Temperature readings beginning in early 18th century disprove global warming

by
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Temperature readings carried out during the 18th and 19th ct. have not yet considered although they are available in 'wetterzentrale.de' from 1701 onwards as monthly and annual averages. The data from 46 stations worldwide have been evaluated generating temperature curves with their trendlines. They were used to ascertain the annual change rates of the average temperatures. These changes do not confirm the wide-spread conviction of a global climate change but identify merely temperature variations yielding a slight warming in approx. two thirds in the regions considered as well as slight cooling in the others. Contrary to general believe anthropogenic CO_2 is meaningless.

Table 1: Change rates of temperature variations between 1701 and 2008 – concurrent regional warming and cooling

Recording stations, period of observation, temperature variation to related 100 years (5) and whole observation time (6)																	
warming	cooling+constancy					urban development, mainly 1900-1950, disregared for statistical aveluations											
Station	from	to	year	°C/100	°C/ot	Station	from	to	year	°C/100	°C/ot	Station	from	to	year	°C/100	°C/ot
1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
Berlin	1701	2008	307	0,44	1,35	Strassbourg	1801	2008	207	0,49	1,01	Friedrichshafen	1866	2008	142	1,07	1,52
De Bilt	1706	2008	302	0,48	1,45	Rom	1811	1990	179	0,11	0,20	Chicago	1873	1993	120	0,21	0,25
Boston	1753	1993	240	1,25	3,00	Oslo	1816	1988	172	0,79	1,36	Montreal	1873	2001	128	1,61	2,06
Basel	1755	1980	225	0,37	0,83	New York	1822	2005	183	2,35	4,30	Perth	1876	1988	112	0,00	0
Stockholm	1756	1988	232	0,37	0,86	Oxford	1828	1980	152	0,60	0,91	Tokyo	1876	1993	117	2,68	3,14
Frankfurt	1757	2001	244	0,00	0	Jakutsk	1830	2008	178	0,19	0,34	AliceSprings	1879	2008	129	0,22	0,28
Paris	1757	1995	238	0,08	0,19	St Johns	1834	1993	159	0,09	0,14	Darwin	1882	1993	111	0,59	0,65
Edinburgh	1764	1960	196	0,33	0,65	Zürich	1836	2008	172	0,85	1,47	Kagoshima	1883	2008	125	1,70	2,13
Mailand	1764	1992	228	0,06	0,14	Greenwich	1841	1960	119	0,69	0,82	Westmannaeyar	1884	1990	106	2,44	2,59
Copenhagen	1768	1988	220	0,22	0,48	Stykkisholmur	1841	1995	154	0,54	0,83	Flagstaff	1894	2005	111	0,63	0,70
Prag	1773	2008	235	0,17	0,40	SanFrancisco	1851	1993	142	1,12	1,59	Werchojansk	1891	2008	117	1,32	1,55
Wien	1774	2008	234	0,15	0,35	Hannover	1856	2008	152	0,28	0,43	Matsumoto	1898	2007	109	1,79	1,95
Innsbruck	1777	1999	222	0,45	1,01	Sydney	1859	2008	149	0,87	1,29	Reykjavik	1901	2008	107	0,04	0,04
Hohenpberg	1781	2008	227	0,13	0,30	Auckland	1864	1992	128	0,07	0,09	Cairns	1907	1993	86	0,16	0,14
München	1781	1993	212	0,00	0	Wellington	1864	1988	124	0,54	0,67	Prince Rupert	1911	1990	79	0,89	0,70
Stuttgart	1792	1999	207	0,07	0,14												

1. Introduction

The IPCC-Report 2007 [1] concludes that climate change is progressing and mankind is guilty because our – anthropogenic – CO_2-production amplifies the greenhouse effect. IPCC has so intensively emphasized the danger of global warming and its consequences that during the last decades it became one of the highest-ranking issues of the world policy and economy. The existence of mankind seems to be endangered and it is concluded that the anthropogenic CO_2 will decide on our future on earth: unless we keep the atmospheric content constant, the so-called climate change will continue, all waters stored in ice shields and glaciers will melt, the ocean levels will rise flooding the islands and lowlands and destroying their cities.

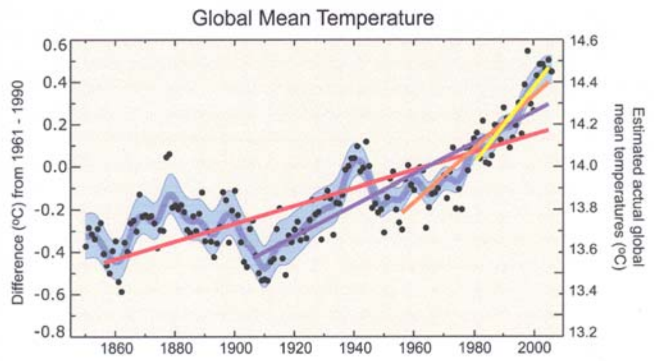
The climate has always changed, constant periods were usually short. Long before the climate change became an issue and completely being aware of its nature-made origin, VON REGEL in 1957 differentiated between 'temperature variation' and 'climate change' [2]. Temperature variations are of smaller extend and do not impair the circumstances of life what climate changes certainly do. The increase or decrease of the temperature that turns a temperature variation into a real climate change is not defined – and a clear definition is probably not helpful, due to the many regional differences. Considering the mean temperatures of different landscapes it requires at least an increase of 5°C to change the climate while a few degrees only cause merely a temperature variation. This text uses generally the term 'variation', unless it is specifically distinguished between 'temperature variation' and 'climate change'.

The IPCC-reports do not distinguish between them, IPCC points out that "*Climate in a narrow sense is usually defined as the 'average weather', …over a period of time…. The classical period is 30 years, as defined by the World Meteorological Organization (WMO).*" Following this description it is to be concluded that a variation takes place if the mean temperature of two subsequent periods of 30 years each differs noticeably. Thus, it takes time to recognize a variation as such: At first the end of the second period reveals whether a variation took place. Hence, 60 years are the shortest possible time to identify a variation provided the second period is significantly warmer or cooler. By contrast, if the same temperature remains longer – say, 60 years –, 90 years are the required observation time to identify a variation, provided the temperature of the 3rd period differs from the 1st and 2nd one – and so one. This means, from the methodological point of view, that reliable assessments require a long-term observation; the shortest possible will be 60 years.

IPCC's conclusions rely on the temperature readings since the late 19th ct. The global mean temperature shown in Figure 1 reveals rather small variations for the period between 1850 and 1910; the variations of the following periods are slightly stronger

- 1910-1950, with an estimated increase of 0.5°C, from 13.5°C to 14.0°C
- 1950-1980, with an estimated decrease of 0.2°C, from 14,0°C to 13,8°C
- 1980-2000, with an estimated increase of 0.7°C, from 13.8°C and 14.5°C

Figure 1: Global mean temperatures, IPCC 2007



The mean temperatures of these periods differ from slightly to moderately. The question arises whether these variations are strong enough to be classified already as a climate change – i.e. do they impair already the circumstances of life? The glaciation during an ice age certainly does – the periglacial tundra has an average annual temperature of approx. less than 3°C, if ever and depending where, compared to 9°C today in Central Europe. The differences towards the tropics are even larger. Hence, a real climate change presupposes much larger variations compared to those experienced so far. These comparisons do not justify calling the current variations a climate change, already. The average temperature would have to increase quite a lot more to reach that state. Nobody knows whether – and how long and how strong – the recent warming continues or whether it is just another cycle in a chain of many others altogether, forming the recovery following the little ice age. With respect to predictions derived from computer modelling, the authors tend – confirmed by experience – more to the wisdom of the Spanish philosopher Miguel de Unamuno, who formulated: "Practice without theory is routine, theory without practice is illusion"

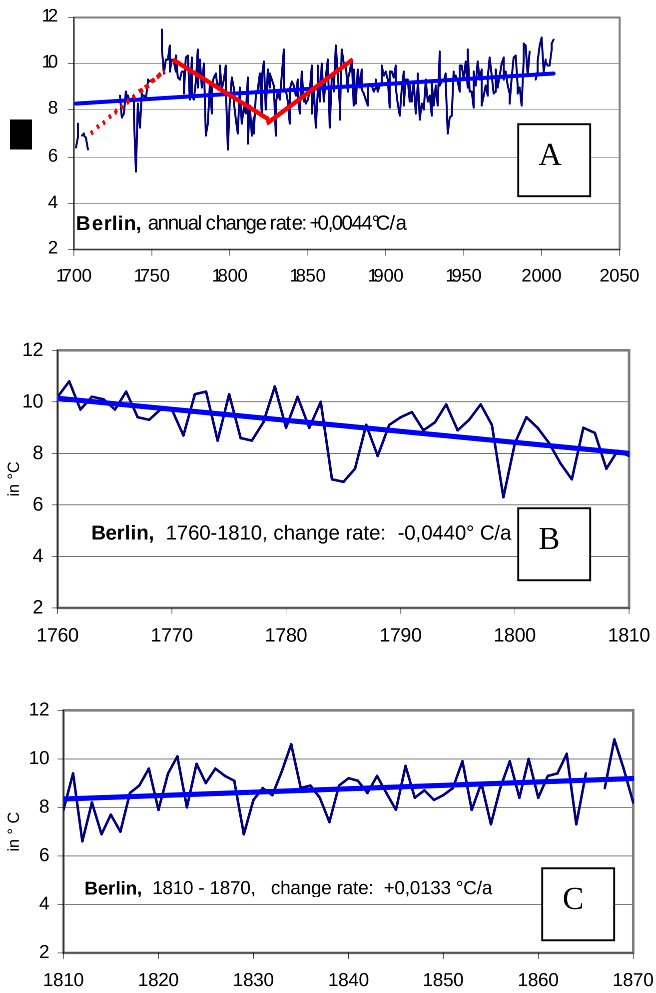
In order to assess the variations shown in Figure 1, it is required to relate them to those occurring during a longer period. The IPCC-reports disregard the temperature readings carried out before 1850 completely, and even those collected during the second half of the 19th century receive little attention. Now, older data have been evaluated to permit a better understanding of the recent variations. This article summarizes the results.

2. Temperature readings, type of evaluation

Origin of data

The temperature readings used for this evaluation are compiled in "wetterzentrale.de" [3]. This portal contains temperature readings collected as monthly and annual mean values in 49 stations worldwide. The first measurements were established 1701 in Berlin, other stations followed during the 18th and 19th century. Finally, stations were created in Europe, Northern America, Australia and Asia. Three stations (Yakutat, Vostok and Akita) began their survey activities in 1941, 1958 and 1986; due to the short period of readings their data have not been considered. Here, the data of 46 stations have been evaluated; Table 1 lists their names, their periods of observation and the temperature variations during that time, exemplarily illustrated in Figure 2.

Figure 2: Temperature curve for Station Berlin for period 1701–2008 (A), with trendlines for the whole period (blue) and exemplary short-term temperature decrease (B) and increase (C)



Temperature curves, trendlines and changes rates

For each data set temperature curves, together with their trendlines, were generated for the whole recording period as well as for its cycles of short-term phases with increasing and decreasing temperatures. The trendlines yielded the annual change rates, either referred to one year given in °C/a or extrapolated to 100 years then given in °C/100a. Figure 2A exemplifies the temperature curve for “Station Berlin” covering the whole period 1701–2008. The temperature curve indicates a change rate of +0,44°C/100a, and for the 307 years in between an increase of 1.35°C (Table 1). The temperature curve includes cycles of short-term phases, which comprise the temporary cooling period of 1760-1810 with an annual change of –0.044°C (2B) followed until 1870 by a temporary warming period of +0.0133°C/a. This latter phase includes a smaller sub-cycle, which was disregarded. The trendlines are marked in blue for the whole period, and green for the short-term phases between 1701 and 1870: The less inclined trendline for phase 1980-2008, marked in red, indicates a slower warming

Lon- term course and Short- term variations

The hypothesis of global warming dominates the public discussion and makes the headlines. In order to prove the correctness of that view this analysis had to examine whether or not opposing developments could have occurred, also. An analysis of data, which intends supporting a conviction is a kind of ideology while science is obliged to check whether the contrary – or any other result – allows a better explanation. Therefore not only the annual change rate for the whole recording period of each temperature curve has been determined but likewise the annual change rates for their inherent cooling and warming phases. Therefore, the following phases have been considered:

- Whole recording period, i.e. from beginning up to the end of available data
- Whole recording period until 1980
- Phase 1850-1900
- Phase 1900-1950
- Phase 1950-1980
- Phase 1980- 2008

The cooling and warming phases do not begin or end at these dates, exactly. The warming phase 1980-2008 probably ended several years ago already, followed by a new cooling now being effective. Since specific information is not yet available, this complex is not dealt with.

The above phases sometimes began – or ended – earlier or later. This applies, for instance, to the data recorded in Berlin. Their cycles suggested to generate temperature curves for these phases: 1701-1810, 1810-1870, 1870-1900, 1900-1950, 1950-1980 and 1980-2008. Nevertheless, the above separation suits best to the cycles listed above, because the phases apply to most of them. Many stations started recording after 1850, their phases begin accordingly. For the data set of each station 6 temperature curves were generated – two for the whole period, and four for the phases. Additional ones were produced for particular purposes. A total of approx. 330 curves were produced. Only a limited number can be selected for this contribution.

A rising trendline derived from a temperature curve indicates warming, a horizontal trendline means constancy and a declining trendline indicates cooling. The evaluation has figured out these results for all the above periods of every station. Table 2 exemplifies, as part of the database, the evaluation of the annual change rates for the Stations Berlin and De Bilt.

Table 2: Annual change rates for phases ‘Warming’, ‘Constancy’ and ‘Cooling’ - 2 examples of all 46 stations

Station	Warming	Const.	Cooling
Phases	annual change rates (°C/a)		
Berlin			
1701 - 2008	0,0044		
1706 - 1980	0,0027		
1850 - 1900		0	
1900 - 1950		0	
1950 - 1980			0,0046
1980 - 2008	0,0377		
De Bilt			
1706 - 2008	0,0048		
1706 - 1980	0,0046		
1850 - 1900		0	
1900 - 1950	0,0113		
1950 - 1980			0,0015
1980 - 2008	0,0579		

Mean values

Mean values are used to characterize the temperature as one factor of the climate – for the world or for all its regions. However, mean values are ambiguous because different combinations can yield identical results: An average temperature of 15°C, for instance, derives from mean temperatures of 20°C and 10°C as well as from 17°C and 13°C, respectively. The living conditions of their regions differ despite of identical mean values. Mean values alone are not appropriate to compare climates of various regions. Graphs showing the relative frequency distribution of the individual temperatures are suitable – and a reliable tool – to compensate the methodological deficit of mean values. Regrettably, the scope of this analysis does not allow realizing such an evaluation. Here, merely the extreme values are used instead: they describe the range of scattering, at least.

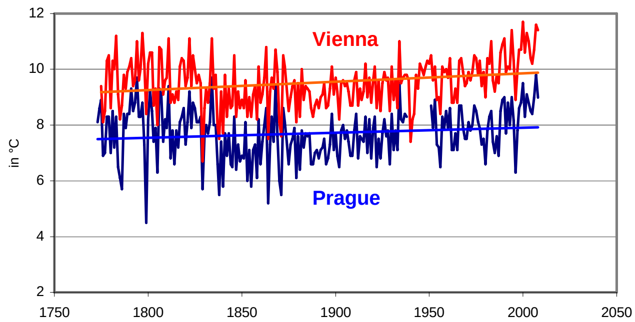
Global mean temperature

In assessing the temperature variations and changes of the whole world, IPCC refers to a global mean temperature. According to Figure 1 it is set at 14°C; all variations are related to 14°; +x°C indicates warming, -x°C cooling, respectively. This is a questionable approach: when already mean values alone are not appropriate, a defined reference value is even less expedient to describe the variety of climates. Paleoclimatological research found out that the only constancy of the climate is its continuous change, warming and cooling take places simultaneously in neighbouring regions. Hence, each region necessarily has its own reference, which is never constant but applies to a limited time only. How could a reference temperature defined for the whole world meet all the local variations? Long term temperature courses and short term variations ought to be always related to their own reference. Therefore, monitoring local temperature is considered the only reliable basis to identify variations or even changes of the regional climates. This is the subject of this analysis.

3. Applicability

The daily readings and the monthly and yearly averages are real results. They present doubtlessly the temperature of their regions. Not all stations will have equal conditions which may imply systematic errors, however the real temperatures superimposed them. Various stations belonging to the same climatic region yield similar temperature curves as the comparison of the courses recorded in Prague and Vienna confirms exemplarily. Other examples are available, too. Thus, regions of a similar climate yield equal or similar temperature curves, of course often at different levels as shown in Figure 3.

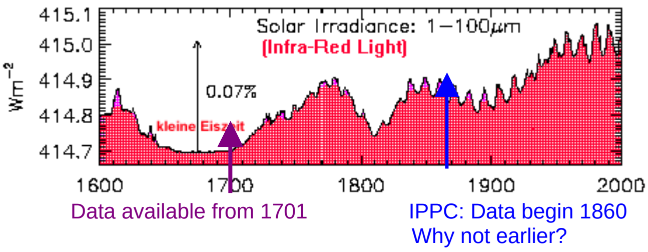
Figure 3: Temperature curves for Vienna and Prague to prove applicability



4. Results of evaluation

The temperature readings began at the end of the Little Ice Age; thus, they reflect the recovering part of a larger cycle, which includes several phases of smaller ones. Both, the recovery and the phases of smaller cycles correspond fairly well with the solar irradiance between 1600 and 2000 shown in Figure 4 [4]. Therefore the data are analysed at first to show the (relatively) long-term course between 1701 and 2008 as a whole. The inherent variations of the subsequent phases are dealt with later.

Figure 4: Gradual increase of solar irradiance since 1700



4.1 Long-term course

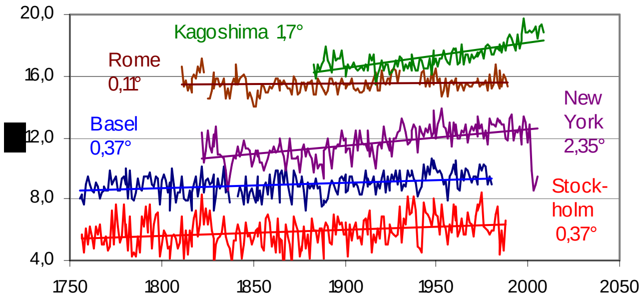
Warming, constancy, cooling

Today mainstream thinking suggests believing in a global warming. Thus, one should expect temperature curves with rising trendlines. However, the reality is different, and quite more complex: The analysis yielded not only temperature curves with rising trendlines but also horizontal as well as declined ones.

The temperature curves for Berlin, Prague and Vienna (Figures 2+3) indicate warming. Their temperatures show similar developments, although at different levels – on the average, Prague is about 2° cooler than Berlin and Vienna. The collection of further temperature curves given in Figure 5 demonstrate considerable differences:

- The change rate of 0,11°C/100a yielded for Rome indicates practically no change.
- The change rates of 0,37°C/100a obtained for Basel and Stockholm identify just a very little warming, almost not noticeable even in 300 years.
- The change rates of 1,7°C/100a and 2,35°C/100a resulting for Kagoshima and New York, respectively, indicate a remarkable warming. It is mainly caused by urban development, some details are discussed below.

Figure 5: Examples of increasing temperatures, change rates given in °C/100a



Horizontal temperature curves and trendlines indicate constancy; they were recorded in Frankfurt, Munich and Perth (Figure 6).

Figure 6: Examples of constant temperatures

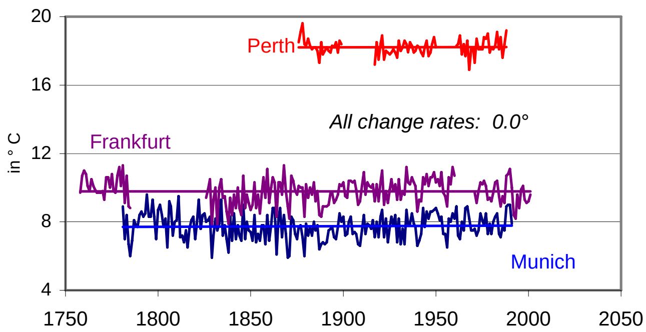
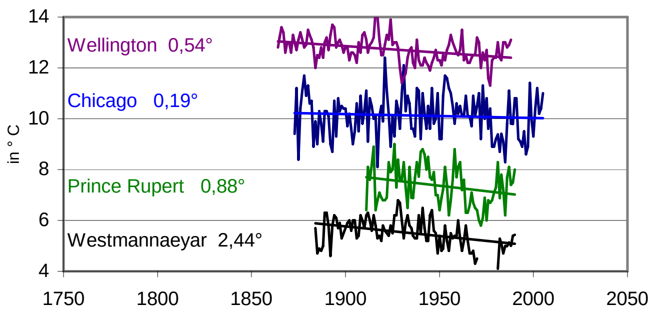


Figure 7: Examples of decreasing temperatures, change rates given in °C/100a



Decreasing temperature curves indicate cooling, examples are shown in Figure 7. The change rate of 0,19°C/100a yields a temperature drop of approximately 0,30° since the beginning of the readings which is practically meaningless. The larger rates of 0,54°C/100a and 0,88°C7100 and in particularly the one of 2,44°C/100a lowered the temperature since about 1850 in a remarkable order, already.

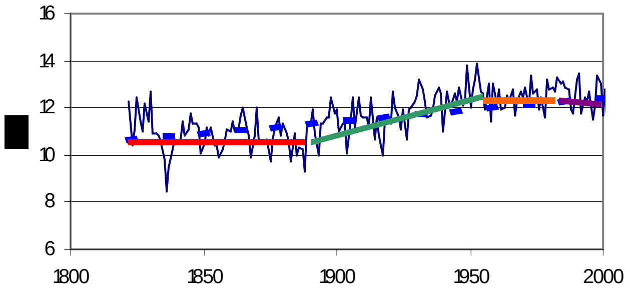
Particular developments in cities

The large change rates recorded during 1900-1950 in Kagoshima and New York were also observed in Boston, San Francisco, Montreal, Tokyo and Matsumoto. That warming was man-made because the stations are located downtown where their temperatures increased simultaneously with the construction of tall buildings. New York exemplifies this development particularly well because the station is located in the Central Park and was set in operation in 1822 when the park was not yet surrounded by skyscrapers.

Figure 8 reveal that four temperature phases follow each other between 1822 and 2005:

- 1822-1900: constancy, change rate 0,0°C/a
- 1900-1950: warming, change rate 0,0285°C/a
- 1950-1980: slight cooling, change rate -0,0045°C/a
- 1980-2005: strong cooling, change rate -0,1198°C/a

Figure 8: Temperature curve for New York, comprising constant, increasing and 2 decreasing phases (red-green-orange-lila)



The construction of tall buildings between 1900 and 1950 around the Central Park increased the microclimate temperature at nearly 3°C. Once the construction ended, the temperature course was ruled again by natural factors. A similar development took place in the other cities mentioned above. Besides, the temperature curves reveal also peculiar courses: in Tokyo, for instance, the construction-induced influence began around 1920 and in Kagoshima and Matsumoto 10 to 15 years later. Chicago, although a town of famous tall buildings too, doesn't show any man-made influence on the climate at all. The temperature curve and the trendline indicate cooling instead, most probably because the city borders Lake Michigan, which is frozen for several months. (By contrast, the waters of the Atlantic and Pacific remain open for New York and San Francisco).

Statistical evaluation

The statistical evaluation comprise the mean values of the relative portion of the stations, separated for warming, constancy and cooling, and the annual change rates for their temperature variations. Both, the portions in percent and the change rates are figured out for the whole period from the beginning up to the end of the readings as well as for their inherent phases between 1850 and 2008. The change rates obtained for those 7 cities mentioned above were not taken into account for this statistical analysis because by far too much urban influence is involved.

Relative Portions

Figure 9: The period 1701-1980 experienced a slightly larger portion warming against cooling and constancy – 53,9 % against 46,2%. The period 1701-2008 yields a greater difference due to the higher temperatures in phase 1980-2008: warming – 66,7% of the stations, cooling and constancy – 33,3%. In the early 80's, a general warming could have not have been diagnosed if the temperature readings since 1700 had been taken into account. The opposite was feared instead, and the extremely hard winter in 1979 let newspapers ask: "Next ice age ahead?"

Figure 9: Relative portion of stations for periods 1701-1980 and 1701-2008, overall warming (red), overall cooling (blue)

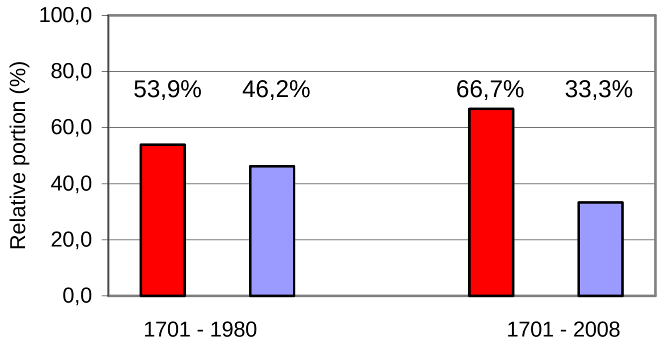
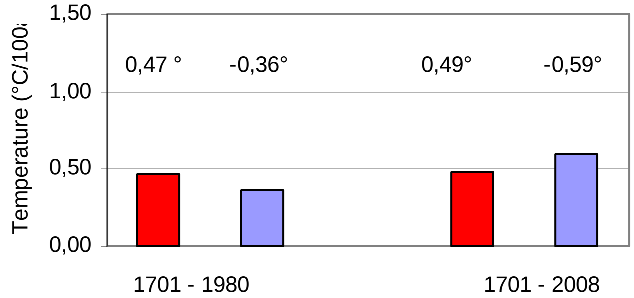


Figure 10: Average change rates, periods 1701-1980 and 1701-2008, red – warming, blue –cooling



Temperature Change Rates

The mean temperatures are shown in Figure 10. Since both periods lasted 279 and 307 years, respectively, the annual change rates are extrapolated to 100 years (°C/100a), the maximum and minimum temperatures refer to one year:

- For the period 1701-1980
  * warming +0,47°C/100a, max +1,05°C/a, min +0,04°C/a
  * cooling –0,36°C/100a, max +1,21°C/a, min –0,06°C/a.
- For the period 1701-2008
  * warming +0,49°C/100a, max +1,32°C/a, min +0,04°C/a
  * cooling –0,59°C/100a, max –2,44°C/a, min –0,05°C/a.

For warming the mean values are almost the same and the extreme values differ just slightly. For cooling the mean value is considerably larger and the extreme values differ distinctly. This is an interesting discrepancy: although the period 1980-2008 is dominated by warming, the maximum cooling of one station lowered remarkably the mean value.

Summary

The long-term courses indicate on the basis of only 46 stations already, that between 1700 and 1980 slightly regional cooling of approximately 1°C dominated, while regional warming reached about 1,3°C. Subsequently, the warmer phase between 1980-2008 turned the tendency: approximately 70% of all stations registered a warming of about 1,3°C, and 30% of the regions cooled off at about 1,8°C. That discrepancy is caused by the fact that between 1980 and 2008 warming took place in more regions and often with larger annual change rates.

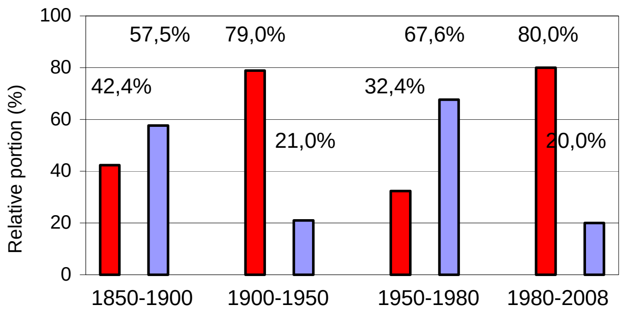
4.2 Short-term variations

The analysis focuses on the short-term variations between the four phases 1850-1900, 1900-1950, 1950-1980, 1850 and 2008

Relative Portions

The four phases experienced a repeated change. In phases 1850-1900 and 1950-1980 prevail cooling and constancy while warming dominates in phases 1900-1950 and 1980-2008 (Figure 11).

Figure 11: Relative portion of stations for Phases 1850-1900, 1900-1950, 1950-1980, 1980-2008 with temporary warming (red) and cooling (blue)



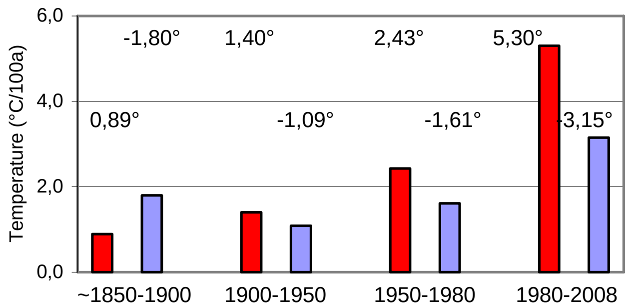
Temperature Change Rates

In order to allow a direct comparability with the above temperature values, the averages of the change rates are given in °C/100a. In brakes they are given in °C/50a and °C/28a to correspond with the real duration of their respective phases. The maximum and minimum temperatures are given as annual change rates in °C/a because they refer always to one year:

- 1850-1900
  - * Warming: +0,89°C/100a (0,45°C/50a), max. +0,0359°C/a, min +0,0009°C/a
  - * Cooling: –1,80°C/100a (0,9°C/500a), max. –0,0395°C/a, min. -0,0013°C/a.
- 1900-1950,
  - * Warming: +1,40°C/100a (0,7°C/50a), max. +0,0251°C/a, min. +0,0026°C/a
  - * Cooling: –1,09°C/100a(0,545°C/50a), max. –0,0223°C/a, min.–0,0020°C/a.
- 1950-1980,
  - * Warming: +2,43°C/100a (1,215°C/50a), max. +3,19°C/a, min. +0,47°C/a
  - * Cooling: –1,61°C/100a (0,805°/50a), max. –3,19°C/a, min. –0,90°C/a.
- 1980-1908,
  - * Warming: +5,30°C/100a (1,48°C/28a), max. +14,07°C/a, min. +0,12°C/a
  - * Cooling: –3,15°C/100a (0,88°C/28a), max.–11,98°C/a, min. –0,33°C/a.

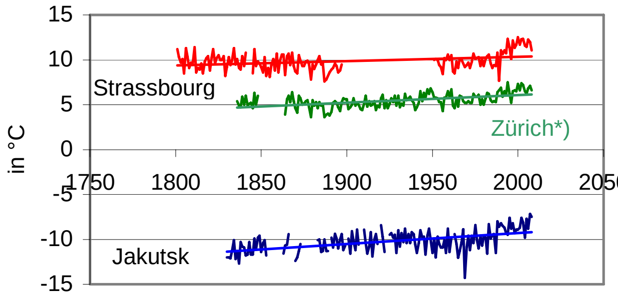
The average change rates given in °C/100a are illustrated in Figure 12

Figure 12: Average change rates in °C/100a for Phases 1850-1900, 1900-1950, 1950-1980, 1980-2008, warming (red), cooling (blue)



Some main features characterize the phase 1980-2008 as a particular one: both, warming and cooling were stronger. However, the variation between 1980 and 2008 followed mostly the pattern experienced for the preceding phases, amplitudes and rises remain similar, and mostly there is no increase at all or even a drop. Only the temperature curves at Jakutsk, Strasbourg and Zurich reveal an exceptional increase, which exceeds the usual amplitudes (Figure 13).

Figure 13: Particular temperature increases in 1980-2008, observed in 3 stations only; *) tempe-rature curve is set 3° lower to avoid overlapping with Strassbourg



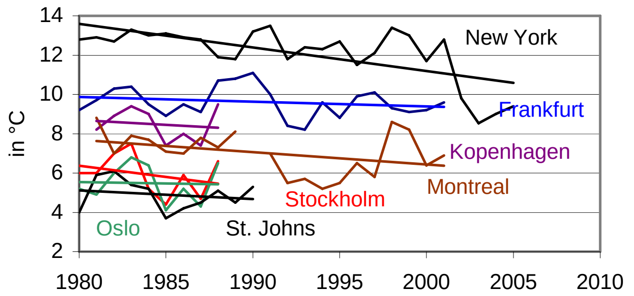
Although warming prevails in phase 1980-2008, the temperature cooled off in 8 regions. Respective temperature curves are shown in Figure 14. Irrespective of the incompleteness of several data sets the deceasing tendencies of all the temperature curves is expressed convincingly.

It is noteworthy that warming and cooling plus constancy share almost the same portions in phases 1900-1950 and 1980-2008 – warming: 79% and 80%, cooling: 21% and 20%. But also opposite developments occurred:

- Frankfurt, Stockholm, Copenhagen and Oslo received warming in phase 1900-1950, but cooling in phase 1980-2008.

- Hohenpeissenberg, Munich, Stuttgart and Strasbourg received cooling in phase 1850-1900 but warming in 1980-2008.

Figure 14: Particular temperature drop between 1980-2008, occurred in 7 stations



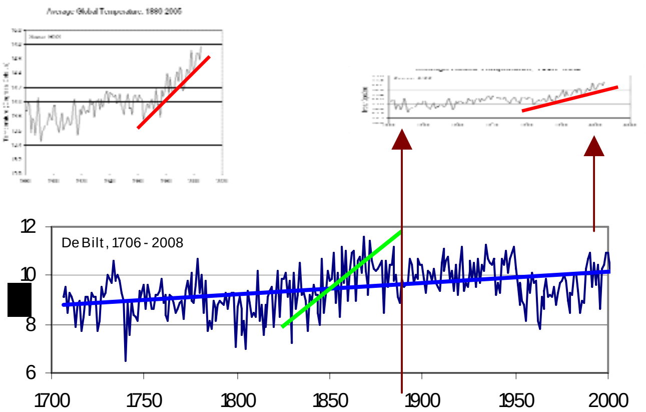
The stations of both groups are located not too far from each other. They confirm a possible affinity of neighboured temperatures courses, but also the differences between regions. This regional independence demonstrates that the regions have their own references. This underlines the above statement that an average temperature as a reference for the entire world is not acceptable and ought to be rejected.

The latest data suggest that the warming phase 1980-2008 ended earlier and is followed by another cooling. In view of the many variations experienced before, such a development is likely to occur within the upcoming years. Its course and intensity has to be awaited and cannot be assessed already.

5. Interpretation

The global mean temperature shown on Figure 1 seems to indicate a real climate change; particularly its strong increase in phase 1980-2008 is impressive. The same impression pretends the GISS-curve 'Average Global Temperature 1880 - 2005' (Figure 15, left). That impression disappears completely if the y–axis of the graph is reduced to the same scale applied to all temperature curves generated for this analysis. Then the reduced trendline is less inclined (Figure 15, right) than the trendline for the interval 1838-1868 of the temperature curve of De Bilt (Figure, 15 below); i.e. the latter increase occurring during the pre-industrial age was faster.

Figure 15: Large scale used by GISS pretends dramatic increase of average global temperature, reduction to usual scale (De Bilt) reveals smaller increase



It is claimed that the temperature increase during phase 1980-2000 was stronger than ever before. Indeed, that phase experienced the fastest and largest increase – but only during the 20th century. Between 1701 and 1980 even higher and faster temperature increases were registered (the cities influenced by urban development are disregarded):

- 80% of all stations registered higher temperatures before 1980, namely
  * 17,5% in phase 1700 and 1800;
  * 30,0% between 1800 and 1900;
  * 32,5% between 1900 and 1980,
- while only 20% of all stations registered higher temperatures between 1980 and 2000.

Thus, the phase 1980-2008 turns out to be merely another – and usual – temperature variation.

In order to assess the temperature changes in relation to their regional distribution, the 46 stations have been integrated into 19 groups, either one sharing similar types of temperature curves and change rates. Table 3 shows the stations of each group and the maximum and minimum values of the average annual change rates as well as the averages of all mean values of each group. Group 1 and 2 comprise the cities where urban development caused a stronger warming between 1900 and 1950; their mean values are not considered. This applies also to Group 19, Westmannaeyar, because their data may not be reliable. The main features for all others groups are as follows:

- The whole period between 1701 and 2008 contains 12 regions of warming and 7 regions of cooling, the respective portions reach 63,2% versus 36,8%. Some regions cover extended areas, others are small – warming: Sydney, Alice Springs, Cairns versus Strasbourg, Basel, Zurich; cooling: Perth, Darwin versus Westmannaeyar.
- The average temperature changes range between + 0,76°C/100a and –0,33°C/100a. These averages are representative because they correspond fairly well to the maximum and minimum mean values of their stations. The mean values for the actual temperature changes are listed in Table 1; they refer to 100 years (°C/100a, column 5) as well as to the observation time (°C/ot). They are grouped as follows:
  * Warming, partly influenced by urban development – 7 Stations, 15,2%
  * Warming < 1°C/ot - 19 Stations, 41,3%
  * Warming > 1 < 2 °C/ot – 8 Stations, 17,4%
  * Cooling and constancy –- 12 Stations, 26,1%

6. Reasons for temperature variations

From the very beginning of the planet, i.e. since 4,5 Billion years, the temperature was ruled by the sun and its subordinated factors. The IPCC is convinced that now man-made CO_2 gained supremacy because higher concentration of the atmospheric CO_2 strengthens the greenhouse effect. Since CO_2-molecules themselves do not reveal their origin, there is only one argument supporting IPCC's idea: The increase of the temperatures between 1980 and 2000 occurred much faster than before, allegedly due to the man-made CO_2-emissions.

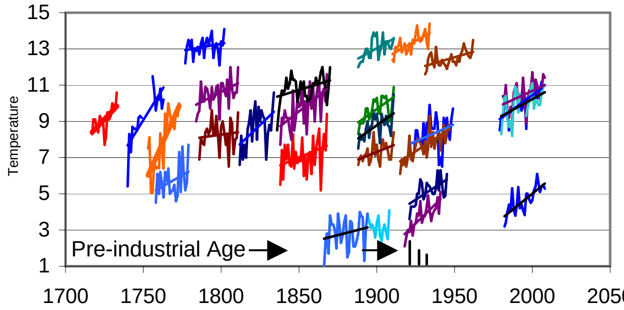
Table 3: Regional groups of warming, constancy or cooling

Stations integrated into groups presenting regions of similar temperature development	1701 - 2008 Local Mean Max	Min	Regional Average
Warming	(°C/100a)		
1*) Tokyo,Kagoshima,Matsu.	2,68	1,70	2,06
2*) Boston,New York Montreal,San Francisco	2,35	1,12	1,58
3 Werchojansk, Jakutsk	1,32	0,19	0,76
4 Strassburg,Friedrichshafen Basel,Zürich,Hohenp.berg	1,07	0,13	0,70
5 Flagstaff			0,63
6 Edinburgh,Oxford,Greenw.	0,69	0,33	0,54
7 Oslo,Stockholm,Kopenh.	0,79	0,22	0,46
8 Sydney,Alice Spr.,Cairns	0,86	0,16	0,41
9 Berlin,De Bilt,Hannover	0,48	0,28	0,40
10 Stykkisholmur,Reykjavik	0,54	0,04	0,29
11 Praha, Vienna	0,17	0,15	0,16
12 Rom			0,11
Constancy + Cooling			
13 Paris,Frankfurt	0,08	0	-0,04
14 Mailand			-0,06
15 Stuttgart,München,Innsb.	-0,5	0	-0,18
16 Auckland,Wellington	-0,54	0,07	-0,24
17 Perth,Darwin	-0,59	0	-0,30
18 St.Johns,Chicago,Rupert	-0,88	-0,09	-0,33
19+) Westmannaeyjar			-2,44
*) *stronger warming due to urban development*			
+) *data subject to verification*			

That allegation can easily be questioned: Most temperature curves include throughout the centuries repeatedly short-term temperature increases. They occurred also during the pre-industrial times similarly or even much faster compared to those between 1980 and 2000. Figure 16 shows a representative collection of steeper inclined trendline sections also before 1980. Fast short-term increases of the temperature occurring during the geological past have been identified, too [5]. Thus, man-made CO_2-emissions have certainly not caused the recent temperature changes. Several facts confirm unanimously this conclusion:

- A stronger greenhouse effect would act all over the world. Hence, the temperature should increase everywhere. However, the decreasing temperature curves presented in Figure 14 prove the contrary, i.e. CO_2 did not strengthen the greenhouse effect. If not everywhere, that strengthening applies nowhere.
- Glaciation occurred repeatedly during the geological past in spite of much larger CO_2-contents. For instance, it ranged at 1400 ppm during the Permian-Carboniferous period when the arctic ice shield reached the 38th degree of latitude. It is not explainable that an increase of 110 ppm of anthropogenic CO_2 initiated the present warming while many times that content during the geological past did not prevent several glaciations from reaching so far south.
- Research *"substantiated clearly that during the last 570 Millions of years the atmospheric CO_2-concentration did not control decisively the air temperature"* [6].
- The results of geological investigations confirm FRANCKES 'Encyclopaedia of Physics' (1959): *"as greenhouse gas CO_2 is meaningless"* [7]. This statement corresponds fairly well with its nature of a trace gas and its limited absorption capacity.
- With respect to the total amount of CO_2, the relatively very little portion of anthropogenic CO_2 – approx. 3% – is by far too small to cause these temperature variations.

Figure 16: Temperatures increased equally or faster in pre-industrial age



Considering duly all facts it ought to be concluded that the temperature variations also during the last 300 years have been caused by solar irradiance and its subordinated factors. The comparison between its varying intensity with the temperature variations registered in Berlin, for instance, reveals a surprisingly good correlation (Figures 4 and 1). There is no actual reason to deny the ruling function of the sun.

7. Conclusions

Only data of 46 stations were available. Of course, this is not enough to permit a representative assessment. Nevertheless, their regions represent a considerable part of the earth and the recognized tendencies characterize regional realities. It would be helpful to extend this analysis by evaluating the data of more stations.

The available temperature readings beginning within the first half of the 18th sc. identify repeated cycles of short-term temperature decreases and increases. Their annual change rates vary between +0,76°/C100a and –0,33°C/100a. These rates indicate that warming and cooling are simultaneously taking place in adjacent regions: approximately two thirds of the regions experienced warming, the others cooling. The intensity of both warming and cooling differ gradually between the above rates; three regions in between remained constant. Both, the rather small change rates and the opposite developments all over the world demonstrate that global warming does not occur but merely slight temperature variations. The latest readings and observations indicate that a new cycle beginning with a cooling phase started already.

The warming of the major part of the regions complies very well with the end of the Little Ice Age in the early 18th ct. In so far, the latter centuries included several cycles of a secondary order, which are superimposed on the recovery of the temperatures after the little ice age. However, this recovery does not apply to the entire globe, because quite a few regions are cooling off.

The cyclic variations, well expressed by the temperature curves, confirm – and justify – VON REGEL's differentiation between temperature variations and a real climate change which impairs our living conditions. The small change rates actually observed, and yielding the small regional averages, merely indicate usual temperature variations; much larger change rates were required for a real climate change. It is not appropriate, misusing a slight temperature variation panicking people to gain acceptance for inadequate political measures. Admittedly, the living conditions are getting worse due to mankind activity in some regions. That, however, is an environmental issue, not a climatologic one. Protecting the environment is required and possible, protecting the global – or even regional – climate is beyond our potential.

Warming of the oceans forces CO_2 to evaporate, the atmospheric CO_2-concentration increases, although with considerable delay. This happens and is still going on. Since the beginning of the industrial age anthropogenic CO_2 is added, too. The anthropogenic CO_2 and all other 'climate gases' reach approximately 3% of the total annual turnover, while 97% originate from natural processes. Principally, CO_2 cannot dominate the greenhouse effect since it is a trace gas with limited absorption capacity; the few percent of its anthropogenic portion cannot noticeably strengthen that little contribution.

IPCC concluded that anthropogenic CO_2 caused the allegedly fast increase of the temperature between 1980 and 2000, which means that we ourselves are responsible. However, former increases during the pre-industrial age occurred much faster. It is surprising that IPCC did not consider the old temperature readings, although it is well known that temperature variations are long-term processes.

The role of CO_2 is largely misunderstood – often the media consider CO_2 to be even a poison. It seems to be forgotten that CO_2 is, besides water, per photosynthesis the main component of our food, i.e. without CO_2 no organic matter, i.e. no life. At low CO_2-concentrations plants have minimal supply conditions, they grow much better at a higher atmospheric CO_2-content. It's doubling yielded for wheat a growth rate of 35%, as research experienced. This type of grain has optimal growth conditions at a CO_2-content of approx. 1000 ppm. And this principle applies to other plants as well. Woodsmen observe considerably larger growth rates for trees, for instance. In view of the growing population, the greater productivity of plants certainly turns out to be positive. Thus, the increase of the atmospheric CO_2-concentration yields steadily a new equilibrium – a development, which remains largely disregarded [8].

After all, the anthropogenic part of the atmospheric CO_2 is practically meaningless or has very little effect only, if ever. A much larger atmospheric CO_2-concentration did not prevent glaciations, why should it cause now warming only because human beings are occupying the earth?

According to WMO/IPCC's definition, 'climate' is '*the average weather of 30 years*'. If so, two intervals of continuous tendency are required for recognizing a variation, i.e. the temperature of the second interval has to differ from the first one. Hence, the shortest possible time for a diagnosis is 60 years. In Phase 1950-1980 prevailed cooling, in Phase 1980-2008 warming. Before 2040 a variation could not have been diagnosed. Conclusively, the IPCC-statement ('*climate change is progressing*') does not comply with IPCC's own rule because it was asserted in 2007 already, i.e. still before the end of the first phase, although a second one would still have to be awaited. Irrespective of that failure, meanwhile that rash conclusion is obsolete because a new cooling phase began already.

The Phase 1950-1980 was dominated by cooling. The unusual temperature increase later occurring between 1980 and 2005 was still ahead. Nevertheless, the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) in 1988 established the IPCC and the United Nations General Assembly for the first time considered the "climate change" to be a problem. It is really surprising that none of the professionals involved examined all the old temperature readings.

The IPCC-Report 2001, graph TS22, WG1, although called '*Scientific basis, Temperature readings 1765-2100'* contains no readings for the 18^{th} and 19^{th} ct., but presents for the new century only differing assumptions based on computer modelling. That approach used obviously either different models or (and) different parameters otherwise less divergent results would have been obtained. If IPCC had evaluated and considered also the long-term readings, they would have certainly refrained from discovering 'global warming'. Of course, no matter how that idea was borne, once it existed it survived – not because of the real climate but powered by well known components of human behaviour: assuring employment and funds, gaining attention, acknowledgement, reputation and authority, irrespective of the consequences on global politics and economy. The often painful consequences of such an approach had to be experienced repeatedly in human history, and that mechanism is still effective. After all, CO_2 has little effect only and the climate depends still on the sun – fortunately!

Last but not least: Temperature readings reflect reality, results of computer modelling can be infected!

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