Expanding Earth's Geothermal Debate

Earth is far more than a lucky planet, with a stable star solar system and the just right Cinderella distance from the Sun. Earth is an incredible complex series of physical properties that have allowed equally complex life forms to develop. The distortions and hyperbole associated with Carbon Climate forcing have opened a wider discovery into, thus far, unnoticed Earth processes.

To explain macro events like Glacial-Interglacial cycles and seemingly random tectonic events, you must focus on the underlying forces at work. One of the most unnoticed is Earths geothermal energy. The advocates for Carbon forcing have neglected this energy as being only 0.17 watts/meter^2 and as constant. It is important to discuss these errors.

We will begin this study with a discussion of our dear solar companion, the Moon. Being the same distance from the Sun we share identical insolation values. A quick visit to http://psrd.hawaii.edu/Dec96/IceonMoon.html provides some basic Lunar conditions. The poles have a constant temperature of ~40 K, the equatorial belt has 35 K minimum and 385 K maximum, giving an average of 178.45 K [or about -95C or -140 F].

This would be the condition on Earth except for a number of fortunate variables. First, we have a magnetic field that shields us from some of our Sun's activity. Next, the Moon makes one solar facing rotation every 28 days and we rotate every 24 hours. We have an atmosphere which prevents 30% of the solar warming, distributes this energy around the globe, and thankfully insulates against rapid heat loss overnight.

Earth has 310 million cubic miles of ocean that act as a heat sink and evaporative cooler. Finally Earth has an internal heater that sets the system base rate temperature. Given the massive scale of all of these systems, it is preposterous that trace levels of a natural occurring gas could be in control. I have many colleagues who agree and we have battled the climate orthodoxy for years.

Recently a Fellow Non Believer posted an article on the misinterpretation of Radiative Transfer. This was followed by an online chat among fifty, multi-disciplinary scientists from every sector. In that exchange, a prominent Physics professor made this statement with regard to the Moon's core temperature…

> "The temperature of its core is going to be very close to the average of the temperature distribution of the on the surface. If the Moon is still heated by radio-actives or has leftover heat from its original formation (both possible), its core temperature would be higher."

The core temperature of the Moon is more than academic trivia as we shall soon see. In researching this quantity, this site http://www.infoplease.com/ce6/sci/A0859765.html states the core temperature as 557 K, or 830 C based on recent analysis of 35 year old Apollo seismic data.

Extrapolating core temperature from meteorite impacts with crude instruments and estimates of meteor velocities and mass is as far-fetched, as fifty years of Earth's temperature records being revealed, ONLY in the tree rings from three trees. Such is modern science, but this does establish an upper boundary. For surface averaging to have any value it must demonstrate some residual value.

When you review the Lunar temperature profiles it is striking how rapidly the Moon heats AND cools. This is almost a step function, indicating almost no downward heat migration. The logical conclusion is that the Moons core temperature is in fact the same as its poles and its unlit side, ~40 K. There is no evidence of any radio-activity and any heat of origin has had billions of years to escape, making these claims irrelevant. So why is the Moon's core temperature important ?

But for the magnetic, atmospheric, oceanic and tectonic forces mentioned above, this would be the core temperature of the Earth as well. There is a vast difference between the Moon's core at ~40 K and Earth's ~4200 K, [or ~4470 C or ~8000 F] core. So where is the evidence of all of this heat ?

Climatologists claim that the measured heat flow on the continents of ~0.2 watts/meter^2 is uniform distribution and from that calculate a ridiculously low amount of heat being generated. It is the nature of all forces to take the path of least resistance, and heat naturally flows to the best available heat sinks. In the case of Earth, this is the ocean and the poles.

We will now construct a simple analogy to demonstrate this system. You are in the kitchen, cooking away on the stove and want to know the temperature of your kettle. First, what is in the kettle determines the boiling point. A heavy lid will increase pressure which raises the boiling point, and variations with the burner will effect temperature. This is the analogy of the Climatologist method of temperature measurements.

The lid is heavily insulated with a few pin holes, termed hot water geysers, and exposed to the room temperature. Measurements of this surface provide no useful information of the cooking below. If you were to measure the steam flow temperature and rate around the entire lid you would have an adequate measure of the energy flux and you could spot variations that you would never detect with the insulated lid measurements.

Now back to the on-line chat and the Moons gravity effects on Earth. The Moon daily lifts the seas causing ocean tides, but it also lifts the atmosphere, and along with solar gravity, creates 12 and 24 hour cycles of pressure gradient forces that supplement other jet stream factors. In addition, the Moon lifts the Earth's crust by 18 inches every day.

This Earthtide causes the tectonic rift zones, where large portions of Earth's geothermal energy escapes, under 5000 ft of water, and at 150 atmospheres of pressure. This is one of our great heat sinks, the other sinks are the poles, with this on Antarctica. The Russians recently drilled through two miles of ice to reach the liquid water of Lake Vostok.

Since heat always flows from a hot location to a colder location, it is illogical to refer to two miles of ice with a surface temperature of 210 K [-60 C or -70 F] as any form of "insulator" as some on the multi-discipline CC chat attempted. We now have two massive heat sinks, so let us return to our boiling kettle.

Now our massively heavy and well insulated lid has a liquid seal [oceans] around the edges which prevent detection of the steam heat flow. In addition, two massive ice blocks [poles] are on opposite sides subtracting additional heat. The boiling contents occasionally gum up the rim, causing the pressure to build. Mommy Moon makes a regular pass and lifts the lid slightly, venting heat and pressure.

Occasionally the lid will stick, will build up pressure causing a sudden "Lid-quake". Occasionally a swarm of pesky Cosmic Neutrinos race thru the kitchen and adjust the burner up or down. We now have a more complete model for real Earth science than any Climatologist has ever presented.

If you want to know the actual value of Earth's geothermal energy, study where the vast majority of energy is being released. Verify enough average temperatures and flow rates, at enough under sea vents, then multiply this by the thousands of miles of undersea rifts.

Next, recognize that it is only Earth's fission energy and a thin atmosphere that keeps Earth's poles from being the same as the Moons. Therefore, multiply the area of the Antarctic and the temperature it wants to be, along with the atmospheric insulation value. You now have some understanding of these invisible forces.

Instead of a cozy kitchen at 70F we are now standing in a cryogenic freezer [outer space]. Take away the heat from the burner, and the solar insolation will barely melt the frozen oceans by day, and Earth descends to the Popsicle Planet conditions of the past. A rapid twist of the burner can cause a sudden pressure release, like the Yellowstone eruption that hurled 250 cubic miles of granite into space and covered the Great Plains with 6 ft of ash.

Now consider one change in this system. If Earth had no Moon there would be no ocean tides and reduced jet stream winds, causing reduced surface winds. Removing the cleansing and mixing effect from these forces would cause stagnation of the oceans. With no Moon there would be no tectonic plate drift and all excess geothermal energy would be released by volcanism, adding ash and chemicals to the atmosphere without the ocean rift filter system.

Now consider how Earth science has treated the geothermal issue. The most referenced value for geothermal energy is http://www.agu.org/pubs/crossref/1993/93RG01249.shtml A pay-wall article of 24,774 observations from 20,201 sites, meaning few sites were measured more than once. The averaged measured grid data was 0.065 w/m^2 for land based and 0.101 w/m^2 for ocean floor sites. This gave a weighted average of 0.87 w/m^2. A value Climatologists have reluctantly allowed to be adjusted upward.

The Abstract from this 1993 era AGU article also states that this "new estimate is….an increase of 4 – 8% over previous estimates"….of 8 – 10 terawatts. Over time estimates continued to rise, to 40 Terawatts by 2003, when this article http://physicsworld.com/cws/article/news/17435 announced the discovery of extra heat released by Potassium-40 and increased estimates by 10% from the then 40 terawatts guess. Estimates continued to rise when in 2009 this study, http://newscientist.com/article/mg18725103.700 from the KamLAND experiment raised total output to 60 terawatts.

Clearly, estimates of Earth's geothermal energy are rising faster than a hockey stick curve. A reasonable estimate of this is required to provide an energy balance, which is more accurate than the current radiative balance, but what is more important than the final agreed total output, is the VARIABILITY of this energy source. It is this small variations that cause the ocean PDO and AMO cycle changes and creates climate change. If planet had no internal fission, it would be a frozen wasteland matching the Moons extremes of night and day, as well as latitude temperature variations. Earth is blessed with an unbelievable number of life benefiting systems.

There was more email discussion among the CC list professionals on how Earth's fission can be variable, a subject I've covered before and with address again in another post. If you have no description for the macro events, you have no business dictating the condition of the micro events. Carbon climate forcing maybe the worst science of all time, but it does have some contemporary rivals, a subject that I have also covered.

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