The new climate theory of Dr. Ferenc Miskolczi

The greenhouse effect in a semi-transparent atmosphere with radiation equilibrium at the surface. On the basis of hundreds of measurements of real atmospheric profiles of temperature and humidity, in different seasons en on different latitudes.

Synopsis

Standard theory about anthropogenic global warming should be compared to, and weighted against, a new theory that is more than ever based on recent measurements. The new theory has as basis a different set of boundary conditions from which the Eddington radiation equilibrium equation is solved. It leads to the hypothesis that our atmosphere gets hold of just that amount of water vapor that allows the maximum radiation of heat into space. This self-regulation allows only for a very minor influence of CO_2 concentration increase on our climate. Independent measurements give insight in the mechanism how this self-regulation takes place. Still other measurements indicate that the atmospheric heating that follows directly from standard climate models as a result of increased CO_2 during the last decades does not exist. Cooling instead is observed.
We conclude that there is now ample ground to organize a discussion between the scientific proponents of these two theories. The problem is very important in the sense of policy and investment.

Introduction

During the 2008 International Conference on Global Warming, Dr. Ferenc Miskolczi presented a radically new theory of the greenhouse effect:
http://www.heartland.org/newyork08/PowerPoint/Tuesday/miskolczi.pdf
Arthur Rörsch asked me to support him in explaining FM's theory in more common terms, and initiated a discussion with our national expert, dr. Rob van Dorland, KNMI, the Dutch Royal Meteorological Institute, to be able to criticize the new theory. Of course, Ferenc Miskolczi himself participated in this e-mail discussion.
The point is, that the new theory predicts a much smaller effect of increased greenhouse gases on the mean temperature of the Earth, about 10% compared to that of the standard theory that is widely known through the IPCC publications.
Rob van Dorland treats in his PhD thesis infrared atmospheric radiation, greenhouse effect and climate change as a function of greenhouse gas concentrations.
My experience as a physicist is heat transfer in general, a.o. the design of "energy producing greenhouses" by employing efficient heat exchangers. www.fiwihex.com.
I am much more an experimentalist than a theorist, made many computer models myself and have therefore some suspicion against complicated numerical solutions. Therefore I am impressed by FM's theory. It has a closed algebraic form, and so is quite open to inspection. The paper is not easily accessible, and difficult to read for the unprepared because a number of well-known physical laws are mentioned solely as an illustration, not as part of the theory. http://www.met.hu/idojaras/IDOJARAS_vol111_No1_01.pdf

Greenhouse heat transfer

A market garden greenhouse is not warm because the glass cover is transparent for visible light, but opaque for infrared radiation [IR]. The greenhouse is warm because a closed roof does not let out the warm and humid air. A greenhouse with a roof that is IR transparent is only a little bit lower in temperature.

The standard theory, in contrast to this experience, teaches us that the earth surface radiates into space through the IR absorbing atmosphere, and therefore, if IR absorbing gases increase, the surface temperature increases. Cooling through radiation becomes more difficult.

FM's theory, in agreement with this experience, teaches us instead that the heat transfer from the surface is by non-radiation processes: vertical & horizontal convection, water evaporation, cloud formation, rain and snow. And FM teaches us more: Our atmosphere has, in the global and time-averaged mean value, a constant optical thickness, so, when more CO_2 is injected, the atmosphere compensates this by increasing its water vapor content to regain the equilibrium.

The atmosphere makes itself just that optimal optical thickness that allows for the maximum heat transfer to space, by adjusting its IR absorbance.

Measurements

Thousands of atmosphere profiles are in the public domain, measurements by weather balloons of temperature, pressure, and relative humidity. Because there is hydrostatic equilibrium, the pressure is a precise function of altitude; there is only a small and well-defined temperature correction term.

The last 20 years there are satellites in orbit that have Fourier Transform Infrared Spectrometers with high resolution, and there are so-called line-by-line computer programs that can translate atmospheric profiles to IR heat fluxes in W/m^2, and that can convert p, T, rH profiles into IR spectra and vice versa. FM is one of the few people that have made such a program, HARTCODE.

http://hps.elte.hu/zagoni/Miskolczi/hartcode_v01.pdf gives a detailed description of this 5000-line Fortran program, based on thousands of laboratory-measured absorption lines. Later, FM went to NASA Langley Research Center, where he published an extensive treatment of atmospheric heat fluxes, based on these thousands of atmospheric measurements: http://www.met.hu/idojaras/IDOJARAS_vol108_No4_01.pdf; where the basic theory is already to be seen. In this 2004 paper, on p.242, he calculates an increase of global temperature of 0.482 °C as a result of doubling the CO_2 concentration.

This is very different from what we learn from the standard theory. The methodological difference is, that the new theory starts with measurements, in contrast with the standard theory that starts with schematic atmosphere models like the Keith-Trenberth scheme. The mathematical difference is, that the new theory treats the atmosphere as semi-transparent, bounded, and in radiation equilibrium with the surface.

On page 233 we find the basic standard mathematics; OLR means Outgoing Long wave Radiation. The OLR is the only way the Earth can get rid of its heat received from the sun, and therefore well known to be 250 W/m^2 as a global and seasonal mean. Optical thickness is the natural logarithm of the IR absorption of the atmosphere, or the natural logarithm of the ratio of ingoing and outgoing radiation flux.

4.1 Overview

Regarding the planetary greenhouse effect we must relate the amount of the atmospheric absorbers to the surface temperature. Assuming monochromatic radiative equilibrium, isotropy in both hemispheres and a semi-infinite plane-parallel gray atmosphere, the predicted air temperature at the surface (t'_A) and the surface temperature (t'_G) are given by the next two equations (*Goody* and *Yung,* 1989; *Paltridge* and *Platt*, 1976):

$$t'_A = \left[\frac{OLR}{2\sigma}(1+\tau_A)\right]^{\frac{1}{4}}, \tag{1}$$

and

$$t'_G = \left[\frac{OLR}{2\sigma}(2+\tau_A)\right]^{\frac{1}{4}}. \tag{2}$$

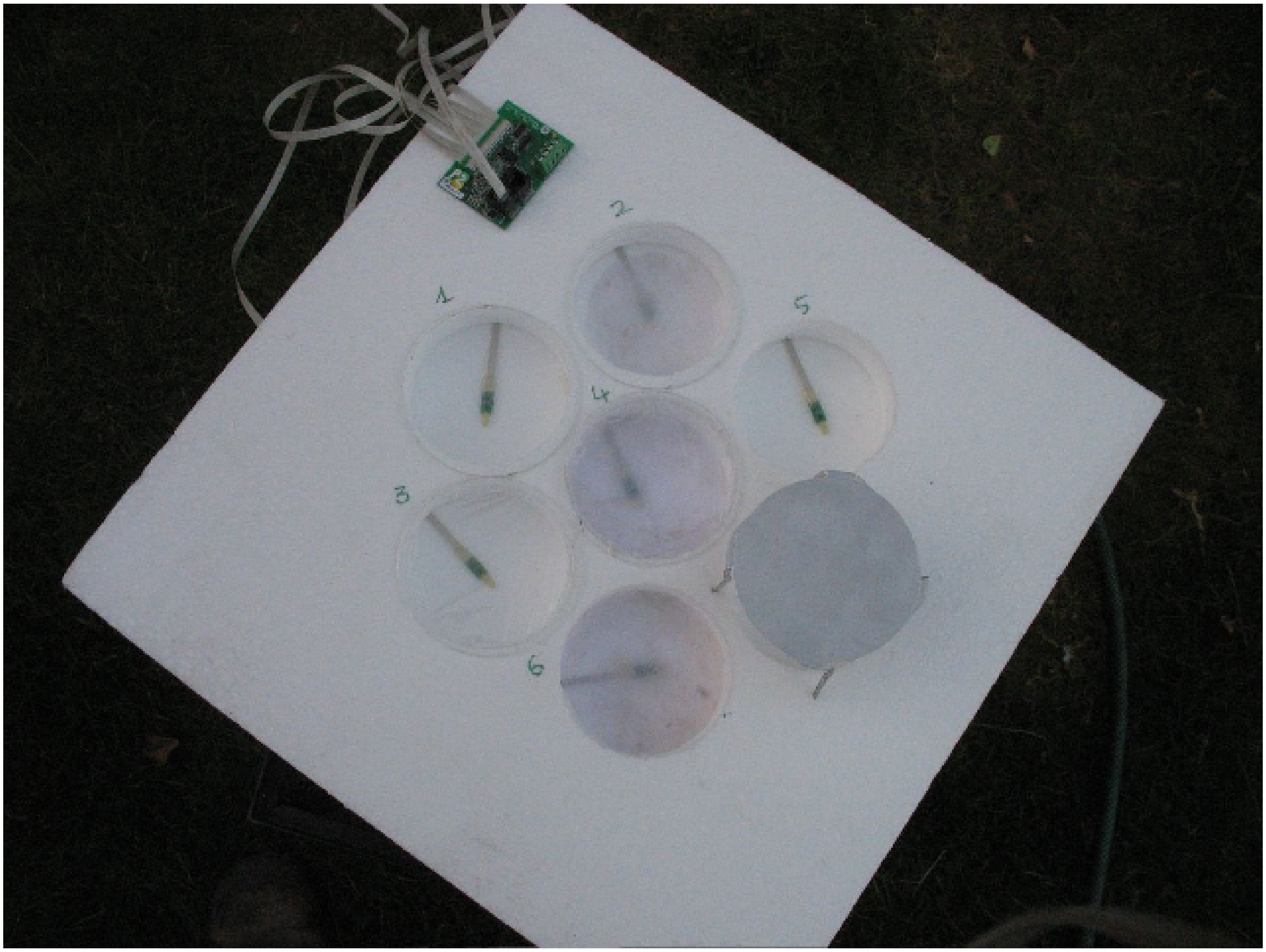
In the above equations τ_A is the total graybody atmospheric optical thickness, as usually defined in two stream approximations, $\tau_A = (3/2)\tau$, where

These are the equations of the standard theory. With OLR=250 W/m^2 and the global average atmospheric optical thickness τ_A = 1.86 we find the air temperature at the surface 282 K, and for the ground temperature 304 K. Here the standard theory is not consistent with what we all know: There is no 22 °C difference between ground and air.

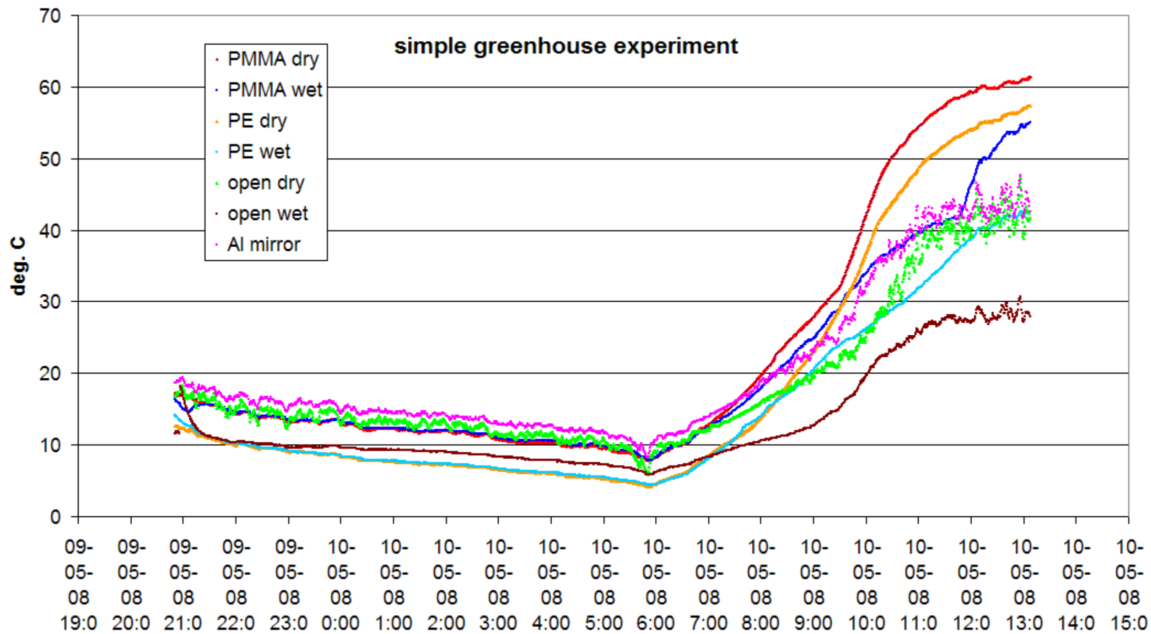
A simple experiment

It is not difficult to measure the ground-air temperature differences, and get at least a qualitative impression of what goes on in a “real” greenhouse.

We make 7 wells; 10 cm diameter and 4 cm deep, in apiece of EPS, fix a temperature sensor on the center of each bottom, and cover some of the wells with windows that have a very different IR transparency. We lay a wet cloth on the bottom of half the wells.
We make 7 temperature measurements every half-minute, log the results, and see what happens night & day.



Color	cover, mirror, wet or dry	# of well
Red:	2 mm PMMA cover, dry bottom	1
Blue:	2 mm PMMA cover, wet bottom	2
Orange:	6 µ PE cover, dry bottom	3
Light blue:	6 µ PE cover, wet bottom	4
Green:	No cover, dry bottom	5
Brown:	No cover, wet bottom	6
Violet:	Aluminum mirror above well, not closed	7



The experiment begins the 10th of May 2008, on an open lawn at Fiwihex, Wierdensestraat 74 in Almelo. The sky is clear, it has been a sunny day, and the following day is sunny too. Quite un-Dutch weather. The experiment ends the 11th 13:00, because my daughter in law wanted to mow the grass by then.

Now, what do we see: After equilibration from installation, 21:00 in the evening, the PMMA [Perspex, or poly methyl methacrylate] cover, red and dark blue points, being black in the IR wavelengths relevant, keeps the well relatively warm. It does not matter if the bottom is wet or dry, however, because the temperature is so low, and the humidity so high outside and inside, that the wet-bulb temperature is equal to the dry bulb temperature.
We see also that, notwithstanding the greenhouse effect of the PMMA cover, the open dry well is slightly warmer that the PMMA greenhouse, and much warmer that the PE greenhouse. The warmest is the well with the mirror above it. How come?
This is, because the air, being composed of mainly a-polar gases like O_2 and N_2, and cannot radiate as strongly as a solid body, stays warm longer than any radiating solid or liquid. So, a sensor that is in open contact with the air stays warmer too.
Now the coldest spot is the PE covered little greenhouse, wet or dry, because PE is transparent for IR radiation, so we have there a connection with the cold heavens, and insulation from the warm air by the cover. The well with the Al mirror is the opposite: here we have contact with the air, but the upward radiation is reflected back by the shiny metal. The difference is large; the PE greenhouse is about 10 °C colder than the mirror well.
Now the day comes, and we see a radically different pattern:
All covered closed greenhouses are very hot. We see a slight difference between the hottest, PMMA, 61 °C in the early afternoon, and the PE covered, 57 °C. The only well, which is substantially less warm, is the open well with the wet bottom. This well is able to cool itself by evaporation. We see also that a wet canopy, as every greenhouse

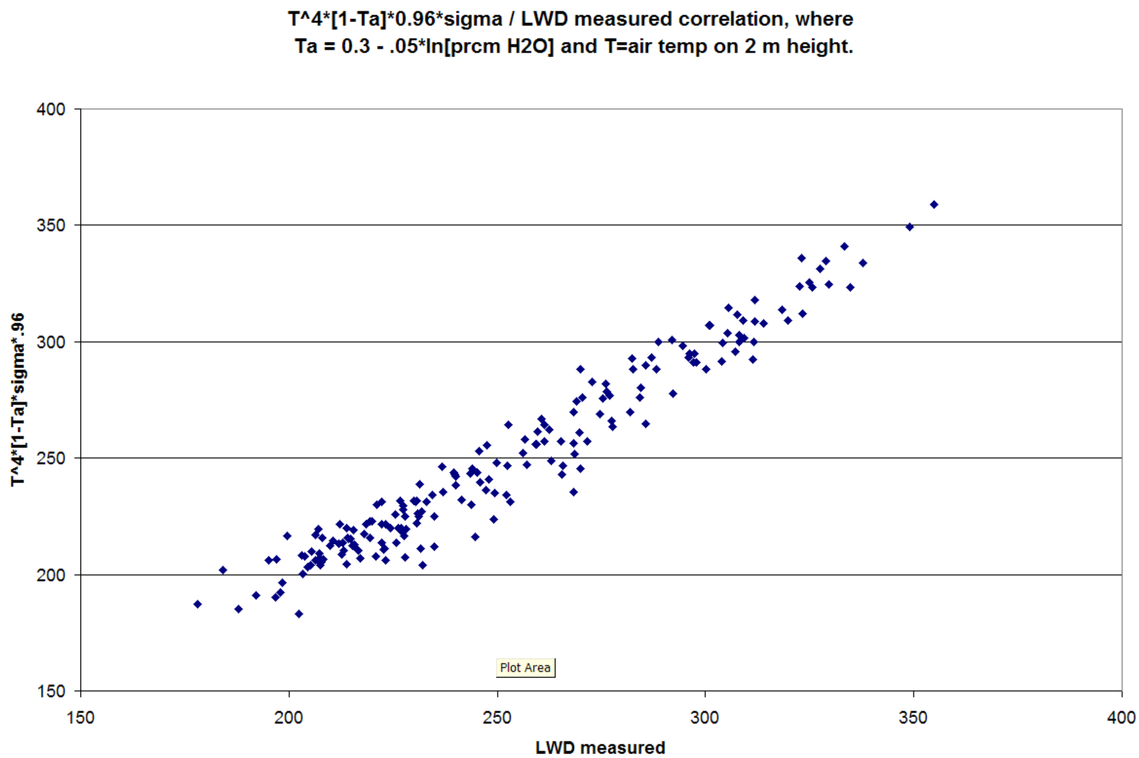
gardener knows, lowers the temperature quite a bit in a greenhouse, because it is never completely closed, so the water vapor from the plants finds its way outside. In the blue case, the water was almost completely evaporated by 13:00; dry spots begin at 12:00 already.
Conclusion: what makes the surface, or climate, warm is the hindered **convective** heat transfer to up in the atmosphere. Not the hindered **radiation** heat transfer, this is much smaller.

1. A completely IR absorbing window, compared to a transparent one, increases the temperature only 5 °C, but as soon as water can be evaporated, we cool 20°C. Both covers hinder evaporation, and that is, why greenhouses can be very hot indeed. They are always being regulated, the normal greenhouse by opening the roof windows, the closed greenhouse by [fine wire] heat exchangers, cooling against ground water, condensing the evaporation from the plants, saving irrigation water and pest control chemicals and allowing CO_2 fertilization in the process.
2. The wet surface temperatures are lower than the air temperatures. In the night, the difference is 10 °C, and during the day it is not the other way around. This looks not conform the standard theory, because there the upward radiation is 65 W/m^2 larger than the downward radiation, which means a 12 °C higher ground temperature than the effective atmospheric downward radiation temperature. In Ferenc Miskolczi's theory, there is radiation equilibrium between ground and atmosphere. So, no persistent higher ground temperature, even lower, as soon as liquid water is available for evaporation.

So, there is no net radiation transport from the ground, other then the radiation through the infrared window. Can our atmosphere then regulate our temperature? Yes she can, because as soon as the temperature lapse rate becomes greater than the temperature lapse rate by adiabatic expansion of dry air; 1°C per 100 m, or air in which humidity is changing phase 0.29 °C per 100 m at 320 K, 0.42 °C per 100 m at 300 K, .74 °C per 100 m at 250 K, the atmosphere becomes instable. Large amounts of heat escape to many kilometers high, where the radiation away into space is much easier: There the atmosphere is thin and much more IR transparent. And, in most cases, the top of the rising air column is a cloud, reflecting most of the incoming solar radiation.
And we live in an atmosphere, where the temperature lapse rate due to IR radiation equilibrium, is always steeper than the adiabatic one. So, as soon as there is radiation equilibrium, the atmosphere tends to instability. The more IR active gases in the air, the steeper the radiation lapse rate, and the sooner the real cooling comes into action. The warmer it is, the less steep the adiabatic lapse rate, and the sooner instability – and cooling – starts.
We live on a planet with an abundance of liquid or solid water, be it in the oceans, in the plant canopy, or in ice. The only really dry place is the desert. There, we have a climate that depends on radiation. Nobody lives there, for that matter.
But how to quantify this water thermostat? And how to estimate the influence of a few hundred ppm extra anthropogenic carbon dioxide?
For the first time, Ferenc Miskolczi has solved this enigma in an analytic way, I think.

The Cabauw measurements

The 200 m high radio broadcast transmitter in Cabauw, near Lopik, the Netherlands, can be used, like a weather balloon, to measure atmosphere profiles, albeit only until 200 m high. Rob van Dorland has measured these profiles. The real ground temperature has not been measured; instead, one takes the air temperature T_A at 2 m. The humidity has been measured too. Out of these profiles, the LWD or Long wave Downward Radiation is calculated using existing computer programs, similar to HARTCODE. This LWD is also measured, using a pyrgeometer. Now we ask, is one of the basic assumptions made by the new theory, also true when we compare the LWD with the absorbed upwelling IR radiation. For this comparison we take the atmospheric transmittance as a function of water content expressed in precipitable centimeters, and the emissivity of the surface as 0.96. The following correlation is the result:

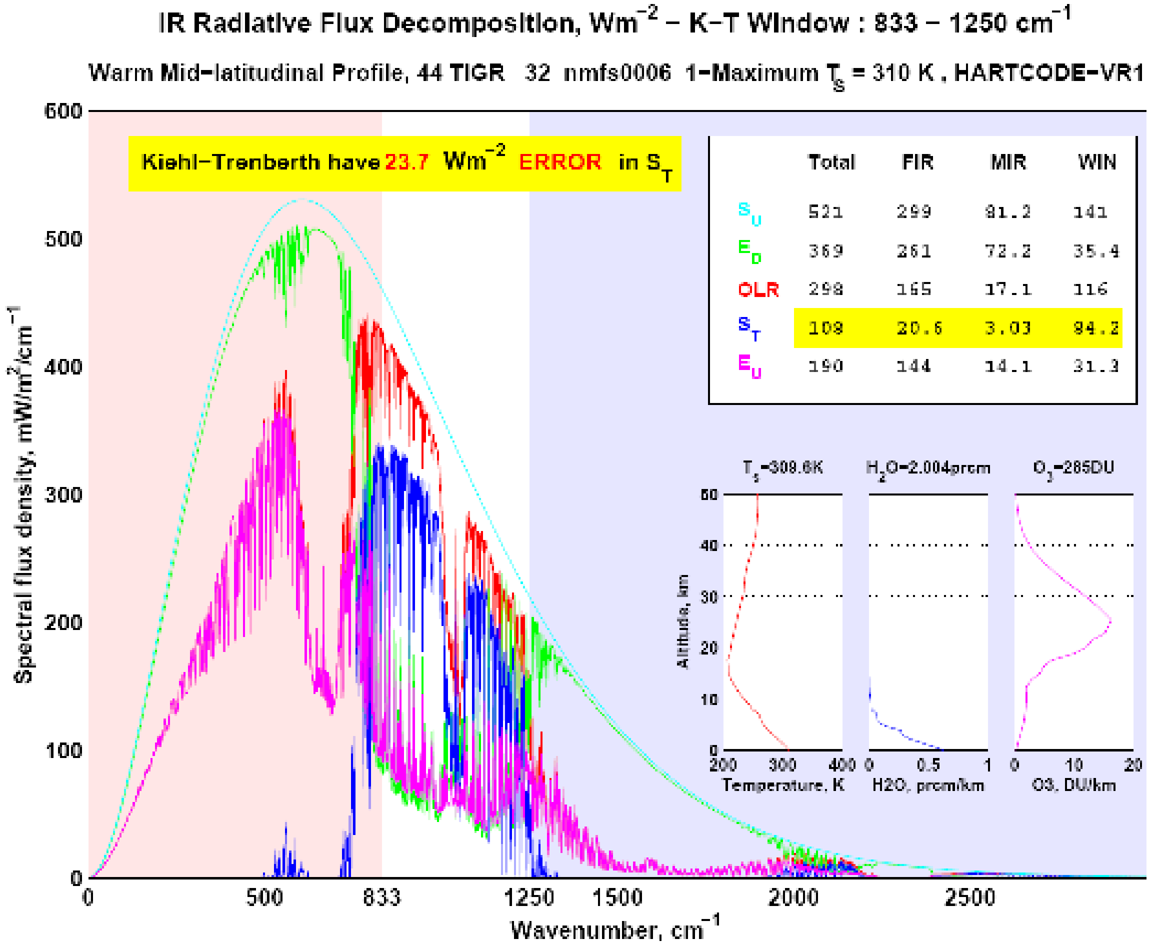


We see that, indeed, the radiation equilibrium extends to the surface. No net IR radiation heat flux reaches the atmosphere from the ground. It is either transmitted through the atmospheric window, or completely compensated by the LWD, or E_U, in FM's terms. The conclusion is, Rob's Cabauw measurements support Ferenc Miskolczi's major assumption.

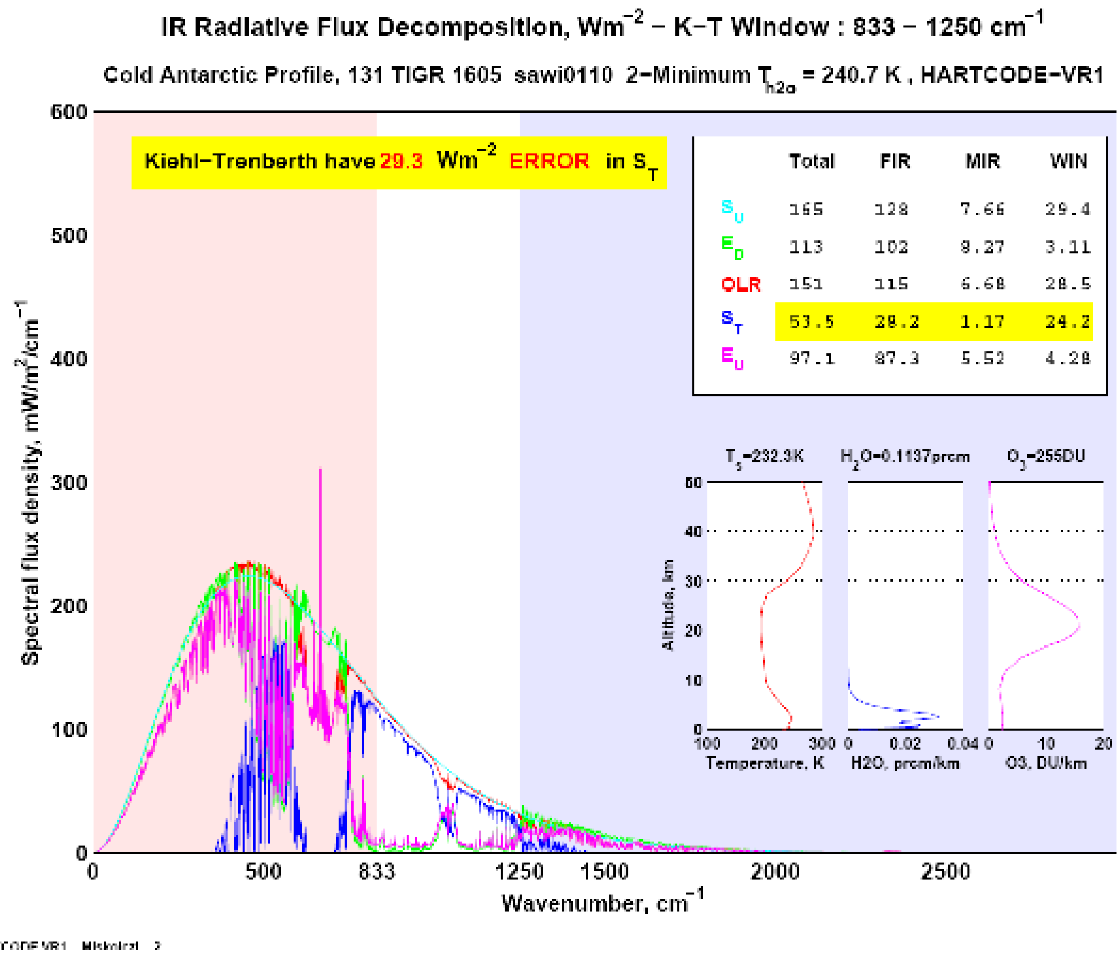
Atmospheric profiles translated into IR spectra

The following two figures are taken from FM, and are examples of typical IR spectra decomposed in the relevant heat fluxes. A very warm climate, and a very cold one. The x-axis is the wavelength expressed as the number of wavelengths per cm, as usual in IR spectroscopy. The list of decomposed heat fluxes is:

S_U is the blackbody radiation from the surface upwards. Light blue line. A continuous spectrum because the ground is solid, or liquid sea surface.
E_D is the long wave downward radiation from the atmosphere to the ground.
OLR is the sum of the heat fluxes S_T and E_U into space
S_T is the heat flux radiated through the IR window and through other partially transparent parts of the atmosphere, from the ground directly to space
E_U is the heat flux from the atmosphere itself into space.



Around 650/cm lies the major absorption of CO_2. E_U is very much hindered there. The back radiation E_D, is here large, almost as large as the upwelling radiation S_U.
Kiehl-Trenberth is the scheme most used in the standard theory. Such schemes do not compare with measurements, because they are modified to be also 100% correct radiation budgets. Local profiles do not have to be conforming an energy budget, because there is also a large horizontal convective heat transfer. FM does not depart from schemes at all, he uses atmospheric profiles that are measured, and converted on a straightforward method into radiation heat fluxes. We see that the standard K-T scheme has a large deviation from the measured profiles that have a much higher flux in the IR window.



In the second figure we are in Antarctica. There it is 232.2 K of -41.2 °C cold, we see that the sharp molecular line at 650/cm of CO_2 in a climate that is cold enough to exclude almost all water vapor, extending even above the continuous spectrum of the snow. We see even the Ozone peak, around 1000/cm, in this dry climate.
In both graphs we see the profiles where they are derived from. CO_2 is not indicated because the concentration is the same everywhere. The adiabat is clearly visible, 110K/15 km=7.3K/km in the first, and 70 K/10 km in the second graph. We see that even in the polar climate, we have less than the dry adiabat.

The standard theory

The standard theory does not work with relations that come out of the study of many measured profiles, but does work with an atmospheric scheme, such as the K-T scheme. From the PhD thesis of van Dorland we take the following figures that show the standard scheme. The overall heat flux balance is 343=83+20+40+200 W/m^2.

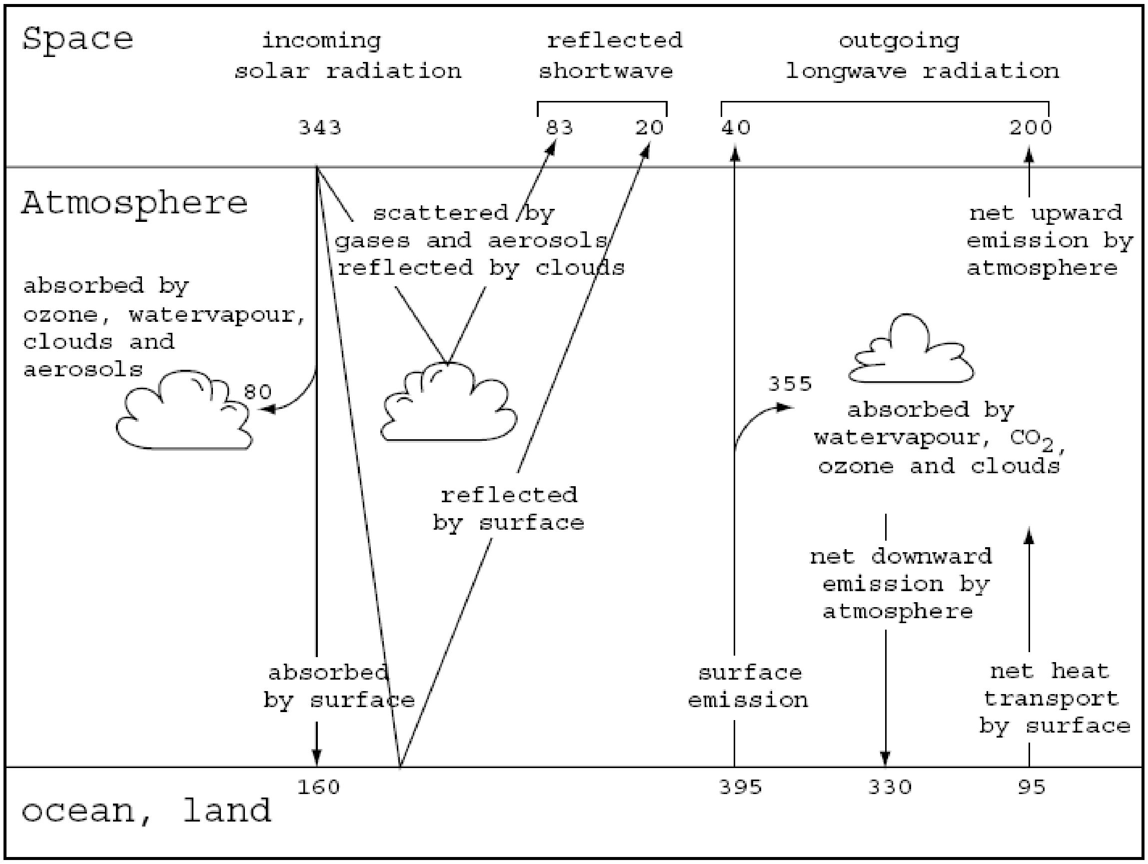


Figure 2.3: *Global and annual mean energy balance of the climate system (Unit=Wm^{-2}).*

Note the net 355-330=25 W/m^2 heat flow through the absorbing atmosphere from surface to space. The next figure shows how we come to the influence of IR active gases
The x-axis is in Kelvin/day, so the system is only then stationary if the tendency is zero. We see that water [vapor] absorbs sunlight [S H2O] and so heats the atmosphere with half a degree per day, but we see also that in the IR region [L H2O] water has a cooling effect. We see that in the stratosphere Ozon is a heater. This gas absorbs UV light from the Sun and therefore the stratosphere becomes so warm, that a stable inversion forms, on 12000 meter, the tropopause.

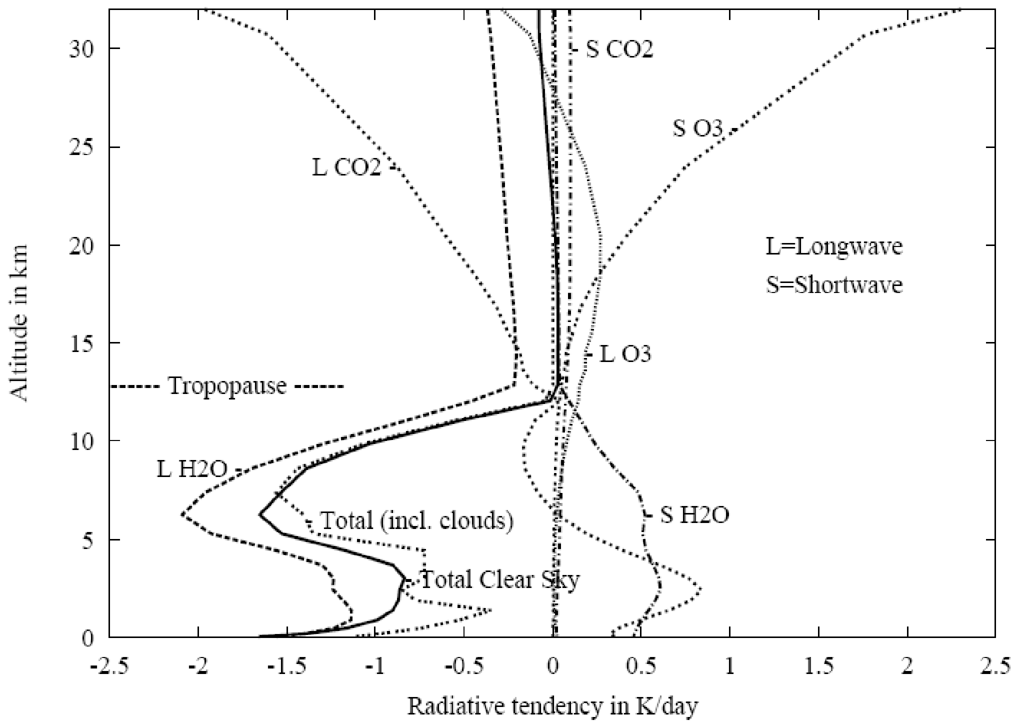


Figure 2.4: *Contribution of greenhouse gases to the global mean radiative balance in terms of radiative tendencies in K/day. Also shown is the sum of these contributions in the clear sky part of the global mean atmosphere as well as including average cloudiness.*

We are interested in the climate, and that is on zero height. We see that CO_2 heats there, but cools on great height, which we saw in the spectra. It is striking, that the large warming on 2-3 km height, which could be easily measured by satellites, is not there in reality. On the contrary, a cooling is measured as a result of increased CO_2.
We see also, that there is a net shortage of heat. That comes form the sun, shining on the surface. This is much more than the necessary 1.5 °C/day, so there is a large term, vertical convection that balances the climate.

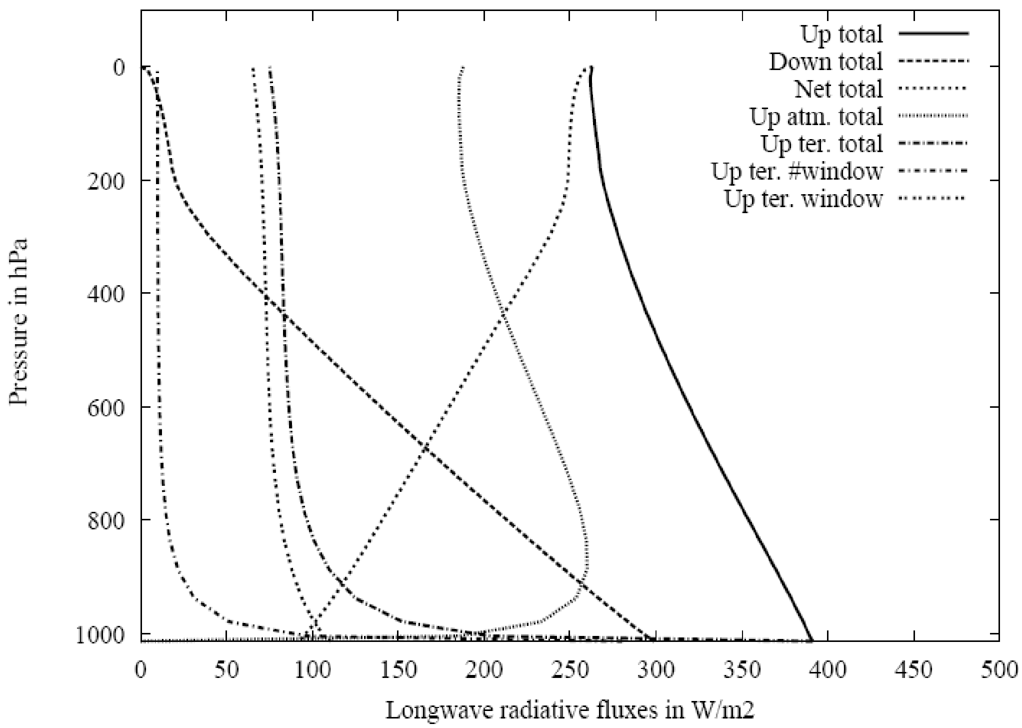
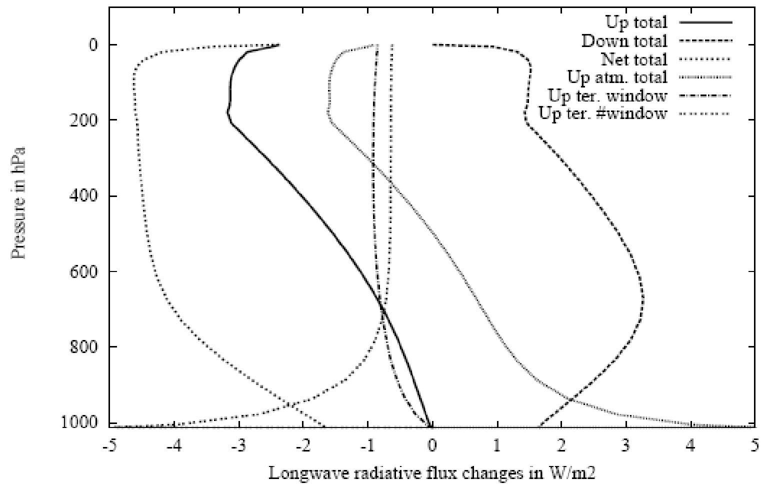


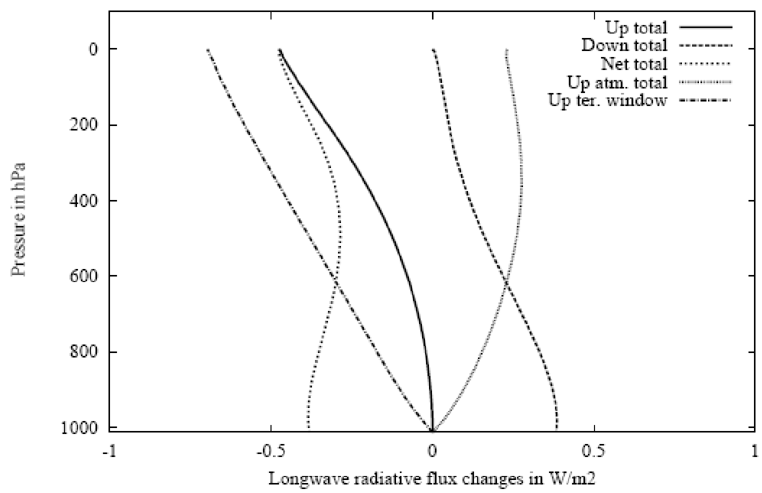
Figure 2.5: *Longwave characteristics of the clear sky part of the global mean atmosphere as computed using a broad band radiative transfer scheme. The curves shown are the total (spectrally integrated) upward, downward and net fluxes. The total upward flux is splitted into the terrestrial and atmospheric fluxes. The terrestrial (upward) flux is also shown for the atmospheric window region (8-12.5μm) and for the remainder of the spectrum (indicated by #window).*

In this graph we see the heat fluxes upward and downward as a function of height. At 1000 hectopascal we are on the surface. The scheme is a good illustration of the unphysically strong discontinuities assumed at the surface. These are the reason for the large influence of extra greenhouse gases. In the new theory there is no such discontinuity. **This discontinuity arouses from boundary conditions used in solving the Eddington equation, taken from the conditions in the Sun. There we have no surface, there we have an infinite atmosphere, so the solution takes the form: ORL=2/[1+τ_A]·S_A for the lowest atmospheric layer, and in the standard theory ORL=2/[2+τ_A]·S_U for the liquid or solid surface. In the new theory $S_A = S_U = S_G$ and is ORL=2/[1+τ_A+T_A]·S_U. This the essential difference between the standard theory and that of Miskolczi.**

In the graph that follows, we see the influence on heat fluxes of a CO_2 doubling. We see a -4.5 W/m^2 decrease in the upward flux outside the window region, and only a +1.7 increase in the downward flux. Here we have the standard “Anthropogenic Global Warming” theory. In the new theory, these two fluxes are equal to each other, and that does not change at all, not with water content, or with extra CO_2. The typical “forcing” due to CO_2 on 700 m height, is conspicuously absent in satellite measurements in the last 25 years.



(a)

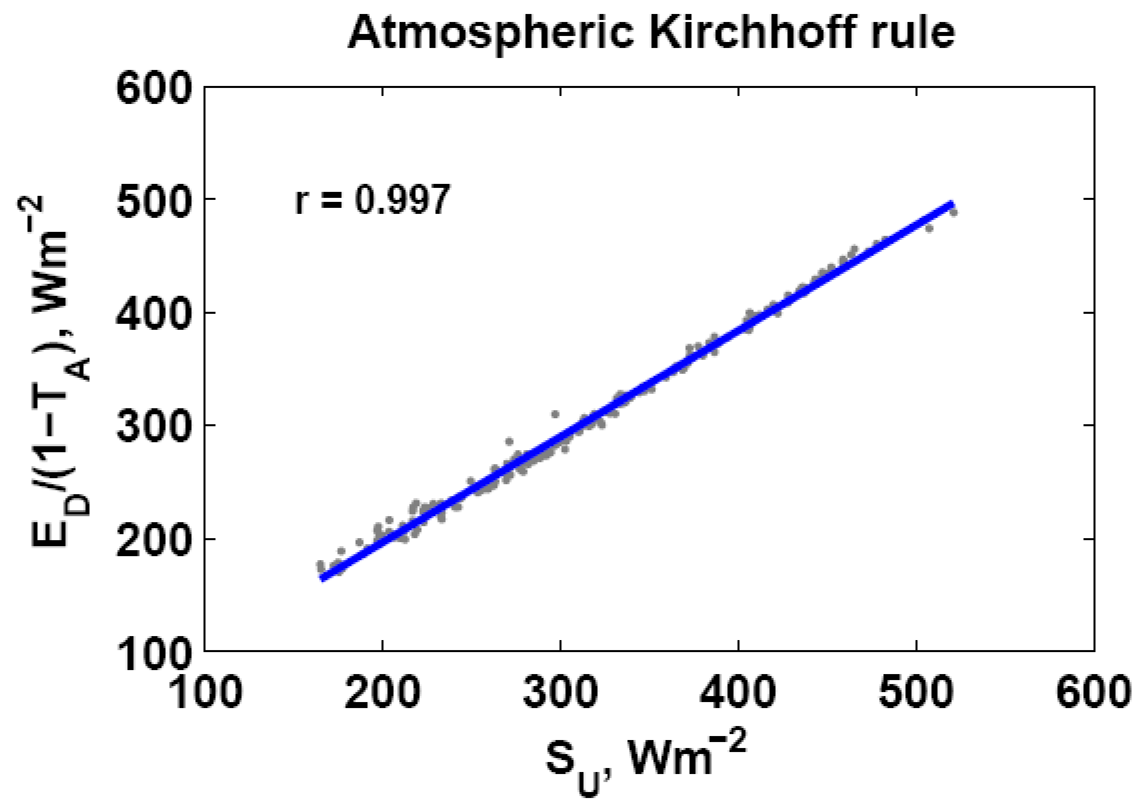


(b)

Figure 2.6: *Longwave flux changes in the clear sky part of the global mean atmosphere due to a doubling of CO_2 (**a**) and CFCs (**b**) as computed using a broad band radiative transfer scheme. The curves shown are the total (spectrally integrated) upward, downward and net fluxes. The total upward flux is splitted into the atmospheric flux and the terrestrial flux for the atmospheric window region (8-12.5μm) and for the remainder of the spectrum (indicated by #window). For increases of CFCs the latter is approximately zero.*

The new theory

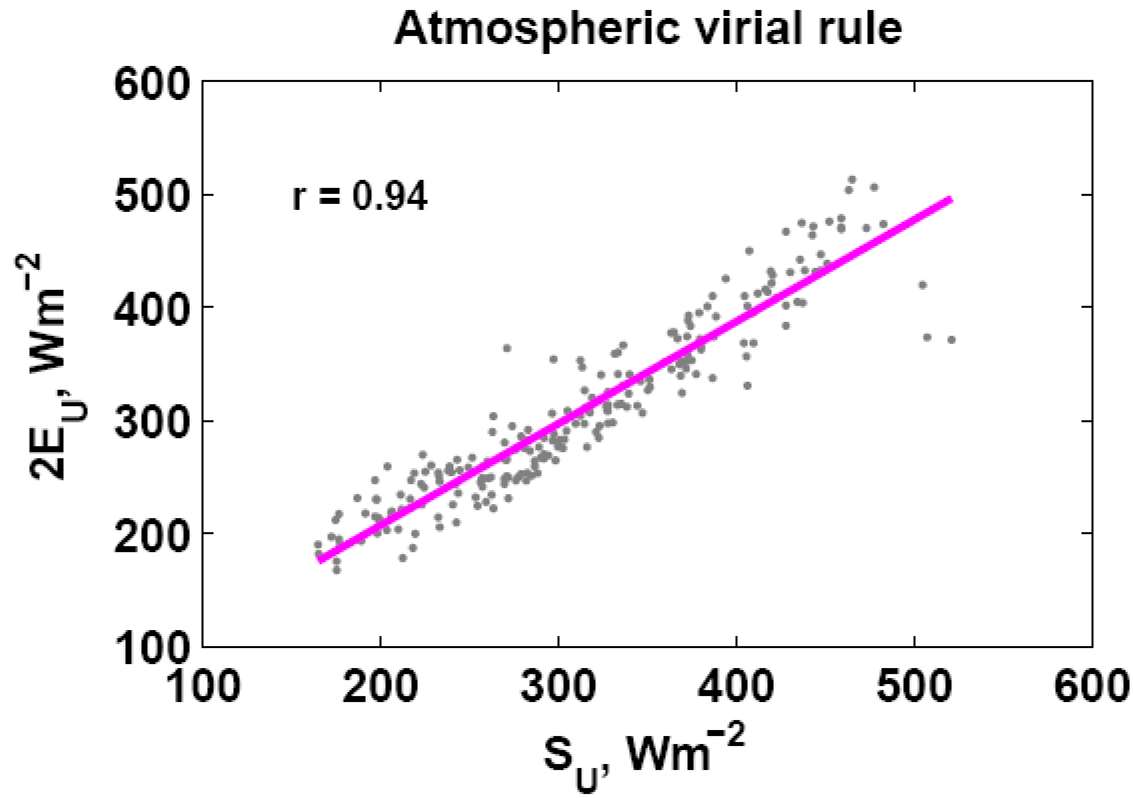
The new theory does not start with schemes, but from atmosphere profiles. It seeks relations between the heat fluxes per profile. In the following graphs, every point represents one profile. The locations are as far apart as they can be. The coldest point is the polar night; the warmest point is a hot day over the tropical pacific. From the study of the relations between the heat fluxes, surprising new insights come to light.



First, it appears that there is a strong correlation between the downward atmospheric radiation E_D, the transparency of the atmosphere and the upwelling radiation S_U. All three vary strongly with latitude, but $E_D = S_U \cdot [1-T_A]$ on all places. FM calls this "Kirchhoff's Law", but it does not follow from the radiation equilibrium. It appears to be a special property of our atmosphere. This is in great contrast to the standard theory, that assumes a fairly large, 25 W/m^2, net flux from the surface **through** the absorbing atmosphere. The absorption grows with greenhouse gas increase, so this net flux is hindered, increasing the surface temperature. If $E_D = S_U \cdot [1-T_A]$, there is no net upward IR heat flow other than that which passes unhindered through the IR window, which is much less dependent on increased greenhouse gas concentration.

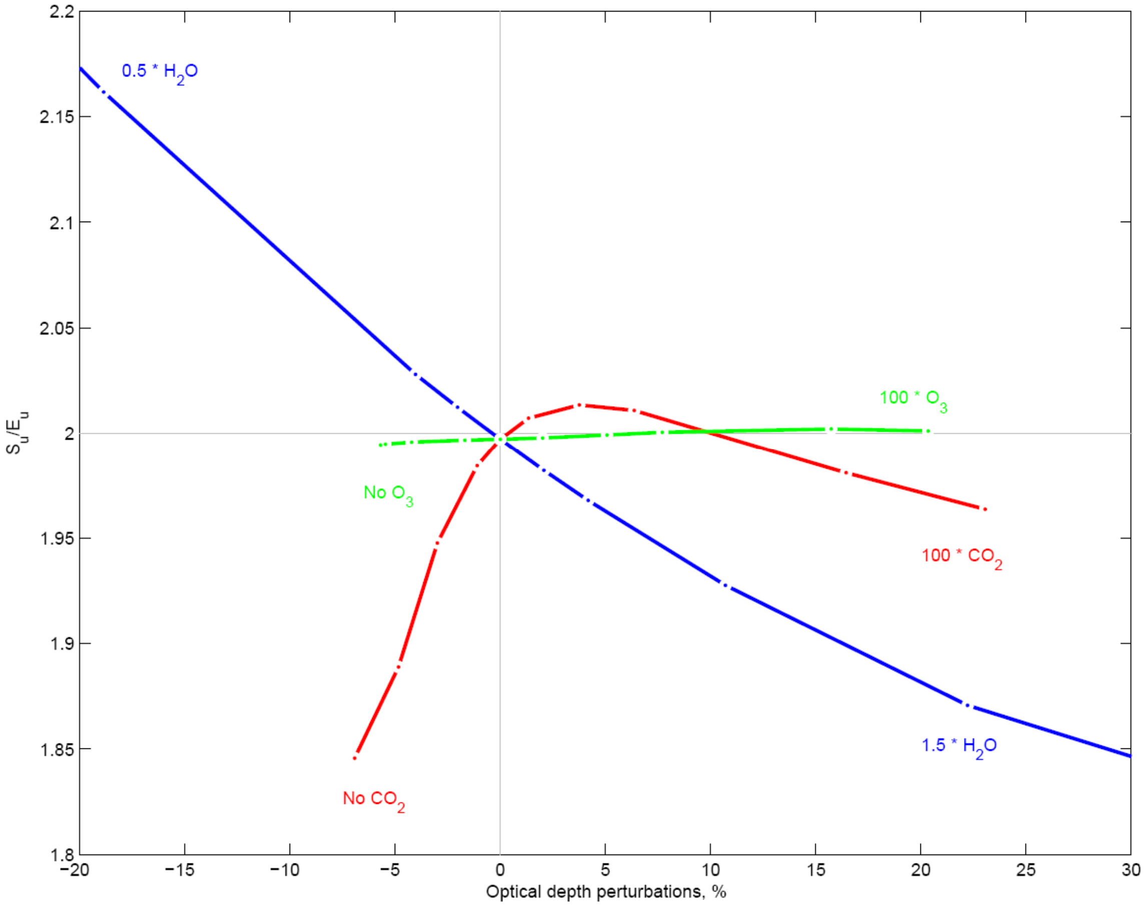
This relation is true for every height, not only on the surface. It is also true for Mars, with its tenuous atmosphere.

From this relation it follows that the OLR is constituted from three parts: The radiation through the window, the absorption of visible sunlight into the atmosphere, and the vertical convective heat transfer when the adiabat is exceeded.



Second, it appears that the upwelling IR flux from the top of the atmosphere E_U, that is, the OLR minus the window radiation, is roughly one half of the surface blackbody radiation. FM calls this "Virial Law", but it does not follow from this general kinetic / potential energy quotient. It appears to be also a special property of our atmosphere. This relation, $S_U/E_U = 2$, means that the optical depth of our atmosphere has, in the global and time mean, the value 1.86. This measured value is precisely equal to the theoretical value, found by solving the Eddington radiation differential equation with the boundary condition on the surface of $E_D = S_U \cdot [1-T_A]$ and with a partial transparent atmosphere that is bounded in height. All these are natural boundary conditions; none of them is applied in the standard theory.

We can calculate which influence an extra amount of greenhouse gas has on the optical thickness. We start at the theoretical, and measured, value 1.86, and it follows that removal of all CO_2 brings us back to 1.73 or a perturbation of -7%, a 100-fold CO_2 concentration causes a thickness of 2.29, a perturbation of +23%.



This we can do for Ozone or O_3, and for water vapor. Each time for all other concentrations being equal. But, we have as a consequence of the new theory, that the atmosphere chooses its own optical thickness, where the maximum heat transfer to space takes place, i.e. 1.86. This has influence on the $S_U/E_U = 2$ equation, see the graph of the calculated functions above. We see that water vapor cools, the other two gases heat, like we saw in the graph of Rob van Dorland.

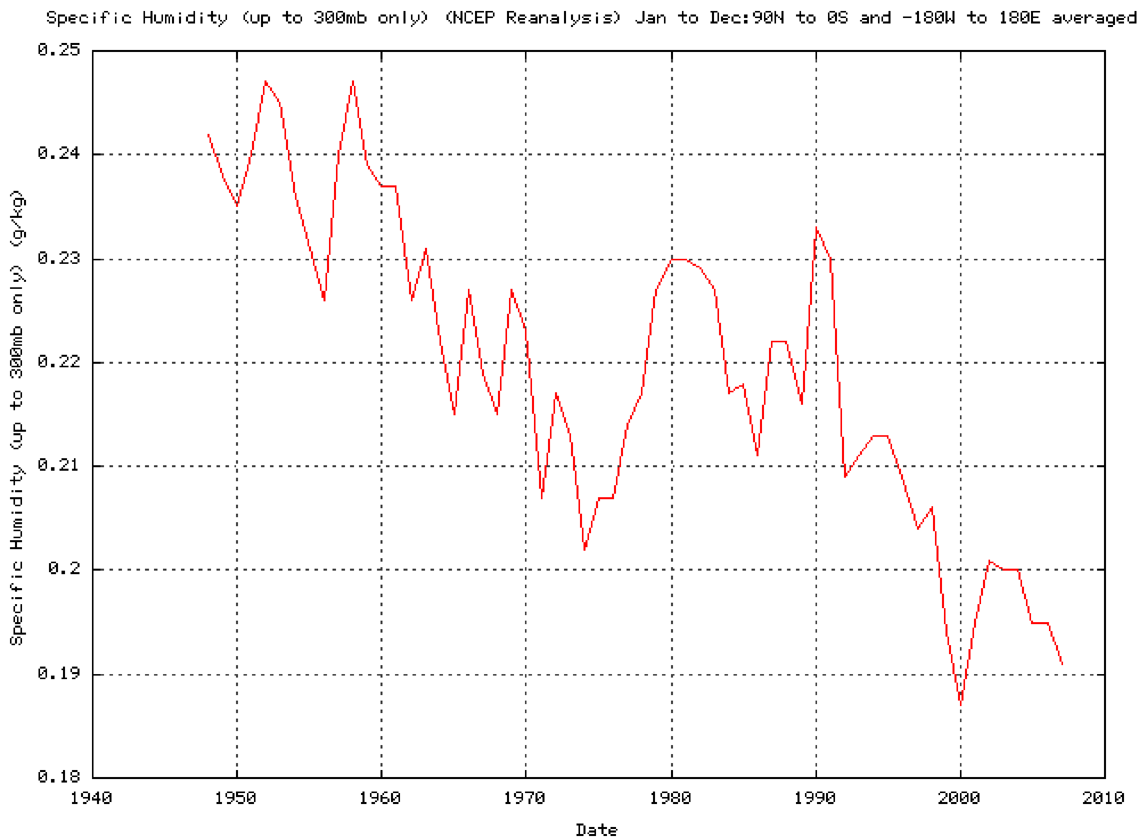
When we increase the CO_2 to 3%, 100 times what we have now, the atmosphere increases its water content about 5% to regulate back to an optical depth of 1.86. Water has a cooling effect, as shown in Van Dorland's figure 2.4.

In the geologic history of the Earth such a period, where the CO_2 concentration increased a hundredfold; the Paleocene-Eocene Thermal Maximum, about 55 million years ago. The oceans were so acid then, that we find no calcium carbonate sediments, but reddish clay instead. The large amount of CO2 was caused by a temperature increase of about 6 °C globally; the arctic polar sea was not saline and full of floating Azolla ferns, now to be seen in rice paddies. Their fossil rests are to be found in the North Sea bottom.

Measurement of absolute humidity

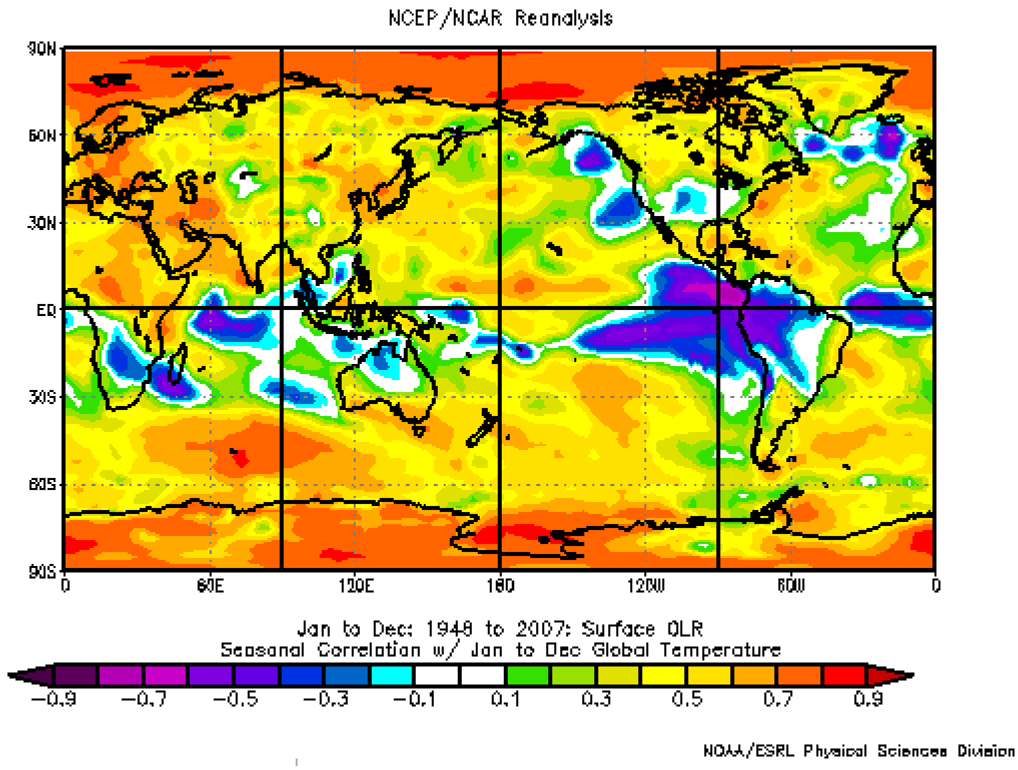
http://www.cdc.noaa.gov/cgi-bin/Timeseries/timeseries.pl?ntype=1&var=Specific+Humidity+%28up+to+300mb+only%29&level=300&lat1=0&lat2=90&lon1=-

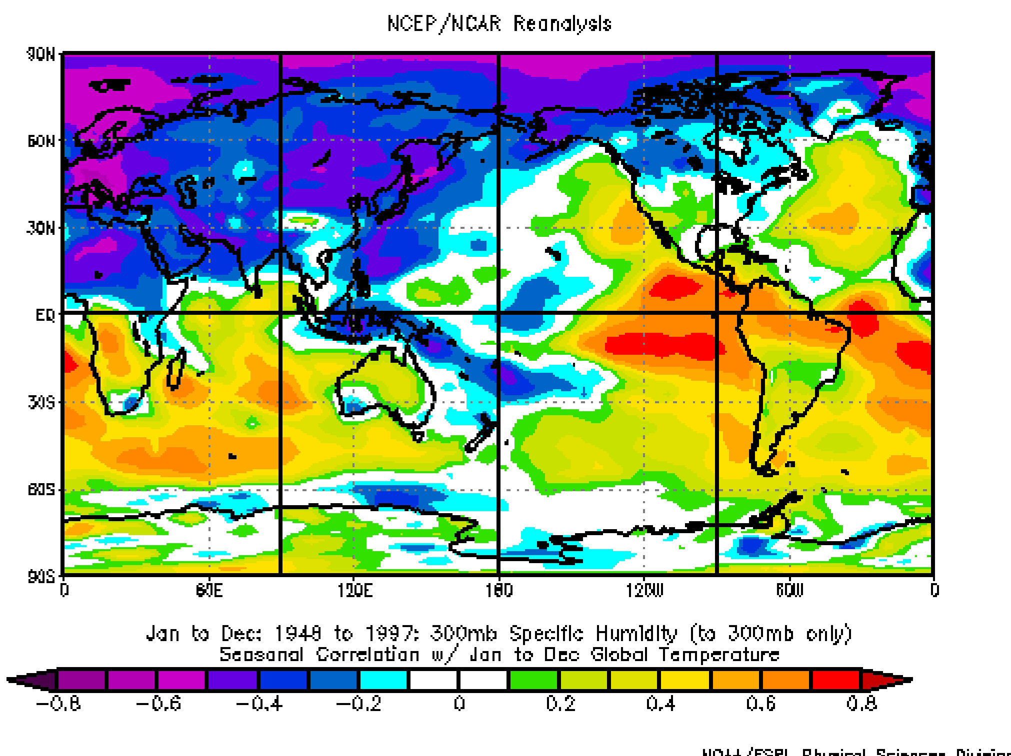
180&lon2=180&iseas=1&mon1=0&mon2=11&iarea=0&typeout=2&Submit=Create+Timeseries
gives a history of water content in the atmosphere up till 300 mB:

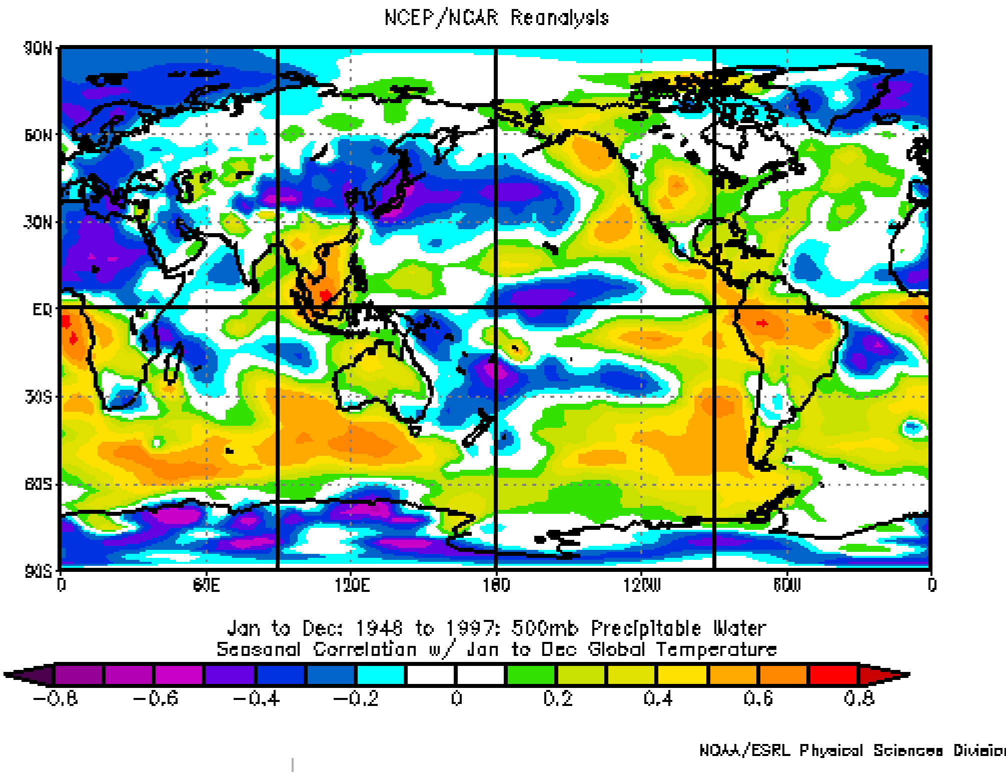


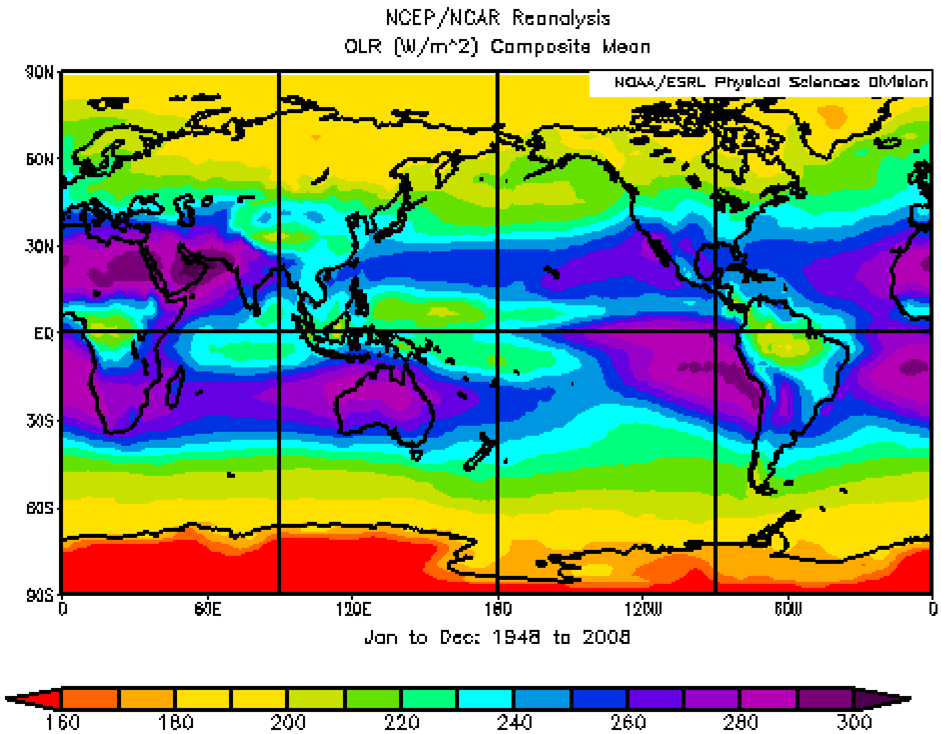
We see a very distinct decrease of humidity in the last 50 years, about 25%, from 0.24 gram/kg air to 19.5 gram/kg air. But this is strangely at odds with the assumption in the preceding paragraph, however.

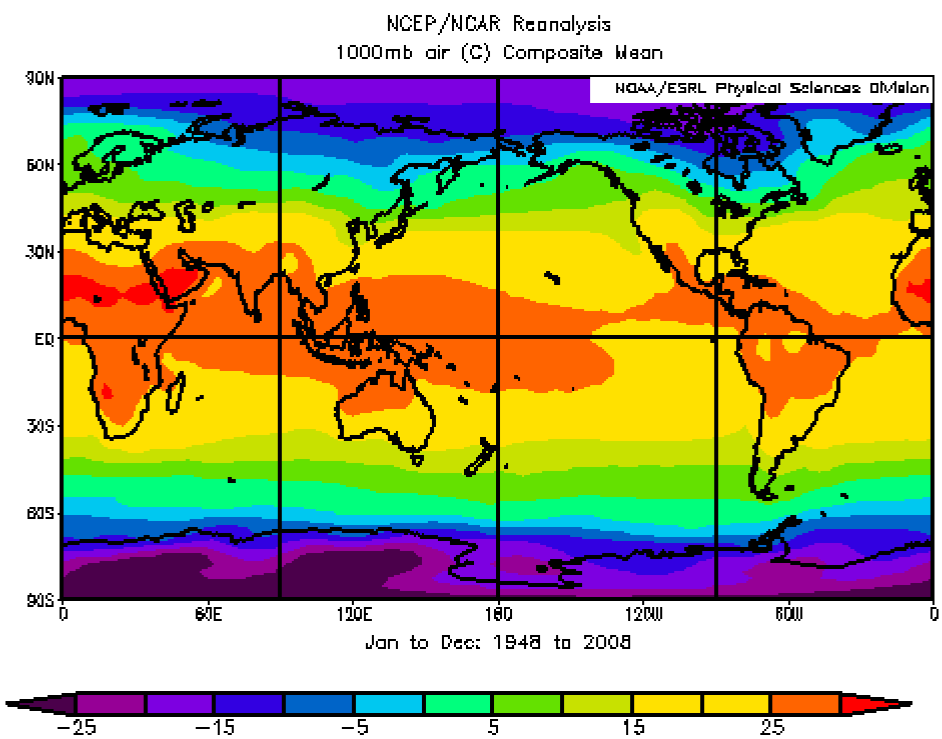
NCEP Reanalysis data provided by the NOAA/OAR/ESRL PSD, Boulder, Colorado, USA, from their Web site at http://www.cdc.noaa.gov

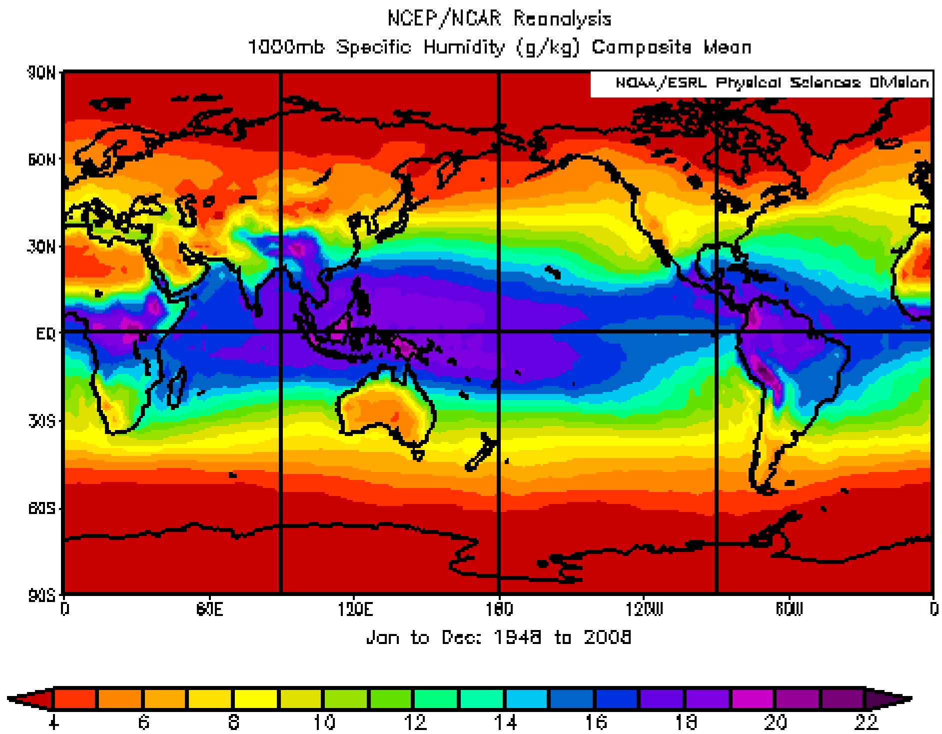

NCEP/NCAR Reanalysis
90N
60N
30N
EQ
30S
60S
90S
0
60E
120E
180
120W
60W
0
Jan to Dec: 1948 to 2007: Surface OLR
Seasonal Correlation w/ Jan to Dec Global Temperature
-0.9
-0.7
-0.5
-0.3
-0.1
0.1
0.3
0.5
0.7
0.9
NOAA/ESRL Physical Sciences Division

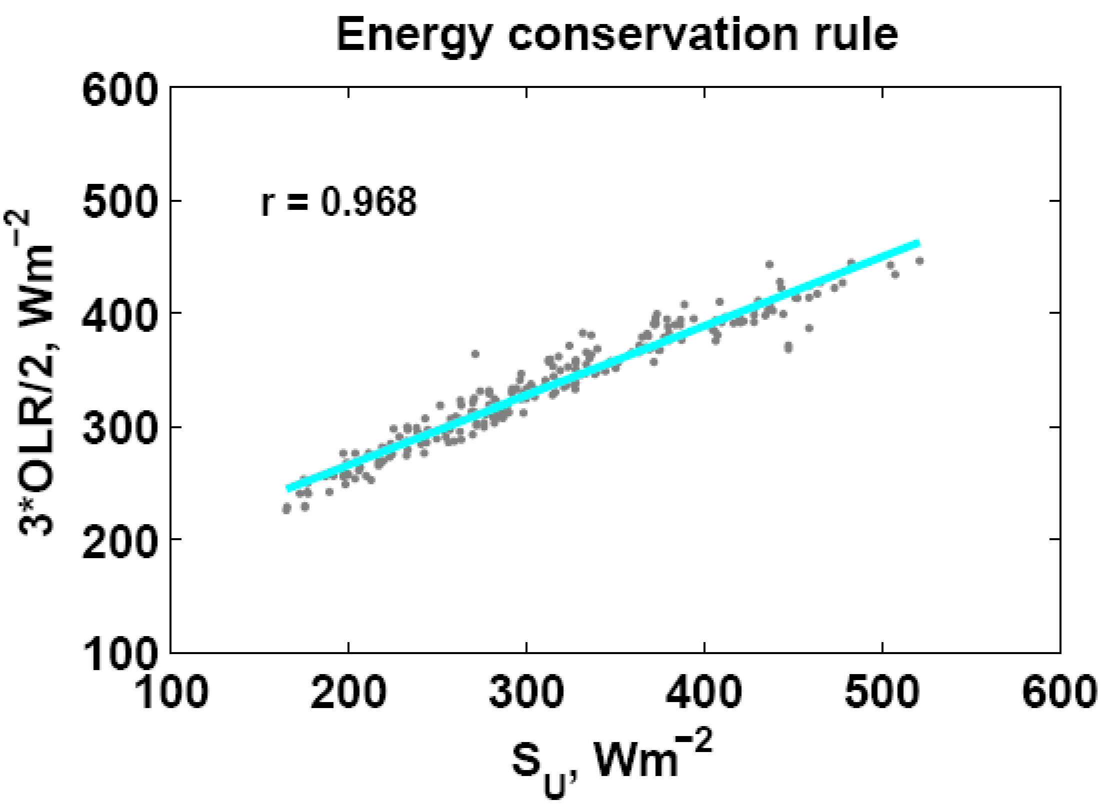

NCEP/NCAR Reanalysis
90N
60N
30N
EQ
30S
60S
90S
0
60E
120E
180
120W
60W
0
Jan to Dec: 1948 to 1997: 300mb Specific Humidity (to 300mb only)
Seasonal Correlation w/ Jan to Dec Global Temperature
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
NOAA/ESRL Physical Sciences Division


NCEP/NCAR Reanalysis
90N
60N
30N
EQ
30S
60S
90S
0
60E
120E
180
120W
60W
0
Jan to Dec: 1948 to 1997: 500mb Precipitable Water
Seasonal Correlation w/ Jan to Dec Global Temperature
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
NOAA/ESRL Physical Sciences Division


NCEP/NCAR Reanalysis
OLR (W/m^2) Composite Mean
NOAA/ESRL Physical Sciences Division
90N
60N
30N
EQ
30S
60S
90S
0
60E
120E
180
120W
60W
0
Jan to Dec: 1948 to 2008
160
180
200
220
240
260
280
300


NCEP/NCAR Reanalysis
1000mb air (C) Composite Mean
NOAA/ESRL Physical Sciences Division
90N
60N
30N
EQ
30S
60S
90S
0
60E
120E
180
120W
60W
0
Jan to Dec: 1948 to 2008
−25
−15
−5
5
15
25





Thirdly, from those measured atmospheric profiles there appears to be a relation of the OLR into space and the S_U, the upward radiation from the surface. In the global mean, around S_U 400, S_U is 1.5·OLR, but on the poles at S_U 200, 1.5·OLR=270 and in hot

tropical climates, at S_U 500, 1.5· OLR is 450. The title, "energy conservation rule", is a bit misleading, but the fact is that S_U – OLR is measured to be equal to $E_D - E_U$, the difference of the downward and the upward thermal radiation from the atmosphere, and both are measured to be equal to one half of the OLR, see FM's paper from 2004, figure 24, here under.
This graph has led to much discussion, as you could take the blue line as a function rather than an illustration of a relation. Then you could make an equation of the blue line, and require that the mathematically derived function $ORL/S_U = 2/\{1+ \tau_A+ \exp [-\tau_A]\}$ must be the same equation with τ_A=1.86, and this leads to gross inconsistencies, of course. There cannot be more than one function between two variables in such a range, and τ_A itself is a function of the latitude, and therefore of S_U.

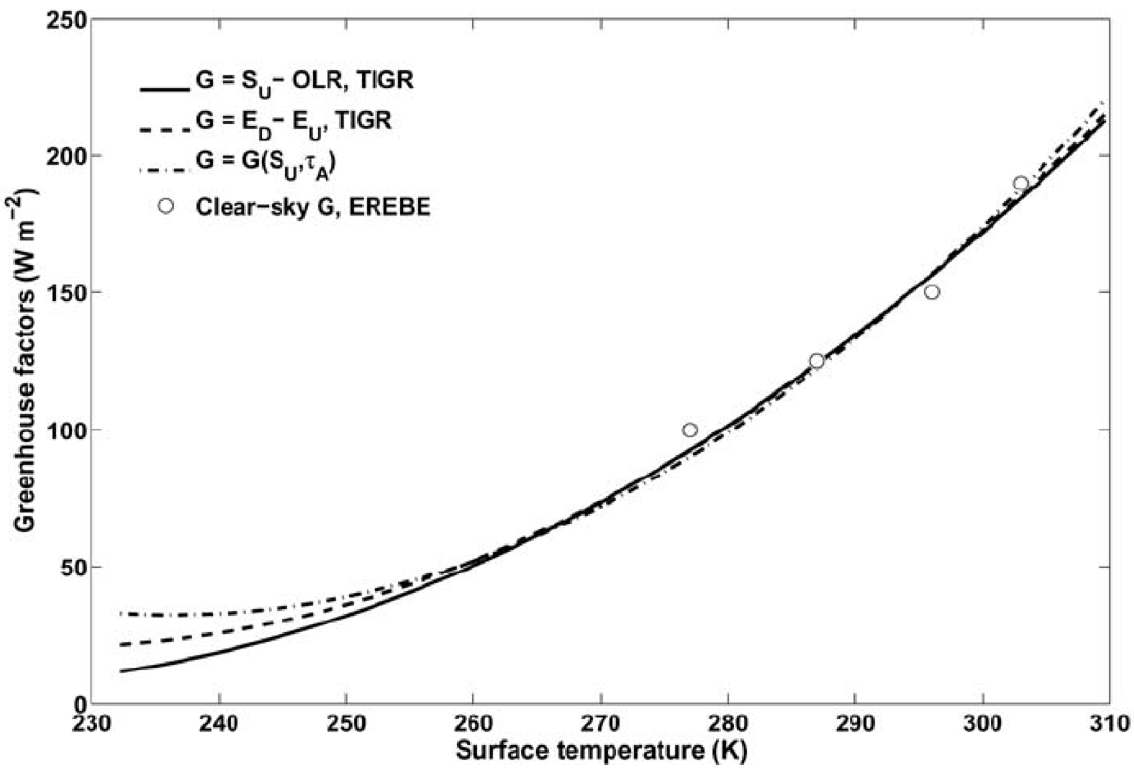


Fig. 24. Dependence of various greenhouse factors on surface temperature.

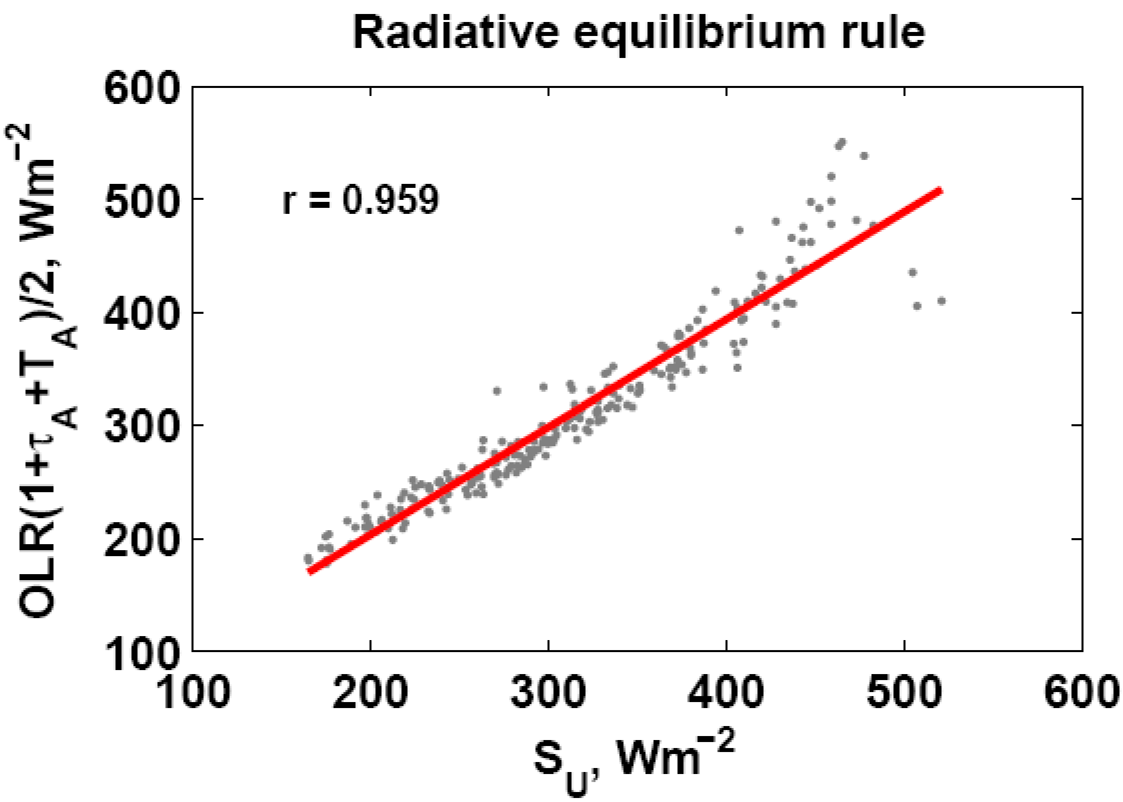
The new theory

Ferenc Miskolczi has sought, as soon as these strong dependencies became apparent to him, for a theory that could explain those relations.
This is the core of his new theory.
It lies in the fact that he solves the Eddington differential equations, that describe the radiation equilibrium in a radiating and thus absorbing atmosphere [originally in the Sun,

1916] not with the classic boundary conditions of Milne [1922] but with two different boundary conditions:

1. The surface is in radiation equilibrium with the atmosphere right above it
2. The atmosphere is bounded in height [about 60 km] and is partially transparent, the transparency is exp $[-\tau_A] = T_A$.

Both boundary conditions follow directly form the spectral decomposition of the set of measured [TIGR] atmospheric temperature, pressure and humidity profiles.



The resulting solution is $ORL/S_U = 2/\{1+ \tau_A+ \exp[-\tau_A]\}$ or $ORL/S_U = 2/[1+ \tau_A+ T_A]$. If we compare this solution to that of the standard theory: $ORL / S_{UA} = 2/[1+\tau_A]$ for the lower atmosphere and $ORL / S_{UG} = 2/[2+\tau_A]$ for the surface, we see that there is no difference any more between surface and lowest atmosphere, and that the transparency is accounted for. Both solutions tend to $ORL/S_U = 1$ for the surface when there is no atmospheric absorbance and thus not greenhouse effect, when τ_A=0 and T_A =1, as nearly so on Mars. Both tend to $ORL/S_U = 0$ when $\tau_A=\infty$ and therefore T_A =0, as on the sun and nearly so on Venus.

It can be shown that if $ORL/S_U = 2/[1+ \tau_A+ T_A]$, that the maximum heat transfer from surface to space is reached for the Earth atmosphere. The theoretical atmospheric optical thickness turns out to be 1.86, very close to the observed 1.87. $T_A= \exp[-\tau_A]$ has the value of 15% there, in the mid section of the graph, there $ORL=1.5\cdot S_U$ while $2/[1+ \tau_A+ T_A]$ there has the value 1.5. In that point global OLR is not dependent any more on the optical density, it has its maximum in a cloudy atmosphere.

For this situation Ferenc Miskolczi has calculated mean global temperature increase as a consequence of the doubling of CO_2 concentration; see table 6 in the 2004 IDOJARAS paper. The result is 0.48 °C, much too low to be measured in the noise of changing sea currents, volcanic eruptions, changing galactic cosmic ray densities, etc.

The regulating mechanism

Now the question is, how does the atmosphere regulate its optical thickness or transparency so that the ORL is maximized over the long term? Recently we have quite independent measurements that elucidate this mechanism.
In the following page we see satellite measurements by Roy Spencer et al. During Intra Seasonal Oscillations, that are periodic weather changes, over the tropical pacific, they traced sea surface temperature, rain intensity, air temperature, water vapor concentration, Short Wave sun light reflection, and the Outgoing Long wave Radiation, all as a function of time, synchronized around the mid-point of maximum SST of an ISO.
Every time the low air temperature increases, the SW light reflects more, the OLR increases, rain increases, until, when the maximum temperature [=0] point is passed, the sunlight penetrates more, the OLR increases, the rain stops, just until the temperature is normal again.
What we see is a thermostat, the atmosphere increases and decreases it water content, so that the climate is kept at a constant value. If the Earth cannot get rid of its heat through radiation form low altitude alone, clear sky conditions, the adiabat is surpassed, and the heat transfer by latent heat high into the top of the atmosphere increases, so that the OLR from a higher altitude, where the effective IR optical depth is so much lower, can send the surplus heat into space.
In the second set of graphs is, with another type of satellite, the amount of high, or ice, clouds, and the amount of low or water clouds, is put as a function of time, synchronized on the same manner. It appears, that cooling low clouds become less, and warming high clouds become more, as the temperature rises, and vice versa.
We see the cloud top temperature, which is a direct measure of the total OLR in that place, increase 2 K as a result of only 0.4 K higher surface temperatures. That means a threefold negative feedback due to atmospheric water content: $\sigma\cdot[258^4-256^4]= 7.7$ W/m^{2}K; a difference of 0.4 K at 305 K is $\sigma\cdot[305.4^4-305.0^4]=2.6$ W/m^{2}K. Spencer et al. have measured the average feedback as -6.1 W/m^{2}K, a full 100% negative feedback at ground temperature level on average cloudiness.
We see now the physical mechanism behind the observed OLR-S_U relations, empirically found and theoretically founded by Miskolczi, in operation. The OLR increases, and the surface cools, with increasing water content as a result of surface temperature increase. The cooling rate, 0.03 °C per day, is conform the value 1 K/day in van Dorland's figure 2.4 in case water content varies only 3%.

In great contrast, the standard theory assumes a *positive* feedback due to water content in the atmosphere, increasing the global warming a factor 2 or 3 as a result of greenhouse gas emission.

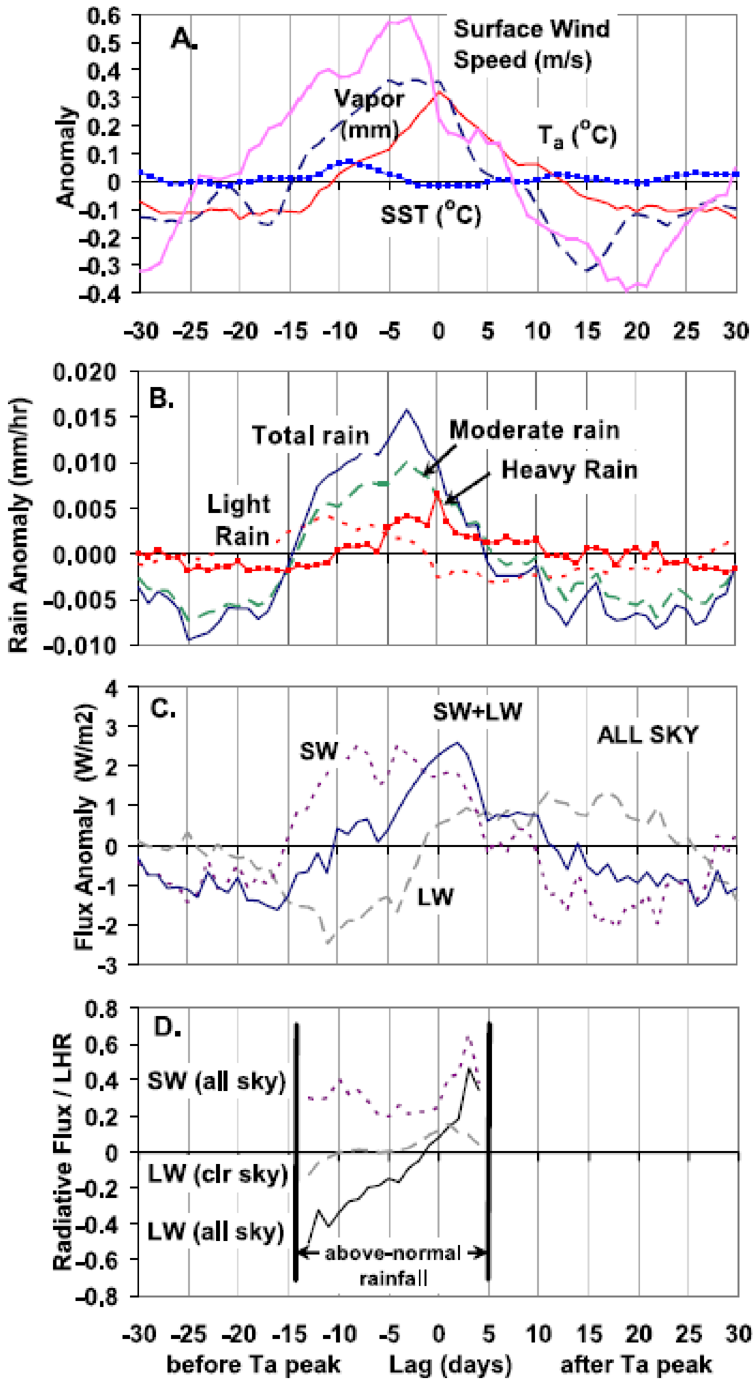


Figure 2. Composite analysis of daily zonal average oceanic anomalies (20°N to 20°S) associated with 15 ISOs, relative to the date of peak tropospheric temperature (T_a): (a) AMSU T_a, and surface wind speed, integrated water vapor, and SST from the TRMM TMI; (b) TMI rain rate; (c): CERES all-sky top-of-atmosphere outgoing longwave (*LW*) and reflected shortwave (*SW*) fluxes; (d) CERES fluxes divided by latent heat release calculated from "total rainfall" in Figure 2b.

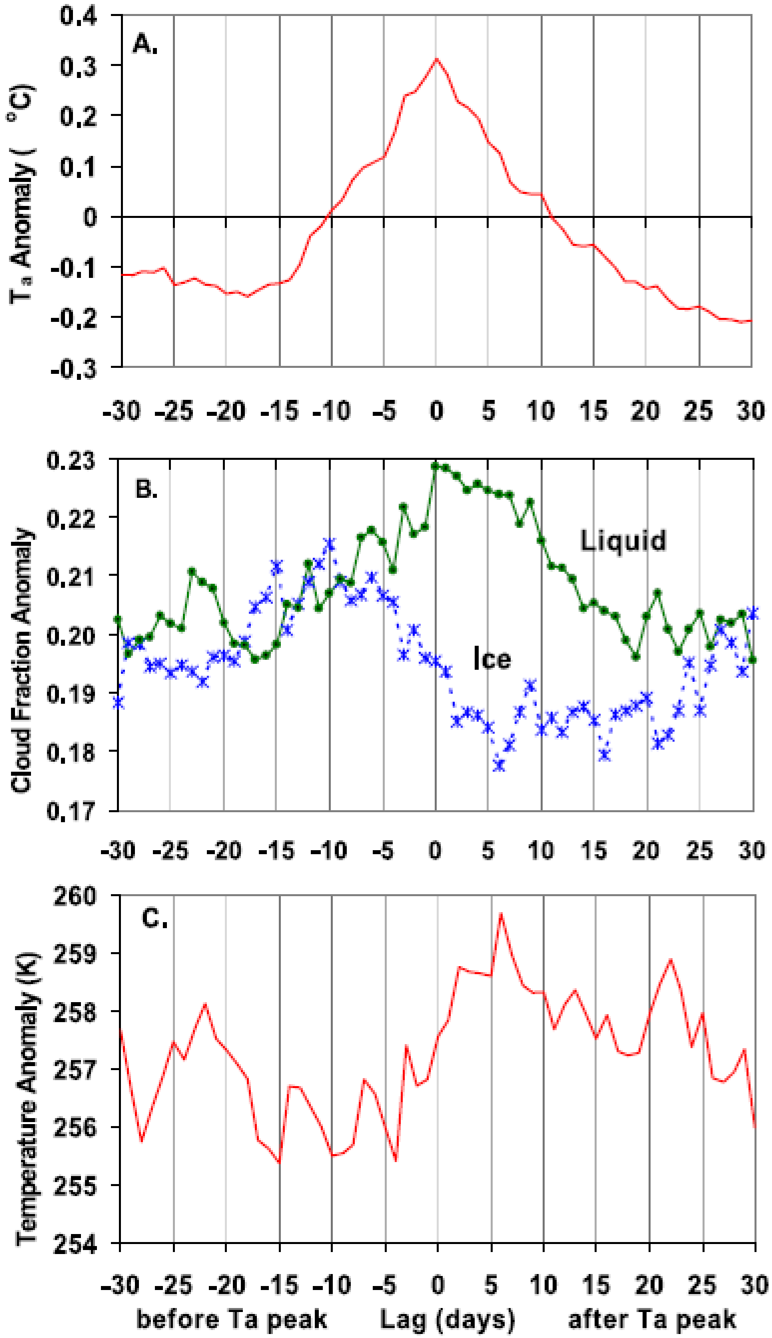


Figure 3. As in Figure 2 but for a composite of nine ISO's: (a) tropospheric temperature, (b) MODIS liquid and ice cloud fractions, and (c) cloud top temperature (all clouds). The tropical average cloud fraction and cloud top temperature have been added to the anomalies in Figures 3b and 3c.

Now, in hindsight, this not so unexpected at all. The heat transfer coefficient of all non-radiation processes is not only way larger that that of radiation processes in the low atmosphere; it is also very strongly dependent on the temperature. That is, because the water vapor pressure is an exponential function of the sea surface temperature. This is also the case for vegetation. The only exception are deserts, where there is no liquid water to evaporate, and indeed, there the solid surface can become much hotter that the air above it. In the night, however, the desert surface and the air just above it is much colder. There is documentation that the classic Egyptian technical men could make ice in that way, screening the surface at day, and exposing it at night.

Troposphere warming by CO_2; measurements compared to standard theory

In the four graphs hereunder, to be found via
http://icecap.us/images/uploads/DOUGLASPAPER.pdf and more direct in the presentation in http://www.warwickhughes.com/agri/Recent-Evidence-Reduced-Sensitivity-NYC-3-4-08.ppt
the lower atmosphere temperature anomaly, observed by satellite is compared with a set of standard climate models. In the standard theory, a sizeable part of the heat transfer is by IR radiation through the absorbing atmosphere, which becomes thicker with increasing CO_2 that radiates back, because it is warming the lower atmosphere. The measured period is from 1979 until 1999, a period with substantial climate change or warming, and a substantial increase in greenhouse gases.
1000 hPa is surface level, 100 hPa is tropopause pressure, about 17 km. The top 4 curves are the results from four different climate models. They all indicate a rising troposphere temperature, 150 to 300 milliKelvin per 10 years, i.e. 0.3 to 0.6 °C climate warming over those 20 years, the known value of IPCC reports as a consequence of greenhouse gas increase.
The measurements do not indicate heating, but generally the opposite. Only on the North hemisphere there is a small warming, but much less than given by the standard theory.
In contrast, the Miskolczi relations, drawn from many radio sonde profiles, conclude that there is no net radiation transport through the absorbing part of the IR spectrum of the atmosphere, only through the “window”, where the greenhouse gas concentration has an order of magnitude less effect. There is no tropopause warming, quite in agreement with these measurements.
The temperature effect of CO_2 doubling in this study is the same as in the Miskolczi theory, about 0.5 °C.

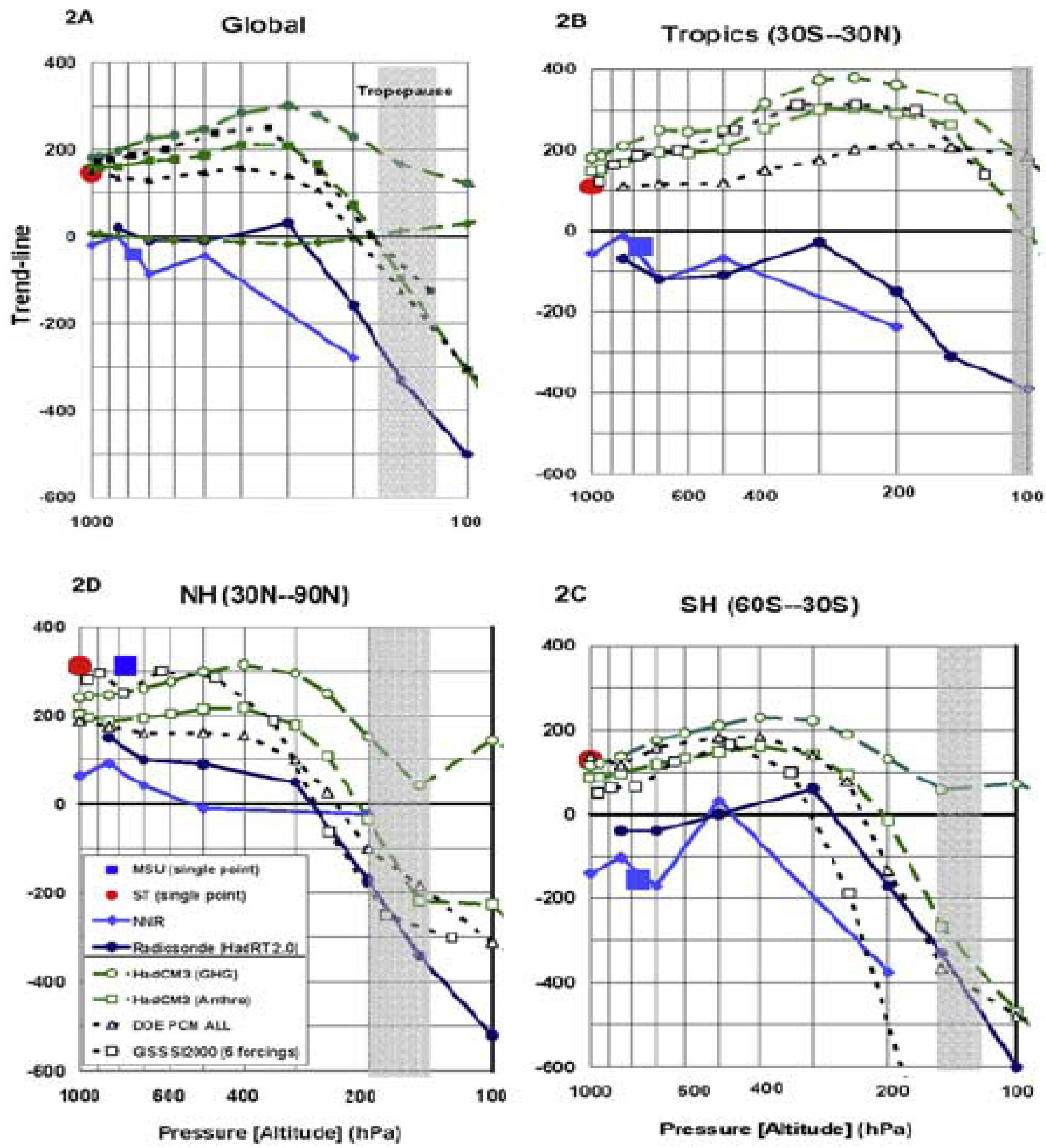


Figure 2. Temperature trend-line [10^{-3}K/decade] versus log pressure (altitude) for different zonal averages. Observations [filled symbols, solid lines]: MSU, ST (Hadley), NNR, HadRT2.0 radiosondes. Models [open symbols, dotted lines]: Hadley model CM3, DOE PCM, and GISS SI2000. Tropopause range is shaded. Tropopause data can be found at http://cdc.noaa.gov/. (a) Global average. All of the data sets have an average taken from 90S to 90N with exception of ST (Hadley), whose average was taken from 67.5S to 67.5N. (b) Tropics. (30S to 30N). (c) Southern Hemisphere (60S to 30S). (d) Northern Hemisphere. (30N to 60N).

Conclusions

1 It is clear now, that radio sonde and satellite measurements do not support the standard theory of "Anthropogenic Global Warming". The new theory of Miskolczi, based on those atmospheric profiles under very different circumstances, does support those empirical results. His theory contains no parameters that are "fitted" to historic climate trends and greenhouse gas concentration trends. The only thing that is different, is that other, more experimentally founded, boundary conditions are taken in solving the differential equations describing radiation equilibrium:

i. Infrared Radiation equilibrium between surface and atmosphere
ii. Partly infrared transparent atmosphere.

The result indicates that the atmosphere chooses an optical thickness, by water vapor take-up or release, that ensures the maximum Outgoing Long wave Radiation globally for a cloudy atmosphere.

2 Measurements of the oscillating weather patterns in the tropical Pacific show indeed that the climate controls itself, by changes in the water content of the air, and so by changing cloud cover and cloud height.

3 Measurements of troposphere heating, predicted by the standard theory as a consequence of the greenhouse gas increase, in de period 1979-1999 contradict the standard theory by measuring a global cooling instead.

Recommendations

Establishing the right relation between greenhouse gas increase and climate change is so important, that we cannot allow ourselves to evade discussion about its physical foundation.

The Netherlands, having a reputation of four centuries of criticizing established opinions, should organize this discussion on an appropriate scientific level.

Dr. Ir. E. van Andel,
Fiwihex, Wierdensestraat 74, Almelo, May 2008,