Dear Peter

We very much value your interest in our work and the difficult job you are doing with your young students.
In your last letter you mentioned the idea of an experiment of the condensation-induced circulation. As another colleague in Bolivia (Peter Bunyard) is also very interested in such an effort, we recently shared a few thoughts with him on this matter. We list them below, just in case you find them of interest.

Note also that as you wrote you had lost all our previous correspondence, we are forwarding (in a separate mail) our previous exchange to you.

Best wishes (we leave to a field trip now, to be back in September)

Victor and Anastassia

****
Regarding the experiment -- let us share a few thoughts. First of all, we have to remember that the circulation of interest is induced when there is condensation (and because of it). Condensation, on the other hand, occurs when the air ascends (i.e., when there is circulation). There is this positive feedback.

In contrast, in the circulation driven by heating this positive feedback is missing. If there is heating, there is circulation (the warm air rises from the chimney). But heating (i.e., the driver) is not affected by circulation. It exists independent of the circulation.

This difference in cause/effect link between the two circulations (that we want to study and separate) is in fact very fundamental. It is due to this difference that the condensation-induced circulation cannot be easily simulated on a small scale. Condensation-induced circulation can be compared to a resonance -- like when you have a pendulum, you can make it swing faster and faster if you apply a force with the same frequency that is inherent to the pendulum (the so called natural frequency). If on the contrary you apply this force in anti-phase to the pendulum, it won't swing fast and may even stop. The eigen frequency (natural frequency) of the ideal pendulum depends on its length L and acceleration of gravity g.

Likewise the condensation-induced circulation represents a resonance phenomenon in the atmosphere. This means that the circulation develops not on ANY spatial scale, but if only the geometry of the initial conditions satisfies some requirements. For example, in our tornado paper we showed that there is a critical minimal horizontal size of the cloud beyond which a tornado (i.e. the most intense condensation-induced circulation) cannot develop.

This is to say that if we take two columns, with dry and wet air, in the laboratory and will see what happens, we may see nothing that could teach us about the importance of the condensation-evaporation force. For example, if you take warm water in the bottom of a column with a cold top I do hope you perceive my studies to date as being worthwhile, you will see a violent flow od vapor from bottom to top (the so-called heat pipe). This is precisely the dynamic flow caused by the vapor pressure difference between the cold top and the warm bottom.

But if you add dry air to the pipe, the flow will stop (despite the temperature difference between the bottom and the top). This is because dry air molecules will drift to the cold top and stop there, compensating the low vapor pressure by excessive air. They may even fully prevent condensation clinging to the cold top and depriving the vapor molecules from contact with water surface. (All this is well studied in the laboratory.)

Therefore, if the circulation geometry is such that the non-condensable air components have nowhere to go (like in the one-dimensional vertical narrow pipe that we have considered), there will be neither condensation nor condensation-induced circulation. In contrast, in free atmosphere the air can "choose" the needed spatial scale itself, such that the momentum gained by total air due to acceleration between the warm and cold areas is not lost, but translates to circulatory air motion.

These caveats should be taken into account when we think of trying to observe the condensation-induced circulation in the laboratory. Had it been all straightforward, the phenomenon would have been known long ago.
***

2011/8/20 Biotic Regulation <bioticregulation@gmail.com>

---------- Forwarded message ----------
From: **Peter Goldsbury** <pgoldsbury@stratex.co.nz>
Date: 2011/7/10
Subject: RE: Biotic regulation: News - feedback
To: "Biotic Regulation: News" <bioticregulation@gmail.com>

Hello Victor and Anatassia,

Thanks for your newsletter which always opens up issues and questions conventional wisdom.

Unfortunately I lost my recent emails including our past correspondence.

We are still surprised that most people seem to understand the nature of the water cycle that they learnt in primary school talking about evaporation at ground level and precipitation at higher altitudes, but very few seem to talk about the massive amounts of energy that is inherent in the latent heat of evaporation, which must be removed for condensation to occur. All talk about the energy we get from the sun, but it seems few consider the high altitude outgoing IR radiation component involved in getting rid of this. In our tiny school in Whirinaki we quite simply observe this largely misunderstood radiative flow at ground level with our black plate sensor on a clear night. Is this an energy flow component that you could illuminate in your publications as we guess that this is part of the pressure gradients that you talk about.

You will see that we continue to collect information and carry out research in our catchment. We freely publish what we learn at http://whirinakirainforest.info/ecosystem_services_value/ . I see some people talking about doing experiments to prove your points; perhaps a limited scale catchment study like ours could contribute to that?

We have almost completed developing the environmental sensor and logging stations. http://whirinakirainforest.info/ecosystem_services_value/Rainforest%20research/forest%20sensor/Forest%20Environment%20Monitoring%20%20Station.doc

We expect these will help us capture hourly data that will allow us to better see the patterns in our catchment relating to sun energy, rainfall, temperature, humidity, air movement, ground moisture, and leaf transpiration: comparing a number of land use situations. That will help us estimate canopy diversion, rainforest transpiration, surface evaporation and river outflow us with water cycle mass and energy balances. We have worked out how to gauge our outgoing river flows http://whirinakirainforest.info/ecosystem_services_value/Rainforest%20research/Flows%20Whirinaki%20-%20Bridge%20Te%20Whaiti/Whirinaki%20flows%20at%20Te%20Whaiti%20Bridge.doc and spreadsheet

So 2012 should be interesting one! If you as scientists have difficulty getting the ears of conventional western academic science you will appreciate that our 38 students school has an even steeper mountain to climb

Thanks again for the challenges you are freely sharing with the world. It has been very influential for us. If either of you ever get to our part of the world for a conference or holiday, please make sure you take time to visit Whirinaki www.kaitiakitnaga.net/whirinaki

Regards

Peter

Peter Goldsbury, Strategic Expertise Ltd

20 Hastings Parade, Devonport, Auuckland, New Zealand

Ph: +64 (9) 4454454, Mob: 021 465372 Skype: petergoldsbury

From: noreply+feedproxy@google.com [mailto:noreply+feedproxy@google.com] **On Behalf Of** Biotic Regulation: News
Sent: Sunday, July 10, 2011 7:07 AM
To: pgoldsbury@stratex.co.nz
Subject: Biotic regulation: News

Biotic regulation: News

Publications: Condensational theory of stationary tornadoes

Posted: 09 Jul 2011 03:00 PM PDT

Makarieva A.M., Gorshkov V.G., Nefiodov A.V. (2011) Physics Letters A, 375, 2259-2261.
The first-ever theoretical description of a 3D tornado circulation is presented that agrees quantitatively with observations.

As acknowledged by experts (e.g., **[1]**), the observed radial wind profiles in tornadoes are remarkably similar to those of hurricanes, provided a proper length scaling is adopted. Tornadoes and hurricanes have two more important features in common:

(1) Both hurricanes and tornadoes move as a whole;

(2) Both hurricanes and tornadoes are accompanied by intense condensation.

However, the conventional wisdom denies the two vortex types a unified explanation. A common view supported by the works of Dr. Emanuel (see, e.g., **[2]** for an overview) is that hurricanes are driven by oceanic evaporation that is *concurrent to the vortex existence*. Since surface evaporation is low on land where tornadoes form, the standard perspective has to admit that, unlike hurricanes, tornadoes must be driven by potential energy that was accumulated in the atmosphere *prior to the vortex formation*. As the vortex moves along having depleted the local store of PE, new stores of potential energy become available for its maintenance. (NB: Why could not one apply the same reasoning to hurricanes?)

Until recently the only candidate for this potential energy to feed tornadoes has been **CAPE** (convective available potential energy). CAPE is a measure of work exerted by the buoyancy force on a moist saturated air parcel rising in the ambient lapse rate. (That is, the steeper the lapse rate over a larger height, the larger the total CAPE). One might then expect intense tornadoes to occur

at high CAPE soundings. However, recent comparisons of CAPE values associated with nocturnal versus diurnal tornadoes **[3]** show quite unequivocally that significant tornadoes form at both high and low CAPE values (as well as high and low **CIN** values). This adds to the suspicion that buoyancy associated with the latent heat release during moist ascent may not be the sought-for tornado driver.

In our work we have considered a different type of potential energy, the one associated with pressure gradients produced by the vapor sink -- the process of vapor removal from the gas phase that occurs during condensation. Formally, this driver of motion, condensation rate S, replaces zero in the right-hand part of the conventional continuity equation applied to a dry atmosphere. (In contrast, the differential heating driver term resides in the temperature equation).

One needs to emphasize that until recently no theory for the condensation rate S has ever been developed. This is remarkable, because other relevant rates have been investigated much better. For example, radiative heating rate is commonly represented as Newtonian relaxation to radiative *equilibrium* (e.g., **[4, Eqs. (1)-(2)]**). Evaporation rate is formulated in the various versions of the **Penman equation** and is proportional to the deviation of water vapor concentration from the saturated *equilibrium* value. But no formulations have ever been offered for condensation rate that would allow for analysis of the physical properties and dynamic importance of the vapor sink.

Ubiquitously across the literature, the account of moist properties of the atmosphere is made using the so-called *microphysics schemes* -- numerical techniques applied in time-dependent circulation models. However, numerical schemes are generally designed *to solve* an already formulated system of equations, not *to define* the terms for which information in the equations to be solved is missing. As we recently discussed **[5]**, the available *microphysics schemes* are based on the unphysical assumption of condensation to occur at constant pressure. This assumption does not markedly affect the resulting magnitude of precipitation (which caused the procedure to become widely applied), but *a priori* leads to a complete neglect of the vapor sink dynamics **[6, p. C10925]**.

In a series of papers we developed a formulation of condensation rate by considering the deviation of the vapor distribution along the temperature gradient from the equilibrium *distribution* that would take place in the absence of condensation. (In the case of horizontally isothermal atmosphere in hydrostatic equilibrium, condensation rate S is a product of vertical velocity and the vertical gradient of the relative partial pressure of water vapor.) This allowed one to derive an expression for the radial pressure gradient in axisymmetric steady-state vortices and obtain a general equation for their radial wind profiles.

A key difference between tornadoes and hurricanes is the smaller vertical velocity and the larger linear size of the latter. Solving the obtained equation for negligibly small vertical velocities yielded realistic radial wind profiles for intense hurricanes **[7]**. In our new paper (attached) we obtained a general solution for arbitrary velocities **[8]**. The profiles obtained for a compact vortex agree satisfactorily with the available data for 3D circulation in Mulhall tornado (world's largest tornado on record). To our knowledge, this is the first-ever theoretical description of a 3D tornado

circulation that agrees quantitatively with observations.

We thus propose a consistent theoretical approach to quantitatively explain intense atmospheric vortices on a unified physical basis. The same driver (vapor sink) as we suggest plays the dominant role in Hadley circulation **[9]**.

We very much welcome comments from our readers and hope that our findings might ultimately generate some positive interest in the meteorological community, especially in the view of the current lack of any competitive theoretical formulations of condensation rate. Our feedback on the comments available so far is summarized in our responses to Dr. Held **[10]**. See also a relevant discussion in the web **[11]**, comments by Dr. Bryan **[12]** and our reply to them **[5]**.

References

[1] Lee W.-C., Wurman J. (2005) J. Atm. Sci., 62, 2373-2393, p. 2379.

[2] Smith, R. K. (2006) Hurricane force. Physics World, 19, 32-37.

[3] Kis, A. K. and Straka, J. M. (2010) Nocturnal tornado climatology. Wea. Forecast., 25 545-561.

[4] Held, I. M. and Hou, A. Y. (1980) Nonlinear axially symmetric circulations in a nearly inviscid atmosphere, J. Atmos. Sci., 37, 515-533.

[5] Reply to 'Erroneous comments' by Dr. George Bryan: Pinpointing where the potential energy of condensation was lost', Makarieva et al., 06 Jan 2011, ACPD

[6] 'Condensation rate and hydrostatic equilibrium of moist air', Makarieva et al., 10 Dec 2010, ACPD

[7] Makarieva A.M., Gorshkov V.G. (2011) Radial profiles of velocity and pressure for condensation-induced hurricanes. Physics Letters A, 375, 1053-1058.

[8] Makarieva A.M., Gorshkov V.G., Nefiodov A.V. (2011) Condensational theory of stationary tornadoes. Physics Letters A, 375, 2259-2261.

[9] Makarieva A.M., Gorshkov V.G., Sheil D., Nobre A.D., Li B.-L. (2010) Where do winds come from? A new theory on how water vapor condensation influences atmospheric pressure and dynamics. Atmospheric Chemistry and Physics Discussions, 10, 24015-24052.

[10] Reply 2 to 'Review' by Dr. Isaac Held: On publication criteria in science', Makarieva et al., 26 Apr 2011, ACPD

[11] Weight of Water and Wind, Hurricane Pro's Weigh in, discussion at Jeff Id's

blog prompted by letter of Dr. Emanuel

[12] 'Erroneous comments', George Bryan, 16 Dec 2010, ACPD

Photos: Boreal spring in portraits

Posted: 09 Jul 2011 03:00 PM PDT

Tysties: courtship, Oystercatcher, Frog about to sing, Old World Swallowtail, Seal at leisure, Fondness, Robber flies mating, Black guillemot: The red gape, Willow ptarmigan, Eiders, Willow warbler, Young eagle, Bullfinch, Green moth on the beech, Tysties: curiosity, Where it all happens.

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Kind regards
www.bioticregulation.ru

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Victor Gorshkov
Anastassia Makarieva
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Petersburg Nuclear Physics Institute

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lost correspondence

---------- Forwarded message ----------
From: **Gorshkov & Makarieva** <ammvgg@gmail.com>
Date: 2010/12/1
Subject: Biotic pump in New Zealand, The Land of the Long White Cloud
To: peter goldsbury <pgoldsbury@stratex.co.nz>
Cc: Maurice Duncan <m.duncan@niwa.co.nz>, David Whitehead <whiteheadd@landcareresearch.co.nz>, paulmitch25@hotmail.com, "bai-lian.li" <bai-lian.li@ucr.edu>, "Sheil, Douglas (CIFOR)" <D.SHEIL@cgiar.org>, Jan Čermák <cermak@mendelu.cz>, pokorny@enki.cz, Petra Hesslerová <M42barta@seznam.cz>, pokorny@esnet.cz, Peter Bunyard <peter.bunyard@btinternet.com>, dgb27@cam.ac.uk, kravcik <kravcik@ludiaavoda.sk>, Ariel Salleh <treesprite@ozemail.com.au>, Iain Bruce <iainafbruce@hotmail.co.uk>, O.Whaley@kew.org

Dear Peter and Colleagues

Thank you for your letter. Our apologies that we have not written back before. Recently there has been an intense discussion of our work in the web and we spent much time on that. This discussion concerns the physical principles of the biotic pump mechanism, namely, how condensation drives winds. See here for open discussion (Where do winds come from? A new theory on how condensation influences atmospheric pressure and dynamics) and here for a discussion at the blog of Professore Judith Curry. We are copying in our friends and colleagues interested in the topic.

Regarding your questions -- they show that we may need several rounds to discuss things, so please feel free to ask back.

*Are we right in assuming that the upward flow of water vapour over rainforests is largely due to the vapour pressure gradient / *diffusion imposed by the sun's radiative heating at ground level and the cooling of water molecules by IR radiation to space that *happens at higher latitudes?

First, the upward flow of water vapour occurs when moist air as a whole rises. Vapor alone could be flowing upwards by molecular diffusion only -- however, such process has a practically zero rate. Vapor is transported by moist air that moves along closed trajectories. This movement can be represented as a superposition of a large scale flow and local eddies (see attached figure). So, vapor transport is not a diffusion, but essentially involves large scale motions and pressure gradients.

Second, the question of temperature gradient. It is complex. The matter is that if ideal gas (like moist air) ascends in the gravitational field of Earth, it cools. This is what constitutes the so-called adiabatic temperature gradient (taken with minus sign to be positive, this

gradient is called lapse rate). Therefore, if the atmosphere circulates in the vertical plane (i.e., there are ascending and descending regions), there will be a vertical temperature gradient even in the absence of emitters/absorbers of thermal radiation. This is a very fundamental point. Vertical movement of ideal gas is associated with formation of a vertical temperature gradient.

Third, when the air is moist, the temperature drop that is associated with ascent, ultimately causes vapor to condense. During condensation, vapor gas molecules are collected in a tiny volume forming a liquid drop. In the result, there appears a partial vacuum aloft which unbalances the pressure distribution. The shortage of gas in the upper atmosphere causes the low-level air to rise. The amount of gas at the surface diminishes. In the result, there forms an area of low surface pressure in the region where condensation occurs. This low pressure "lures" air from surrounding areas to arrive to the area of condensation.

As long as condensation continues, the circulation it thus induces continues as well. However, condensation "feeds" on vapor molecules. Thus, the incoming air must be rich in vapor for the condensation-induced circulation to be sustainable. A forest draws moist oceanic air in and thus sustains condensation (and air circulation) over the continent.

This is how biotic pump works. Note that it is not a HEAT pump. It is a purely dynamic pump, working on the basis of the fact that condensation reduces the NUMBER of gas molecules.

*(The paper by Kay and Schneider "Life is a Manifestation of the Second Law of Thermodynamics" proposes that life emerges to *try to dissipate these cyclic gradients where things are far from in equilibrium and if so, is that why the transpiration processes *in forests have evolved to create the vapour pressure differentials / water / energy flows that drive your Biotic pump)

We disagree with the point that life emerges to dissipate something. There are lifeless planets -- everything that can dissipate there, does so without any problems in the absence of life. Moreover, as is well-known, lifeless planets are much more close to equilibrium than Earth. Therefore, life creates the disequilibrium conditions itself to sustain conditions suitable for its own existence. We emphasize: life creates the disequilibrium rather than passively takes part in its dissipation. Here you can find a paper on this topic discussing the orderliness of living matter and the irrelevance of formally applied 2nd law of thermodynamcis to their functioning.

*2. Local hydrologists and climate researchers tell us that NZ as an island nation has weather pattern / rainfalls largely *determined by weather events that originate in the vast Pacific so the local terrain and its composition has little effect - Perhaps * things are quite different to the kind of conditions around the massive forests in Rusisia and elsewhere. We wonder if that *might be so as far as horizontal water / vapour flows are concerned, but assume that there will be still the more vertical *transport component over rainforests and vegetated catchments as you describe, which involves massive flows of energy. (You *may not know that the real name of NZ is "Aotearoa - The Land of the Long White Cloud" which was given to it by approaching *Maori on canoes at a time when the whole of the country was covered in forest. That perhaps relates to observations that the *rainforest complex system includes the coupled cloud sub-systems above them)

Not only local hydrologists and climate researchers, but hydrologists and researchers everywhere perpetuate the opinion that forests and vegetation in general are passive

objects adapting to abiotically maintained external conditions. This is incorrect. This paradigm must change in the future. The biotic pump theory shows that for a forest like that of NZ (which is very close to the ocean) it should be very easy to maintain moist local conditions by inducing local sea-to-land circulation on a scale of a few hundred kilometers. Forest degradation will put an end to such a circulation.

The accumulating historical evidence (see, e.g., recent study on the demise of a Peru civilization due to deforestation, we are copying the authors in), readily interpretable in the framework of the biotic pump theory, provides direct evidence of such local circulation and water regime changes. Also, appreciate the following statement made in by the son of Christopher Columbus which might interest you:

"On Tuesday, July 22nd (1494), he departed for Jamaica.... The sky, air, and climate were just the same as in other places; every afternoon there was a rain squall that lasted for about an hour. The admiral writes that he attributes this to the great forests of that land; he knew from experience that formerly this also occurred in the Canary, Madeira, and Azore Islands, but since the removal of forests that once covered those islands they do not have so much mist and rain as before."
The Life of the Admiral Christopher Columbus by his Son Ferdinand, Translated by Benjamin Keen (1978).

With the change of the current paradigm that denies forests a role in climate stabilization, such historical studies must definitely become more abundant.

*If this makes sense can you suggest any simple ways in which we can get some indicative figures of the horizontal H2O flows *in an out of our the atmosphere above our catchment? We have wind, temperature, pressure humidity, measurements (and *also cloud coverage indicators we can derive from our black plate sensor temperature difference from ambient) every hour.

We are also copying in Mr. Paul Mitchell from England, who is restoring an ancient oak forest on his own land and is concerned about monitoring the associated changes in weather patterns over forested vs deforested regions.

Once again, we need to remember that it is not the vapor flow that constitutes the pump, but the horizontal and vertical flow of moist air. We believe it would be instructive to measure wind direction, humidity and precipitation amounts in the forest and compare them with the corresponding quantities on deforested land. However, this reference measurements should be made about 100 km away from the forest. This is because as our research shows the biotically uncontrolled moisture flow dissipates over several hundred kilometers (see here for a paper with graphs).

In any case, data on precipitation in the forest compared to precipitation over non-forested areas could be very valuable. Regarding circulation, it may take a long time and lots of observations to be able to separate signal from the noise.

We have to warn you that it may well happen that nothing can be easily measured with statistical significance for a particular small forest. Our own work on biotic pump is based on analysis of large bodies of data collected across the world.

*When orbiting satellites with their their spectral sensors observe the low temperature areas over rainforests are they really *seeing the rainforest ground radiation or are their "averaged" readings more sensing the radiation component from water *molecules higher in the atmosphere?

Cloud absorption cover most part of the thermal spectrum. So the infrared radiation measured by satellites over a cloudy forest reflects the brightness temperature of water and CO2 molecules above the clouds. It is true that in the tropics this temperature can be much lower than the ground temperature somewhere in the higher latitudes. Perhaps our colleagues working with satellite data (Douglas?) could make an input here.

*One thing we are very interested in is the outgoing IR radiation of energy from earth to space (Global Cooling) which we observe *on clear nights via our black plate radiator temperature. We assume this radiation also happens with water molecules in the *upper atmosphere, so wonder if your Biotic Heat pump is a the vertical energy transfer mechnism that gets past the Greenhouse *gas shield that others talk about - That way at least least over rainforest regions the suggestion that H2O i
* s a Greenhouse gas contributing to Global warming , may have excatly the opposite effect?

This is a complex question that demands an understanding of what greenhouse effect is. Greenhouse gases in the atmosphere can be compared to a coat our planet wears. This coat (as our own coat in winter) re-directs part of our thermal radiation back to the surface. The thickness of the coat dictates what part of the radiation will be re-directed back. However, the absolute warming effect of the coat will also depend on the magnitude of the radiation flux that is re-directed.

So, forest evaporation captures some part of solar energy at the surface in the form of latent heat. In the absence of evaporation, this energy would take the form of thermal radiation at the surface and sensible heat flux. The rising air flow transports vapor to the upper atmosphere, where it condenses and releases latent heat. In the result, this part of energy escapes interaction with a significant part of the planetary greenhouse coat (the lower atmosphere). The latent heat dissipates to thermal radiation not at the surface, but in the upper atmosphere, from which it can be radiated more directly and unimpeded into space. In this sense evaporation works to reduce the overall magnitude of the greenhouse effect. As you say, some part of energy "gets past" a certain part of "the greenhouse gas shield".

At the same time, one definitely cannot say that "due to evaporation, the Earth is cooler!" Cooler compared to what? If we take an Earth without water vapor (and without evaporation), the Earth will be definitely very cold (the thickness of the greenhouse coat will be very small, because atmospheric water is the major greenhouse substance).

On a regional scale, observations show that regions with intense condensation and evaporation (the ascending areas of a biotic pump circulation) have lower ground temperatures than dry regions. This effect emerges as an interplay of several complex factors, including higher cloudiness over forests, evaporation, vertical transport of latent heat as discussed above, horizontal transport of latent heat away from the condensation area. At the same time, the descending region of the circulation becomes warmer. One should carefully think of the scale (regional, global) issues when relating evaporation/condensation to temperature changes.

We welcome your further thoughts and questions. Good luck with your educational project!

Best wishes
Victor and Anastassia

2010/12/1 peter goldsbury <pgoldsbury@stratex.co.nz>
Hi Victor and Makarieva, cc Maurice and David

Hope you are well an the urgent initiatives you were occupied with have gone well

Just to catch up with a few questions.

We are proceeding with our project that focusing at the moment more on the water and energy balances in and above the 32600 Hectare Whirinaki Catchment, most of which is in Native NZ Rainforest. Can you please skip to and look at at the diagram on this in section (c) about half way down the document http://www.whirinakirainforest.info/weather/explanation.htm to see if we are on the right track. Here are some things we are pondering on:

1. Are we right in assuming that the upward flow of water vapour over rainforests is largely due to the vapour pressure gradient / diffusion imposed by the sun's radiative heating at ground level and the cooling of water molecules by IR radiation to space that happens at higher latitudes? (The paper by Kay and Schneider "Life is a Manifestation of the Second Law of Thermodynamics" proposes that life emerges to try to dissipate these cyclic gradients where things are far from in equilibrium and if so, is that why the transpiration processes in forests have evolved to create the vapour pressure differentials / water / energy flows that drive your Biotic pump)

2. Local hydrologists and climate researchers tell us that NZ as an island nation has weather pattern / rainfalls largely determined by weather events that originate in the vast Pacific so the local terrain and its composition has little effect - Perhaps things are quite different to the kind of conditions around the massive forests in Rusisia and elsewhere. We wonder if that might be so as far as horizontal water / vapour flows are concerned, but assume that there will be still the more vertical transport component over rainforests and vegetated catchments as you describe, which involves massive flows of energy. (You may not know that the real name of NZ is "Aotearoa - The Land of the Long White Cloud" which was given to it by approaching Maori on canoes at a time when the whole of the country was covered in forest. That perhaps relates to observations that the rainforest complex system includes the coupled cloud sub-systems above them). If this makes sense can you suggest any simple ways in which we can get some indicative figures of the horizontal H2O flows in an out of our the atmosphere above our catchment? We have wind, temperature, pressure humidity, measurements (and also cloud coverage indicators we can derive from our black plate sensor temperature difference from ambient) every hour.

3. When orbiting satellites with their their spectral sensors observe the low temperature areas over rainforests are they really seeing the rainforest ground radiation or are their "averaged" readings more sensing the radiation component from water molecules higher in the atmosphere?

We like the "Habits of System Thinker" mindmap produced by a school in The Netherlands which is found at the bottom of web page above.

I have also copied this to Maurice Duncan and David Whitehead, both of who have helped us get our heads around this and suggested things school children could easily do. Perhaps they can help us with the question above too.

We appreciate you interest and are looking forward to your feedback. Its not urgent just yet as the schools is moving into summer holiday time, but the sooner we can get some ideas together for next year the better.

Regards
Peter

Peter Goldsbury, Volunteer Coordinator Kaitiakitanga Program and Network www.kaitiakitanga.net

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From: Gorshkov & Makarieva [mailto:ammvgg@gmail.com]
Sent: Monday, 18 October 2010 6:19 p.m.
To: pgoldsbury@stratex.co.nz
Subject: a water competition

Dear Peter

Thank you very much for your feedback through our website. We are excited to know you are using the biotic pump theory to advance the rainforest protection. We will write more within a few days -- right now have two very close deadlines to deal with. In the meantime, you might wish to look at the announcement below, which might be of some interest to your team. If you decide to participate and feel we could contribute a description of the biotic pump theory, please, let us know.

Best wishes
Victor and Anastassia

--
Victor Gorshkov
Anastassia Makarieva
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From: Peter Goldsbury
Email: pgoldsbury@stratex.co.nz
Subject: Rainforest Heat Pump
Hello Victor and Anatasia,

Thanks for the great work you are doing and sharing

We have a research project underway in the Whirinaki Rainforest which aims
to draw international attention to the real value of rainforests for the ecosysytem services

they provide to support life on earth. Details are at www.whirinakirainforest.info/weather/explanation.htm You will see we refer to your work / site there. All this gets us conentrating on thw Water Cycle ahaed of the pre-occupation with CO2.

One thing we are very interested in is the outgoing IR radiation of energy from earth to space (Global Cooling) which we observe on clear nights via our black plate radiator temperature. We assume this radiation also happens with water molecules in the upper atmosphere, so wonder if your Biotic Heat pump is a the vertical energy transfer mechnism that gets past the Greenhouse gas shield that others talk about - That way at least least over rainforest regions the suggestion that H2O i
 s a Greenhouse gas contributing to Global warming , may have excatly the opposite effect?

We also wonder if the horizontal heatpump caused by the daily sun vaporising clouds and distributing that absorbed heat horiontally in the higher atmospere accross the planet matches your thinking?

We would really appreciate you looking over our page above to check we are on the right track please.

Regards
Peter

--
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Anastassia Makarieva
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