THE DYNAMICS OF WATER DEPLETION AND GLOBAL WARMING

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Abstract: Water is the most vital liquids on our planet which makes this study to focus on the regimes of human disturbance and the dynamics of water involving energy discharge, motion, change of state, and other relationships that compromise the phenomenon of global warming. The objectives show that land use activities contribute to this prodigy; dielectric permittivity in connection to microwave heating was used to show the vulnerability of our atmospheric water, and the results revealed that aerosols are derivatives of human activities from different land use practices, especially urban, industrial, and agriculture. Furthermore, water was identified as a self-protected land use--the Polar Regions are ice-protect creep zones; other regions with thermal agitation, water becomes fluid and flows into any shape it can find to avoid depletion--protection against thermal runaway. This dynamic flow, including the melting of polar ice, partly determines global climates and local weather at sea level.
Keywords: Thermal agitation, thermal-runaway, creep-zone, aerosol, and dielectric permittivity.

INTRODUCTION

Water experiences widespread thermal distress in many regions of the Earth through global warming concepts. Global warming has become emergent in recent years but its environmental consequences have not been grasped with any sensitivity of impacts to urban and rural living, which include continuous random displacement of humans in various cities around the world as temporal to permanent climatic refugees. Hurricane Katrina in the Gulf States of the United States of America was a typical example. Water is naturally polarized. This makes it a target for microwave heating through electromagnetic radiation. In addition, aerosol or land use activity dusts serve as climatic enzymes that infiltrate and thermally agitate the state of atmospheric water in adiabatic process of cloud formation. Governments, politicians and laypersons are therefore, compelled to contribute positively to further protect the planate or live in anticipations of random threatening and destructive weather conditions as they loom more frequently.

The basic structure of water as a natural dipole was emphasized in three states of water: solid-ice, fluid-liquid and vapor. These natural states of water are common to humans. However, water appears in more complex forms in aqueous media (largest habitat coverage of water bodies); this includes water-the nomenclature of the existence of the liquid composed of two hydrogen and an oxygen atoms; marine, the nativity of larger coverage of water bodies, and Ocean--the largest coverage with greatest relative penetration of the Earth crust. These dynamics are obvious because of the area coverage and relative penetrations of water bodies on planate Earth. Rivers and streams are the friendliest, smallest and the most harmonic water bodies, with highest cohabitations with human and their daily development activates.

Liquid water occurs in different forms like free water in cavities or spouts of water on surfaces; bound water or slush; water of crystallization or water of constitution. Liquid water is also located as surface and subsurface water, which account for about 0.6222% of total Earth's water. The majority of water comes from ocean water, about 97.2% of Earth's water [6]. One common parameter of these forms of water is the changing dielectric property when water changes from one form to another [12]. Most importantly is water in the form of solid-ice and glaciers. This accounts for about 2.15% of total Earth's water system. The third state of water is gaseous state or vapor, which accounts for about 0.001% of approximated total of Earth's water distribution. With this volume, the adiabatic process of the clouds in the atmosphere defines different climates. Climates, fundamentally affect global and regional environments by infiltrating clouds formations with carbon-base aerosols, which are targets of microwave heating; hence, the inclinations to global warming[1]. Clouds build around aerosols which develop from land use activity dusts (LUAD) derived from different geographic locations as pollution[1].

PURPOSE OF THE STUDY

The facts about global warming strictly rely on the machineries of interpretation of columns 4 and 5 of Table 1; rainfall and evapotranspiration, respectively. The Table shows a balanced quantification of water received from rainfall and the quantity lost due to evapatranspiration. Such balance will not be achieved on any local or regional approximations. Rather, it is a global balance determined by local and regional contributions. It answers the questions on global warming, how could the planet be covered with water if the polar ice melts away? The probability is stable that the Earth would not be entirely submerged under water because it has an achievable hydrologic balance. But local cities and geographic regions cannot achieve such balance; therefore such severe weather developments could frequently foul local/regional livelihoods. The knowledge is purposeful that the impacts are random and may continue to hunt different cities and regions around the world. The universal concern of what we put up into the clouds through different land use practices is the focus because the clouds bring it back to us in terms of severe weather. Aerosols (dust particles), water and ice particles that form clouds range from 0 to 50 microns, and are capable of absorbing radiant energy in the form of heat, especially microwave heating, from electromagnetic radiation [10][1].

Table 1. Earth's water distribution.

Location	Vol-1000 mile³	% of Total	Rain fall	Annual Evapo
Surface water				
Fresh-lakes	30	0.009		8.137
Saline-lake/sea	25	0.008		6.781
Rivers/streams	0.3	0.0001		0.0814
Total on land	55.3	0.017	9	15
Subsurface				
Soil Moisture	16	0.005	15	
Grndwater<1m	1000	0.31		
Grndwater>1m	1000	0.31		
Total	2016	0.625		
Ice & Glaciers	7000	2.15		
Atmosphere	3.1	0.001		
On Ocean	31700	97.2	71	80
Grand Total	326000	100	95	95

Data derived from (Leopold et al, 1968)

The particles need aerosol alliances to build clouds, which are derived from LUAD via desert floors dust, volcanic ashes, salt residual from dried water vapor, forest and forest fire, and notably from urbanization and industrial combustion [11]. These LUAD are contributed in the order of 0.1 and 1.0 micron and act as climatic enzymes. They attract water particles in the atmosphere (hydrometeors) to build mist, rain, ice pallet, freezing rain, snow, and ocean spray around them, and condense into particles and patches of clouds [13].

DISCUSSION

A focus was made due to the fact that the distribution of water vapor is a function of temperature, the adiabatic process responsible for precipitation. This process converts latent heat to effective heat, which is sufficiently unlikely to allow the cloud particles to keep growing denser and in diameter. Therefore, between 50 to 100 microns, the water droplets start to coalesce into heavier droplets of about 500 microns in diameter; these sizes of water droplets transform to drizzling precipitation. Droplets that coalesce up to 1000 microns to about 7 mm (1/25 inch to 1/4 inch) are significantly unstable. They break off and fall back to earth as rain. This type of rain is frequent in tropical climates [11]. The statistics of how water change from one state to another, such as thawing, was also discussed.

Thawing of water. **W**ater undergoes thawing when it changes from one state to another. What becomes of the water quality after the process, creates concerns on the dielectric loss factor, the latent and sensible heat, and the asymptotic tendencies-thermal runaway or creep zoning effects. These tendencies were classified as eternal structuring-1 and -2, (E_t and E_c), respectively. For example, a block of ice at temperature t_0, melts to water at temperature t_1 such that a very small additional temperature (Δt) will cause the water to escape to eternal structure E_t (vaporize), or creep back to eternal structure E_c (solidify) at t_0. The focus on Δt is to determine the dielectric loss factor. Remember that ice builds around LUAD. This may play a role in the complex permittivity (ε) of the ice. Complex permittivity is defined by [12] [8] as: $\varepsilon = \varepsilon' + j\varepsilon''$ …eqn1 (ε' = dispersion factor and ε'' = dissipation or loss factor) [4]. For the fact that E_t and E_c have properties that the derivative of E_c is the integral of E_t, the function can be represented with an exponential function e^t such that $de^t/dt = \int e^t \, dt = e^t$ …eqn2. Mathematically, exponential function is defined as Ke^{qt} such that q is generally^G complex and ($-\infty < t < \infty$). Hence, q is writable as: $q = \delta + j\omega$. …eqn3. The expression in parenthesis implies that the function is eternal--to represent the eternal structuring domain of E_t and E_c. The nature of q allows for mathematical manipulations of the function to express constants, monotonic and varying sinusoidal functions. The superscript "G" shows how equations 1 and 3 are similar. Therefore, the expanded definition of exponential function would be: $e^{(\delta + j\omega)t} = e^{\delta t} e^{j\omega t}$ …eqn4. [3]. The difference between the real (cos ω*t*) and imaginary (sin ω*t*) parts of equation 4 is just a phase shift of the wave on the independent variable-time. The decay and direction of the wave depends on the values of δ, which can be replaced with the dispersion factor ε', equals (ε' - ε''). The loss tangent is equivalent to the ratio of the exit-energy and the entry-energy (ε''/ε') (Figure 2). If the ratio equals zero, it sufficiently implies the conductivity of a very low lossy or perfect dielectric [2] [8].

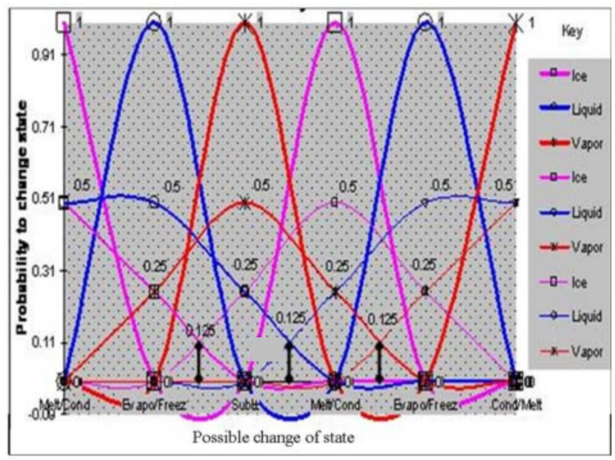

Figure 1. Change of the states of water.

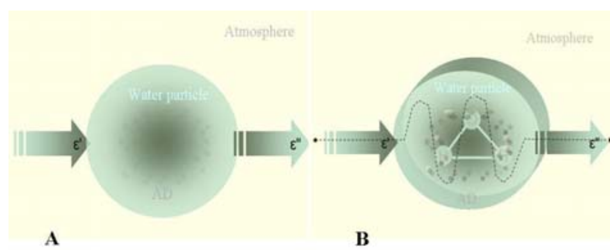

Figure 2. LUAD-effect on polarization-- ε' and ε''.

The ε' and ε'' are measurable parameters in E_t and E_c. Figure1 shows probabilistic dielectric integrity of water, vapor, and ice, the fully extended heavy lines, and change of state--the thin solid lines. The accessible probabilities of the states of solid ice, water, and vapor respectively holds the integrity of state until it reaches the critical zone-the short vertical solid lines; the probability to change a state aproaches zero due to the fact that if it does, the state will be locked in eternal state; for example, ice will continue to remain ice and can not convert to water or vapor again. To avoid this possibility, the states of ice, water, and vapor respectively uses air and other impurities for volume manipulation in order to create thermal creep protection (TCP) and thermal runaway protection (TRP). This manipulation allows for electric and magnetic susceptibilities, including the dielectric properties. Otherwise, Earth's water will be in extinction. That is why ice float on water irrespective of size, to avoid locking the state of ice in eternal frozen and denser state.

FINDINGS

When dielectric loss factor increases with thermal agitation, a binary instability occurs. In TRP, the interior of the ice remains stable while the exterior is unstable. The dielectric loss factors associated with the binary instability: ε^o is equivalent to the initial dielectric before the change or the interior ε'', which is now different from the dielectric of the surface after the change has started-ε^1. For example, when heat is applied to ice, the surface ε'' immediately changes to ε^1 while the interior change to ε^o but ($\varepsilon^o \approx \varepsilon''$). The same is the case when water begins to form ice (losing TCP). The ice begins to form water from the surface toward the interior at about 39°F. This is the first creep zone. Secondly, the ice water slightly loses its oxygen/hydrogen bond to accommodate air pockets around distributed mobilized tiny water drops. Further, at 32°F, it becomes a solid, which is the third creep zone. This makes the ice lighter than water, so ice floats on water. The ice further bond in n-molecular networks to accommodate more air pockets, in the interior, and its structure gets more rigid but lighter. This is the fourth creep zone resulting from other creep protections.

Creep zoning is the inverse of thermal runaway but our interest is the binary instability ε^o and ε^1, their thermal relationships which increase with temperature and frequency. But ε^1 is sensitive to thermal orientation or thermal vectors; hence it is the front loading of activities of the changing state, and ε^o is the back loading; both are independent of each other.

The probability that a frontloading activity happens together with a backloading remains a coincidence that factors out as natural motions, such as wet and dry adiabatic movements; wind with hot and cold fronts, thunder storm with positive and negative charges. Since the loading of the changing state is separated by some ill-conditioning butterfly effects, the significant of the binary instability expresses the order of absorption in liquid water ($\tan \delta = 0.31$), and solid ice ($\tan \delta = 0.0009$) [12]. The front and back loading of the imaginary state differ by a factor or upset amplitude separated by real active environments such as urban areas. This implies that a very little thermal instability, like water tempering from land use activities, can trigger the upset amplitudes of the imaginary environments, which we experience as threatening weather/climatic conditions. Therefore, we don't have to do much, to positively or negatively effect global warming.

Water Tempering. Water is always tempered naturally and in domestic, agricultural and industrial applications. The dichotomous concerns for global warming include water tempering. 1). Meddling with the immediate state of water after any change of state. 2). Contributions to the instability of the immediate state of water. Ice may attain stable equilibrium but water, in fluid state (vapor or liquid water) is always in unstable equilibrium. Hence; regimes of activities and environments that contribute further instability to the fluid systems are major threats to global thermal stability. The environment does not have to be thermally promoted. It could be due to dry adiabatic lapse rate, which after the level of condensation goes further into wet adiabatic lapse rate, and yet further, to produce precipitation [11]. These regimes of activities develop from LUAD rising from different land use categories such as industrial, commercial, agriculture etc; hence, they are regimes and dimensions of human disturbance in urban and forest ecosystems. LUAD infiltrates and tempers with the orders of water particles in the atmosphere through the dissipation factor and loss tangent expressions ($\varepsilon' - \varepsilon''$ and $\varepsilon''/\varepsilon'$) (Figure 2). The maximum value of these expressions are computed at the frequencies where ε'' is maximum for different types of water. The value is dependent on the contribution of the permanent dipole expressed as the difference between the dissipation factor in static medium and the square of the optical index of the medium $(\varepsilon_s' - \varepsilon_\infty)/2$ …eqn5. It is equivalent to the ratio of the volume of polarization and the period of the wave $(Vp^2)/(6kTe_o)$ …eqn6. The relationship between the quantities e_o and p is the electrical susceptibility of the medium. The maximum value of ε'' is dependent on this susceptibility, and is capable of hindering dipoles rotation due to intermolecular bond [12].

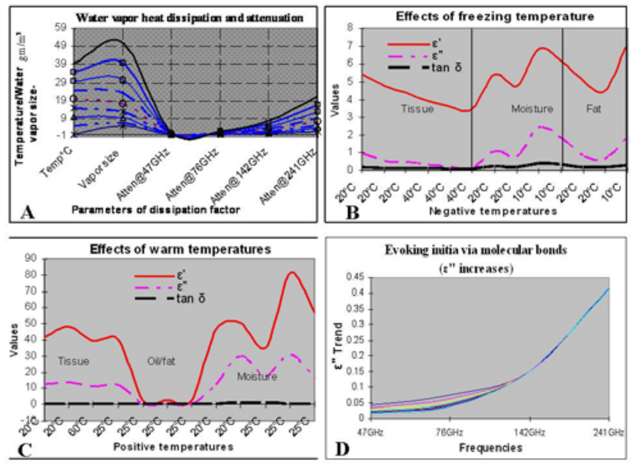

Figure 3.Thermal agitations. Data from [1] and [12]

As radiation passes through the water particle, the particle wobbles in polarization; dissipates heat until it returns to normal molecular disorder. The return to order is the process of relaxation of the polarization, to about 63%. Data used by [1] for water vapor and oxygen, attenuation of microwave transmission were applied here to explain dipole alignment polarization (frontloading) in electromagnetic field at different frequencies (Figure 3-A), and different temperatures (Figure 3-B and 3-C).

Figure 3-D shows that at lower frequencies, the dipole have lowest attenuation, suggesting no wave difference. This implies that the orientation of the dipoles is in synch with the local electric field. At higher frequencies, the dipoles evoke inertia due to intermolecular bonds in denser materials like ice and water. This produces friction that disengages the dipolar rotation, the synchronization already established between the local field, and the orientation of the dipoles. Hence a phase difference builds in the relations of the field and the dipolar polarization, which now becomes dormant to ε' and ε'', but not to ε_∞, the optical permittivity or index of the medium. The dormancy in equation 1 $\varepsilon = \varepsilon' + j\varepsilon''$ …eqn1 is shown in Figure 3-D, and its contributions to ε'' now shifts to the static permittivity $(\varepsilon_s - \varepsilon_\infty)$, and this is dependent on the periodic orientation or alignment of the dipoles with the local field (frontloading). This significant observation shows that at lower frequencies, the conditions in Figure 2 are possible, and otherwise, at higher frequencies. Hence rain results from some type of natural frontloading disengagements-coalescing of water vapors immediately after the adiabatic process in the atmosphere [11].

The dipole of water makes it a target for microwave heating due to energy dissipation from the field of the EMR. Therefore, the heating of the water vapors is a process of microwave absorption, and hence its attenuation by rain. Consequently, the data from Figure 3 were plotted with the assumption that the maximum attenuation or energy dissipation occurred in the frequency continuum at which ε'' is maximum. It also reveals the trend values of ε'' and their corresponding ε' at different frequencies. [5] also shows that ice clouds and rain attenuate microwave due to particle size.

Tempering of water has always been serious concern, especially when it increases the instability of the state of water, as shown in Figure 3 (A) (B) and (C). The concourse of Figures 3 and 4 includes demonstrations that lean on microwave radiation to show that the sizes of oxygen and water vapor generally increase with temperature. Hence rain clouds, fog, snow and hail, but dry snow; attenuate microwave signal (may not be significant) [10]. With this exception, precipitation ranging from drizzle, light to heavy rain, and intense torrential thundershowers may affect microwave at high frequency. This includes fog that results from temperature inversion near the Earth's surface [7].

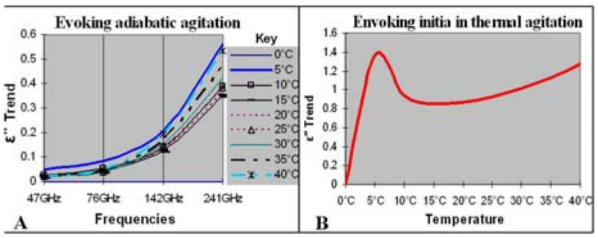

Figure 4. ε'' as function of temperature.

The consequences of water tempering constitute voluntarily and involuntarily environmental hazards to include damages by hailstorm, lightning-forest fire and death, and tornadoes-personal damage and death. The summary of this study is on the human dimensions of land use disturbance via LUAD to upset the latent heat of atmospheric water on local, regional and global bases. The planetary response is through natural forcing functions to balance the energy produced in the system and the state of water. This was shown in Table 1. The process involves the patterns of trans-latitudinal transport of water vapor for global water balance. [11] showed that this process involves an average transportation rate of about 8.3 x 10^{13} kg of water per month, and to move around this amount of overhead water volume in approximately 30 days, has huge consequences due to adverse weather. This water is air-lifted and falls back as air-driven rain. The distribution decreases pole-ward due to reduced solar radiation toward the poles.

The human contributions to this system are demonstrated in Figure 2--what we put into the air from our land use practices--LUAD. This point of view seem insignificant [13], due to the fact that water and its alliances are already in unstable equilibrium; very little negative contributions will ill-condition the system into thermal agitations with the capabilities of causing creep structuring and some types of thermal runaway. Both of these agitations are asymptotic responses by the water system to balance planetary energy relative to the state of water. The consequence of moving 8.30 x10^{13} kg of water each month, in the immediate overhead, is a random observation of weather formation with effects that attracts serious considerations of climatic displacement of communities of humans and animals.

CONCLUSION

The imaginary global warming impacts are delusional; for example, one may ask how/when is the system going to dump the 8.30 x 10^{13} kg of water on anybody per month? The actual water in the form of precipitation may not reach you. But note that to move that mass of water around also involves about 83.0 x 10^{10} KN of force, which expresses itself in different categories of wind, ranging from gentle breeze to destructive tornados and typhoons. The causes of binary instability are the sensitivities to be concerned with. The stable probability that this will occur at all is equivalent to achievable relaxation time, e^{-1} (37%); the probabilities it will occur on land and ocean are about 25% and 75%, respectively [6], and the probability it will occur to you is a Poison arrival of comprehensive failure relative to your global positioning. Poison distribution is dependent on prior observations and exponential decay of the rate of the observations [9]. Such permutation of observations is relatively applicable to anyone who is a statistical observer/observation anywhere on the globe. The nomenclature of such observation is that if it has occurred to you before, the probability is high it will repeat. Governments, politicians and decision support systems should consciously incorporate land use activities that mitigate specific threats to water resources, and reduce threats of global warming, via clean environments and proper land use practices.

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