



## **An error “common to all models”**

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Computer climate models postdict that, as a result in the increase in carbon dioxide, the tropical upper troposphere should have warmed much more than the surface. The measurements from radiosondes show the opposite. Santer *et al.* [2006] investigated this problem and concluded:

“These results could arise due to errors common to all models; to significant non-climatic influences remaining within some or all of the observational data sets, leading to biased long-term trend estimates; or a combination of these factors.”

Common to all models is a radiation scheme based on the idea “that the atmosphere behaves like the transparent glass cover of a box . . .” [Ramanathan, 1998]. However, R.W. Wood [1909] showed that it is not the glass which raises the temperature in a greenhouse. The air is heated by the greenhouse gases, which absorb infrared radiation from the base. The base, which is heated by solar energy, loses heat by convection as well as by radiation. Since the air is being heated by the thermal radiation from the base, the heat loss by convection is inhibited, which acts as positive feedback on the temperature of the base and of the air.

The enhanced warming from increased greenhouse gas concentrations is mainly due to the increased inhibition of convection, caused by the greater absorption of heat near the surface. This explains why the upper troposphere is not warming much more than the surface.

Ramanathan, V. (1998) “Trace-Gas Greenhouse Effect and Global Warming”, *Ambio*, **27**, pp.187-197.

Santer, B.D., Penner, J.E. & Thorne, P.W., (2006) Chapter 5 in *Temperature Trends in*

*the Lower Atmosphere - Understanding and Reconciling Differences*

Wood R. W. (1909) "Note on the Theory of the Greenhouse" *The London, Edinburgh and Dublin Philosophical Magazine and Journal of Science*, **17**, pp. 319-320.