PHYSICS

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THE PROBLEM OF THE DEPENDENCE OF GLOBAL WARMING ON THE INCREASE IN CO2 AS A SCIENTIFIC DEBATE

Abstract. ***The Purpose of the Study*** *is theoretical substantiation of the problem of global warming and climate change.* ***The Research Methodology.*** *Methods of analysis, modelling, description and generalization of data were used to study the problem of the dependence of global warming and climate change on the increase in CO2.* ***The Scientific Novelty*** *of the study consists in identifying the contradictions of scientific conclusions regarding the direct dependence of global warming and climate change on the level of CO2, outlining new directions of experimental work on the specified problem.* ***The Conclusion****. For an objective study of the climate problem and the role of CO2 in global warming, additional unbiased studies are needed, which are based on scientific facts and involve the use of the most modern measurement tools.*

Keywords*: global climate problem, climate, ideal gases, CO2, energy consumption, transport energy.*

The Relevance of the Topic. When I read on a German “education server” that “the worldwide emission of CO2 has increased by a factor of 200 in the period XY” or I read in a source that the proportion of CO2 in normal air is 0.038 % is almost zero, but there is still a hint as to how dangerous this "almost nothing" would be for our climate, one comes up with the idea of considering whether the

presentation of objective truth is not just tendentious will. So, I did some research, and the results are amazing and simple.

The Formulation of the Problem. According to the postulate that is widely held and repeated like a mantra, CO2 is supposed to contribute to global warming and therefore to climate change; so far the well-known claim.

If one rummages through these so-called “sources” one quickly comes across that CO2 would supposedly be able to “absorb radiation, therefore store or store heat and therefore it would hinder the dissipation of heat and − derived from this − would warm the earth would.

The Purpose of the Article is to substantiate the contradictions of scientific conclusions regarding the dependence of global warming and climate change on the increase in CO2 and to determine new directions of experimental work on the specified problem.

The Presentation of the Topic. Now is the gas CO2 supposed to do this? Just like oxygen, nitrogen and (almost) all other known gases, CO2 belongs to the group of so-called "ideal gases", which makes the calculation much easier. For our purpose of consideration, it is only important to note that in principle it behaves in the same way as all other gases in the air we breathe.

From a chemical point of view, CO2 - unlike CFCs - is extremely inert ("inert"); so much so that it is used as a “shielding gas” in welding. Our plants need CO2 as a basis for life to be able to split off oxygen again and in mineral water and beer it is wonderfully refreshing. Seen in this way, CO2 is a friend, not an enemy.

This gas cannot “warm up the climate” on its own at all; that is complete nonsense and, as I said, it does not react with other substances either.

The following is correct and irrefutable − because it has been physically proven: any substance, regardless of whether it is liquid, solid or gaseous, can naturally absorb or store heat due to its mass, which can be heated. To quantify the ability of a substance to do this, the so-called “heat capacity c” was introduced. This unit of measurement is comparable to the specification of the volume of a coffee pot: if the volume of the pot is 1 litter, then a maximum of 1 litre of coffee will fit into the pot. However, this does not mean that this litre is always in the jug; it just means that a maximum of 1 litre fits in.

The mass-related heat capacity cp has the unit Joule / (kg * K), whereby for our consideration the (kg * K) should not play a role at first. The important thing is: “Joule” is a measure of the energy or heat, which is what we are talking about here. If you irradiate a gas or heat it in some other way, it will store heat (i.e., joules) according to its physically defined heat capacity. Incidentally, the gas does not care whether the thermal radiation comes “from above from space" or "from below from Earth”.

A comparison of its heat capacity and its share in the total volume of the other gases in the atmospheric air or in the breathing air is decisive for the assessment of CO2 in this context, and the following applies:

As you can easily check using the literature values, for example, normal breathing air has a mass-related heat capacity of approx.1,000 J / (kg * K), while CO2 with approx. 800 J / (kg * K) is by approx. 20% below the value of the air you breathe and can therefore store less heat than normal air.

You have to read through this sentence in peace and let yourself sink in .. and then ask yourself how it can come that CO2 is demonized because of its ability to store heat, while normal breathing air can store even more heat.

If one - in addition − also regards the fact that the volume fraction of CO2 in the air is specified as 0.038%, i.e. in the per mile range, a reasonable person should not be alarmed by the statement that "the CO2 share in the last 10 years but would have increased from 0.0275% to 0.038% "... which, by the way, would not have increased the overall ability of the air to store heat, but would have – marginally − even reduced it.

Questions about measurement technology: As a mechanical engineer specializing in measurement technology, I ask myself, of course, who measured these values when, how often and with which method, given information in the per mile range of this increase from 0.0275% to a fabulous 0.038%. How reliable are these values? Every measurement is afflicted by a measurement error and, especially when determining very small, measured variables, careful attention must be paid to ensure that the measurement error of the measuring apparatus does not reach the expected magnitude of the measured variable. In this case one would have to demand that the measurement error does not exceed the size of 0.0001% if one publishes such figures and that is difficult to achieve.

Argumentation with the "absorption of frequency spectra". For a little more on the subject of well-read contemporaries, I would like to address this special topic, because in the whole discussion that can be found, especially within the anti-CO2 faction, the following argumentation repeatedly occurs:

The following picture shows the absorption of IR light, above water vapor and below CO2:

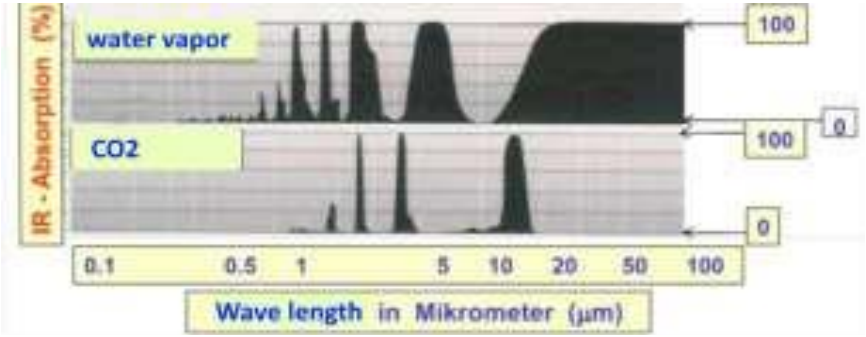

Figure 1. The absorption of IR light; water vapor and CO2

The thesis is always that the CO2 absorbs 100% certain parts (frequency spectra) of the IR light and holds onto this energy or does not release it into space.

This statement is initially CORRECT in itself; however, it requires classification or interpretation. We are here in the area of energy transfer or heat transfer through the mechanism of radiation. At this point, well-known gentlemen from contemporary history such as **Max Planck** and colleagues come into play, but in order to remain understandable, I leave them out here.

Only: such a "quantifying" statement is of course completely worthless if one does not say what amount of CO2 and what dose of IR radiation were involved in this experiment. "100%" ... but of what?

Again, facts from physics. It is correct that the radiation as a mechanism of energy transfer is primarily to be considered here. Radiation − easily imaginable even for the absolute layman − has something to do with wavelengths and frequencies and in fact it is the case that different molecules absorb different wavelengths or frequencies when absorbing energy = heat (they are the reciprocal of each other if you still have the time into play) or can only absorb energy in certain frequency ranges.

Now comes the crucial point: all gases in the air do it that way! This is completely normal: every gas has its specific frequencies in which it can absorb more or less well.

... which, by the way, means that its energy consumption is practically zero at all other frequencies and, as the picture shows, the CO2 does not have very many peaks, namely only 3.

Since all gases (must) behave in this way, I cannot deduce any danger to the earth from this alone, from CO2, even if I wanted to.

Classification of the absorption. To put it clearly: Radiation is a mechanism to transport energy = heat. That alone says nothing about how much heat was transported and therefore does not give any direct information about the associated warming up. Nobody denies that a CO2 molecule, like any other gas molecule in the air, receives radiation and is consequently warmed up by the absorbed fraction.

But it is also clear that a molecule can only store a certain amount of energy due to the physical property of heat capacity (see above, there it is again!), provided the temperature does not increase.

Criticism / discussion. Nobody denies that a gas molecule can heat up and store heat when irradiated. Every gas does that. Our topic here is to find a starting point for an exceptional position that should be assessed negatively, and we do not find it, at least not this way.

However: if you can absorb heat, you can / must also release it again, but that was going too far here. And as far as "the temperature" is concerned: what temperature are we talking about? When and where measured? Annual averages are not to be used for physical calculations!

Summarizing physical evaluation. As a result, it appears that the heat capacity of a substance or gas alone is decisive for how much heat can be stored in the substance under defined temperature conditions. Substances of the same heat capacity behave in the same way in this regard. As already shown, CO2 has a heat capacity of the same order of magnitude as the rest of the air combined. All gases in the air are subject to the same radiation and absorb heat or give it off again in higher, cold air layers. An exceptional position for CO2 is not discernible.

The Conclusions. This CO2 bashing was introduced sometime from somewhere into the world and as in science and, of course, in politics, one copies the other (this is called "quoting" if it is done according to the rules), and how so often without even thinking. Lately it has gone so far that politics, which are often completely uneducated in these issues, can think of nothing better than to think out loud about a CO2 tax and to make the famous stupid "German Michel" (the man on the street) know once more that he will have to pay more money to the "omniscient state" as a result.

No sensible person is against a good environmental policy, not even industry and I am certainly not against energy savings with the automatically associated reduction in CO2 emissions. But I am strictly against misleading people and targeting false opponents, because all measures aimed at incorrect information are an expense for the cat. In the case of fluorocarbons (CFCs), for example, the situation is completely different: there, chemical- physical effects can be demonstrated which have a damaging effect on ozone holes. Such effects are not known with CO2.

Yes, we are currently experiencing global warming and yes, we should basically use our resources as sparingly as possible. Completely haphazard measures such as a CO2 tax testify to ignorance and helplessness rather than to measures with climate policy effectiveness.

However, we should be careful not to cut down the green lungs of the earth significantly, which give us the beautiful oxygen, which, by the way, has not yet decreased.

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