### The Miskolczi Greenhouse Theory

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Apparently the global climate records in the last decade are not cooperating with the government approved  $CO_2$  greenhouse effect based AGW doctrine, Arrak, [21], [22], [24], [25]. It is extremely important to focus the GH related research to look for alternative and robust theories explaining the real observed climate change or stability. So far the Miskolczi Greenhouse Theory, MGT, is the only relevant one which is consistent with the observed global climate data.

Dr. Ferenc Mark Miskolczi is a physicist of Hungarian origin. At the Eotvos Lorand University, Budapest, he earned an MS degree in nuclear physics, and a PhD degree in astrophysics. At the Hungarian Academy of Sciences he earned another PhD in Earth Sciences. He also holds a diploma in high level computer programming. Recently his research interest has been the atmospheric greenhouse effect.

The exact analytical relationship between the surface upward long wave radiation and the outgoing terrestrial radiation has fundamental importance in the planetary radiation balance. The difference of the surface upward flux density,  $S_U$ , and the outgoing long wave radiation, OLR, is the definition of the greenhouse factor:  $GF = S_U - OLR$ .

In 2004 Miskolczi published a new theoretical relationship between OLR and  $S_U$ , developed for a semi transparent bounded greenhouse gas atmosphere in radiative equilibrium, [1]:

$$S_{U} = \frac{OLR}{f} = \frac{OLR}{2} (1 + \tau_{A} + e^{-\tau_{A}}).$$
(1)

Please note that because of the exponential term, Eq. (1) is different from the standard astrophysical solution of the radiative transfer equation derived for the semi-infinite atmosphere problem, [13]. Here  $f = 2/(1 + \tau_A + T_A)$  is the definition of his transfer function,  $T_A$  is the flux transmittance of an air column, and  $\tau_A$  is the total infrared flux optical thickness of the atmosphere:

$$\tau_A = -\log(T_A) \,. \tag{2}$$

In Eq. (2)  $T_A$  is the hemispheric Planck weighted flux transmittance.  $T_A$  is a rather complicated mathematical expression of the monochromatic directional path transmittance and may only be computed by a full-blown line-by-line radiative transfer code.

In [1] he introduces the important concept of the quasi-all-sky protocol which considers the fact that the global average vertical atmospheric temperature and humidity structures are implicitly affected by the actual global average cloud cover. He has demonstrated, that Eq. (1) is able to reproduce the observed global average surface source function with an absolute accuracy of 0.03 W/m<sup>2</sup>, which is far better than the admitted accuracy of any ground based or satellite radiation measurements. He also argues, that (in case of the local instantaneous fluxes) any violations of Eq. (1) are caused by the stochastic nature of the humidity field, and using the analytical form of the  $f(\tau_A)$  function the flux differences can easily be translated into surplus or deficit in the total water vapor column amount. One should notice that his transfer function  $f(\tau_A)$  is mathematically related to the normalized greenhouse factor, via the simple  $g(\tau_A) = (S_U - OLR)/S_U = 1 - f(\tau_A)$  relationship. Based on radiosonde observations and global scale line-by-line simulations of the atmospheric downward,  $E_D$ , and upward,  $E_U$ , emittances he discovered and quantified two more fundamental empirical relationships among the flux density components:

$$E_D \cong A_A, \tag{3}$$

and

$$S_U \cong 2E_U \,. \tag{4}$$

In Eq. (3)  $A_A = S_U(1-T_A) = S_U A$  is the absorbed surface upward flux by the atmosphere, and  $A = (1-T_A)$  is the flux absorption of the air column. Eq. (1) and (3) proved to be valid for local instantaneous fluxes, while Eq. (4) is valid for global averages. According to Miskolczi's terminology Eq. (3) is the atmospheric Kirchhoff law and Eq. (4) is the atmospheric virial law.

The integration of his Eq. (1), (3), and (4) into a coherent greenhouse theory was presented in his second paper on this topic published in 2007, [2]. The derivation of Eq. (1) was also presented here with proper mathematical rigor. From empirical data he recognized that on global scale the conservation of the energy and momentum of the radiation field requires the

$$S_U = \frac{3}{2}OLR \tag{5}$$

relationship. He called Eq. (5) the energy conservation law of the long wave radiation field (in the Earthatmosphere system). In [2] he showed, that the virial and energy conservation relationships, Eq. (4) and (5), may be expressed in a simple form which correctly satisfies the  $\tau_A \rightarrow 0$   $S_U \rightarrow OLR$  tendency (the so called transparent limit constraint) :

$$S_U + \frac{S_T}{2} - \frac{E_D}{10} = \frac{3}{2}OLR$$
 or,  $\frac{3 + 2T_A}{5} = \frac{OLR}{S_U}$ . (6)

The steady state climate requires the long term radiative equilibrium and energy balance of the system in which case Eq. (1) and (6) must simultaneously be satisfied:

$$\frac{3+2e^{-\tau_A}}{5} = \frac{2}{1+\tau_A + e^{-\tau_A}}.$$
(7)

Eq. (7) is a transcendental equation which has only one solution:  $\tau_M = \tau_A = 1.867561$ . According to the Miskolczi Greenhouse Theory, MGT, the Earth's atmosphere has a theoretical equilibrium infrared optical thickness,  $\tau_M$ , which is controlled by the radiative equilibrium, the virial, the energy conservation, and the Kirchhoff laws. He postulates, that in the water rich planet of Earth the chaotic space time distribution of the atmospheric water vapor maintains the above constant theoretical infrared optical thickness. For the whole Earth-atmosphere system, to stay at the global radiative balance the excess water vapor will precipitate out and the deficit will be supplied by evaporation from the surface and cloud top.

In 2010 in his third article, [3], using different climatologic radiosonde archives and unprecedented numerical accuracy in his radiative transfer code he showed that the directly observed infrared absorption properties of the atmosphere are fully consistent with the theoretical expectations and the global average infrared optical thickness is really 1.87. In 2011 he presented new results, [4], and showed that the global average IR optical thickness remains constant while using radiosonde time series of different length.

His global average clear sky greenhouse factor computed from the TIGR 2 radiosonde archive is G = 127.8 W/m<sup>2</sup>. In [4] he also presents a new relationship (extropy rule) among the flux density components which takes care of the addition or removal of the optical depth due to evaporation and condensation.

The first published greenhouse factor verifying Miskolczi's result appeared recently in the Journal of the Atmospheric Sciences by Costa and Shine [5]. With a primitive radiative transfer model and using different climatologic data set [5] obtained a global average clear sky greenhouse factor of G = 127

W/m<sup>2</sup>. To explain the 0.8 W/m<sup>2</sup> (rather small) difference in *G* one has to reproduce the Costa-Shine results. Unfortunately, the necessary details on the source of the input atmospheric structures and the key computational parameters are missing from [5], and without those details all his results just could be an artifact. Here we should also note, that [5] unethically claims to be the first who computed the global average clear sky transmitted surface upward flux density of  $S_T = 65 \text{ W/m}^2$ , which is not true. About ten years earlier, based on the TIGR2 radiosonde archive, Dr. Miskolczi published his line-by-line (HARTCODE, [23]) estimate of  $S_T = 61 \text{ W/m}^2$ , see page 216 Table 3 in [1].

# Recently Dr. Miskolczi's greenhouse theory is the only existing valid theory which can predict and explain a-priori the observed infrared characteristics of the Earth's atmosphere, the global average water vapor content of the atmosphere, and the greenhouse effect.

There are some other consequences of his greenhouse theory. He resolved the long-standing surface temperature discontinuity problem, he showed, that in the real world the runaway greenhouse effect is physically impossible. He set the possible theoretical limits for the minimum and maximum infrared optical thickness of the atmosphere. His theoretical normalized clear sky greenhouse factor is  $g(\tau_M) = 0.338$ . From his theory the derivation of the global equilibrium cloud cover and a cloud top altitude is straightforward. He also showed huge quantitative errors in the popular Kiehl and Trenberth radiative budget scheme, [6]. According to [2] the use of the USST76 atmosphere for global energy budget studies causes about 30 W/m<sup>2</sup> errors in clear sky  $E_D$ . Also in [2] he suggests that the overall global greenhouse effect is nothing but the conservation of the momentum of the radiation field.

#### Summarizing his work:

- 1. He made a quantitative theoretical statement about the equilibrium infrared absorption optical thickness of the atmosphere:  $\tau_A = 1.867561$ .
- 2. He showed with transparent state-of-the-art line-by-line radiative transfer computations and using several independent climatologic radiosonde data sets that the observed value of the optical thickness is  $\tau_A = 1.867$ , which is consistent with his theoretical expectation.
- 3. He showed in seven different time series that the observed  $\tau_A$  did not change in the last 61 years while the atmospheric CO<sub>2</sub> concentration increased by 21 %.

## The refutation of the $CO_2$ greenhouse effect based AGW hypothesis is a profound and direct consequence of his theory and the presented empirical facts.

The explanations of the global warming by the  $CO_2$  greenhouse effect and the 'settled' greenhouse science, the idea of Fourier, Tyndall, Arrhenius, Manabe, Ingersoll, Pierrehumbert, Lacis, Ramanathan, Lindzen, Stephens, Hansen, Shepherd, Shine, Trenberth, Solomon, and many others are obsolete. The opinion of the IPCC or R. Cicerone (National Academy of Science) and Sir P. Nurse (Royal Society) are no exceptions, [15].



Annual mean normalizd surface, effective and greenhouse temperatures, and CO<sub>2</sub> concentrations 1948 – 2007, NOAA Earth System Research Laboratory

*Figure 1* Observed empirical facts. The decreasing greenhouse temperatures are not consistent with the increasing  $CO_2$  concentrations. The  $CO_2$  greenhouse effect based AGW is nonsense. Data source: http://www.cdc.noaa.gov/cgi-bin/Timeseries

A genuine support of the MGT comes directly from the most competent source of climate related information, the NOAA Earth System Research Laboratory, [16]. In Fig. 1, the NOAA R1 data set is presented for the 1948 - 2007 time period. The above named eminent scientists should have a pretty hard time to explain (with the 'settled' greenhouse theory) the observed decreasing greenhouse effect caused by the observed increasing  $CO_2$  concentration.

The MGT does not deny or support the observed facts about the changes in the global average surface temperature. However, it has a strong explicit conclusion that the greenhouse effect of increasing atmospheric  $CO_2$  is not the cause of the changes in the surface temperature.

#### Criticism of the Miskolczi Greenhouse Theory

In the last decade his numerical computations and theoretical work was not challenged in the peer reviewed radiative transfer and global warming literature. Probably the simple reasons are: his theoretical work rests on fundamental physical principles; his numerical calculations are based on real observed atmospheric structures; his radiative transfer code, (HARTCODE), was properly validated against high resolution spectral radiance measurements and other line-by-line radiative transfer codes of similar complexity.

Anyone wishing to refute the validity of MGT will have to perform these scientific tasks:

- 1 Present quantitative results based on global scale radiosonde observations resulting in a DIFFERENT infrared optical thickness.
- 2 Present quantitative results showing that the long term global average  $\tau_A$  is NOT a constant.
- 3 Present PROOFS against his theoretical equations.

So far no criticism from scientists who have the resources to reproduce the numerical results and empirical facts on which the MGT rests has appeared. Scientists at NASA, JPL, AERI, OSU, CSU, and NCAR have not spoken. Those who really understand what the MGT is and what are its consequences have chosen to be silent.

However, in the blogosphere from time to time one may encounter some critics who are mostly underqualified, self declared, radiative transfer experts. They forgot that they are dealing with somebody who spent an active thirty years working in the field of the theoretical radiative transfer and remote sensing, as well as on the different aspects of accurate ground based and satellite radiation measurements.

On the Real Climate blog one can find some early attacks by R. Pierrehumbert, his student, and G. Schmidt of NASA. Since they could not produce any useful arguments against the published numerical results, and worrying about their own reputation they backed off in a relatively short time. When somebody asked G. Schmidt (on the Real Climate blog) about the Miskolczi theory, he got:

"... Question: Is it possible for the physicist to explain Ferenc Miskolczi's theories and disprove them in a peer reviewed journal? ..."

"... **Response**: They are nonsense and so it is unlikely that anyone will take the time. Further discussion on this is OT. - gavin. ..."

Such hubris of course has no scientific value (or in fact any value). He knows he can't handle it and hides behind the fallacy of authority. He is chiefly remembered for changing the text of an IPCC report after it had been approved. The lack of real scientific debate on the MGT can be traced back to the missing high quality accurate flux optical depth computations from other researchers. Apparently, Real Climate transferred the risk of the criticism to some academically illiterate bystanders. From the long line of critical and supportive comments on the Internet, Real Climate suggests four relatively detailed posts dealing with the refutation of the MGT.

The 6 part kindergarten level radiative transfer series of Science of Doom [7] is not a match for what Dr. Miskolczi presented, for example, in the AIRS-CERES Science team meeting in 2005, [8] or in the EGU meeting in 2011, [4]. Certainly Science of Doom is not in the position to educate Dr. Miskolczi about general radiative transfer, and will not falsify any of his quantitative statements and theoretical concepts, or his 'mystery'  $\tau_M = \tau_A = 1.867561$ .

Another example is Paul Barton Levenson's series of Why Ferenc Miskolczi (or in fact everybody who question the AGW doctrine) is Wrong, [9]. Levenson does not have the slightest idea what the virial theorem is. Before he engages with an attack on Dr. Miskolczi's atmospheric virial law he should have

read the original work of Clausius [10]: "...Hence our theorem is demonstrated; and at the same time it is evident, that it is not merely valid for the whole system of material points, and for the three dimensions of coordinates together, but also for each material point and for each direction separately...". Levenson's virial computation is a joke, and not the refutation of Miskolczi's  $S_U = 2^* E_U$  virial relationship, see Fig.2, [18]. The same applies, for example, to the articles of V. Toth, [19], and A. F. Pacheco and J. Sañudo, [20].

R. Spencer, [11], and R. Dorland [12] criticize the  $E_D = A_A$  relationship. They are not able to comprehend that in a steady state global radiation field there cannot be any accumulation of non radiative energy fluxes anywhere in the system. It seems that they are not aware of the fundamental identity of the theoretical radiative transfer that the downward emittance from an isotropic radiation field must be exactly equal to the absorption from the same isotropic radiation field. For simplicity, in all his computations Miskolczi assumed a perfect blackbody radiator at the surface. Arguing about the 3% global average discrepancy in the  $E_D = A_A$  relationship, while knowing that the surface is not a perfect blackbody is meaningless.





Figure 2 The virial relationship in hydrostatic atmosphere.  $S_U / E_U = \Omega / T = 2$ . The global average emergent radiation from the atmosphere is half of the surface upward flux density. According to the  $S_U / E_U = 1/(f - T_A) = 1.971$  relationship the system is close to radiative equilibrium. http://www.atlatszo.hu/wp-content/uploads/2011/07/article.pdf

More than 100 years ago Karl Schwarzschild wrote, [13]: "...Thus the variation of radiation E with overlaying optical depth  $\tau$  can be derived only by assuming Kirchhoff's law..." R. Spencer and R. Dorland are eager to communicate their beliefs about the global warming and greenhouse effect, but unfortunately the physical science is known to be quantitative, and quantitative results cannot be refuted by beliefs. Pushing the below mark write-up of R. Dorland in [12] as the refutation of the MGT will only reveal their lack of understanding of the elementary concepts of the quantitative radiative transfer.

MGT is a new view of the planetary greenhouse effect and as such it is certainly not yet a closed complete final solution of the greenhouse phenomenon. However, in its present development, and with the overwhelming supportive empirical facts it is quite sufficient to dismiss the AGW hypothesis, and seriously question the favorite idea of climatologists about the role of GCMs in the long range global climate prediction. According to G. Schmidt, [14]: "... Current climate models yield stable and nonchaotic climates, which implies that questions regarding the sensitivity of climate to, say, an increase in greenhouse gases are well posed and can be justifiably asked of the models...". Apart from the known fundamental errors of the GCMs (the improper handling of the vertical air density structures, see Brooks, 2011, [17]), it is quite a lunatic idea to model the demonstrated chaotic space-time distribution of the water vapor and cloud cover by deterministic climate models using a bunch of primitive equations of motion, hydrodynamics and thermodynamics, while ignoring the stochastic nature of the radiation field, and in fact, of the whole climate system. The permanent failure of the GCM's global warming predictions is not a surprise. According to Miskolczi's new theory, the climate future is not in the hand of the climate modelers and their mighty feedback processes implemented into their GCMs, but rather rests on the first principles of physics. Suppressing the open discussion on the Miskolczi Greenhouse Theory in scientific journals by censorship does not advance climate science. The empirical facts, the magic  $\tau_M = 1.867561$ 

of Miskolczi and his greenhouse theory will not go away on its own. On the contrary, it is on its way to becoming the fundamental theory of radiation climate of planetary atmospheres. The Miskolczi Greenhouse Theory already constitutes a fatal blow to the  $CO_2$  greenhouse effect based AGW hypothesis. It is impossible to invalidate it by using legitimate, well established scientific standards. The long range effect of this will be to destroy the credibility of any elite scientific institutions that oppose it for ideological reasons. This will also severely damage the multibillion dollar  $CO_2$  business of the governments and their ideological climatologists.

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Estonian-born Arno Arrak has a B.A. degree from Dartmouth where he took a combined major in Chemistry and Zoology. He also took Physics courses at Columbia and has a Masters degree in Chemical Engineering from Pratt where he studied nuclear engineering. After college he worked in the field of spectrochemical analysis and has published a number of articles in that field. He is also a contributor to the Encyclopedia of Spectroscopy (George L. Clark, editor) and has presented papers at spectrochemical conferences in the U.S. and abroad. He was already retired when he saw Al Gore talk of a twenty foot rise of sea level from global warming. That was almost like an alternate universe to him and he decided to investigate. His first clue on sea level rise was an article from three guys in Taiwan who proved that sea level rise had been linear for at least eighty years and that the rate of rise had been 2.46 millimeters a year. If something has been linear for this long, he decided, it was not about to change anytime soon. You don't need to be a rocket scientist to calculate that in a century this amounts to little under ten inches, not twenty feet. He decided to investigate but he had no academic connections then and his research career had ended when Nixon came in and cancelled the last three moon shots. That is when his employer, prime contractor for the Apollo Lunar Lander project, had to lay off ten thousand people, and that is when he became a science teacher. As a retired teacher his research had to be entirely on his own but the Internet made up for that. Using satellite temperature measurements he discovered that the supposed anthropogenic warming in the eighties and nineties did not happen. That is the warming James Hansen spoke of in 1988 when he announced that global warming had arrived. The only warming within the last thirty years turned out to be a short spurt that started in 1998, raised global temperature by a third of a degree in four years, and then stopped. Arctic warming turned out to be real but not of greenhouse origin but caused by warm currents. This had been going on for more than a hundred years, since the beginning of the twentieth century. All of which means that no anthropogenic global warming, AGW, has ever been detected. Ferenc Miskolczi has shown that the optical thickness of the atmosphere in the infrared where carbon dioxide absorbs has not changed for the last 61 years despite steady addition of carbon dioxide to the atmosphere. Which means that the greenhouse absorption signature of this added carbon dioxide is missing. Perhaps this is the reason why AGW cannot be detected.