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Climate Concepts

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1. Introduction

This presentation was given at the Clintel Climate Conference in Prague. It was designed to be as simple as possible to describe two competing climate theories, the Radiative Transfer Concept and the Heat Transfer Concept, and that they are both valid and work together.

The Introduction included a few slides to show the foundation for these concepts. The research was led by Douglas Lightfoot, with me as the co-author. We collected our data using a cell phone and the AccuWeather website, which contains over a million locations with a surface weather station. The typical weather station is called a Stevenson Screen, which is a white box with slats to let the air pass through. Advanced versions are connected to the Internet and are read once an hour. Our research design was to see if high-level climate research could be done with just a cell phone and a laptop computer. Just 20 locations around the world were chosen to cover as many different typical local climates as possible, including the polar, mid-latitude areas and the Tropics. The metadata for each location included the latitude, longitude, and elevation. Once a month all the local weather details, such as temperature and humidity were read and entered into an Excel spreadsheet. With just 20 locations and three or four numbers for each location – all 20 could be recorded in an hour. This meant that they were essentially done at the same time – before the next hourly reading would change the data values. This was repeated every month for a year – so in total 240 different sets of readings made up the main database. From this data, a set of six papers were submitted for peer review.

An add-in to Excel was found, called Humidair, which implemented the Ideal Gas Laws. Humidair uses the molar mass version of the Ideal Gas Laws – **PV = nRT, P** is pressure**, V** is Volume**, T** is the Temperature, **n** is the number of molar masses and **R** is the Gas constant. Given just the Temperature and Humidity, Humidair can calculate some dozen different parameters of the local air. These include the humidity ratio, the specific humidity, the enthalpy and more. Knowing the concentration of gases in the air – e.g. CO_2 at 420 ppm, many other calculations can be done. For instance, the first diagram shows the division of the Earth into sections and what percentage area is each part. This is a simple example of what can be calculated from the collected data.

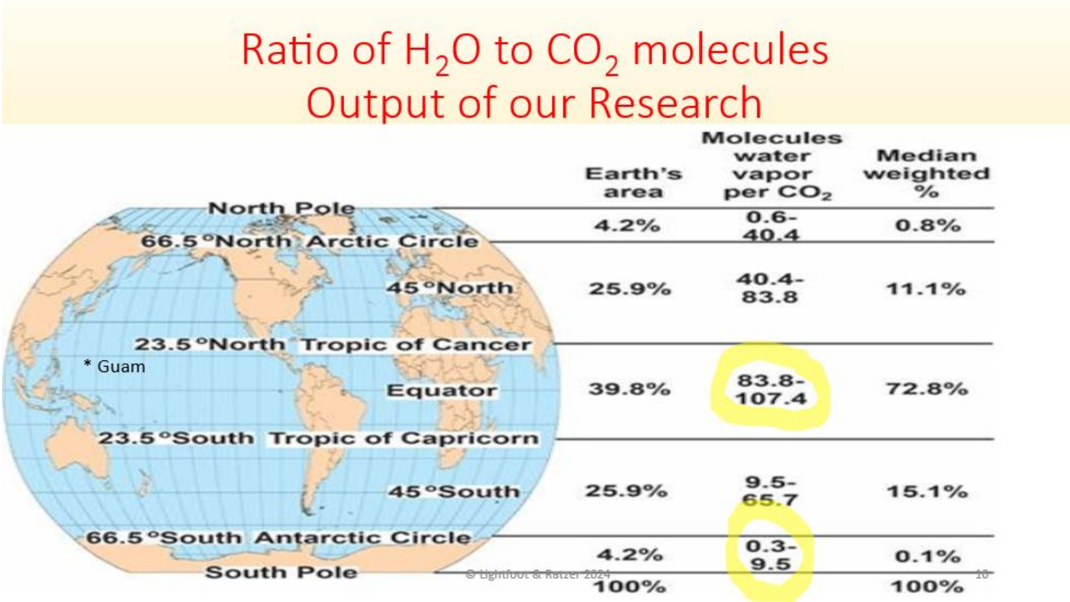

Fig. 1. Ratio of H_2O to CO_2 molecules

Note the Tropics cover almost 40 % of the Earth. Everyone knows the Tropics are hot and humid but could not give even an approximate guess for the ratio of water vapour (WV) molecules to CO_2 molecules. In the Tropics, the ratio is anywhere from 80 to 100 times more WV molecules to CO_2 molecules. On the other hand, in the polar regions, this ratio can be close to 1 to 1. This is a reflection that Vostok in Antarctica is the driest location on Earth – drier than deserts like the Sahara.

We assert that the surface (~2m) data (Temperature and Humidity) includes all the local physical effects from latitude, elevation, Sun angle, Sun's variability, proximity to oceans and lakes, clouds, Urban Heat Island effect (UHI), precipitation, wind, local albedo, and any recent volcanic action. Also included are any feedbacks and the interaction of the 99 % non-GHG gases N2(78 %), O2(20 %), and Ar(1 %), and the main GHGs of water vapour and CO2 (the remaining ~1 %) make our weather.

From this data, we can calculate the enthalpy, which is the total heat in kilojoules per kilogram. This allows us to further find the enthalpy of any gas in the local air, provided we know its concentration and specific heat – which are readily available. Using this technique, we have written six papers which can be found here and in the references at the end of this Abstract. The link above is to the most recent of them (but also lists the other ones) which analysed all 61 greenhouse gases GHGs and showed that only Water Vapour (WV) had a detectable warming effect. Other papers have shown that the warming from CO_2 at 420 ppm is 0.00496°C and is too small to measure on a global basis. Doubling CO_2 concentration to 800 ppm - the warming increase is still immeasurably small (~0.01°C). The link above also gives you access to "Suppl", which is the supplemental data and all the details of the calculations in the Excel sheet.

2. Main message

This research forms the background and foundation of the current presentation. RTC – the Radiative Transfer Concept has been well studied.

The main source of our energy is the Sun, which emits energy as photons, that travel at the speed of light. These photons vibrate over a wide range of frequencies (colours). At the Top of the Atmosphere (TOA) about 1,366 watts/m^2 of energy arrive. The albedo is 0.30 or about 30 % of the incoming sunlight is reflected. About 240 watts/m^2 arrives at the surface on average (~ quarter). At the surface about 2/3 cools by local heat and 1/3 by emitting radiation.

When an individual photon arrives at or near the Earth's surface, it can be scattered or absorbed by the dense, moist surface air. This process is called thermalization and converts the photon energy to heat energy. HTC or the Heat Transport Concept is the second part of understanding the internal processes of our weather and climate. HTC is just classical physics, governed by the four Laws of Thermodynamics. These are taught in high school and are much easier to understand than the quantum mechanics needed for RTC.

The important air molecules are Nitrogen, Oxygen and Water Vapour. The optical depth/transparency at the surface is very opaque to photons. In the upper atmosphere, an excited air molecule can relax – by spontaneous emission and emit a new photon to space – in any direction.

Once a photon has been thermalized – its energy is now heat. The heat of a gas is the average kinetic energy of the molecules. Heat moves with a medium (gas, liquid or solid) by a few processes, namely - Conduction, Convection, Evaporation, and Gravity. In the Troposphere the important one is Convection from the surface – up. In the Tropics, much of the sunlight energy is used to evaporate water. This phase change from water-to-Water Vapour (WV) must overcome the Latent Heat of evaporation of 2,454 kJ/kg at 20°C. The warm moist air moves upwards, against gravity, to the dew point where condensation takes place, releasing heat for more upward travel. This upward rise is a gain in potential energy for the warmed gas molecules.

The atmospheric winds and the oceans are the main ways to transfer heat from the Tropics to the poles. Considering there is about 1,000 times more heat in the oceans than in the air. The ocean currents are the major way to transport heat to the poles. The Gulf Stream moves at ~4 knots but keeps Scandinavia ice-free. The trade winds, jet streams and Hadley cells move heat as well.

Under the oceans, there are many volcanoes which heat the oceans. Hunga Tonga was a submarine volcano, which blasted a huge amount of water into the Stratosphere, which warmed Earth for some 20 months. These submarine volcanoes give rise to El Niño and the "Warm blobs" in the Pacific and Atlantic.

3. Conclusions

The Radiative Transport Concept and the Heat Transfer Concept are described, and both are needed for a complete understanding of the heat transport in the atmosphere. There is no need to reduce CO_2 and no need for Net Zero.

The presentation finishes with suggested Recommendations for Policymakers, some of which appeared in the Conference communiqué.

Guest-Editor: Stein Storlie Bergsmark

References

- Lindzen, Richard – MIT, CO2 Coalition ICSF GWPF Talk Paper

- Happer, Will – Princeton, CO2 Coalition ICSF GWPF Talk Paper
- John Christy and Roy Spencer at UAH – Talk Talk ICSF
- Judith Curry – Climate Etc. Talk
- John Shanahan – allaboutenergy.net Search: Lightfoot Ratzer papers
- Benny Peiser – GWPF Global Warming Policy Foundation ICSF Talk
- Guus Berkhout – Clintel WCD – World Climate Declaration Talk
- Alex Epstein – Fossil Future Talk