

THE UKMO ADMIT FEEDBACKS ARE OMITTED FROM THEIR MODEL

In June 23 2009 Professor Mitchell of the UKMO claimed to the EAC Enquiry that all relevant feedbacks were in the climate models behind the UK Climate Act: -

"The models will take into account all the feedbacks we are aware of that we think are important, then we can quantify that we understand, and to that extent the Climate Change Committee has obviously done that.

Science being science, we uncover new feedbacks and there is a delay in being able to incorporate those in the complex models.

One can use simple models to get, if you like, a fast-track estimate of what the effect would be, but one would have to refer to the more complex models to make sure that when you add that additional feedback you are actually taking into account all the processes that are important."

This was an incorrect & misleading statement. The UK Climate Act is a product of this. In November 2010 the UKMO placed this on & later removed from its website: -
<http://www.metoffice.gov.uk/climate-change/guide/science/explained/feedbacks>

Are there feedbacks that *aren't* included in the models?

"There are some feedbacks we have recognised but remain big uncertainties. We don't know enough about them to include their effects in climate models. However, they are potentially very serious so there is still a lot of work going on to try to understand them and get them into our projections."

Methane hydrates (positive feedback)

"These are potentially a very big deal which could change our whole understanding of climate change, but it's very uncertain.

There are very large stores of methane locked away at depth in the ocean. We know the stability of these stores is dependent on temperature. As the oceans get warmer it's possible this balance could be upset and the stores released — which would be very serious. Methane is more than 20 times as potent as CO2 as a greenhouse gas.

There's some evidence to suggest that going back over a very long historical period (more than millions of years), the release of these methane stores may have played a big role in abrupt and severe changes to past climate. How close we are to any possible threshold is very much an open question."

Permafrost methane (positive feedback)

"This is a big question mark but also potentially a very big deal. There are very organic rich soils in certain parts of the world. At higher latitudes, these are frozen over by permafrost, and those greenhouse gases are effectively locked away. When the soil thaws due to rising temperatures, these gases could become unlocked and be released as CO2 or methane. At the moment we don't know how much of the CO2 is stored away or to what extent it would be released when the soil thaws.

These are two key questions, and we need to figure out how to resolve them on a global scale in a climate model before this effect can be included in our projections. Within the next five years we hope to know enough about this process to start including its effects."

Could there be other feedbacks that you don't yet know about?

"Yes, we assume there are hidden feedbacks in the system, but as long as we keep climate change relatively small we can be confident these unknown issues won't come in to play.

However, as we move further away from the present climate, we are exposing ourselves to more risk about these unknowns. Even only taking into account the climate feedbacks we are aware of now, they pose a great incentive for us to quickly reduce our greenhouse gas emissions to keep global temperature rises to a minimum."

Last Updated: 29 November 2010

Aligning itself with the RCP scenarios apparently now the base of IPCC AR5, UKMO published the 'Advance Paper' in 2010 last updated 29/04/2013: -
<http://www.gci.org.uk/Documents/advance.pdf>

The climate-modelling in this paper continues to omit the feedbacks listed on page 18 of the 'Advance' document, as do the RCP scenarios with which UKMO aligned itself

"We will continue to improve the representation of processes included in our model.

There are also a number of processes not currently included that could potentially have a major impact on the degree of warming for a given emissions scenario, quite apart from their impact on local and regional climate. Some of these processes have been discussed here and we are actively working on including them in the model: -

- The impact of ozone on plants reduces their ability to take up carbon. Given their major implications for international technology and economic development, policy decisions on climate change must be underpinned by the best possible evidence.*
- The deposition of black carbon on snow changes the reflectivity of the surface leading to more warming at high latitudes. Other processes are less well understood but are actively being researched with a view to including them in future models.*
- The ability of plants to take up carbon may be limited by the supply of nitrogen available naturally, but may be enhanced by man-made sources of nitrogen. Climate change itself may also increase available nitrogen and stimulate plant growth.*
- The thawing of permafrost may lead to large amounts of carbon release, but these processes are not well understood.*
- Dynamic ice processes could speed up freshwater supply from glaciers into the ocean.*
- The processes that affect methane in the Arctic Ocean could lead to increased methane release (the science is poorly understood so may take longer to include in models).*

The international science community is working hard to understand and narrow the uncertainties in future climate projections — and it is doing this primarily through model inter-comparison projects, comparison with observations, and the synthesis of results by the next IPCC report.

Understanding the interactions within the Earth system is critical."