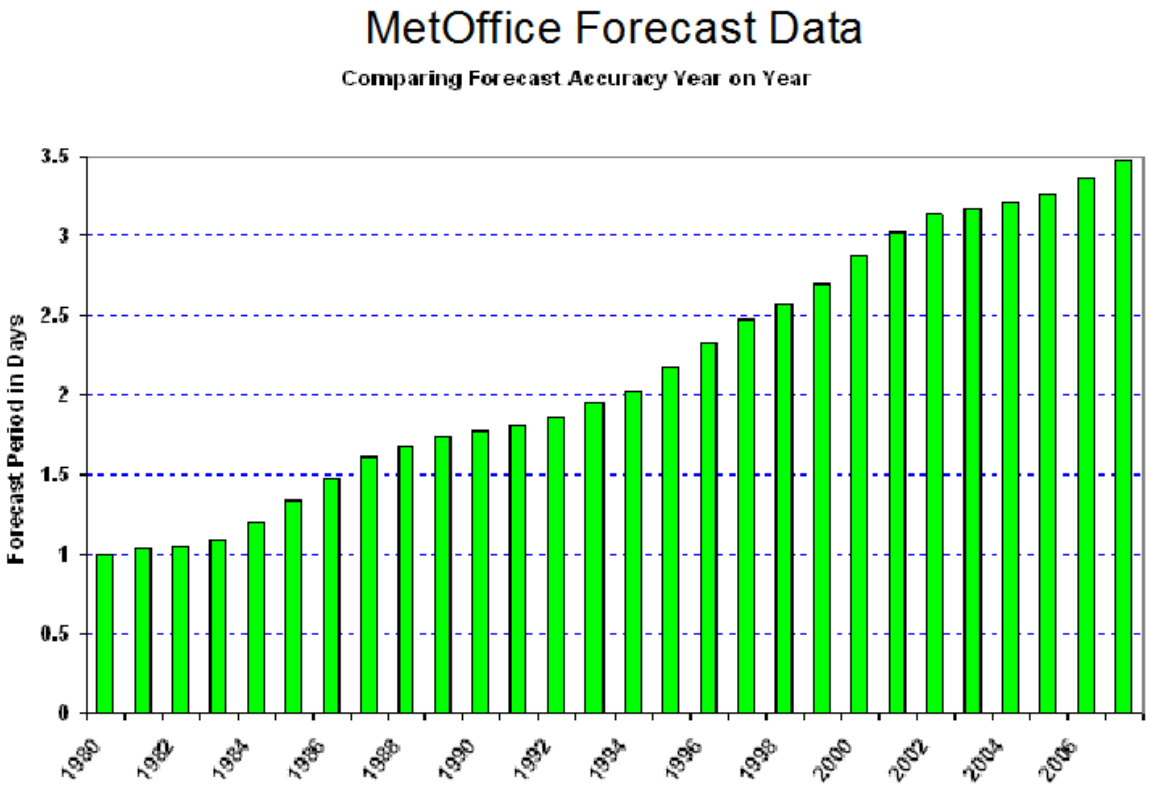
Is the MetOffice to Blame for the Rising CO_2 Levels?

Recently I was trying to explain for the millionth time that the cumulation maths process can make almost any positive data set with an upward trend look like the increase in CO_2 within the atmosphere. As usual I presented a few examples using simple synthetic datasets, but somehow they don't seem to be sufficiently compelling. What might be better than a simple example? How about an amusing one?

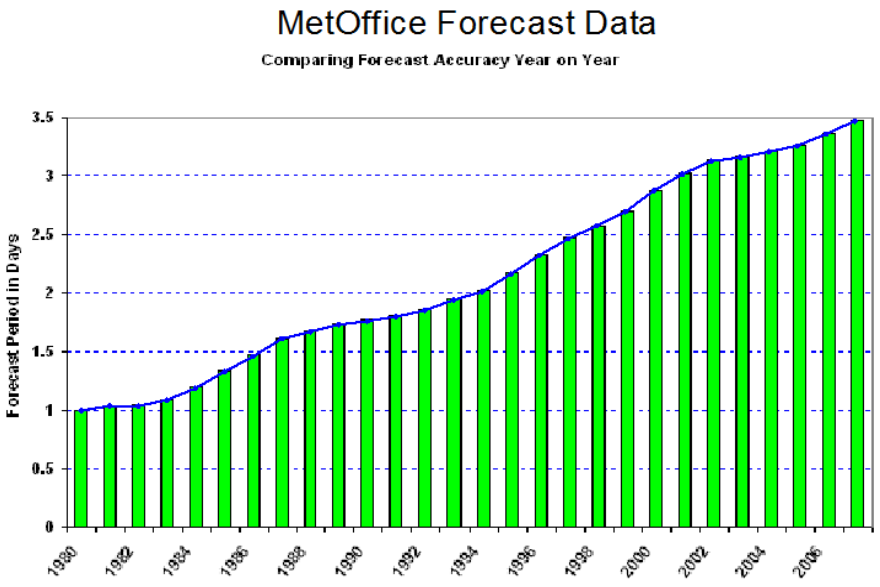
I was browsing the news and came across a bulletin claiming that the new MetOffice computer was extremely energy hungry (not to mention expensive), but that it would improve the predictive skill. So I had a quick look at the MetOffice website and fell across a plot comparing forecast accuracy year on year. It was hardly surprising to find it is a positive dataset with an upward trend. Just the kind of data required for a little demonstration. It was found here:

http://www.metoffice.gov.uk/corporate/verification/forecast.html Sourced 9/8/2009



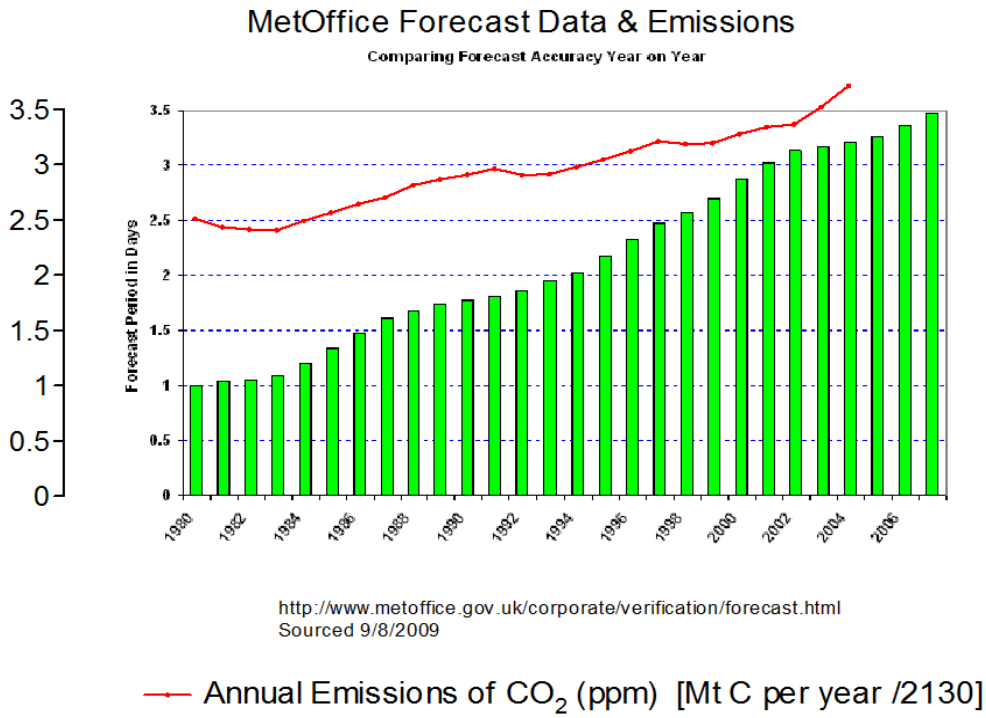
http://www.metoffice.gov.uk/corporate/verification/forecast.html
Sourced 9/8/2009

I borrowed the graph and extracted the values:



http://www.metoffice.gov.uk/corporate/verification/forecast.html
Sourced 9/8/2009

For comparison I have plotted the annual change of CO_2 in the atmosphere on the same chart:



http://www.metoffice.gov.uk/corporate/verification/forecast.html
Sourced 9/8/2009

What can you say? Hardly a good match, but then why would it be?

Anyway, now we have two datasets to which the same cumulation method will be applied. Each will have a different pair of variables. The variables are a scaling factor and a half-life.

This simple function was used:

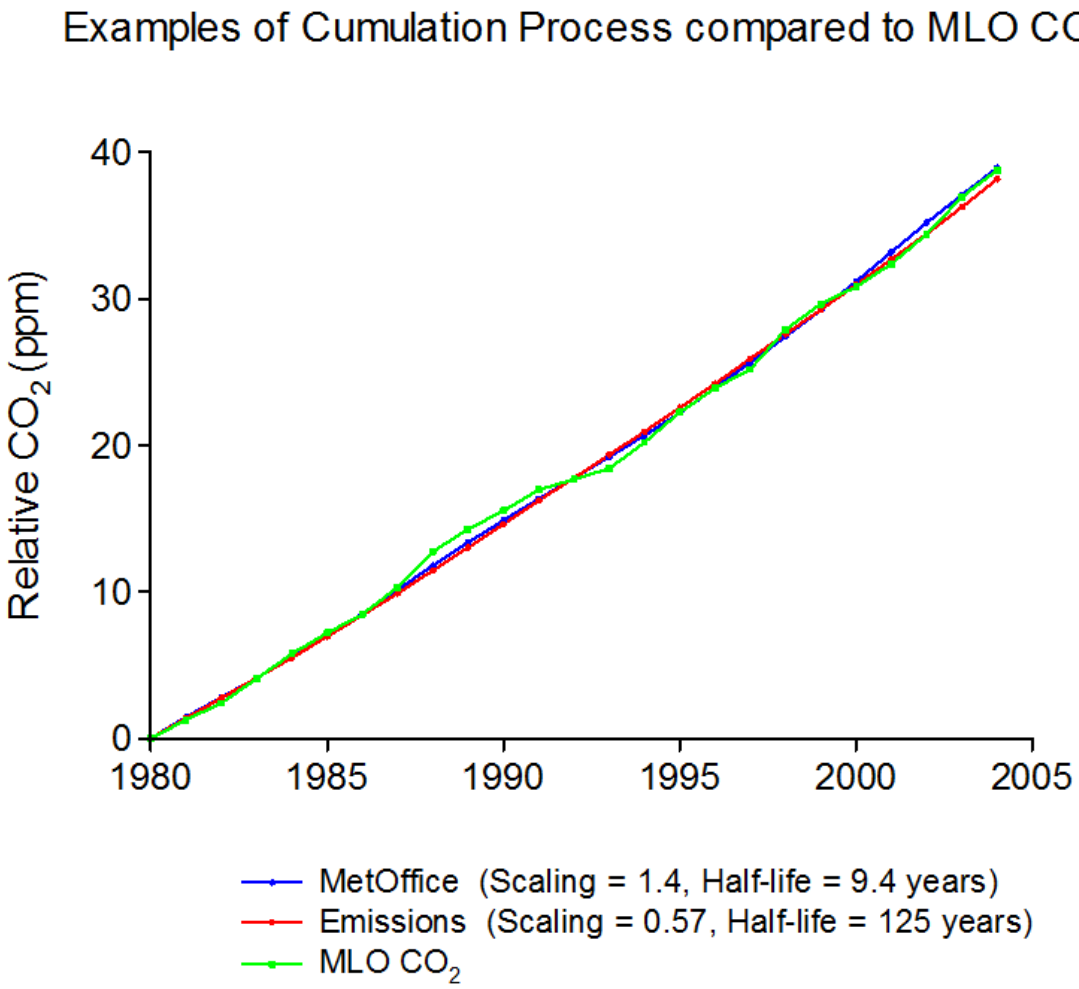
CO2 = (Old*EXP(-LN(2)/Half_life))+(New*Scale)

Where:

Old = the amount of CO_2 left after the last year

New = quantity of CO_2 added this year

From the model, time series were built and are shown in the next graphic. NB: For expediency, the two parameters for each were adjusted to give a reasonable visual fit. They were not optimised.



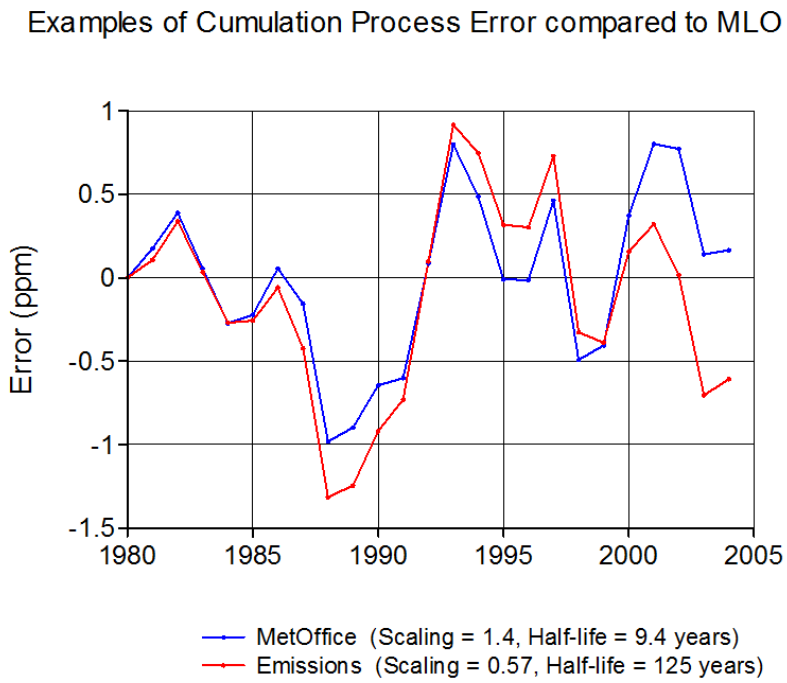
It can be seen that both datasets produce a reasonable fit to the MLO CO_2 measurements. Just for the record, the following values were used:

MetOffice forecast: Scaling = 1.4, Half-life = 9.4 years

Emissions: Scaling = 0.57, Half-life = 125 years

Coincidentally, the half-life of 9.4 years for the MetOffice set is within the range of reported values for the residency of CO_2 in the atmosphere, but it is exactly that, a coincidence.

As it is difficult to see the variation between the time series in the above, time series of the errors between the two sets and MLO history were created:



Well, what can I say? That is a pretty good comparison. Could this be damning evidence that the MetOffice has caused the rising levels of CO_2 in the atmosphere? Of course not! What it does show is that if cumulation is used to create time series, it must be supported by strong evidence for, and tight constraints on any variables, ideally with a valid physical mechanism.

Is the MetOffice to Blame for the Rising CO_2 Levels? Unfortunately no, but there is little doubt it has contributed.

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Questioning Climate

10/9/2009