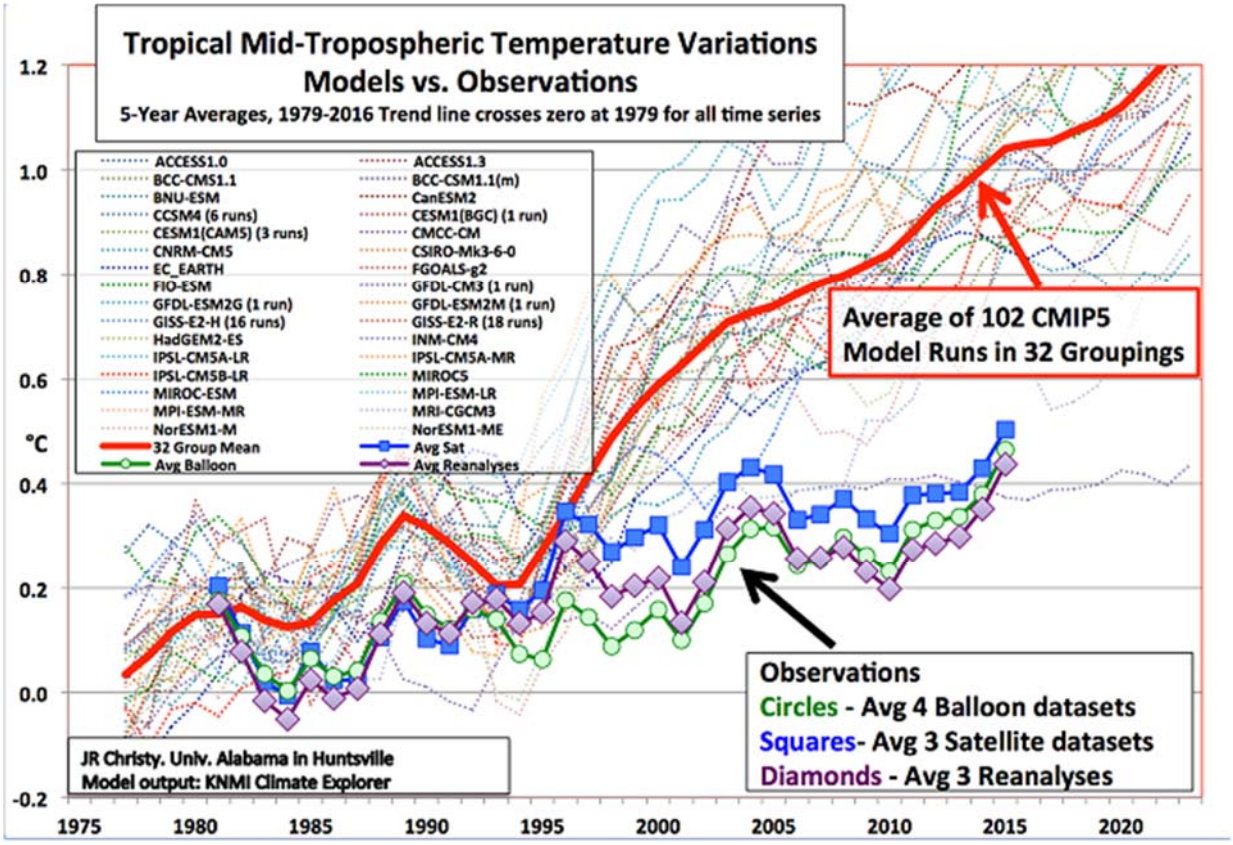
Surface and Satellite Temperature Measurements

Over the past ten years or so the modeling of future temperature increases has been shown to be highly inaccurate. Yet these modeled temperature increases have been used to support the policies which have been adopted to reduce emissions of CO2 and, so it is argued, reduce the threat of dangerous global warming. The failure to accurately predict temperatures suggests that at the least the policies should be modified if not abandoned altogether until more accurate modeling is developed.

A good demonstration of the uncertainty in temperature prediction was given by John Christy from the University of Alabama at Huntsville (UAH) on the 29 March 2017 to the U.S. House Committee on Science, Space & Technology. In his testimony the following figure illustrated the major differences between various predicted temperatures and the actual measured temperatures. Thus over the period from 1977 to 2015 the average of the predicted temperatures (red line) shows an increase of about one degree C whereas the average of the actual shows an increase of only about 0.4C, with an increase of only about 0.2C over the past 20 years when emissions of C02 were increasing strongly.



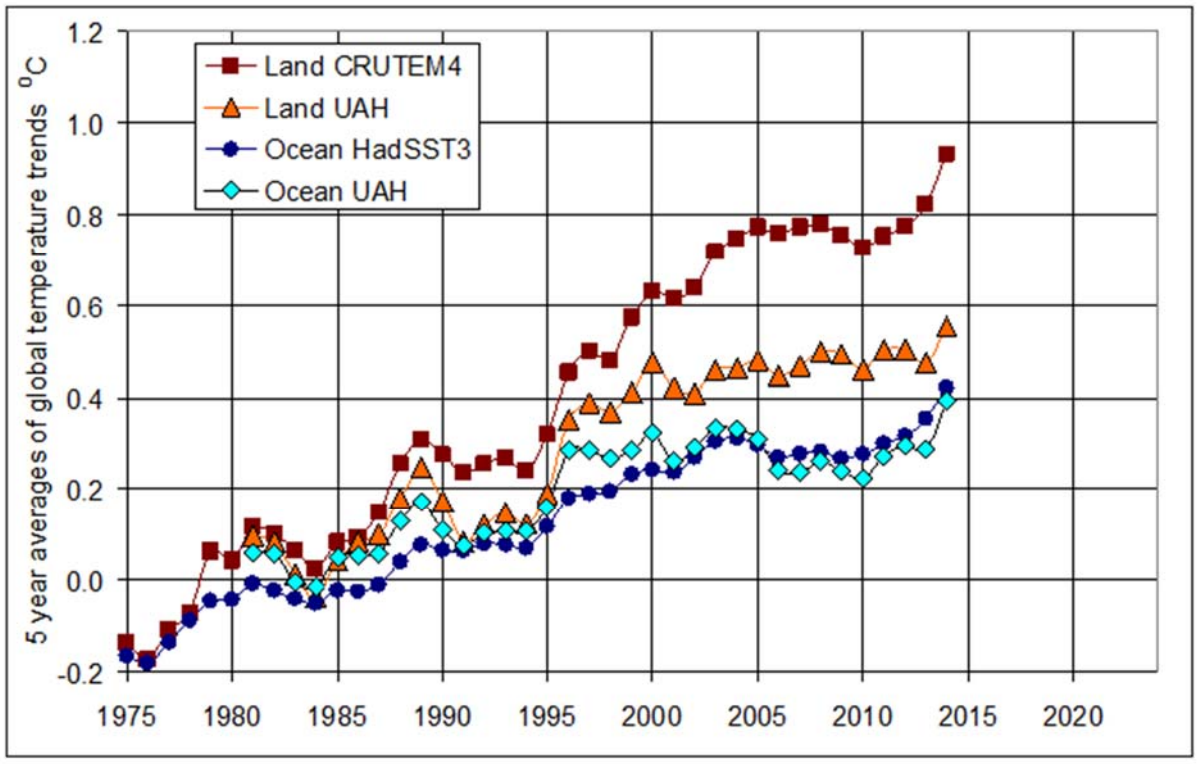
There have been over fifty “after the fact” explanations for the supposed “missing heat”; but the alternative that there is no missing heat and that the models are wrong is supported by measurements of rainfall that are three times the computer- predicted rainfall. Also the multiplier factor that amplifies the CO_2 contribution to increasing temperatures has been shown to be less than 1 rather than the assumed values of 2 to 4 used in computer models.

In his testimony Christy states that *the average of the models is considered to be untruthful in representing the recent decades of climate variation and change, and thus would be inappropriate for use in predicting future changes in the climate or for related policy*

decisions. Christy went on to say that *If one follows the scientific method…..the average model trend fails to represent the actual trend of the past 38 years by a highly significant amount. As a result, applying the traditional scientific method, one would accept this failure and not promote the model trends as something truthful about the recent past or the future.*

There is a further related problem that measured global temperatures may have been over estimated.

This can be seen in the second figure showing global temperatures measured at the surface of the earth and in the lower troposphere. Temperatures at the ocean surface are largely measured by satellite as are the temperatures in the lower troposphere with broad coverage. On the other hand the surface temperature is the result of combining many individual weather station measurements to match the satellite measurements.



5 year averages of lower troposphere global temperatures from UAH and surface temperatures from the UK Met Office for land, CRUTEM4 and for the ocean HadSST3. The yearly trend measurements are adjusted to cross zero in 1979 before the 5 year averaging (as is the case for the Christy figure).

The ocean temperature trends for the surface temperature and for the temperatures taken from satellites atmosphere are in rough agreement.

But for the last 25 years there has been a 0.2 to 0.3 ^{0}C higher increase in the land surface trend than the lower troposphere trend taken by satellites. There are two competing explanations. The first being that land, with smaller heat capacity than the oceans, warms more rapidly. However land also loses heat more rapidly. Day to night temperature changes in a desert are a good example. The second and more likely explanation is that the Urban Heat Island effect has driven the measurements apart. This effect is a surface temperature increase brought about by a growing city changing the surroundings of a weather station. This is well documented for United States cities.