

Cold Weather

I usually start my climate presentations with a chart showing maps of the surface temperature anomalies in the last four months. My most recent presentation (at Illinois Wesleyan) is available at http://www.columbia.edu/~jeh1/2008/illwesleyan_20080219.ppt. The referenced chart is shown below.

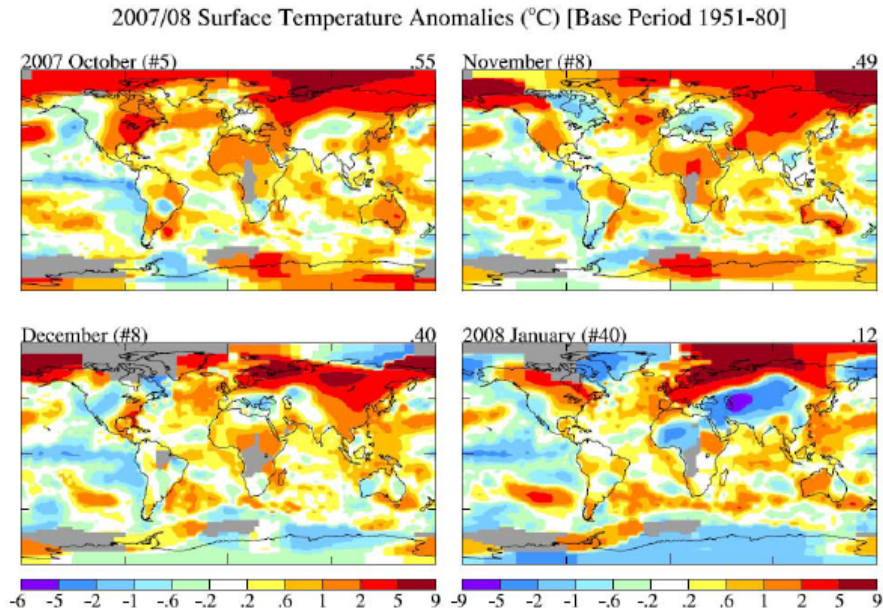


Figure 1. Global distributions of surface temperature anomalies of the last four months (GISS analysis).

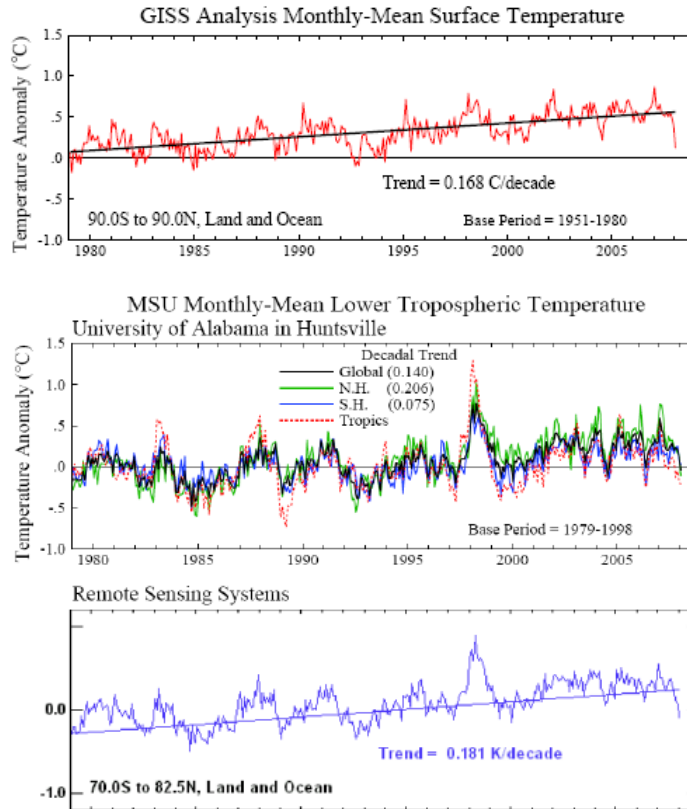
The maps are used to show that, even averaged over a month, local weather anomalies (dynamical fluctuations, more-or-less independent of forced long-term climate change) are much larger than the global mean temperature change of recent decades.¹ Weather fluctuations or ‘noise’ have a noticeable effect even on monthly-mean global-mean temperature, especially in Northern Hemisphere winter. Weather has little effect on global-mean temperature averaged over several months or more. The primary cause of variations on time scales from a few months to a few years is ocean dynamics, especially the Southern Oscillation (El Nino – La Nina cycle), although an occasional large volcano can have a cooling effect that lasts a few years. The 10-11 year cycle of solar irradiance has a just barely detectable effect on global temperature, no more than about 0.1°C, much less noticeable than El Nino/La Nina fluctuations.

The past year (2007) witnessed a transition from a weak El Nino to a strong La Nina (the latter is perhaps beginning to moderate already, as the ocean waters near Peru are beginning to warm). January 2007 was the warmest January in the period of instrumental data in the GISS analysis, while, as shown in Figure 1, October 2007 was # 5 warmest, November 2007 was #8 warmest, December 2007 was #8 warmest, and January 2008 was #40 warmest. Undoubtedly, the cooling trend through the year was due to the strengthening La Nina, and the unusual coolness in January was aided by a winter weather fluctuation.

The monthly fluctuations of global or near-global temperature, as well as the trend over recent decades can be seen in Figure 2 for the GISS surface temperature analysis as well as the lower

¹ The other way that I have tried to make this point is with climate dice, one for the 1951-1980 period and one for the first decade of this century, the colors of the sides of the dice representing seasonal mean temperatures. The change between these two periods has the number of blue sides decreasing from two for 1951-1980 to one for the present. It is still fairly common for the three-month-mean local temperature to be colder than its 1951-1980 mean.

tropospheric data of UAH (University of Alabama at Huntsville)² and RSS (Remote Sensing Systems). The reason to show these is to expose the recent nonsense that has appeared in the blogosphere, to the effect that recent cooling has wiped out global warming of the past century, and the Earth may be headed into an ice age. On the contrary, these misleaders have foolishly (or devilishly) fixated on a natural fluctuation that will soon disappear.



Note that even the UAH data now have a substantial warming trend (0.14°C per decade). RSS find 0.18°C per decade, close to the surface temperature trend (0.17°C per decade). The large short-term temperature fluctuations have no bearing on the global warming matter or the impacts of global warming discussed in the Illinois Wesleyan presentation. A global warming much smaller than weather fluctuations has the potential for dramatic effects, e.g., by setting in motion future large sea level change, species extinction, and various other impacts.

Cold weather does raise an interesting point, though. People who do not like cold weather, and might have welcomed the idea that Minnesota may become more like Missouri or Massachusetts like Virginia, must give up that notion, unless they wish ill for a large fraction of the planet’s inhabitants, both human and other creatures. We are going to have to figure out a way to keep climate zones pretty much where they are now (winters will continue to happen, as always). It is possible that we can still do that – just barely. But I digress – that will be in our next paper, almost finished.

² UAH consistently finds a smaller temperature trend than other analyses, but, after careful checking of the analysis by the scientific community, their results have come into reasonably good agreement with the analyses of others (<http://www.climate-science.gov/Library/sap/sap1-1/finalreport/default.htm>), so their results are no longer sufficiently different to constitute a significant issue. Thus we no longer hear the cry of contrarians “but satellites show that the world is really getting cooler”.