

The Validation of the Climatological Models Used by the Intergovernmental Panel on Climate Change (IGCC)

The Assessment Report of 2001 for the Intergovernmental Panel on Climate Change (IPCC) shows how well the climatological models it uses are able to duplicate the current climate characteristics. The ability to duplicate current climate data is an essential step in the validation of these models and establishing their creditability for projection. However there is an even more important validation procedure for climate models; i.e., run them backwards to estimate past climate characteristics from those of the current time. The models will work equally well at projecting the climate of 1900 from current data as projecting the climate of 2100. There is information on the climate of regions going back to the mid-19th century. This results of such *backcasting* has not been reported by the IPCC either because it was not done, or more likely, because the results showed the models to be so poor that showing the results would destroy any credibility for the projection models. So the only validation procedure available is the attempt to duplicate current climate characteristics.

The current climate data that are most relevant are the zonal averages of such quantities as temperature, precipitation, atmospheric pressure, cloudiness and humidity. The latitude profiles for temperature for December-January-February (DJF) are shown below.



Visually the correspondence looks good, but one should note that the substantial deviations occur in the polar regions. Also it is notable that the models generally overestimate the temperatures in the Southern Hemisphere. This casts some doubt on projections of global warming in as much as there seems to be a built-in bias in the models to overestimation of temperatures.

Although the results for temperature look reasonably good but they are definitely not perfect. However elsewhere the Report reveals that some results may include what is called a *flux adjustment*; i.e., if a model's results were wildly unrealistic a *flux adjustment* would be added or subtracted in the computation to give *realistic* results. The Report tells that there may have been flux adjustments in the results but does not tell precisely where and how much these flux adjustments were. It does say that the results for about half of the models involved such flux adjustments. The other way of expressing the result is that the models generally failed the validation test but *fudge factors* were included to make them look good.

The latitudinal profiles for precipitation during the Northern Hemispheric winter (DJF) are given below.



What is notable here is the general overestimation of precipitation by the models. A few of the

models underestimate precipitation in the equatorial region and some have rather erratic profiles for precipitation.

The profiles for mean sea level (MSL) pressure for the Northern Hemispheric winter (DJF) are shown below.



It is notable how much deviation is shown, but the scale is such that those deviation are on the order of only 1 or 2 percent. However it is notable that the models are doing worst in the polar regions.

The observed latitudinal profile of the proportion of cloudiness during the Northern Hemispheric winter (DJF) is complex and the climatological models do not do very well in duplicating it, as shown below.



In meteorology pressure is more convenient to use as a vertical dimension than altitude. The region of the atmosphere in which temperature decreases with altitude is the troposphere and contains 90 percent of the atmosphere. The region of the atmosphere in which temperature increases with height is the stratosphere and it contains only 10 percent of the atmosphere.



The models do a better job in duplicating the shape of the vertical temperature profile. However the relative errors of the models for pressures in the stratosphere are quite large, on the order of 50 to 100 percent.

The Report notes that there are some important elements of the models that cannot be compared with observed data because the observed data is not available. One of those climate elements for which the results of the models are not compared with observed data is humidity. One would think that if the models cannot even be compared with observed data that it is inappropriate to give credence its projections 100 years into the future.

And the overwhelming question concerning the validation of the climate projection models used by the IPCC is why are there no results of using the models to *backcast* the current data to hundred or a hundred and fifty years ago and comparing those *backcasts* with the actual data of those times? Before advocating the expenditures of trillions of dollars for policy measures now the climate modelers should at least demonstrate this validation of their models.

As it happens Patrick J. Michaels in his book, *Meltdown*, does give a graph of the backcasting of global temperature data from 2000 to 1900 for two computer models. For an analysis of those backcasts click <u>here</u>.

HOME PAGE OF applet-magic HOME PAGE OF Thayer Watkins