

Global Warming Over The Last 16 Years

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Countercurrents.org

Since the onset of the industrial age (from 1750 AD) Earth's atmosphere, surface and ocean temperatures warmed mainly due to the rise in greenhouse gases (CO₂, CH₄, N₂O, O₃, Halocarbons, stratospheric water vapor from CH₄) by a total of +3.06 Watt/m². Other drivers include black carbon (+0.1 Watt/m²) and solar irradiance – the latter during the first half of the 20th century (+0.12 Watt/m²).

Warming was in part mitigated by emitted sulphur aerosols (direct effects -0.5 Watt/m²; cloud albedo effects -0.7 Watt/m²) and by land clearing (-0.2 Watt/m²) (IPCC, 2007) [1]. Cyclic, regional and transient climate effects are related to the ENSO cycle, water vapor (whose concentration depends on air temperature) and volcanic events. Fastest warming occurs in the polar regions due to the ice/water albedo contrast and where little or no water vapor exists in the atmosphere.

The consequent warming trend, as measured by NASA, NOAA and Hadley-Met and analyzed by Berkeley [2] (Figure 1), indicates a rise in average land temperature by about +1.5 degrees C over the past 250 years, and about +0.9 degrees in the past 50 years [2]. A sharp rise in temperatures from about 1975-1976 was related to both, an accelerated rise in CO₂ [3] and a decrease in emission of SO₂ from coal and oil due to clean air policies (Figure 2), which decreased the albedo of the atmosphere, thus driving further warming.

Following a sharp El Niño peak in 1998, since about 2000 a slowing-down of the mean rate of global warming was related to a sharp increase in SO₂ emission from coal mainly in China (Figure 2), strong La Niña events [4] and a low in the 11 years sun-spot cycle [5].

As some 90 percent of the global heat rise is trapped in the oceans (since 1950 >20x10²² joules), the ocean heat level reflects global warming more accurately than land and atmosphere warming (Figure 3). The heat contents of the oceans has risen from about 2000 by about 4x10²² joules. (Figure 3).

The rise in land and atmosphere temperatures since about 1996 reflects a combination of greenhouse radiative forcing from 360 to 395 ppm CO₂ [6] at rates of up to 2.54 ppm/year (unprecedented since 55 Ma ago), the ENSO cycle and 11-years sunspot cycle. Peak temperatures at ~2006 exceeds any measured in the instrumental record.

To summarize, claims as if warming has paused over the last 16 years (1997 - 2012) [7] cited in [8] take no account of ocean heating.

At the root of the issue is the non-acceptance by some of the reality of the greenhouse effect, known since the 19th century [9] and consistent with the basic laws of greenhouse gas radiative forcing [10] and black body radiation [11].

Continuation of global warming trends would eventually lead to collapse of the North Atlantic Thermohaline Current, related to advance melting of the Greenland ice and major sea level rise, analogous to events in the history of Earth ~12.9-11.7 and 8.2 thousand years ago [12, 13].

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[1] http://www.ipcc.ch/publications_and_data/ar4/wg1/en/contents.html

[2] <http://berkeleyearth.org/results-summary/>

[3] <http://www.esrl.noaa.gov/gmd/ccgg/trends/>

[4] <http://www.esrl.noaa.gov/psd/enso/mei/>

[5] <http://solarscience.msfc.nasa.gov/SunspotCycle.shtml>

[6] <http://www.esrl.noaa.gov/gmd/ccgg/trends/>

[7] <http://www.dailymail.co.uk/sciencetech/article-2217286/Global-warming-stopped-16-years-ago-reveals-Met-Office-report-quietly-released--chart-prove-it.html>

[8] <http://www.theaustralian.com.au/news/nothing-off-limits-in-climate-debate/story-e6frg6n6-1226583112134>

[9] <http://www.aip.org/history/climate/co2.htm>

[10] <http://www.britannica.com/EBchecked/topic/245233/greenhouse-effect>

[11] <http://www.britannica.com/EBchecked/topic/68456/blackbody-radiation>

[12] <http://www.britannica.com/EBchecked/media/111065/The-Younger-Dryas-event-was-characterized-by-a-substantial-and>

[13] http://en.wikipedia.org/wiki/Lake_Agassiz

Annual Land-Surface Average Temperature

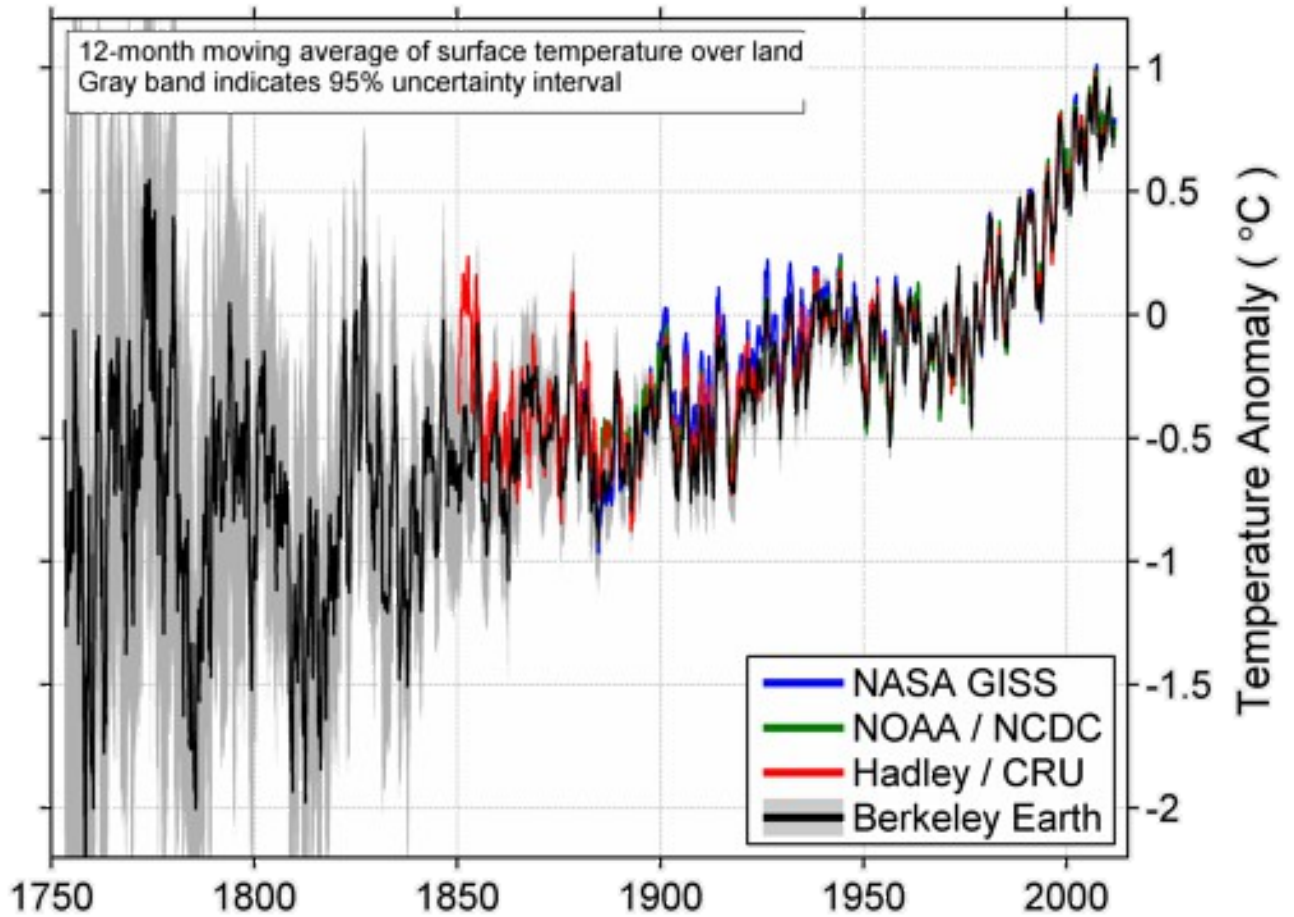
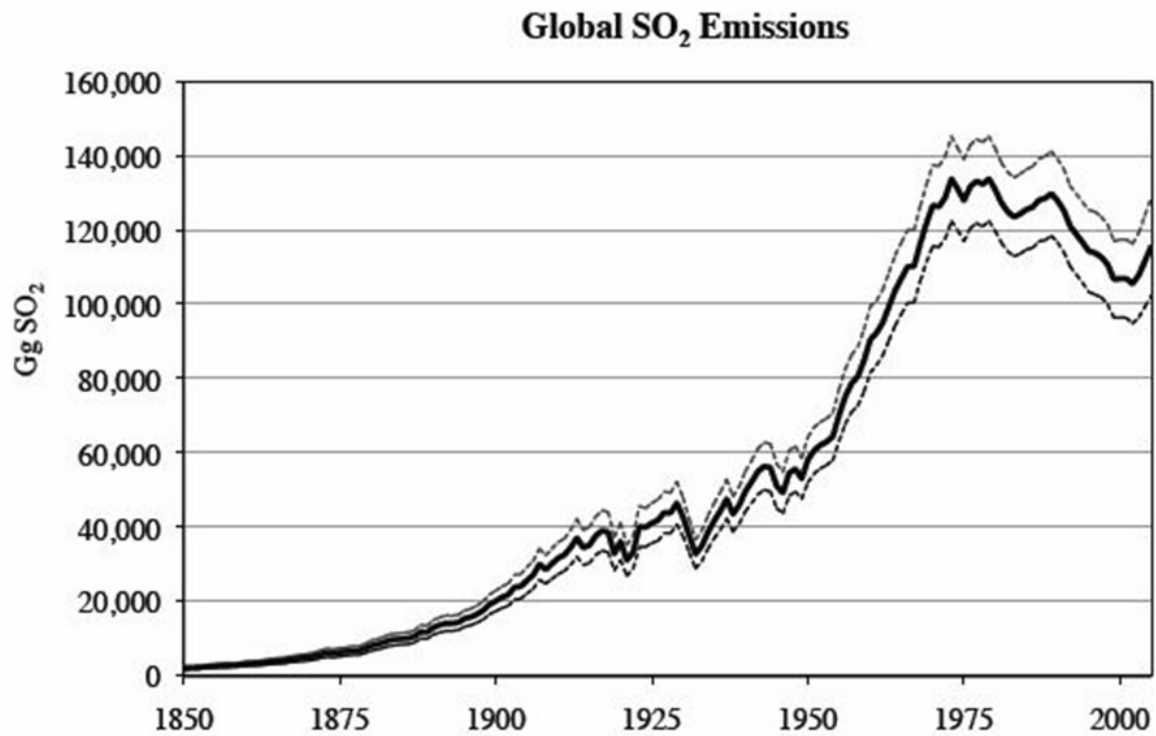


Fig. 1. Mean continent-ocean global warming since 1750 (<http://berkeleyearth.org/results-summary/>)



Atmos. Chem. Phys., 11, 1101–1116, 2011 pg 1107

[Anthropogenic sulfur dioxide emissions: 1850–2005](#) S. J. Smith¹, J. van Aardenne^{2,*}, Z. Klimont³, R. J. Andres⁴, A. Volke¹, and S. Delgado Arias¹

Fig 2. Anthropogenic sulphur emissions 1850-2005

www.atmos-chem-phys.net/11/1101/2011/acp-11-1101-2011.pdf

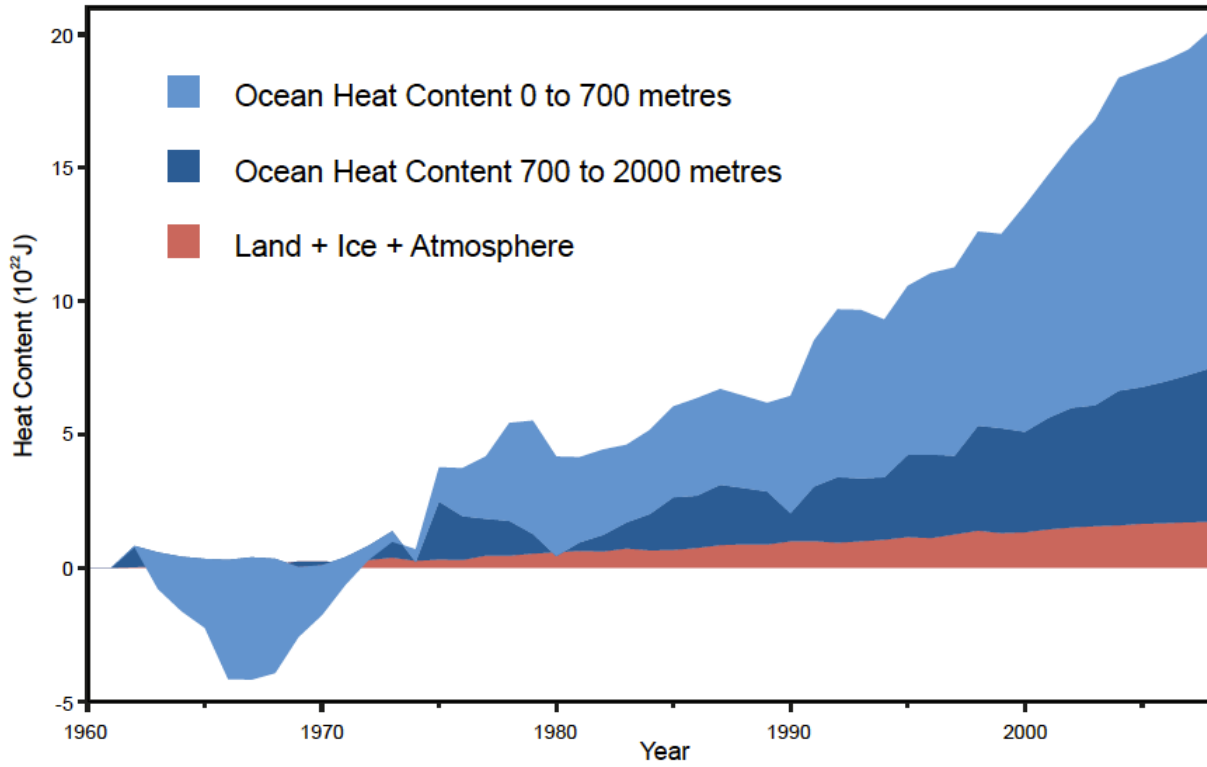


Fig 3. Build-up in Earth's total heat content
www.skepticalscience.com/docs/Comment_on_DK12.pdf

Monthly Mean Global Surface Temperature

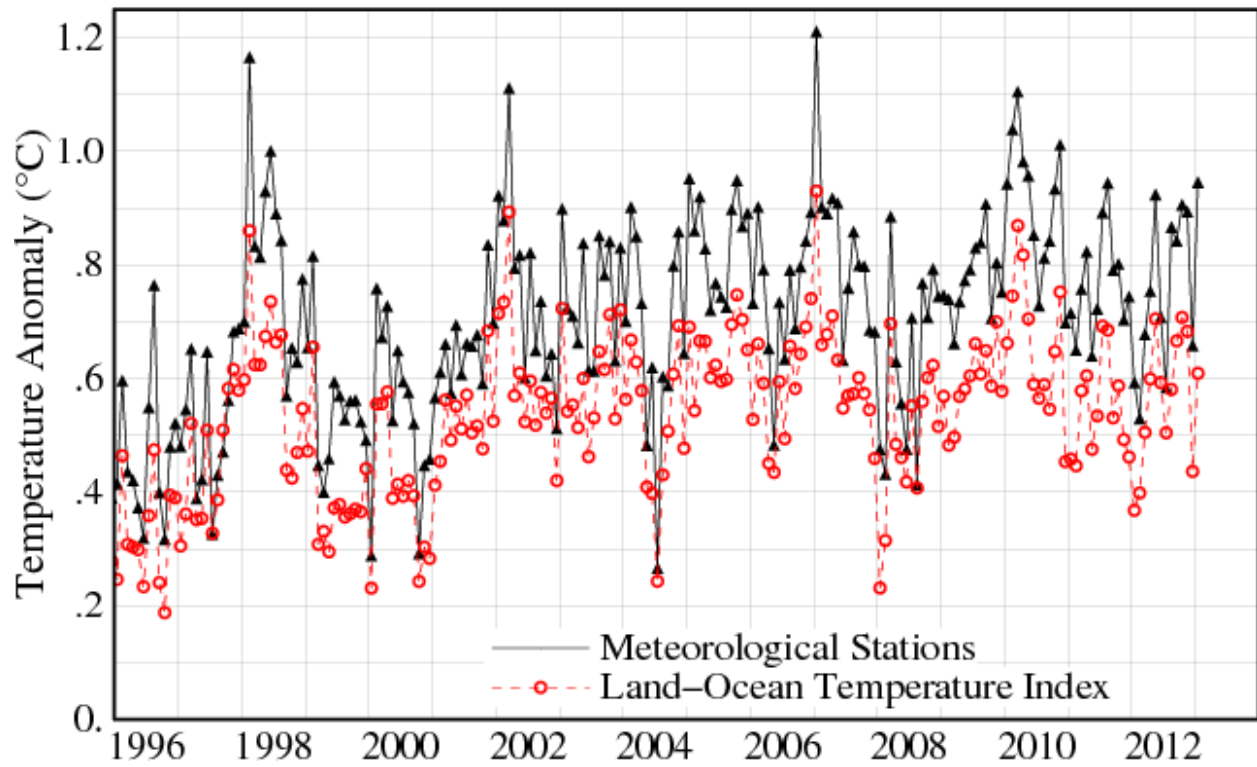


Fig. 4

NASA Land-ocean temperatures http://data.giss.nasa.gov/gistemp/graphs_v3/