

meteoLCD Weblog

A weblog on climate, global change and climate measurements

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DTR in Luxembourg: BEST, Findel and meteoLCD

In the [previous post](#), I commented on the BEST global land based results for DTR, and stressed the important finding that the decline (predicted by climate models as a consequence from global warming) surprisingly switched to a rise during the 1980's.

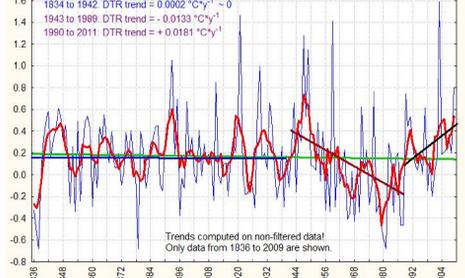
In this post, I will take the available BEST daily data for **Luxembourg** and compare the DTR trends computed from the anomalies with those from the Findel airport national weather station and from our meteoLCD data. Let me recall that trends computed from anomalies can be compared, but not those computed from the absolute measurements.

BEST reference period is the traditional 30 years period from **1951 to 1980**. As meteoLCD started only in 1996, and that the station did not move anymore after 2002, I will compute for Findel and meteoLCD the anomalies with respect to the 10 year period from 2002 to 2011. I am not sure, if there is a noticeable influence of the length of the reference period on the slope of the regression lines i.e. the trends. I did not find any easy explanation, so let us take as an hypothesis that the three trends can validly be compared.

The BEST data for Luxembourg daily low and high temperatures are at <http://berkeleyearth.lbl.gov/regions/luxembourg>. Again I applaud the BEST crew for the openness and easy accessibility of their data.

1. The BIG picture:

The next figure shows the situation from 1834 to 2011 with an overlay of 3 linear fits and a 5 year moving average in red. The plot only shows data from 1836 to 2009, the linear trends are computed on the original values. The vertical axis corresponds to the DTR anomaly w.r. to the 1951-1980 period, in °C. The DTR anomaly is computed from the average DTR for that period i.e. DTR anomaly = (Tmax anomaly) - (Tmin anomaly). BEST gives the absolute average temperature of that period (13.37°C), but alas not the absolute values of the averages of Tmax and Tmin for the reference period.



Clearly there are three very distinctive periods, best visible on the filtered data: from the start to about 1942, the trend is flat; then follows a period up to 1989 with clearly declining DTR's, and finally from 1990 the DTR trend is again on the rise.

The overall trend from 1834 to 2011 is flat, similar to that of the sub-period 1834 to 1942. The negative trend is what pours water on the mills of the climate alarmists, and what should happen according to climate models if anthropogenic global warming takes place. The last period of more than 20 years does not fit into that scenario, what leads to the inevitable conclusion that you should not trust global climate models!

2. The regional picture

Lets us now compare the situation from 2002 to 2011, when meteoLCD equipment at Diekirch was not moved anymore and was the same. The Findel daily data were fetched from the ECA&D database of the "European Climate Assessment and Data" project.

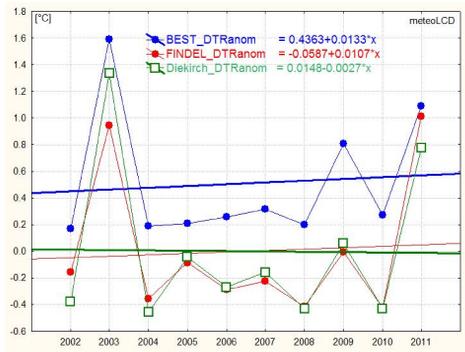
This database holds daily Tmax and Tmin data, but there is a curious problem with the Findel data series: for the maximum data, the source identifier is 100634, and for the minimum it is 100632. If one does not use the defined subsets but the custom query, the data will be easy to find (thanks to Mr. Jacques Zimmer from [Meteolux](#) for helping out!).

A second problem is nearly unexplainable: The Findel ECA&D TN series has 5 month missing data in 2011! I solved this problem the following way:

- first I calculated the maximum and minimum of Jan to May 2010 for Diekirch, made the difference and compared this difference to the monthly extremes given by the Findel station in their monthly summaries. A linear fit gives that Findel = 0.9767*Diekirch with a very good R2 = 0.93.
- for Jan to May 2011 I calculated the missing Findel DTR from the available meteoLCD data by multiplying these with 0.9767
- finally the annual average DTR was computed from these calculated 5 months and the remaining 7 months with available Tmax and Tmin data. This gives an annual average DTR of 8.79 for the Findel station.

The DTR anomalies for Findel and Diekirch were computed with respect to the 2002-2011 average (BEST uses 1951-1980)

The next figure shows the 3 data series, together with the regression lines:



The conclusions are easy to draw:

- both BEST and FINDEL show an DTR increase of similar magnitude: 0.13 resp. 0.11 °C per decade (rounded to 2 decimals)
- the meteoLCD trend is practically flat: 0.03 °C per decade

The BEST/Findel comparison is interesting as the BEST data series may hold measurements from neighboring stations, which may be relatively far away (several hundred of kilometers!): in the header of the data series, BEST writes "Note that all results reported here are derived from the full field analysis and will in general include information from many additional stations that border the current region and not just those that lie within this region." This could be the cause why BEST does not show the very visible dip in 2006.

- FINDEL and meteoLCD DTR anomalies are very close, and I think that the difference in the linear trends fall well into the overlapping uncertainty interval.

The overall conclusion is that BEST and local station data anomalies give very close trends, so the easily available local BEST series may be used with confidence. The data at meteoLCD confirm the absence of a DTR decline, found as well in the global pattern and in the that for the Luxembourg region.

References:

ECA&D: Klein Tank, A.M.G. and Coauthors, 2002. Daily dataset of 20th-century surface air temperature and precipitation series for the European Climate Assessment. Int. J. of Climatol., 22, 1441-1453. <http://www.ecad.eu>

Findel airport station: www.meteolux.lu

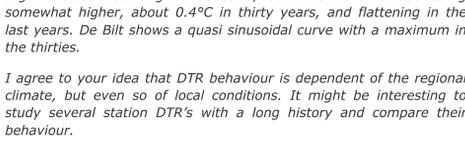
Addendum 03 Feb 2013:

Marcel Severijnen sent me the following interesting comment and graphs, showing the DTR trend for two Dutch stations: de BILT and Maastricht. Here what he writes:

I'd gladly add some information to your last posting on DTR's. From KNMI files I calculated the DTR's of stations de Bilt (1901-2012) and Maastricht (1906-2012). I have chosen de Bilt as reasonable representative for mid-Holland and Maastricht as representing the southeastern part of the Netherlands, not far from the Ardennes/Eifel.

Graphs were made in R, showing yearly averages and a smooth trendline with 95% confidence intervals. There is a clear difference in the two DTR mean levels, and in their behaviour in time. Both show a slight increase starting about 1980, de Bilt's DTR-increase being somewhat higher, about 0.4°C in thirty years, and flattening in the last years. De Bilt shows a quasi sinusoidal curve with a maximum in the thirties.

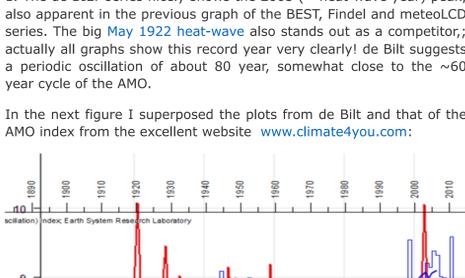
I agree to your idea that DTR behaviour is dependent of the regional climate, but even so of local conditions. It might be interesting to study several station DTR's with a long history and compare their behaviour.



My comment:

1. The de BILT series nicely shows the 2003 (= heat-wave year) peak, also apparent in the previous graph of the BEST, Findel and meteoLCD series. The big [May 1922 heat-wave](#) also stands out as a competitor; actually all graphs show this record year very clearly! de Bilt suggests a periodic oscillation of about 80 year, somewhat close to the ~60 year cycle of the AMO.

In the next figure I superposed the plots from de Bilt and that of the AMO index from the excellent website www.climate4you.com:

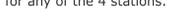


I am not sure if there is any relationship, even if the closer to the sea located de Bilt station should show somehow an influence of AMO. Leaving aside any scientific precaution, one could conclude that DTR is going to decline when AMO reaches a high plateau and rises again when AMO is at its lowest... but I would not take any bets on this for the moment.

2. The situation in Maastricht (about 140 km distant from the Findel airport) is quite different from that of Luxembourg. The ~40 years decline is not visible (even if the 3 peaks in the 40's and 60's will surely yield a negative slope of the regression line). For the BEST team, Maastricht and Luxembourg may seem as stations representing a same climatological situation. The data show that regional specifics matter!

3. All stations show a post 1980 rising DTR, which possibly is flattening off. The simplistic inference "more CO2 -> delining DTR" which was so ubiquitous among many alarmist papers does not hold for any of the 4 stations.

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2 Responses to "DTR in Luxembourg: BEST, Findel and meteoLCD"

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February 12, 2013 at 17:26 | Reply

[...] A weblog on climate, global change and climate measurements « DTR in Luxembourg: BEST, Findel and meteoLCD [...]

Roma Says:
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I am no longer certain the place you're getting your information, but great topic.

I must spend some time studying much more or understanding more. Thanks for excellent information I was in search of this info for my mission.

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