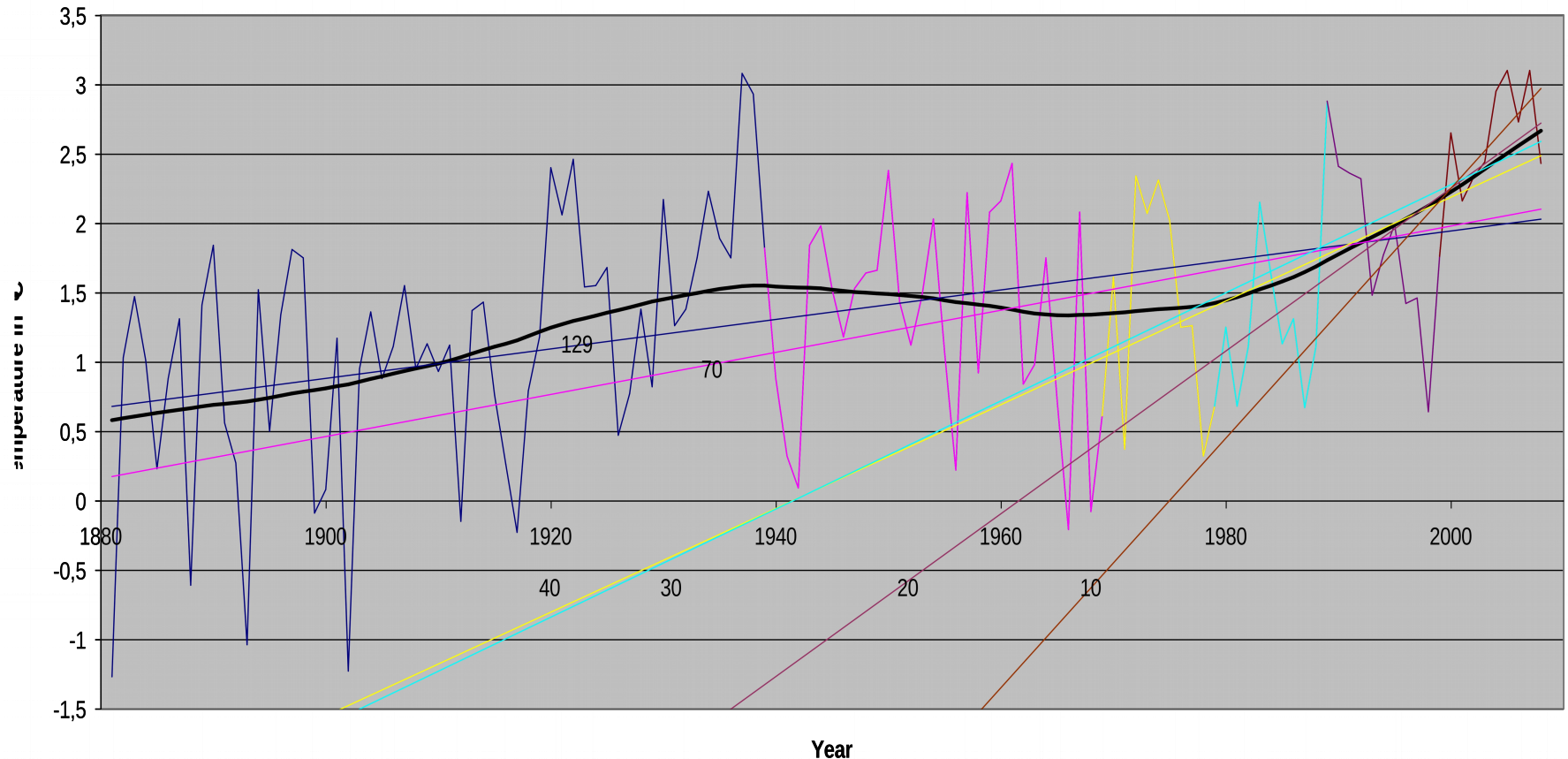


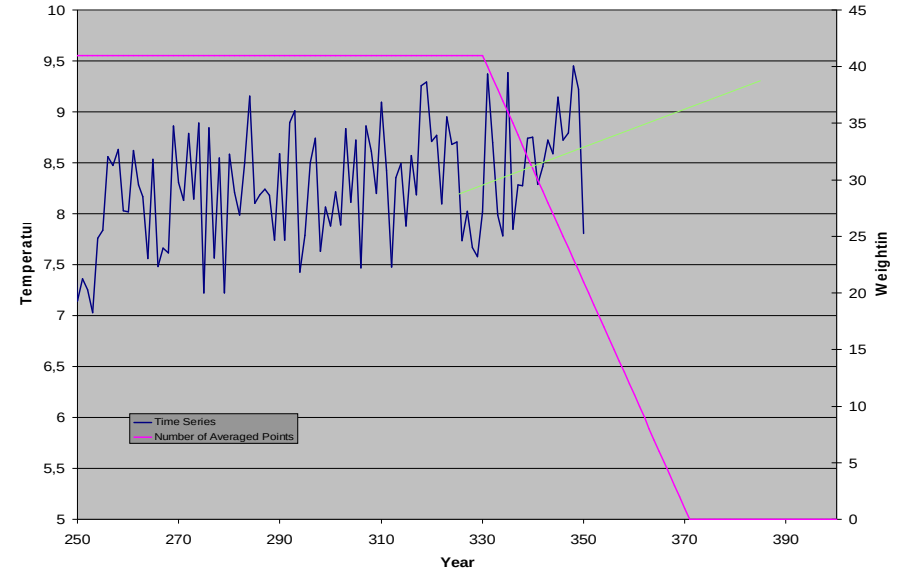
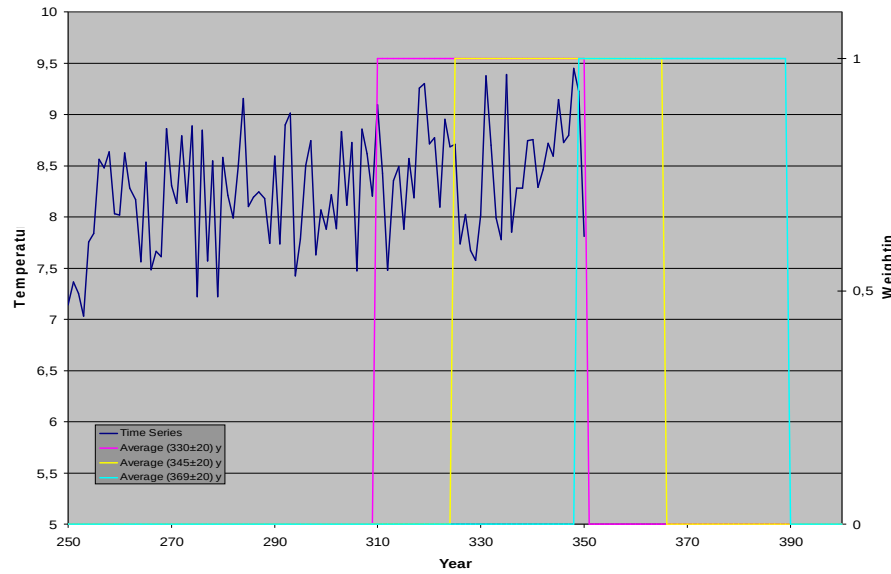
Calculation of climate trends functions from local time series

Dieter F. Ihrig, FH Suedwestfalen, Iserlohn, Germany

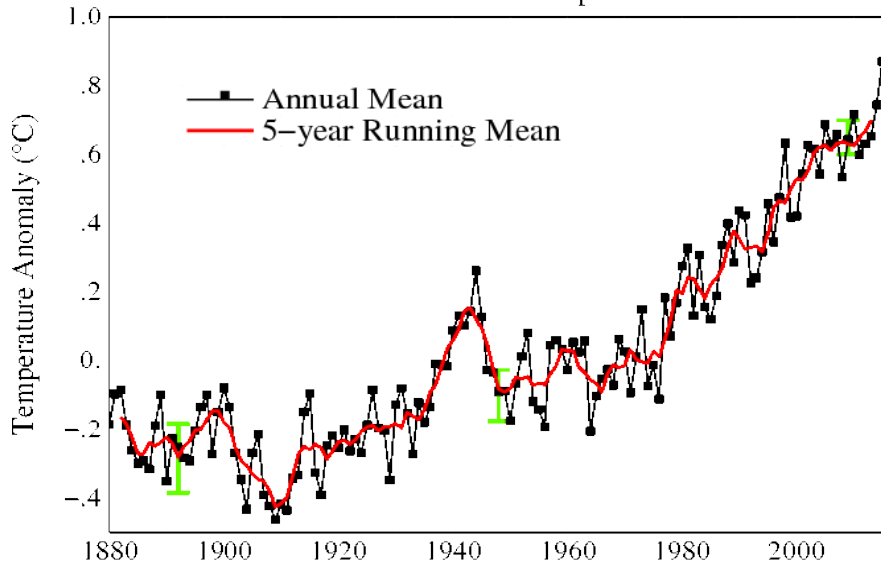
Annual mean surface temperature

Vardo 70,4 N 31,1 E

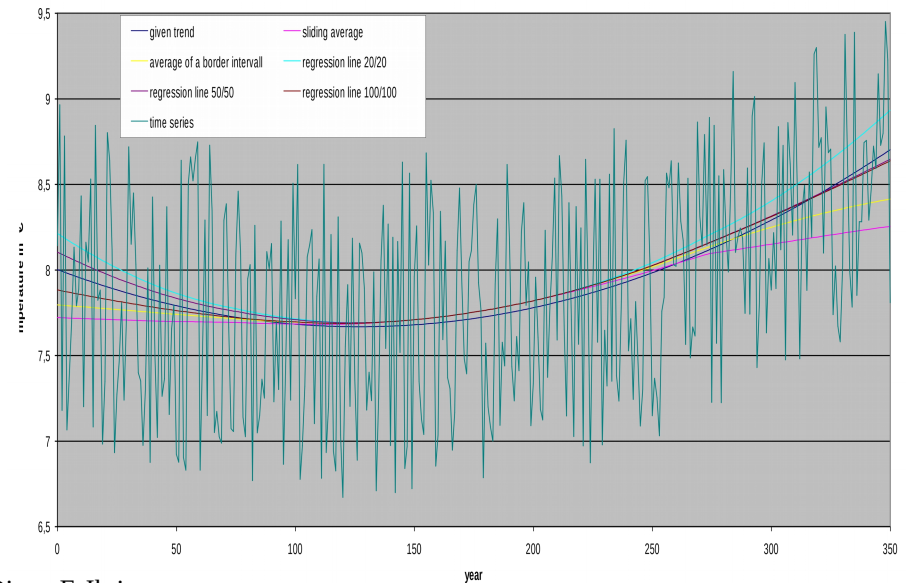


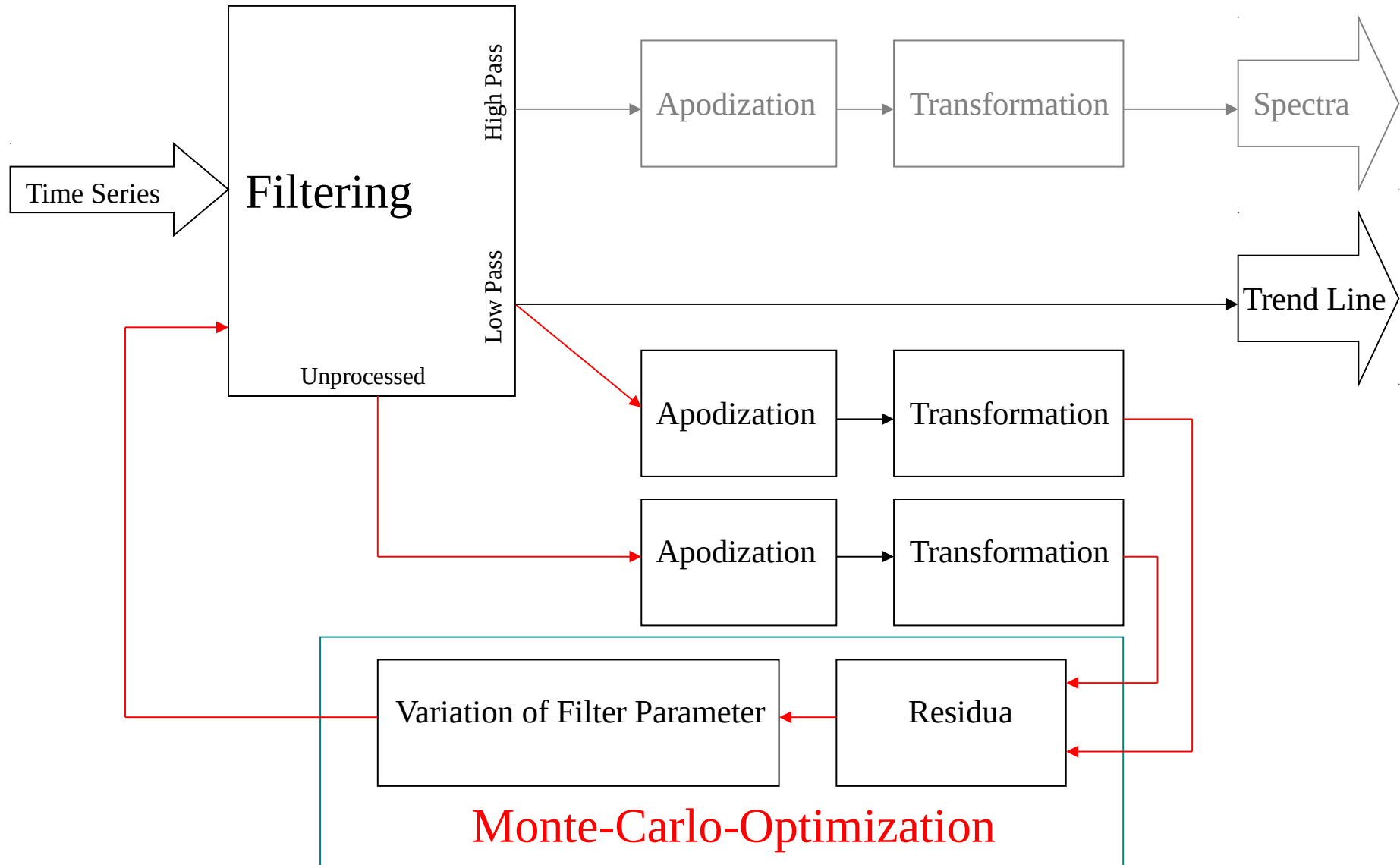


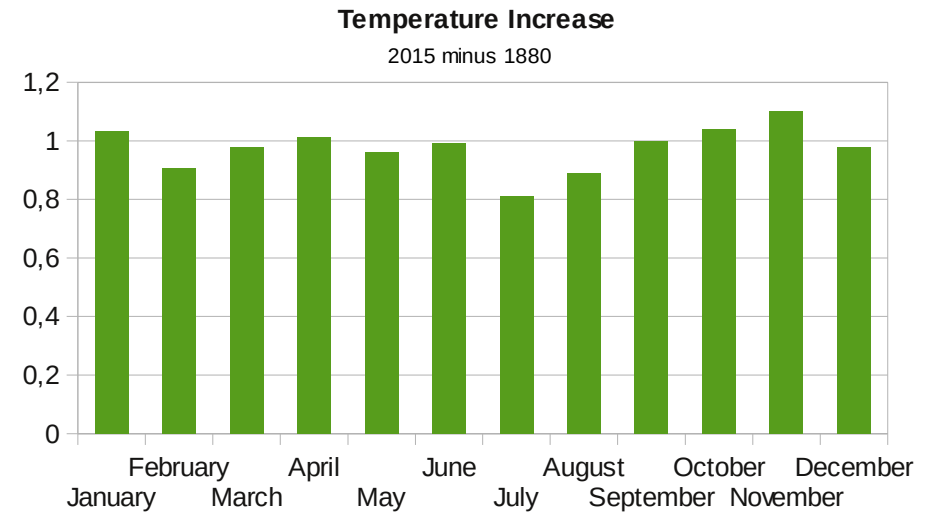
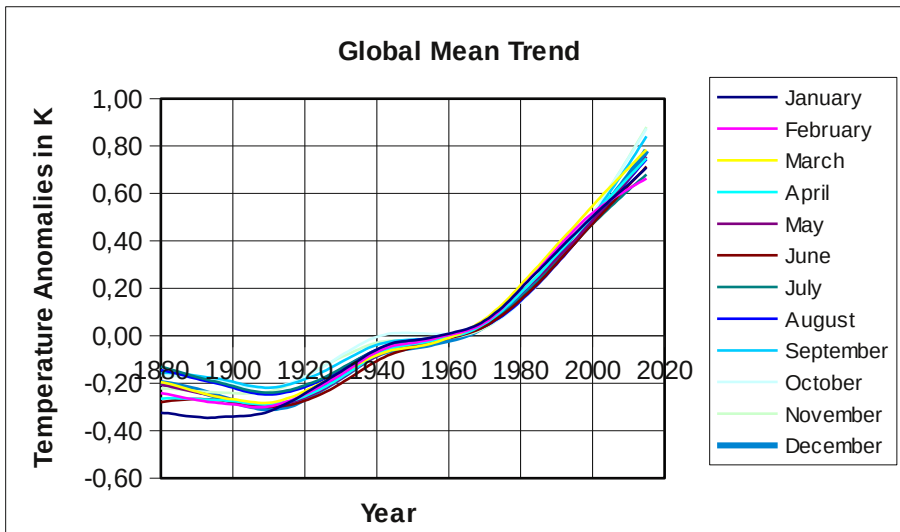
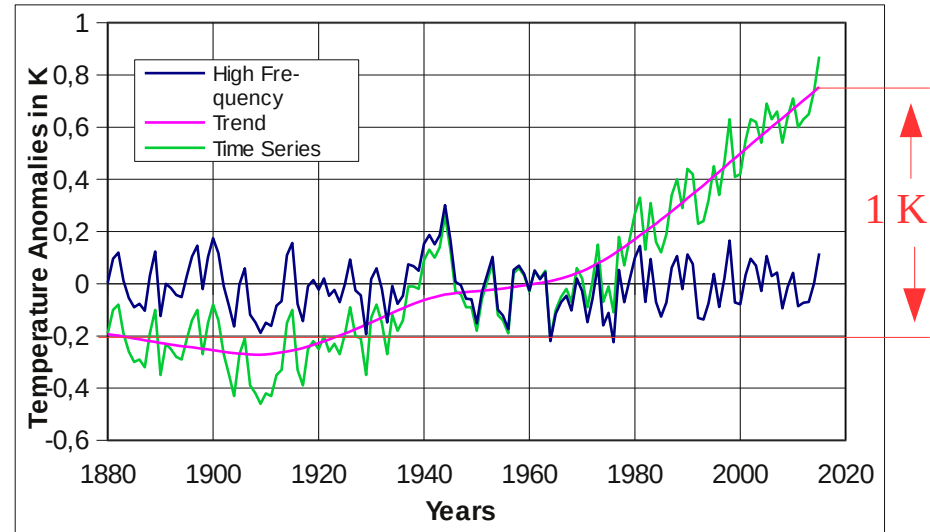
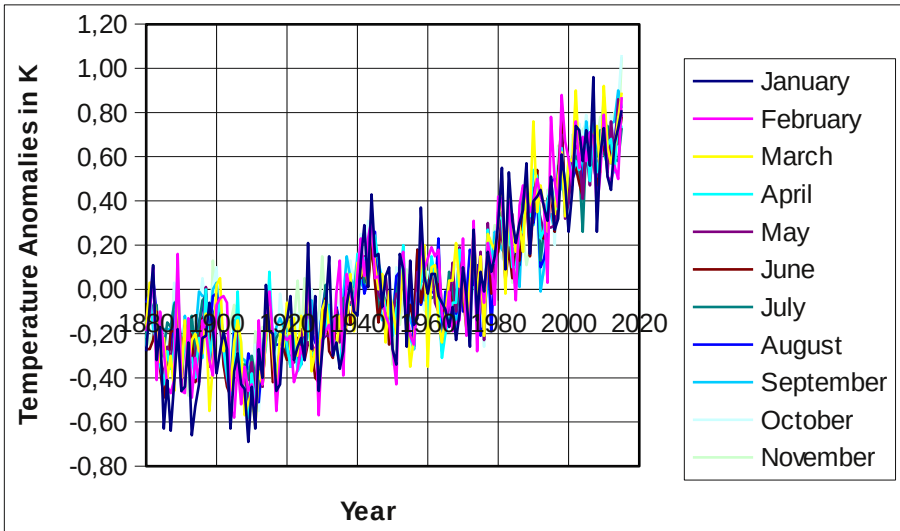
Global Land–Ocean Temperature Index



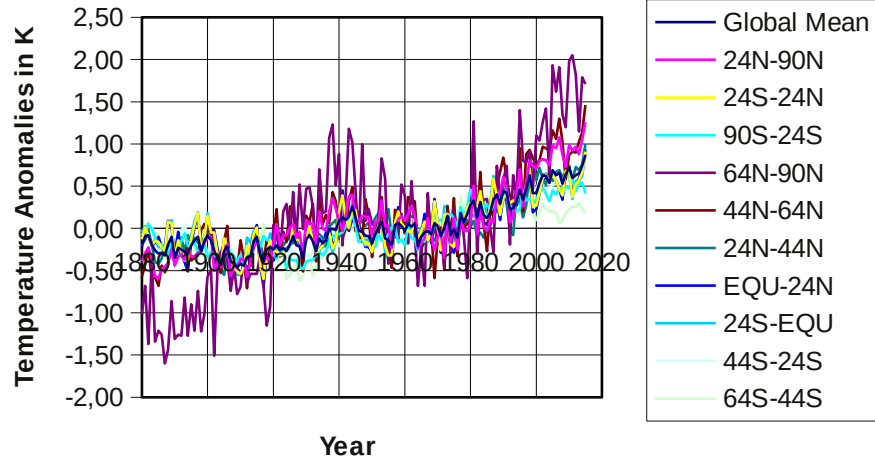
results of different procedures calculation the trend function
2. order filter





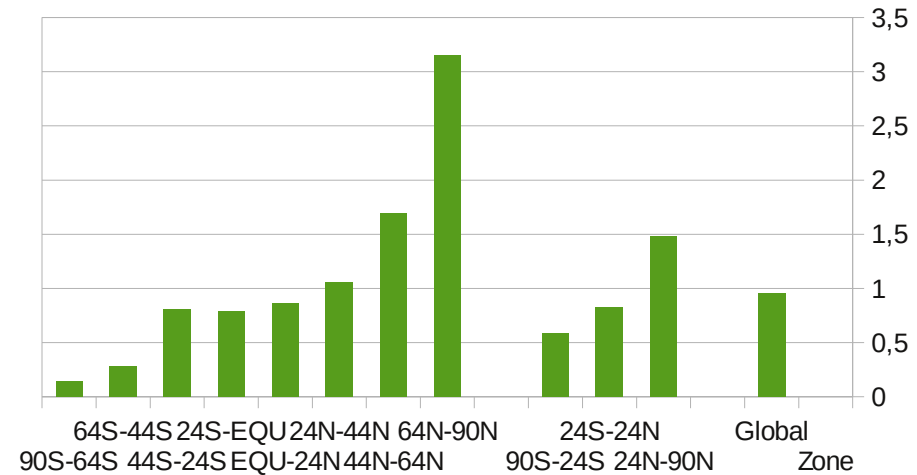


Time Series

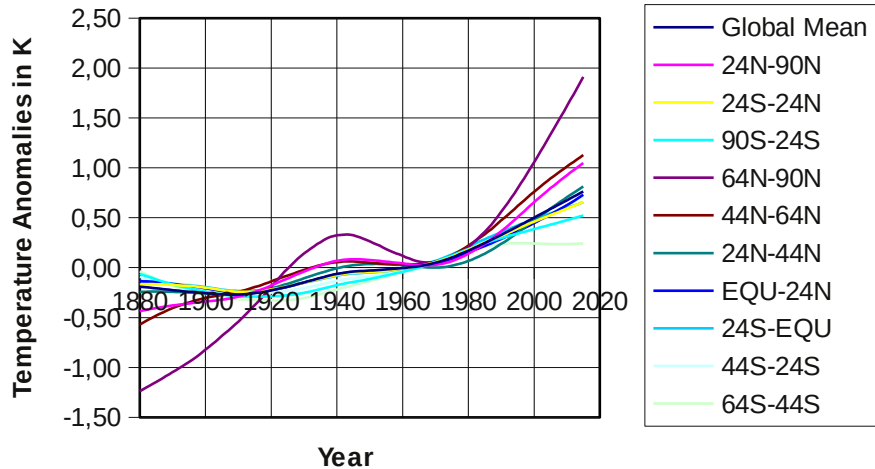


Temperature Increase

2015 minus 1880

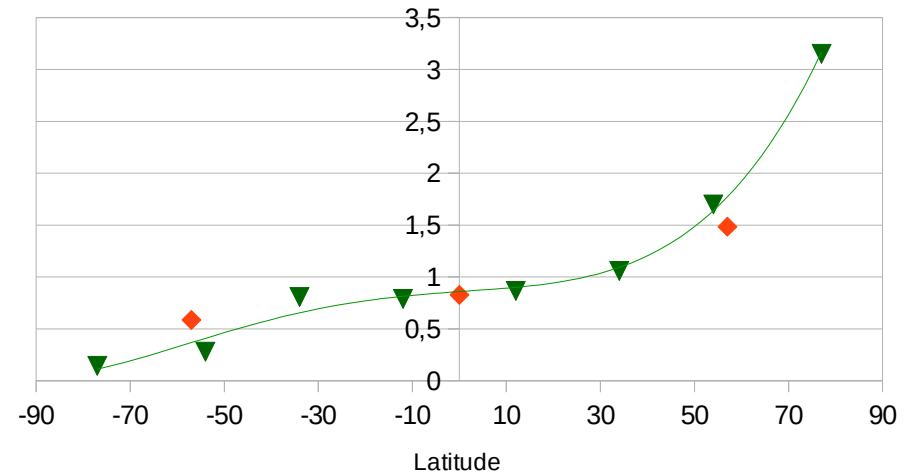


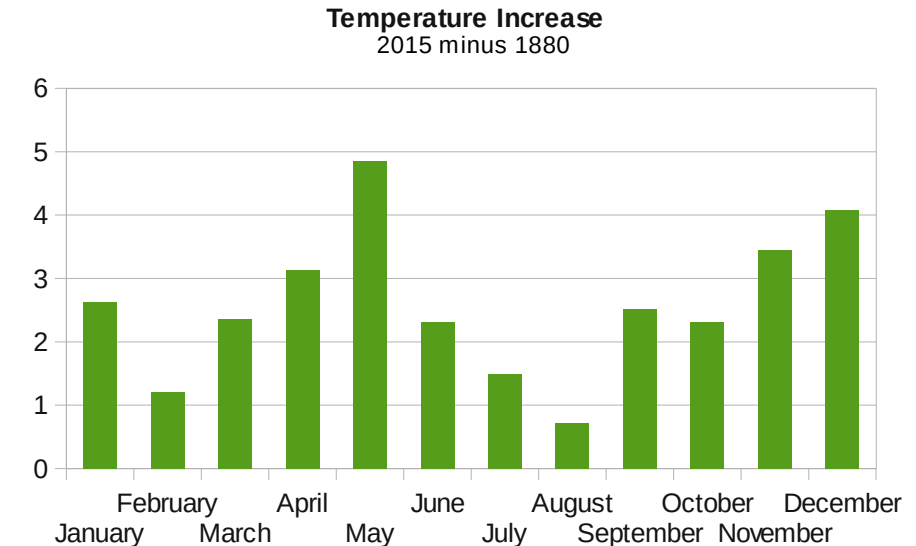
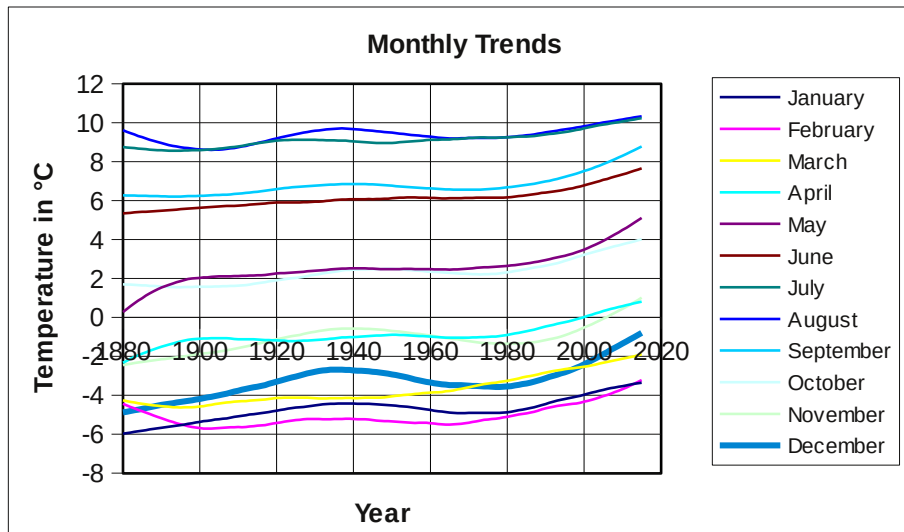
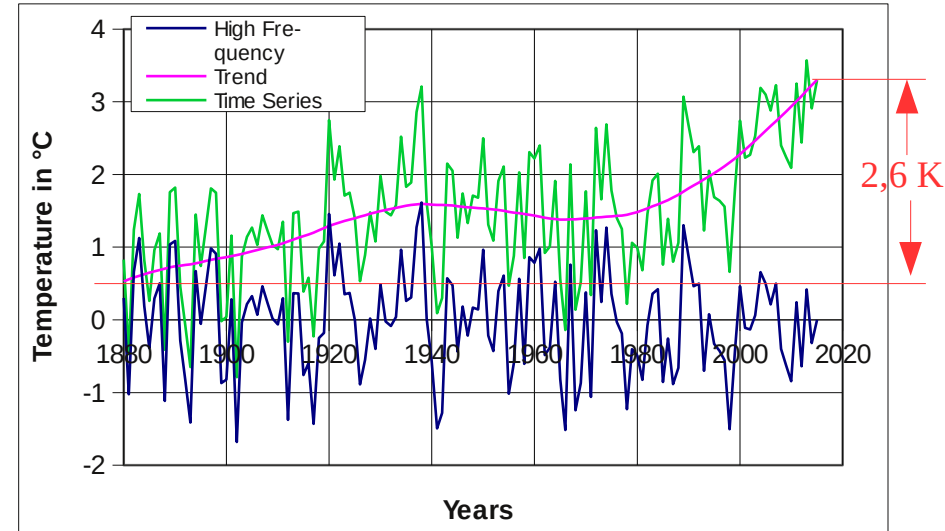
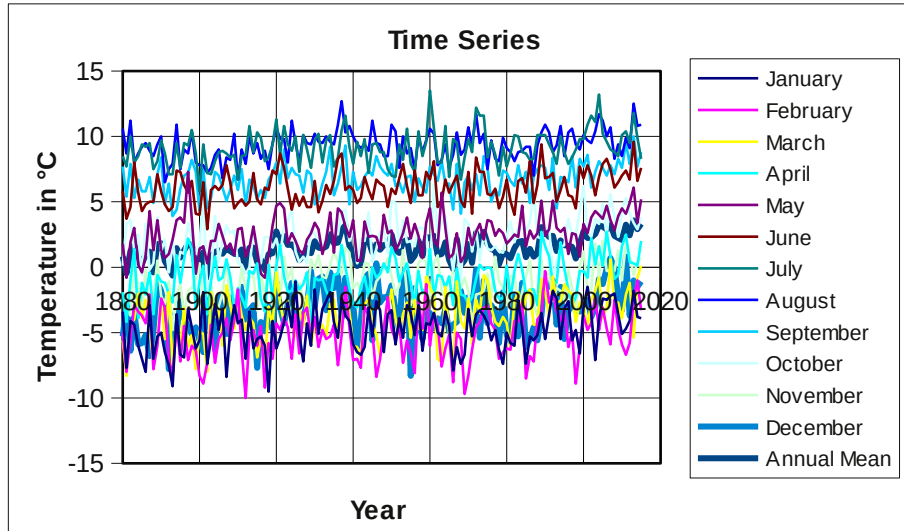
Zonal Mean Trend



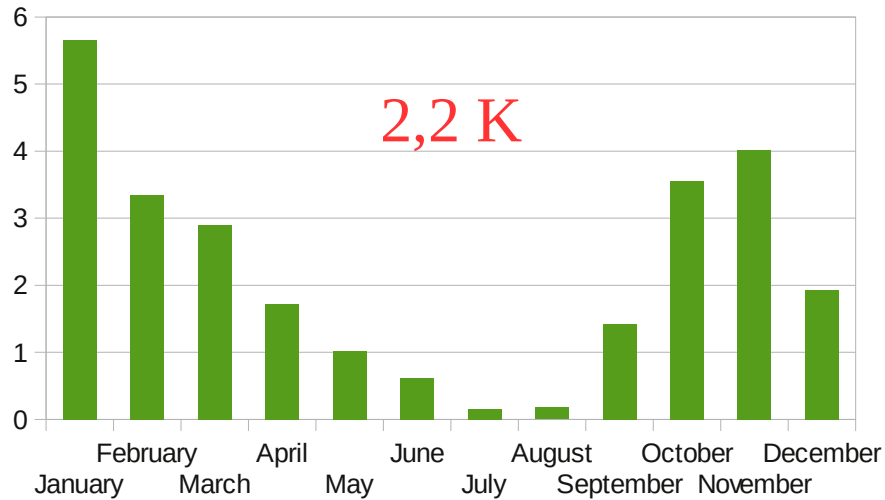
Temperature Increase

2015 minus 1880

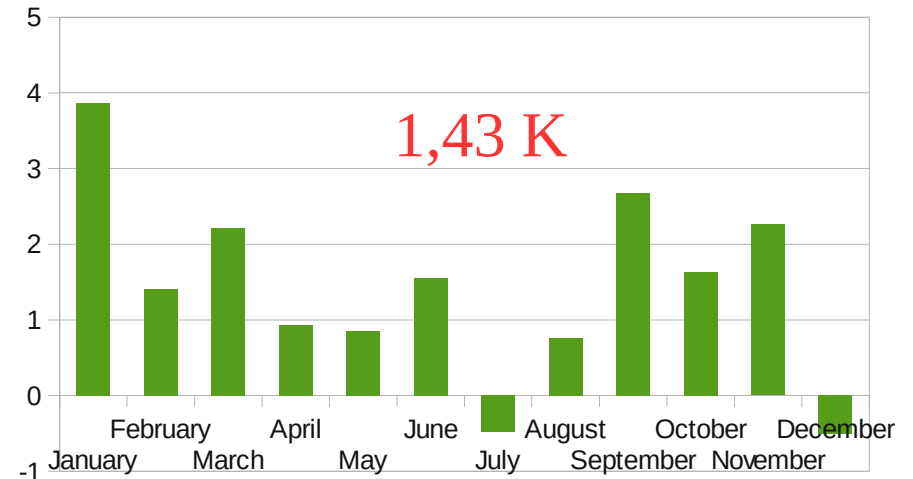




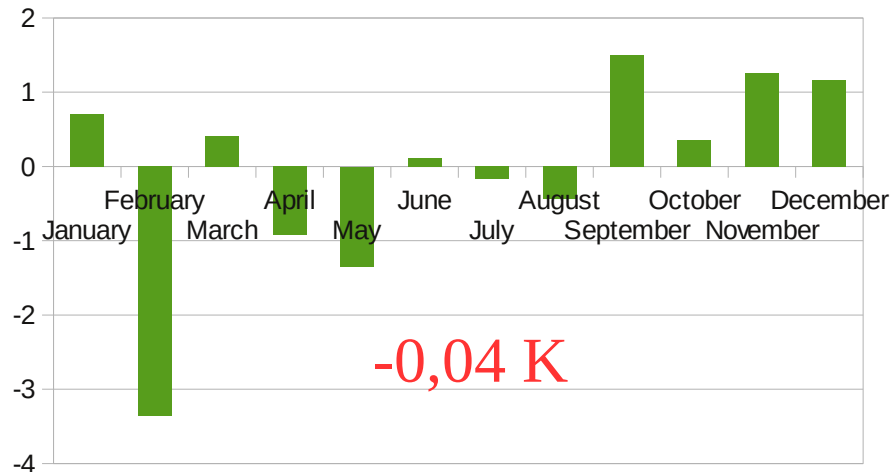
Los Angeles California 33,7N 118,3W



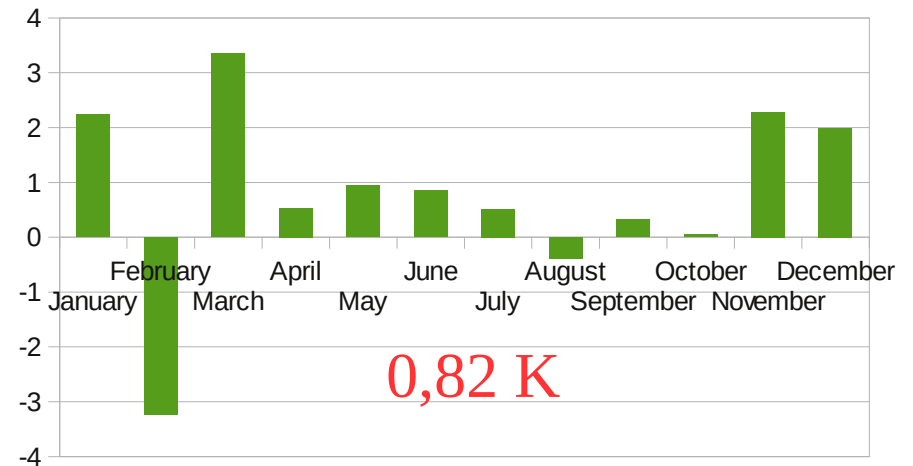
Phoenix Sky H 33,4N 112,0W

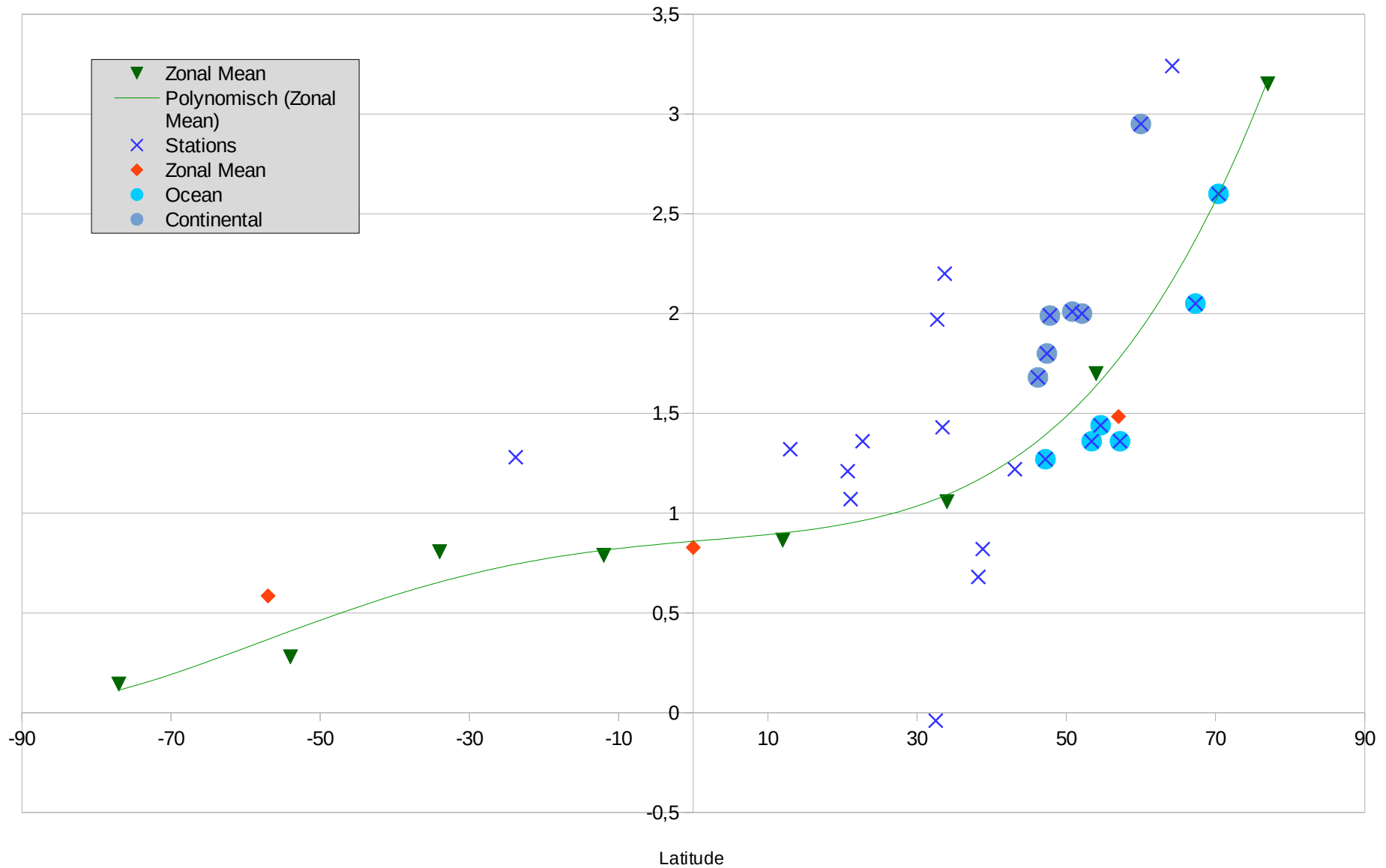


Shreveport Re 32,5N 93,8W

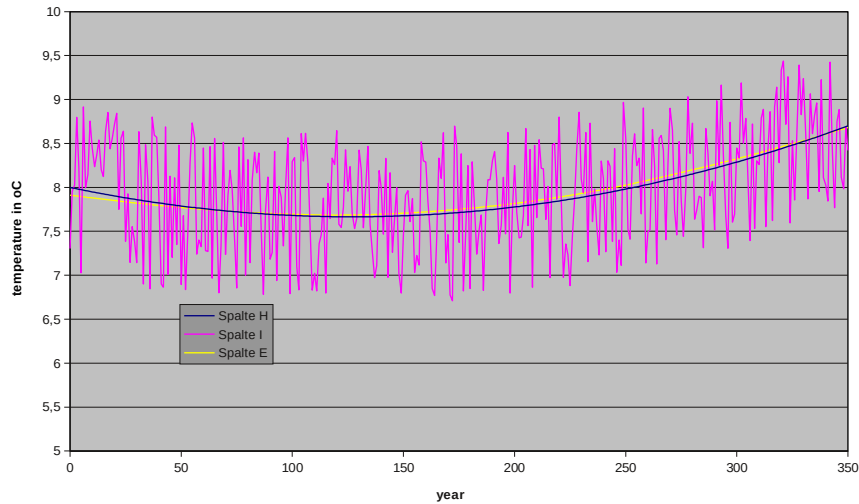


St Louis Lamb 38,8N 90,4W

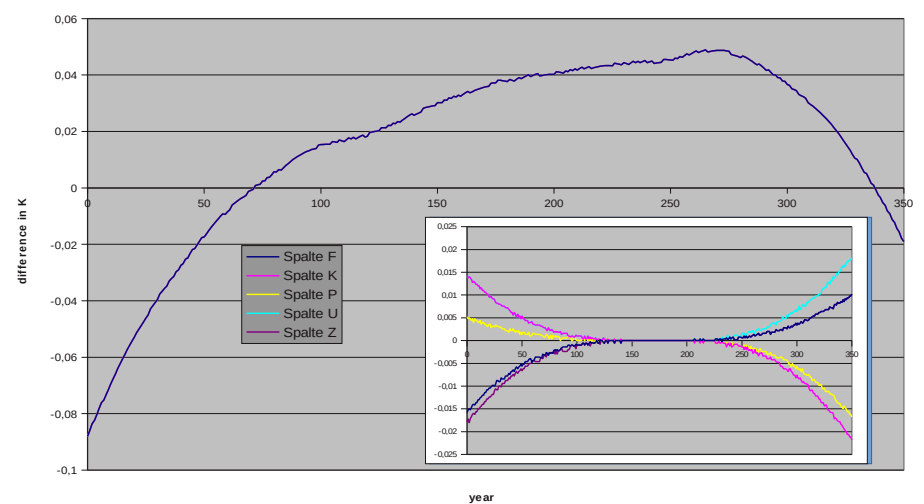




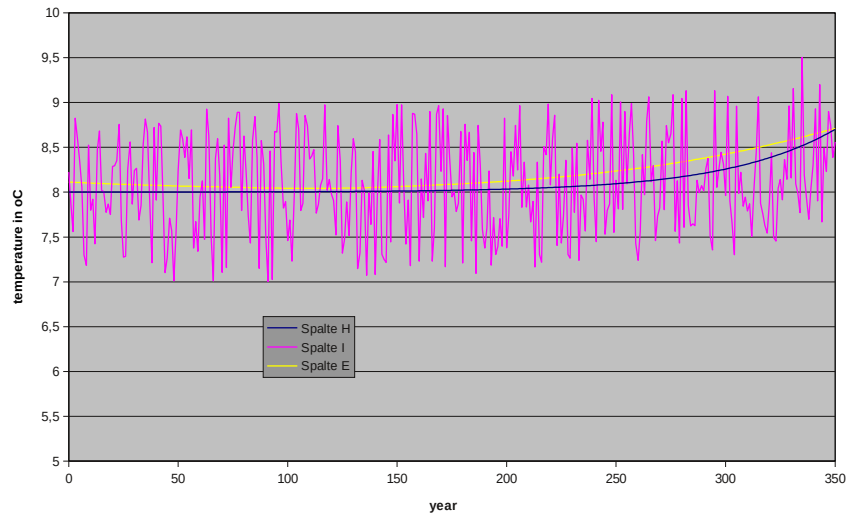
Simulated Time Series



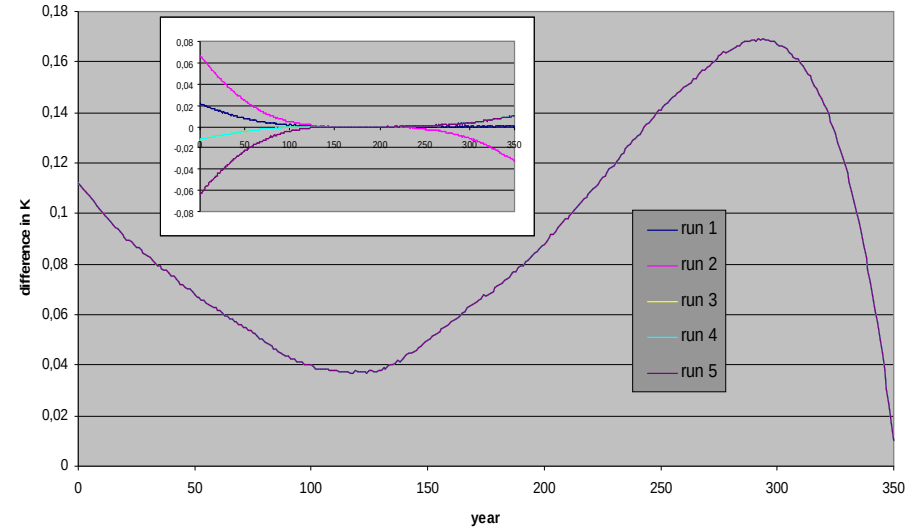
Difference between given and calculated trend

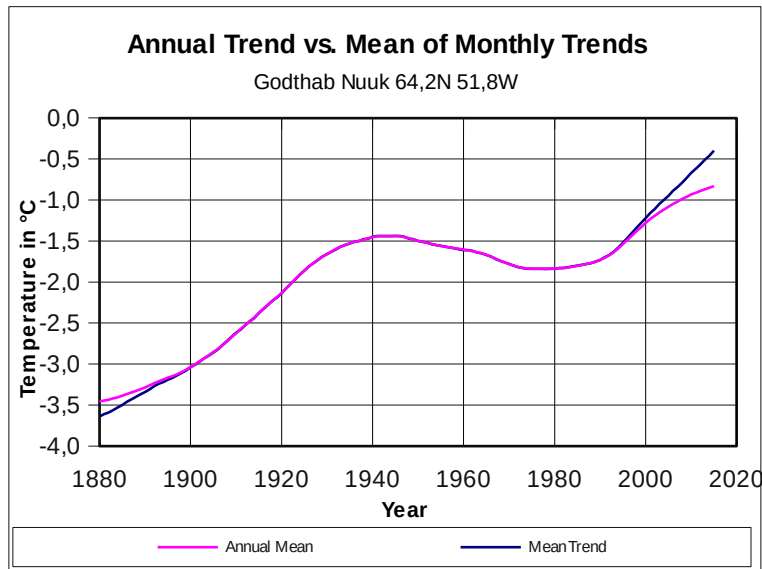
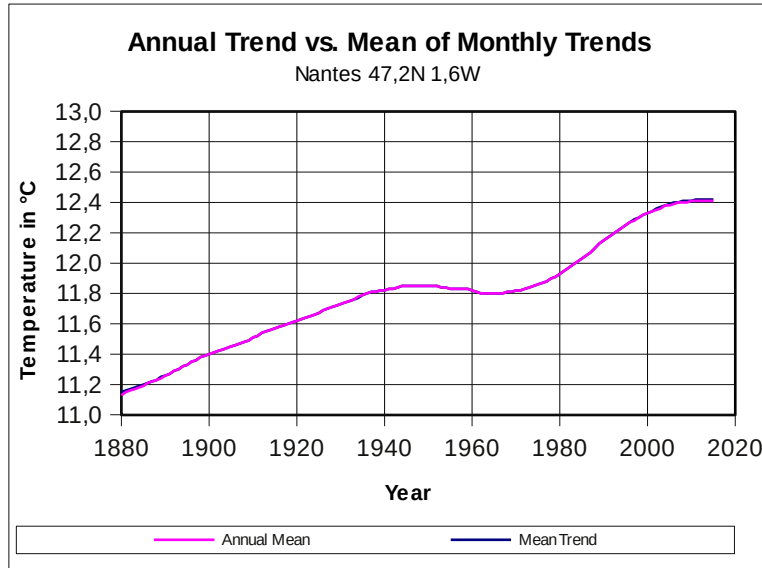


Simulated Time Series (exponential increase)



Difference between given and calculated trend functions

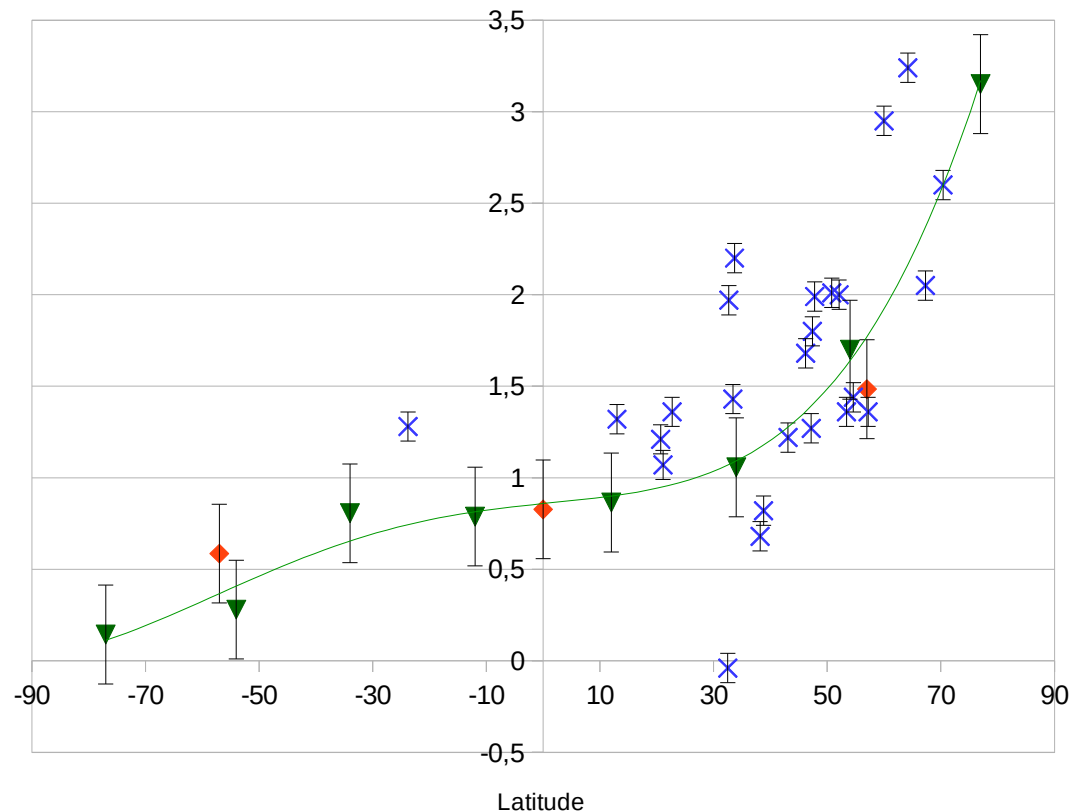


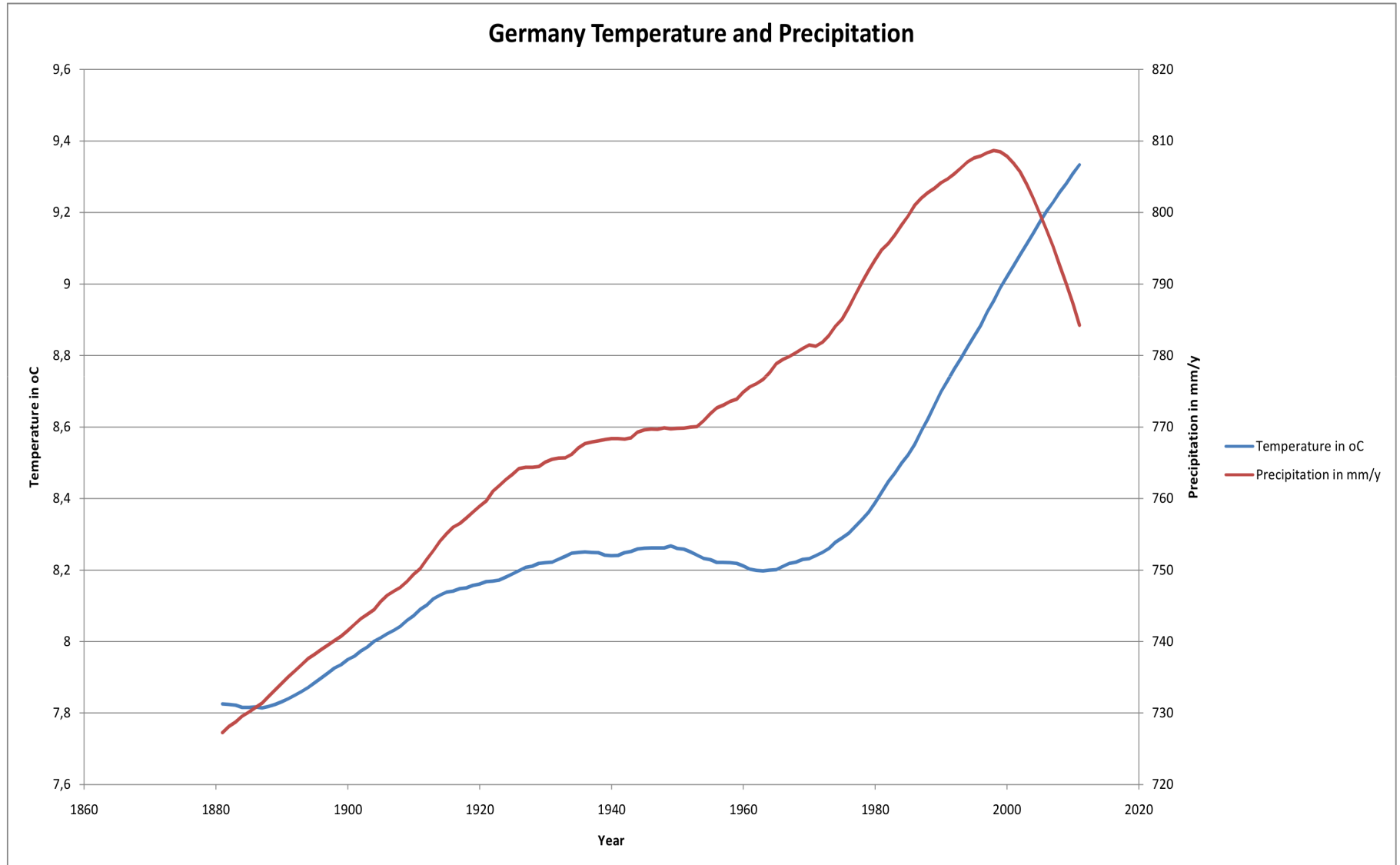


Comparison: Trend of Annual Mean vs. Mean of Monthly Trends

Standard Deviation of 25 Stations: 0,27 K

Confidence Limit: 0,077 K





- The Process calculates trend functions as new time series (Standard Deviation: 0,27 K; Confidence Limit: 0,077 K)
- 400 time series were processed
- Recently the most successful solution of the border problem is the use of regression lines. (In future: higher order or irrational functions?)
- But it's necessary to optimize the field length processed by calculation of regression lines using a Monte-Carlo-process.
- The algorithm cannot decide whether the calculated trend is man-made!
- There is a significant tendency of higher temperature (Up to 3.2 K at higher latitudes)

I thank you for your attention!