Global temperatures may not increase by 4°C by the end of this century

Global warming exists in computations and sometimes reconstruction but without much support from measurements directly by thermometers or indirectly by tide gauges[1–10].

The global temperatures have not been exponentially rising but mostly oscillating over the last century about a constant longer term warming trend of 0.7°C per century, according to NASA's Goddard Institute for Space Studies (GISS) Surface Temperature Analysis dataset[11]. There are clear quasi-60 years oscillations with upward phases 1910–1940 and 1970–2000 and downward phases 1940–1970 and 2000–2030 (refs 1–10).

The value 0.7°C per century is biased upwards by anthropogenic factors having nothing to do with the anthropogenic CO_2 emissions. These factors include heat release and heat storage effects, spreading of urban data to rural areas, corrections mostly arbitrary of temperature, use of flawed model result to provide data prior to any measurement. More realistically, the warming related to longer-term natural oscillations or global warming is less than 0.2°C per century and nearly constant over the century[6].

Sea levels have consistently not accelerated, but also oscillated about a slow longer-term constant rising trend that is fully compatible with this reduced constant warming and the known land movement of isostasy or subsidence.

Global warming is still to be proved by one single measurement. Its only support is in the never properly validated climate models. After the clear failure of climate models to predict the temperature for the past, present and near future (the latest 13 years of global warming 'hiatus', or the similar 'dwelling' of temperatures 1940–1970 and 2000 to present, or the same rising temperatures 1910–1940 and 1970–2000 are all clear signs), surprisingly rather than reducing the modelled dependence of temperature gradients to the carbon dioxide emissions, already overrated predictions are made more and more overrated and more and more unrealistic.

In the last case[12], the clouds effect is added to support a 4°C in the remaining years of this century that so far has seen a rise of 0°C measured over 13 years not only in the land but also in the oceans from sea surface to 2000 m depth. According to Sherwood *et al.*[12], 'the temperatures are on course to rise at least 4°C by the end of the century, because earlier climate models projecting smaller increases are likely to be wrong because based on assumptions that clouds might help limit temperature increases'. 'The biggest uncertainty in modelling climate change in the past 25 years is the changes in clouds and whether they help to limit increases by cooling the surface as well as reflecting sunlight back to space.'

No matter what is measured, the never proved to be true increased heat uptake by changed composition of the atmosphere is never questioned, and if present climate models are already proved to be gross exaggerations, there is unfortunately always space for models that are more and more severe and more and more unrealistic.

Some data to better understand the experimental evidence and the wrong modelling assumptions are proposed in Figure 1. The figure presents the carbon emission, the GISS original and corrected temperature reconstructions, and finally the standard model predictions 1910–2010.

Figure 1 *a* shows the Carbon Dioxide Information Analysis Centre (CDIAC) carbon emission data[13]. This is a number directly proportional to the CO_2 emission and the trend is of exponential increase.

Figure 1 *b* and *c* shows the GISS temperature reconstruction[11,14]. The reconstructed global temperatures are mostly oscillating about a constant warming trend of 0.7°C per century. The correlation with the CO_2 emission is minimal.

If the following equation holds

$$dT/dt = c \cdot dCO_2/dt,$$

where T is the temperature, t time, CO_2 the anthropogenic carbon dioxide emission and c is a sensitivity parameter, then the sensitivity parameter has different values every year for module and sometimes sign.

The result of Figure 1 *b* and *c* is biased upwards by many anthropogenic factors not related to the modified composition of the atmosphere[6]. Examples of this bias are the difference between the warming of a large metropolis like Melbourne, Victoria, Australia measured by a thermometer in the central business district that is much larger than the warming in neighbouring towns like Ballarat, or the spreading of the Melbourne warming to the rest of Victoria, or the larger warming of minimum versus maximum temperatures in Melbourne, or the difference between the truly measured temperatures in Alice Spring, Northern Territory, Australia and the much higher warming of the global reconstructions. Additional sources of artificial warming are the different demography of the stations providing data for the global reconstruction (addition of new stations from warmer climate biases upward of the average), relevance of the multi-decadal oscillations (short records below 60 years return temperature gradients not representative of longer-term trends simply because of the oscillations) and obviously artefacts in many flavours, from corrections during change of site to replacement of missed data to 'cherry picking' the supporting measurements.

Alice Spring has a record started in 1879. The minimum temperature is warming 0.49°C per century over the period 1880–2012. However, the maximum temperature less affected by heat island effects is warming over the same period by only 0.12°C per century. The larger warming for the minimum rather than the maximum temperatures is possibly an indication of heat island contamination of the thermometer reading. If we take the average of the maximum and minimum temperatures, it has a warming trend of 0.30°C per century. Alice Spring is the only location of adequate length covering the central part of Australia. The GISS reconstruction returns a much larger warming of 0.90°C per century over the period 1880–2013 for Alice Spring.

Melbourne has a record started in 1855. While the minimum temperature is warming 1.66°C per century over the period 1880–2013, the maximum temperature is warming 0.90°C per century over the same period. The nearby Ballarat, only 100 km away, has a record

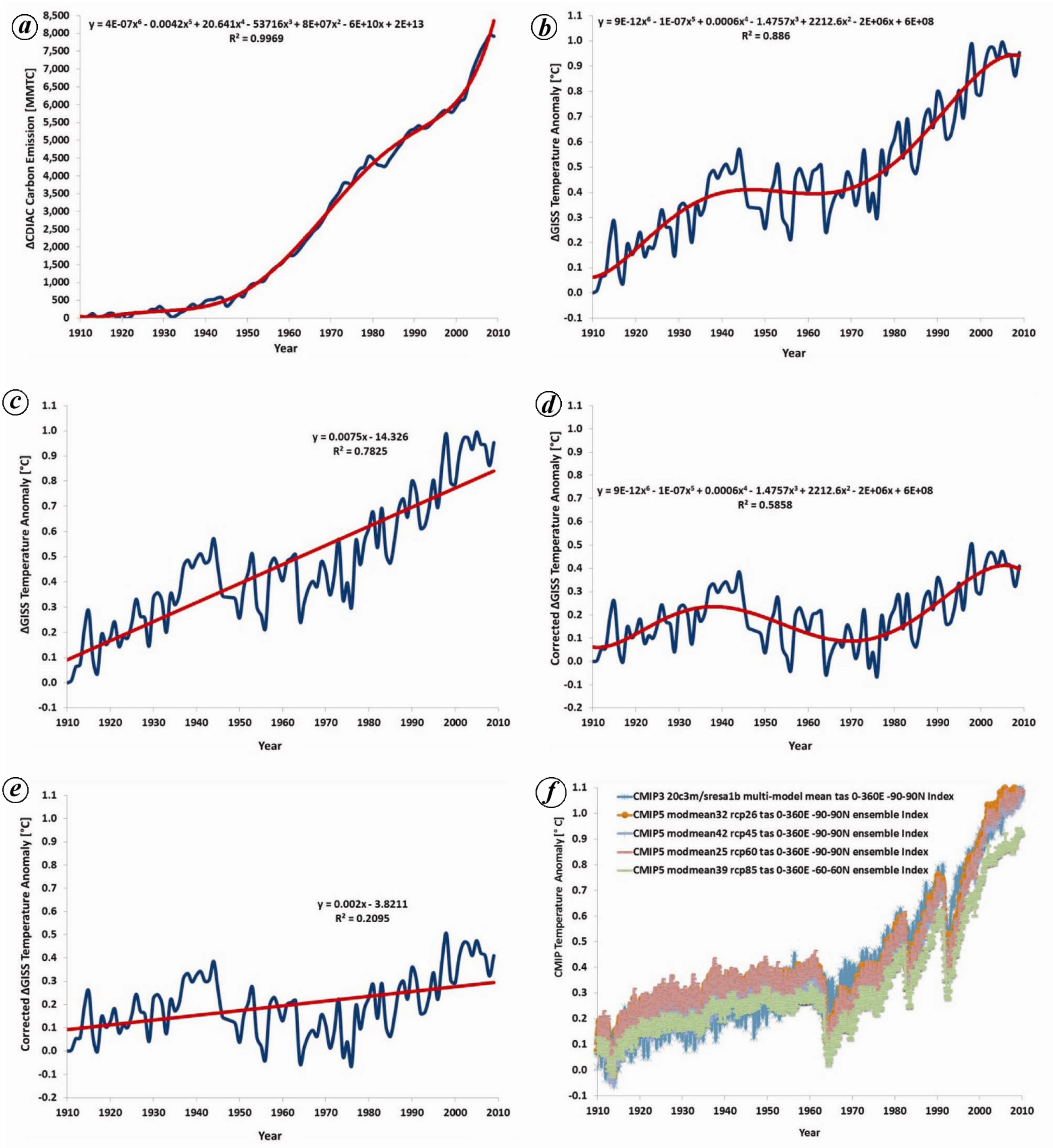

Figure 1. ***a***, CDIAC carbon emission[13]. This is a number directly proportional to the CO_2 emission and the trend is of exponential increase. ***b***, ***c***, GISS temperature reconstruction mostly oscillating about a constant warming trend of 0.7°C per century[11]. ***d***, ***e***, GISS temperature reconstruction with the anthropogenic upward biasing not related to the CO_2 emission removed. The warming rate is a much smaller 0.2°C per century. ***f***, CMIP model results wrongly correlate temperatures to CO_2 emissions and return a poor description of the temperature behaviour[14]. All the data are zeroed in 1910.

started in 1908. The warming 1908–2013 is –0.43°C and 0.79°C per century respectively for the minimum and maximum temperatures. Clearly, the larger warming for Melbourne compared to Ballarat or the other country-side stations of Victoria is only an indication of heat island contamination of the thermometer reading in Melbourne. If we take the average of the maximum and minimum temperatures, it has a warming trend of 0.18°C per century in Ballarat. The GISS reconstruction returns a much larger warming of 0.63°C per century over the period 1880–2013 for Ballarat, and an even larger warming of 0.80°C per century over the period 1908–2013. The warming of Melbourne is spread out to Ballarat and not the vice versa.

Figure 1 *d* and *e* shows the GISS temperature reconstruction with the anthropogenic upward biasing not related to the CO_2 emission removed. The warming rate with the corrected temperatures is a much smaller 0.2°C per century that is possibly still overrated and correlation with the CO_2 emission is further negligible.

The sea-level results of individual tide gauges are consistent with the oscillating temperatures and the reduced constant temperature gradients. As thermal expansion of the oceans is related to the change in temperature of the ocean mass not at the surface but as an average over the ocean depth, the lack of time rate of change of the temperature gradient with negligible d^2T/dt^2 (Figure 1 *b–e*) is consistent with the lack of acceleration of sea levels d^2H/dt^2, that is common to all the long-term tide gauge records of the world[1,7–10]. The smallest temperature gradients of Figure 1 *d* and *e* are more compatible with the absolute rates of rise in sea level locally measured (a tide gauge measures the sea relative to the land, but the land moves because of isostasy and subsidence) than the higher temperature gradients of Figure 1 *b* and *c*.

Figure 1 *f* shows the Coupled Model Intercomparison Project (CMIP) results wrongly correlating temperatures to CO_2 emissions and returning a very poor description of the temperature behaviour even over short time windows[14]. The present CMIP models are already wrong enough that they do not need a further exaggeration of the computed warming effect by accounting for the clouds effect as in ref. 11.

The upward bias of the GISS result has been dealt with in many studies, and there are examples from Australia and other parts of the world. Hughes[15] has shown how Adelaide, Broken Hill and Willis Island, similar to Alice Spring, had temperature records corrupted during the update from v2 to v3 of the GISS surface temperature analysis station data in 2011, with cooling for the past introduced to magnify the warming.

The Antarctic is another example of artificial cooling of the past and spreading of this warming to significant areas not covered by any thermometer measurement.

Goddard[16] notes how the GISS 1200 km is the only temperature index which shows significant warming since 2000, and shows how their defective interpretation of the Arctic may be the reason. The author compares the 250 km (measured) and 1200 km (extrapolated) 2000–2009 trend maps. The region at the centre of the green circle shows 1–2°C warming, even though the closest actual measurement near Herschel Island shows no warming. The Arctic has only red spots on the 250 km map representing a few thermometers north of Russia. The 1200 km map proposes a massive temperature warming across the North Pole.

The Arctic artefacts are also dealt with by Gosselin[17]. The author notes the large corrections on the few and far northern stations to produce warming patterns. The temperatures for Reykjavik, Iceland are made arbitrarily cooler by up to 3°C over the period 1940–1970 to produce a warming trend. The changes to the temperature data that resulted in early 20th century cooling in Reykjavik were applied on other station data. The red Arctic grids on the anomaly maps represent ten stations, mostly in Arctic Russia. Eleven stations in or close to these locations were investigated and many have large corrections. The mainstream climate scientists have always disliked the warming in the 1920s, 30s and 40s, and the cooling in the 1960s and 70s. At several locations in the Arctic, these years have been corrected. Ostrov Dixon (Dickson Island), Ostrov Kotel (Kettle Island) and Barrow stations are examples of significant corrections. The GISS corrections at the 11 Arctic locations are cooling of the distant past, and warming of the inconvenient 60s and 70s. The corrections double in this case (the warming trend).

The 1999 correction in the GISS temperature result is an example of more generalized warming. Some studies have proposed the temperature trends before and after the 1999 tampering[18–20]. The US temperature trends prior and post tampering show a significant cooling of the temperatures of the 1930s to produce a warming[18]. The version before the 1999 correction suggested that there was no long-term warming prior to the 1977 shift of the Pacific Decadal Oscillation, and that all global warming occurred between 1976 and 1998 (ref. 19). The version before the 1999 correction showed 1877 as the hottest year prior to 1980, with the 1960s/1970s having the same temperature as 100 years earlier[20].

In addition to warming corrections and spreading of artificially generated warming, there is also the spreading of warming due to urban heat island (UHI) effects[21,22]. Hughes[21] studied the warming effect of incorrect conventional adjustment of steps in temperature data due to site moves outward from an urban centre to conclude that global temperature trends would be more accurately assessed by just gridding the raw data because in the absence of work to adjust out UHI warming, the trend would actually be closer to reality. Ludecke *et al.*[22] evaluated to what extent the temperature rise in the past 100 years was a trend or a natural fluctuation, by analysing 2249 world-wide monthly temperature records from GISS with the 100-year period covering 1906–2005 and two 50-year periods from 1906 to 1955 and 1956 to 2005. The data document a strong UHI effect and a warming with increasing station elevation. For the period 1906–2005, there has been a global warming of 0.58°C as the mean for all records, reducing to 0.41°C if restricted to stations with a population of less than 1000 and below 800 m amsl. About a quarter of all the records for the 100-year period shows a fall in temperatures. Ludecke *et al.*[22] conclude that the probabilities that the observed temperature series are natural have values roughly between 40% and 90%, depending on the station characteristics and the periods considered and, therefore, only a marginal anthropogenic contribution cannot be excluded.

Over the last century, the temperatures have not been exponentially rising but mostly oscillating about a constant longer-term warming trend certainly much smaller than the GISS 0.7°C per century and very likely less than 0.2°C per century. The same upward phases 1910–1940 and 1970–2000 have been followed by the same downward phases 1940–1970 and 2000–2030 in a clear quasi 60-year oscillation of temperatures. The temperature trend with the smaller constant gradient is confirmed by the lack of acceleration in the sea levels measured by individual tide gauges all over the world and the generally low (on average) absolute rate of rise. The average relative rate of rise is small positive, and because the most part of the tide gauges have subsidence rather than isostasy, the average absolute rate of rise is close to zero. The temperature and sea-level behaviour are clearly not driven by the anthropogenic CO_2 emission, but they are more likely natural.

The quasi 60-year oscillation of temperature, the recovery of temperatures since the end of the Little Ice Age and the isostasy and subsidence of land are all well-known. What is not known is why we should read models already failing validation in their original formulation that are revised to push even further the already exaggerated warming. With anthropogenic global warming having vanished since 2000 at the end of the latest upward phase of a quasi 60-years oscillation, it is unlikely that the global temperatures will increase by 4°C in the remaining years of this century.

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Received 11 January 2014; revised accepted 22 June 2014

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Camelina sativa: success of a temperate biofuel crop as intercrop in tropical conditions of Mhow, Madhya Pradesh, India

Camelina sativa or false flax is an oil-yielding plant of the family Brassicaceae. It is an annual crop of the temperate region. It is also a self-pollinating and autogamous plant[1]. The most acceptable chromosome number for this plant is $2n = 40$ and other values could be due to variation among populations[2]. It can be sown on frozen grounds as well[3]. The plant is gaining popularity as a feedstock for bio-diesel in Europe and North America[4]. Yield potential of *Camelina* is at par with Brassica[5]. It gives a good yield of 1987 to 3320 kg/ha (ref. 6). *Camelina* is a low-input crop and its nutrients requirement is also very less; hence it can be grown on marginal lands[7,8]. It has around 40% of oil content[9]. The possible industrial uses of *Camelina* include its use in cosmetics and bio-diesel fuels[10]. Wu and Leung[11] attempted to optimize bio-diesel production from *Camelina* oil through alkaline transesterification. Krohn and Fripp[12] studied the environmental feasibility of *Camelina* bio-diesel compared to petroleum diesel[12]. *Camelina* proved better due to its lower life-cycle energy than traditional bio-diesel crops like soybean and canola[12].

In India, Defence Institute of Bio-Energy Research (DIBER), a constituent Institute of Defence Research and Development Organisation (DRDO), is working on bio-diesel production from *Jatropha curcas* and is also doing research on *C. sativa*. Research is going on to standardize the agriculture packages of practices at its field stations and project sites in order to make it a viable source of bio-diesel. Intercropping trials of *Camelina* in *Jatropha* plantation were conducted at DIBER Project Site Biofuel Park at Harsola, Mhow, Madhya Pradesh from July 2012 to February 2013 at 15 days interval; these trials were repeated during 2013–14 to validate the data. Both line sowing and broadcast methods were tried. Plot size was 1 m^2 and plots per replicate were 8; line-to-line spacing was 20×30 cm. The average number of plants was 120/1 m^2 plot. All the inputs were optimized. It takes 5–9 days for germination. Flowering starts from 35 to 45 days of sowing and fruits set after 55–60 days of sowing. Data regarding vegetative parameters such as plant height, number of branches per plant, shoot and root mass and reproductive parameters such as number of pods per plant, number of seeds per pod, seed yield per plant and yield per plot were recorded (Table 1). *C. sativa* can be grown in the tropics