island (UHI), but no urban-related warming since at least 1900. In other words, the centre got warmer earlier.

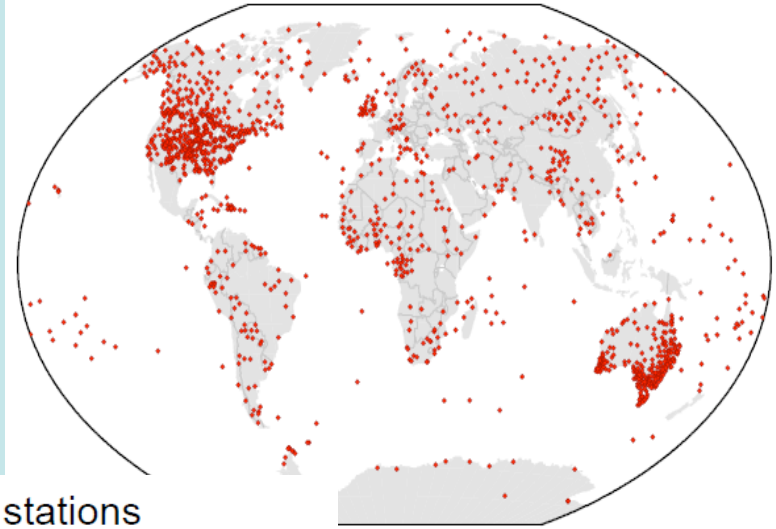
Jones, P.D. and Lister, D.H., 2009: The Urban Heat Island in Central London and urban-related warming trends in Central London since 1900. *Weather* **64**, 323-327.

Classification gives this

CRU urban stations

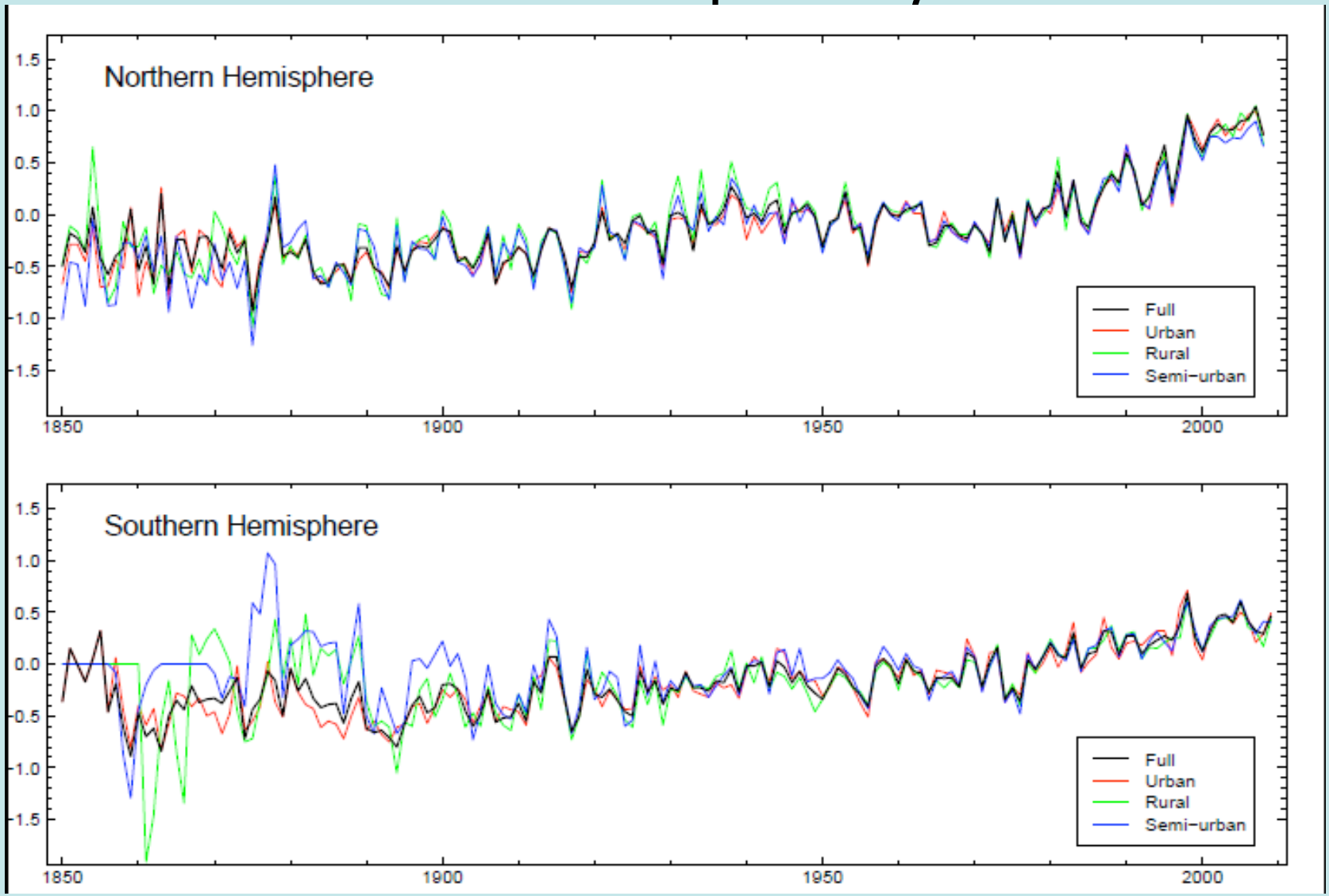


CRU rural stations

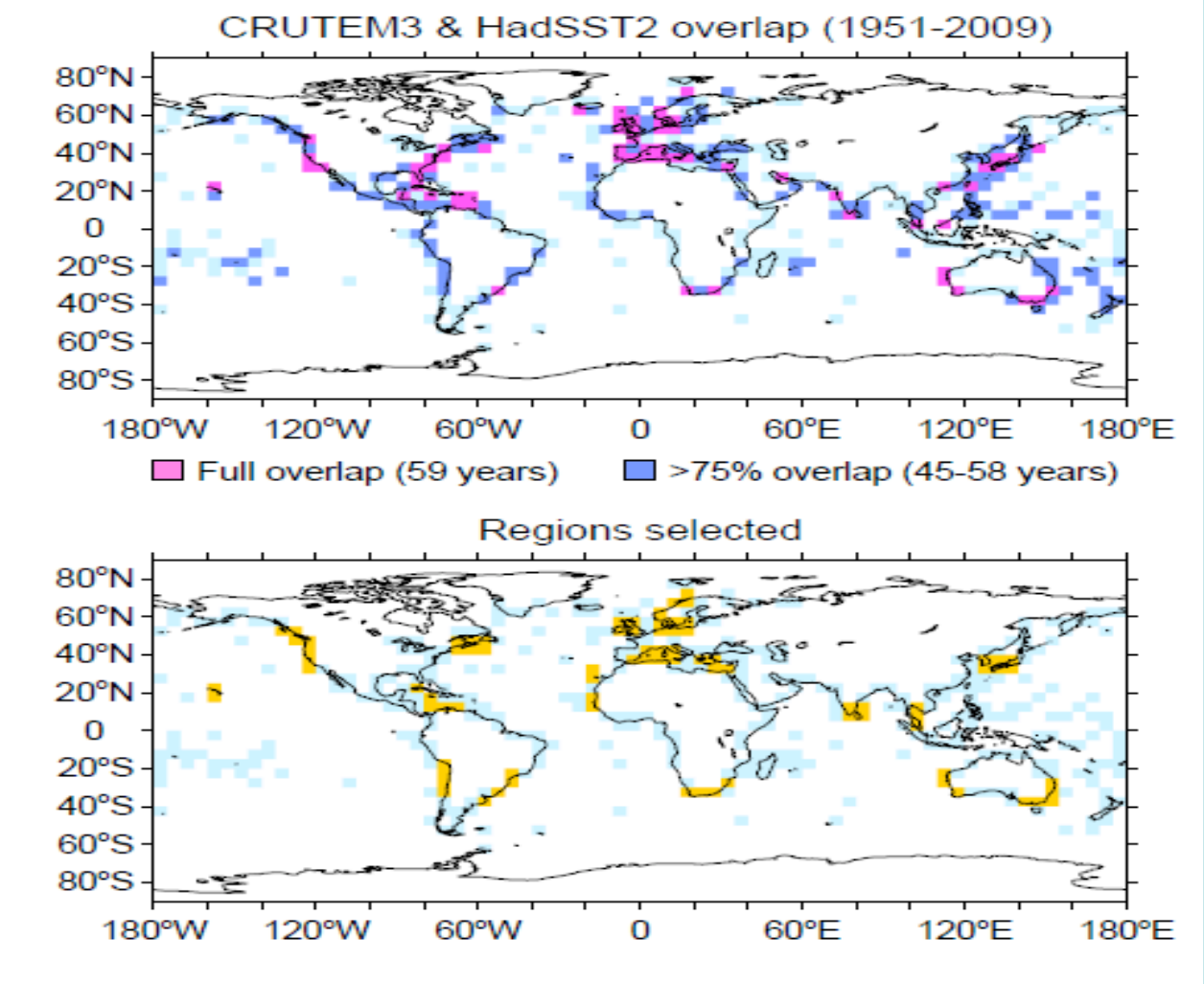


CRU semi-urban stations

Little difference if these different groups are combined separately

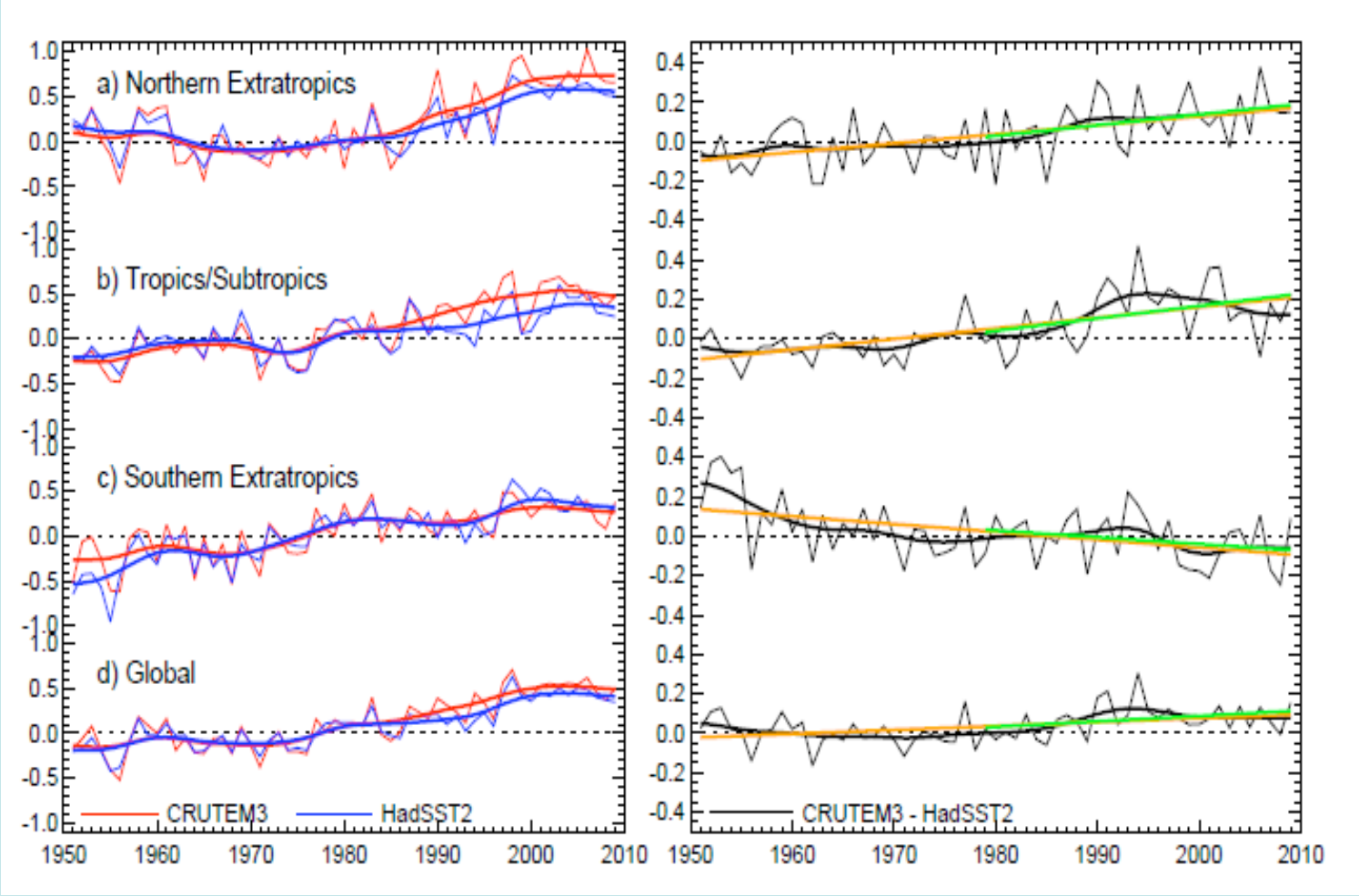


Coastal Overlap



Efthymiadis, D. and Jones, P.D., 2010: Assessment of maximum possible urbanization influences on land temperature data by comparison of land and marine data around coasts. *Atmosphere* 2010, **1**(1), 51-61; doi:10.3390/atmos1010051.

Comparisons for large regions



Brown is trend over 1951-2009 and Green is over 1979-2009