

Diego Fdez-Sevilla, PhD.

Filling in or Finding out the gaps around.



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Rayleigh–Taylor instabilities in Atmospheric Circulation. Follow-Up on Atmospheric Dynamics and Climatic Implications (By Diego Fdez-Sevilla PhD)

Posted on May 16, 2019

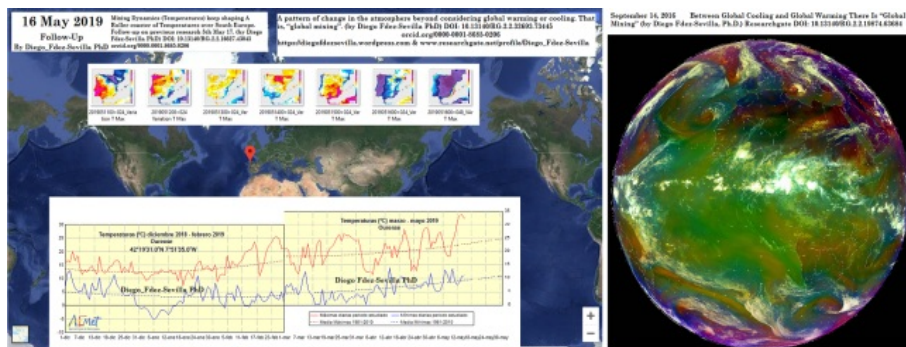


Image: May2019 Atmospheric dynamics over the Iberian Peninsula (& Ourense) Follow-up on previous analyses: May 5, 2017 [Mixing Dynamics keep shaping A Roller coaster of Temperatures over South Europe. Follow-up on previous research 5th May 17. \(by Diego Fdez-Sevilla PhD\) ResearchGate DOI: 10.13140/RG.2.2.16627.43043](#)

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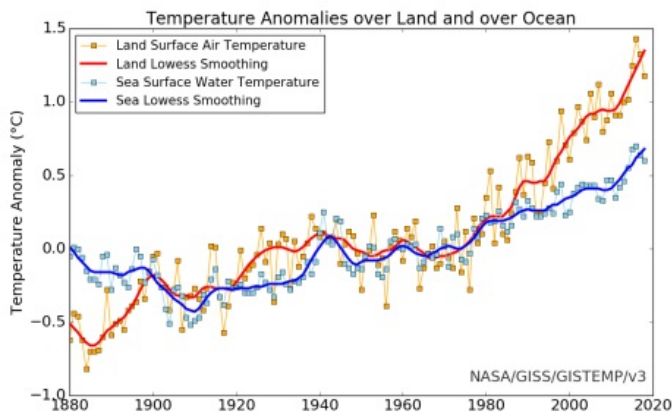
Let's introduce ourselves to each other. You know that I am Diego Fdez-Sevilla, PhD. author of this blog.

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I keep constantly looking into new developments and info in related topics. Since we both are interested in the same subjects, I would appreciate that you leave a comment or use attribution to my work when you find it influencing yours. Either through inspiration, data or methodology. It is sad seeing



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Whatever the discussion is about multiples future scenarios, we should be able to, at least, define our present scenario in order to work with it. In my research, and throughout more than 200 analyses, I have worked in this direction. I have described our present scenario based on consolidating theoretical arguments with real time developments. I do not know any other scenario described and published able to do that. After seeking feedback from experts in the field by email ([Jennifer Francis among them](#)) and platforms such as AGU and NOAA groups at linkedIn, my assessments have not received comments or arguments invalidating the conclusions presented. I expose my assessments in this blog trying to allow anyone to be the reviewer contrasting current developments with my arguments and conclusions, enabling Official Bodies and Established scientists to consider the value of my research despite its informal format. The current line of research since 2013 has been carried out without institutional or economic support. Funding and sponsorship of any size is welcome in order to acknowledge the value of the effort already invested and to support its continuity. Author details: d.fdezsevilla@gmail.com" <https://diegofdezsevilla.wordpress.com> and https://www.researchgate.net/profile/Diego_Fdez-Sevilla (**Intellectual Property and Academic Value** EGU 2017. GDB4 - Is Open Science the way to go?". min 56 Q&A Data Citations and Credit on producing data [Link to Discussion](#). **EGU 2019 Rewards and recognition in science: what value should we place on contributions that cannot be easily measured** | [Details](#) | [Stream](#))

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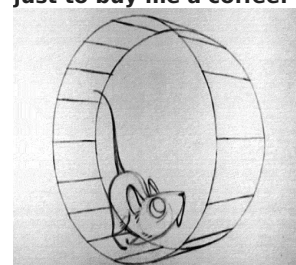
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- Discussion: climate drift, the link between the Polar Vortex and tropospheric circulation, the role played by SST and the ENSO, the dynamics explaining abnormal Arctic Warming and sea ice cover, the synergistic implications from the biotic component, solar forcing and the scientific methodology applied.
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Rayleigh-Taylor Instabilities

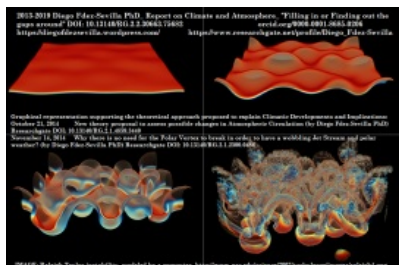
Rayleigh–Taylor instabilities is what physicists call mixing. Since 2013 I have worked trying to make my analyses open for all disciplines but it is time to show that whatever the name chosen, we all agree on something.

The stratification of the composition, structure and concentration of the components part of our thermodynamic ecosystem is what builds the synergistic interactions between soils, gases and water. [Ref2014](#) & [Ref2017](#))



The whole approach described in [the line of research presented since 2013](#) suggests an increase in

atmospheric global mixing due to an overcharged atmosphere. These dynamics can be explained in many different ways for different audiences. In the case of physics, these dynamics have a name and can be observed by the increasing instability displayed in the atmosphere named as “Rayleigh-Taylor Instabilities”.



The Rayleigh–Taylor instability (RTI) is an interface instability due to interpenetration of two fluids with different densities and occurs whenever a light fluid tends to push on a heavy fluid (Rayleigh [1883](#), Taylor [1950](#)). In this dynamical process two fluids seek to reduce their overall potential energy.

In the line of research here presented I have [discussed throughout more than 150 analyses](#) that atmospheric patterns associated with weather events point to an increase in atmospheric instability as the result of an increase in **global mixing dynamics** between two fluids with different densities, those from MidLatitudes and the Poles (Arctic). A difference in density showing a stratification in the amount of energy in free state carried by those fluids.

In the framework presented throughout the line of research published in this blog (and researchgate) it has been considered **“Climate” as being defined by the amount of energy free to do work**. In other words, energy free to promote weather events. Accordingly, in my research I define **Climate** by the **amount and state** of energy in circulation, and **Weather** by the **use** of this energy. ([ref](#))

Consequently, with the definition applied for Climate and Weather, my [definition](#) of **Climate Drift** is:

“the deviation from equilibrium of the conditions allowing the perpetuity of an

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Your feedback is much appreciated. I want to use this blog to increase the level of exposure of my research and enhance discussion in a multidisciplinary and open review in order to scrutinise its validity throughout the interaction between proactive thinkers. The only way to overcome limitations is by joining the potential of different mind sets, knowledge and points of view. So I treat every contribution as positive as long as it is constructive. Comments only require a name and an email address. There is no need to be a blogger or manage a web site. Comments are not published immediately since all comments follow moderation in order to check genuinity and avoid spam. Mastering sarcasm is not a skill I would appreciate. You can also contact me: [d.fdezsevilla\(at\)gmail.com](mailto:d.fdezsevilla(at)gmail.com) Diego Fdez-Sevilla.

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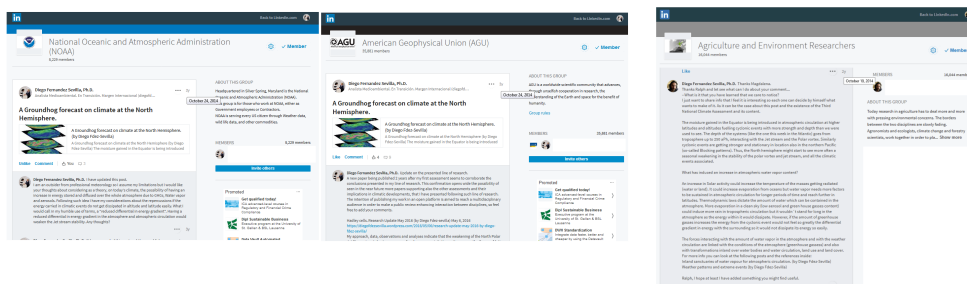
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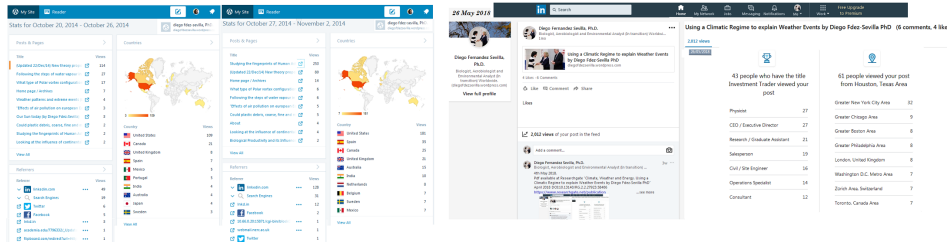
established symbiotic relationship between biotic and none biotic components in a micro and macro ecosystem. This situation can be due to changes in any component of the ecosystem playing a synergistic effect over the rest. And the causes can be either a change in the magnitude of the already implemented forces in place, changes in the directionality or rates in the flows of energy pre-established OR/AND the impact suffered by the incorporation of new components/forces and energy sinks or sources in any part of the system interfering with the previously established order and balance."

Ultimately, the theoretical proposal part of the present line of research ([ref2013](#) and [ref2014](#)) points out that an **increase in the amount of free energy** contained at the **Meridional atmosphere** (Equator and Mid Latitudes) will **expand into higher latitudes** (into the Poles) **and altitudes** (e.g. Sudden Stratospheric Warming) thanks to an **enhanced thermal capacity** of the atmosphere due to CO2 forcing using **water vapour** as the carrier transporting and releasing such extra **pool of energy**. Such increase in mixing dynamics will move towards decreasing the differential **gradients of energy** between latitudes and altitudes. In other words, an increase in Rayleigh–Taylor instabilities.

In **2014** I shared such theoretical approach asking for feedback with scientists working in the field of climate like Professor Jennifer Francis ([email](#)). She replied saying: *"the topic you've written about is extremely complicated and many of your statements have not yet been verified by peer-reviewed research. You will need statements supported by published (or your own) analysis, (not just suggestive examples and anecdotal evidence)"*.



A New Climatic Regime. By Diego Fdez-Sevilla PhD. Maybe you did not know, maybe because nobody told you.



Boltzmann-Stefan vs Rayleigh-Taylor Instabilities

Opposite from those theories studying climatic developments based on applying Boltzmann-Stefan calculations to project increases in temperature related with increases in CO2, in the line of research here presented since 2013 Boltzmann-Stefan calculations are considered inaccurate since its application uses as a reference the radiation emissivity of a surface and assume an homogeneous system in thermodynamic equilibrium. Instead, throughout the approach followed in the present line of research I use the conceptual interpretation followed by Rayleigh–Taylor instabilities since those represent a more accurate description of the atmosphere as a volume instead of a surface, heterogeneous in composition, stratified and out from equilibrium.

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through time, handling, intrusive methodologies, ... The discussion is [not about agreement but about trust and understanding](#). What is science about, [thinkers or data managers](#)?

The increasing role seen by scientists performing as “data managers” has led science to adopt many assumptions based on statistics without explanations, and applied as “dogmas” in all aspects of science, without any regard for their impact over the conclusions raised. There are more results obtained by data management than understanding over their meaning.

Among those preconceptions distorting the meaning of data we have the concept of using greenhouse as simile, ice cores from [Antarctica](#) representing the whole planet and even continuity in time under “dry and wet conditions”, [the concept of black body radiation](#), temperature as correlation independent of stratification and [indexes such as the Enso being considered “the origin of” but “without an origin”](#) in itself, as being born [without conception](#) and even without the need for an explanation.

The “Greenhouse” simile uses atmospheric gases with high heat retention capacity as it is CO₂, to describe an scenario in which CO₂ replicates the conditions of a greenhouse. However, the structure of a greenhouse and the dynamics of productivity in this structure are far from the reality of what our atmosphere and planet are.

The idealised concept of seeing gases like CO₂ in the atmosphere is that those inhibit the planet from reflecting Solar radiation back into space. And the conceptualised figure of a greenhouse creates the assumption of that it **replicates the function of the plastic or glass cover** in a greenhouse. So it becomes an assumption that CO₂ creates a “**blanket**” around the troposphere as the glass ceiling in a greenhouse. However, the constant motion of the atmosphere created by convective motion avoids such configuration. Instead, Gasses with High Heat Capacity Retention, like CO₂, get incorporated into the whole dimensions of the atmosphere, only restricted by the atmospheric circulation delimited by thermal compartmentalization. So **their effect implies a volume and not a surface**. In a time in which the terminology of things are being discussed, CO₂ and Water vapour should not be called “Greenhouse gasses” because these gases do not create “barriers with a surface” and our planet is not a greenhouse.

The configuration of our planet is compartmentalised and its composition is heterogeneous in latitude, longitude and altitude. All that shows in the data and the mismatch between correlations. Differently from a greenhouse, the [feedbacks between water and CO₂ are not defined by sharing same volume and radiation](#), neither lapse of permanency or adiabatic behaviour.

Furthermore, the success for the biotic productivity in a greenhouse relies entirely in the constant supply of resources and the consumption of energy regulating all parameters, from temperature, CO₂ and humidity. [Different from a greenhouse, an ecosystem is an open system because it can exchange energy or materials with other ecosystems](#). Comparing our planet with a greenhouse creates a misconception about the structure of the atmosphere and the use of the resources.

Between global cooling or warming we are undergoing [a process of global mixing](#), but that will only make sense to whom understand how heterogeneous was the configuration of our planetary circulation. The problem is not how far temperatures can raise, but [what happens when they do not raise](#).

There is a point which I have strongly highlighted in my research trying to showcase how differently is the outcome from looking at our environment by

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“quantitative” variables (numbers of everything and anything, from temperatures, concentrations, number of trees, storms, ...) against “qualitative” (“time of permanency” for all, trees, temperatures, GHGs, storms, heat waves, ...). What makes all the difference for any situation is what it is needed for that something to exist and to be sustained. The nature of the element existent is as important as the environment allowing for its existence, and that goes for trees, storms (hurricanes, typhoons, ...), for the state of water in the Arctic as ice-liquid-gas and the atmosphere as precipitation, for the spread of masses of heat reaching high latitudes and cold moving to low latitudes, and for the weathering of soils. Changing the “environment” inhibits or allows for them to exist AND affect their behaviour and nature. Furthermore, since the instability of an environment inhibits reaching equilibrium, the constant environmental change accelerates processes of degradation/mixing invalidating modelling.

Previous analyses part of the present line of research 201-2019 point to an increase in atmospheric mixing patterns for the global circulation, and in the NH most extensively.

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August 26, 2016. [Aug 2016 Follow-up on previous assessments. Atmospheric Dynamics, Temperature Displacements, Atmospheric Mixing](#) (by Diego Fdez-Sevilla, PhD.) [DOI 10.13140/RG.2.2.24586.36804](https://doi.org/10.13140/RG.2.2.24586.36804)

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June 9, 2017. [“Mixing Dynamics” in the Atmosphere. A follow-up on previous research by Diego Fdez-Sevilla, PhD.](#) ResearchGate [DOI: 10.13140/RG.2.2.23548.03209](https://doi.org/10.13140/RG.2.2.23548.03209)

March 14, 2018. [Visualising Wind and Convective Forcing Driving Climatic Dynamics. Follow-up 14 March 2018 by Diego Fdez-Sevilla PhD](#) Pdf available at [DOI: 10.13140/RG.2.2.34233.06249](https://doi.org/10.13140/RG.2.2.34233.06249)

April 19, 2018. [Climate, Weather and Energy. Using a Climatic Regime to explain Weather Events](#) by Diego Fdez-Sevilla PhD Research [DOI:10.13140/RG.2.2.27923.58406](https://doi.org/10.13140/RG.2.2.27923.58406)

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May 2019

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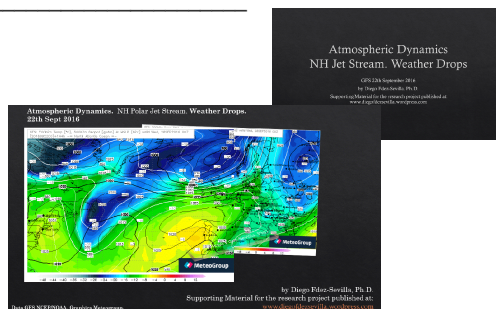
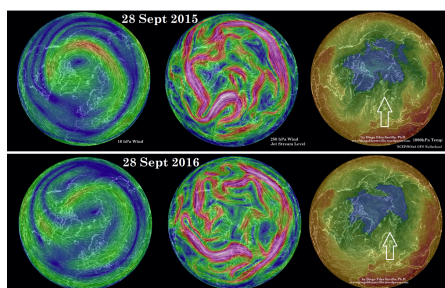
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“Rayleigh–Taylor” and a “Wobbly Polar Jet Stream”.

"Rayleigh-Taylor" and a "Wobbly Polar Jet Stream". An instability of an interface between two fluids of different densities.



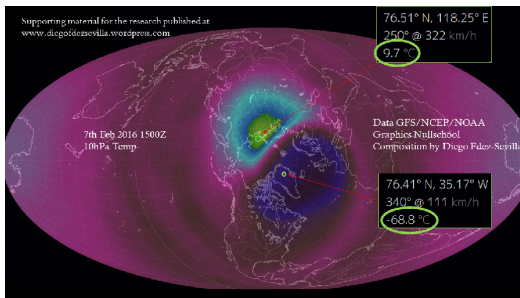
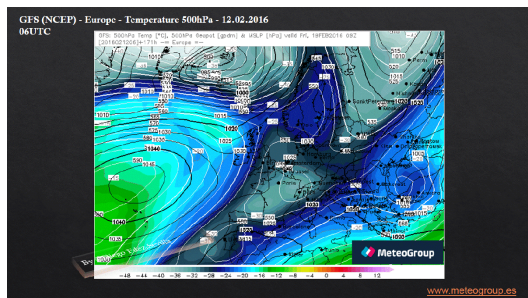
A wobbly Polar Jet Stream represents a mixing pattern which makes the **Polar Jet Stream** just a visual indicator for the position of the collision between two fluids of different densities, cold and warm air. An instability of an interface between two fluids of different densities which occurs when the lighter fluid (warmer) is pushing the heavier fluid (colder). (previously discussed in [January 13, 2016: Atmospheric Dynamics And Shapes \(by Diego Fdez-Sevilla, PhD. DOI: 10.13140/RG.2.2.35973.65765 \)](#))

The Polar Jet Stream is a current as volatile as the currents in a river dictated by its water flow rate but within the perspective of time lapse and the slope in a current as the force generated by the curvature and rotation of the Earth.

The **drainage of the "Arctic cold reservoir"** is a process which started with a timid seasonal waving on the Polar Jet Stream. This process has become more extreme by the years, beginning to show as the collapse of a wall under the pressure on a tide gaining strength. Convective forcing from mid latitudes is invading the north pole forcing the displacement of cold masses into foreign territories. What began as a process marked by seasonal pulses, this is showing to maintain momentum throughout seasons. (Discussed in previous analyses. [October 5, 2018 A New Pattern in Atmospheric Circulation drives towards an "unpredictable" New Climatic Scenario \(Diego Fdez-Sevilla PhD\)](#))

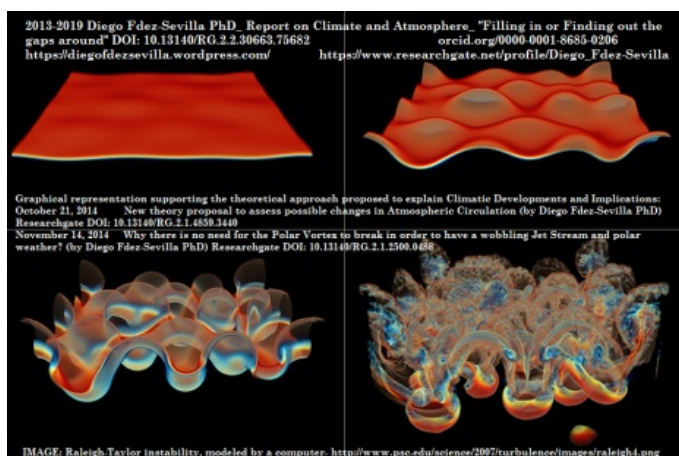
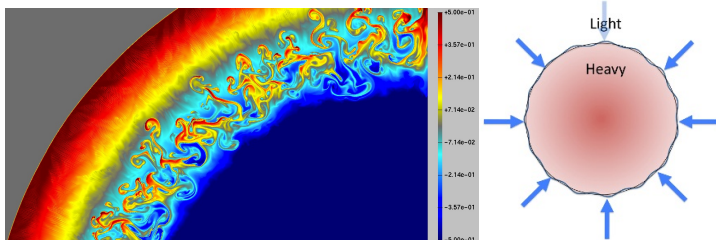
DOI:10.13140/RG.2.2.31673.62567. See home page for [full index](#))

The results obtained from the line of research here presented and suggest strongly that the energy being captured by "GHGs" in the atmosphere empower convective forcing dynamics inducing equatorial and mid-latitude circulation to expand over the Polar circulation in an intrusive way, displacing cold masses of air from Arctic circulation.

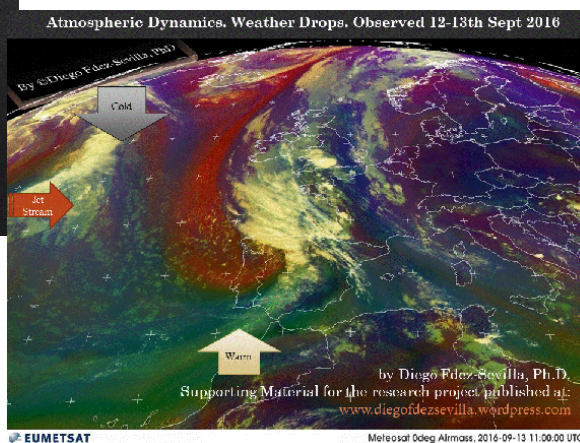
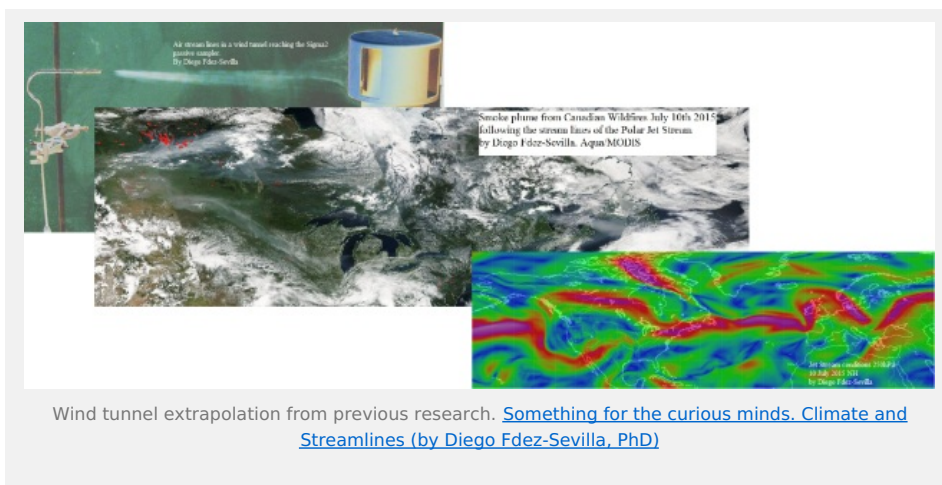


Such intrusions would increment the energy pool of the atmospheric masses contained at Arctic latitudes, and consequently, debilitating the thermal contrast which generates the configuration of a straight Polar Jet Stream and generates the configuration of what is known as **Rayleigh-Taylor instability**.

atmospheric dynamics
atmospheric pressure
Biological Productivity
Changing Climate
Climate
Climate change
climate drift
Climate modelling
climatic drift
climatic events
Cloud formation
Continental
Diego Fdez-Sevilla
Diego Fdez-Sevilla PhD
DNA Ecosystem
energy
flows
Environment
environmental conditions
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environmental issues
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Global
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Polar vortex
Polar vortex and Jet Stream
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soil weathering
Solar activity
solar energy
Spain
surface
temperature
Temperature
temperature anomalies
United States
United States Environmental Protection Agency



The instability observed in the Polar Jet Stream can be compared with those which arise in a system that primarily have to do with surface tension between two fluids of different densities. Such emphasis can be found in the imagery applied through the whole line of analyses published as part of the current line of research.



Vapour Pressure Deficit
Water cycle
water vapour
Weather Development



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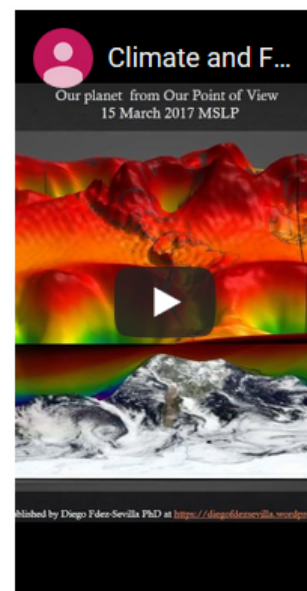
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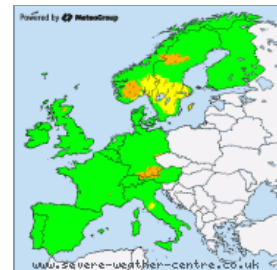
YouTube channel



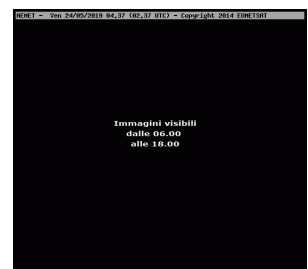
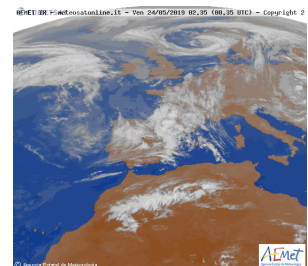
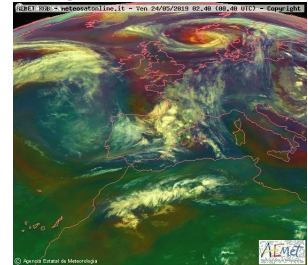
Contact info:

email: [d.fdezsevilla\(at\)gmail.com](mailto:d.fdezsevilla(at)gmail.com)
Twitter: @SevillaDF
Skype: quercusmagnus

All warnings for Europe



Europe Satellite



Weather currents and Temperature North America

<http://www.severe-weather-centre.co.uk/en/weather/weather-for-professionals/film-of-currents/north-america.html>

NOAA National Forecast Maps
<http://www.weather.gov/forecast-maps>

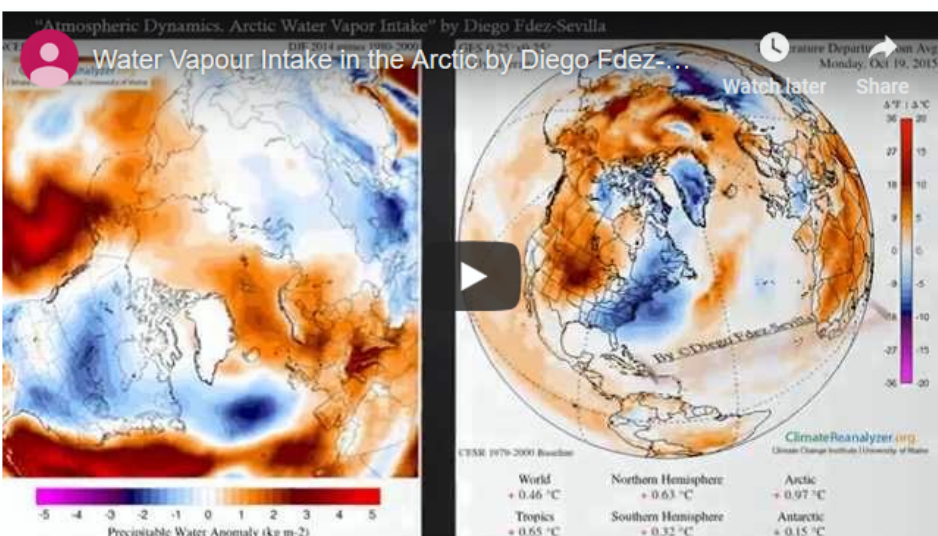
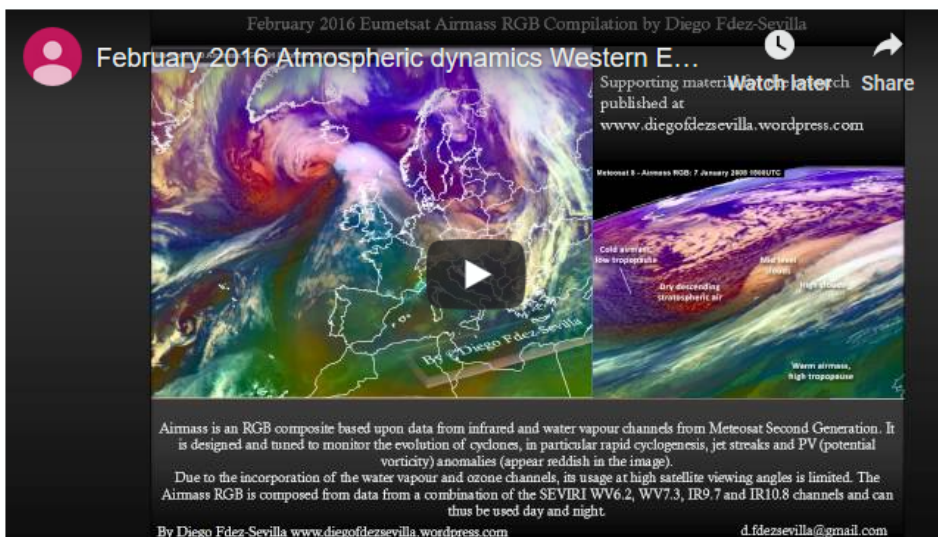
High Definition Earth Viewing (HDEV). International Space Station (ISS) on the Columbus External Facility.

<http://www.ustream.tv> Broadcast live streaming video on Ustream

Spanish Meteorological Agency The weather. Consult the AEMET weather forecast for Ourense

Centers visiting diegofdezsevilla.wordpress.com

From Academia International Ocean Discovery Program (IODP)/Texas A&M

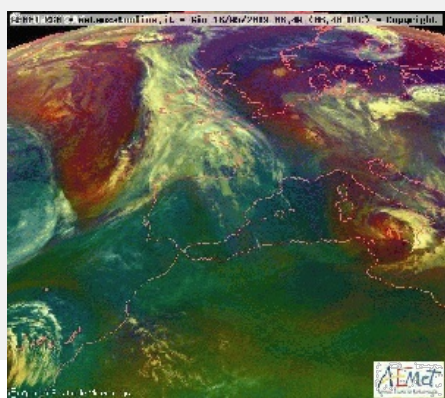




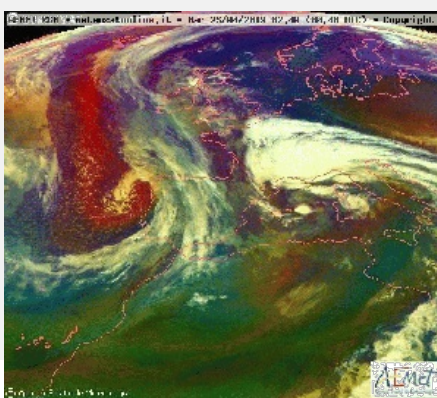
28 Nov 2018 Pacific Dynamics.

Current and previous dynamics observed over the North Atlantic and South Europe. (right click over the image to enlarge.)

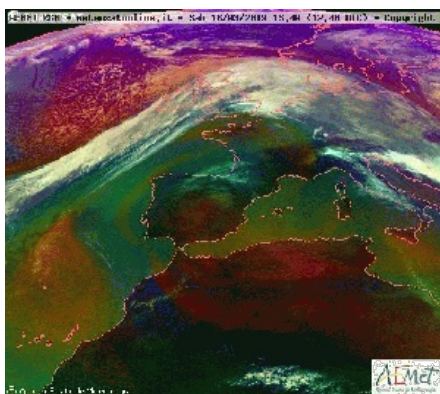
Airmass 16th May 2019



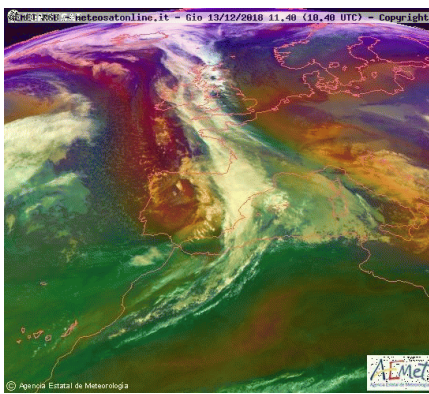
Airmass 23rd April 2019



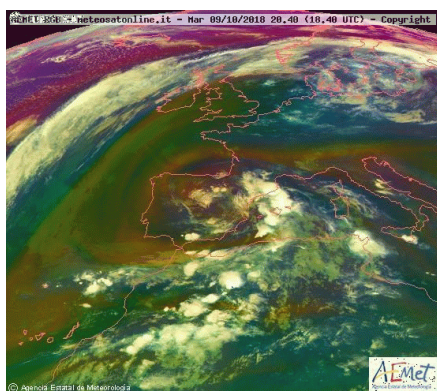
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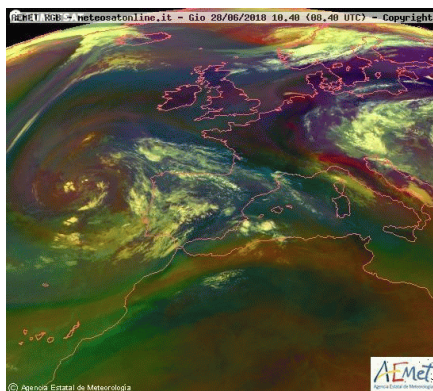
AirmMass 13 Dec 2018



Airmass 9th Oct 2018

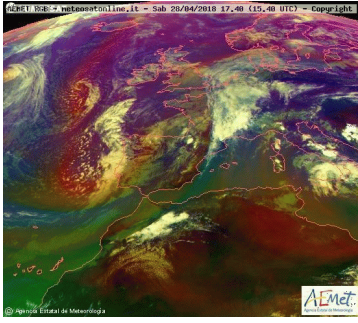


AirmMass 28 June 2018

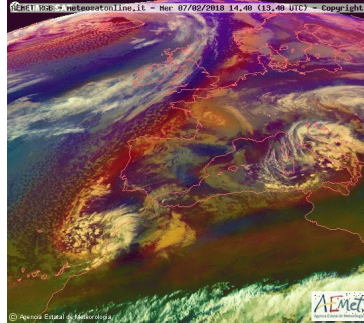


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- Academic Computer Centre
- CYFRONET AGH
- American University
- Arizona State University
- Binghamton University
- Boston University
- Brown University
- California State University, Long Beach
- California State University, Northridge
- California State University, Office of the Chancel
- Canterbury Christ Church University
- Central Methodist University
- Central Queensland University/CQU
- Charite - Universitaetsmedizin Berlin
- Charles University
- CIT2 - Universite Rene DESCARTES
- CKPOLSL - Silesian University of Technology, Compu
- Columbia University
- Comenius University Bratislava
- Consortium GARR
- Cornell University
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- Korea University
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- LAN University of Vienna
- Lancaster University Campus Network
- Lancaster University Network Services Limited
- Landmark-university
- Leeds University
- Liepajas Universitate

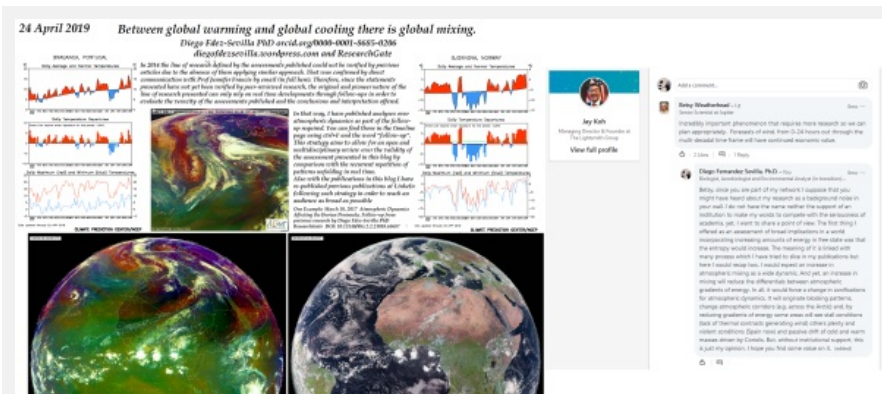
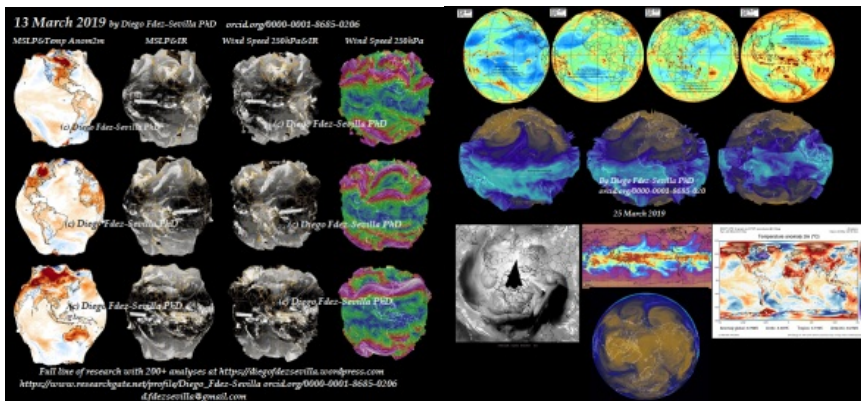
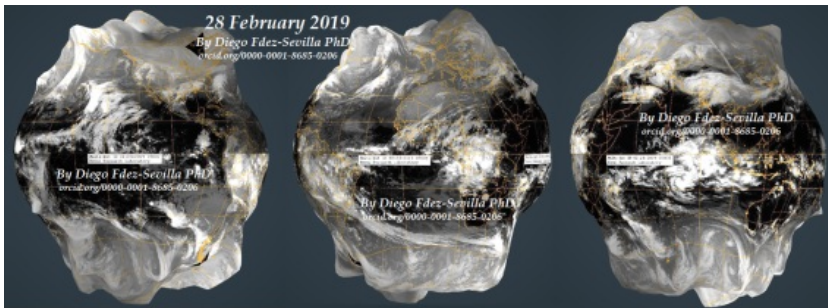
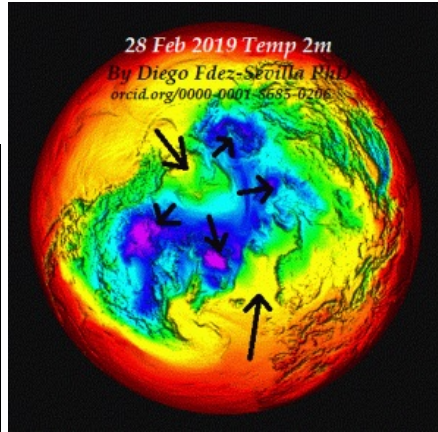
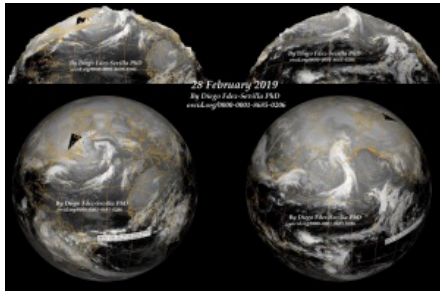
Airmass 28 April 2018



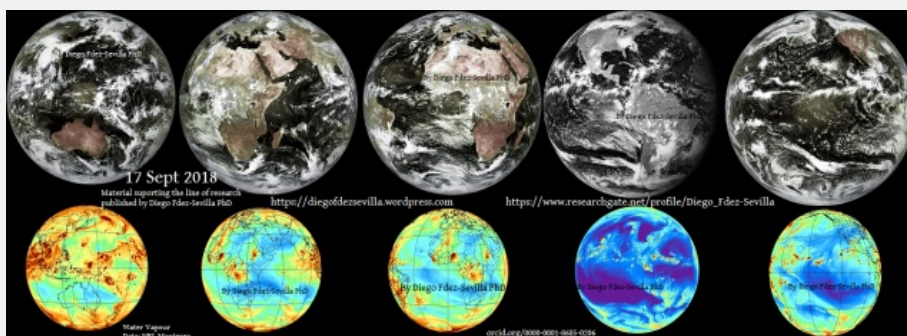
AirMass 7th Feb 2018



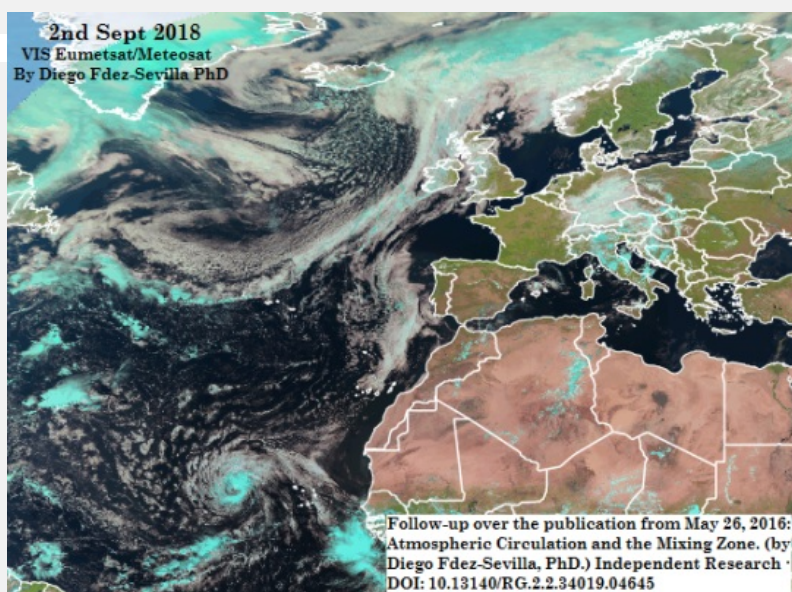
- Loughborough University
- Louisiana State University
- Ludwig-Maximilians-Universitaet Muenchen
- Lulea technical university
- Maharishi Dayanand University
- Rohtak
- Mahidol University, Thailand
- McGill University
- McMaster University
- Michigan Technological University
- Middle East Technical University / Orta Dogu Tekni
- Middle East Technical University(METU)
- Mississippi State University
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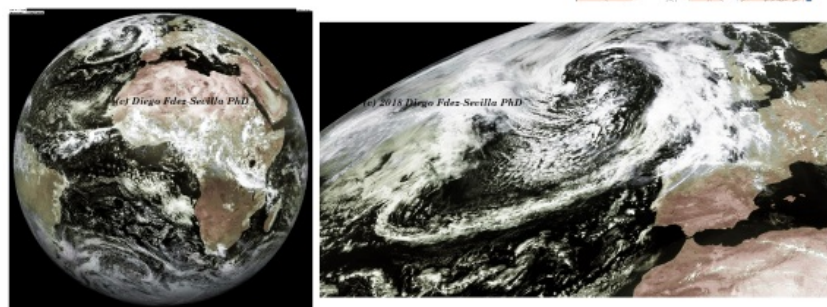
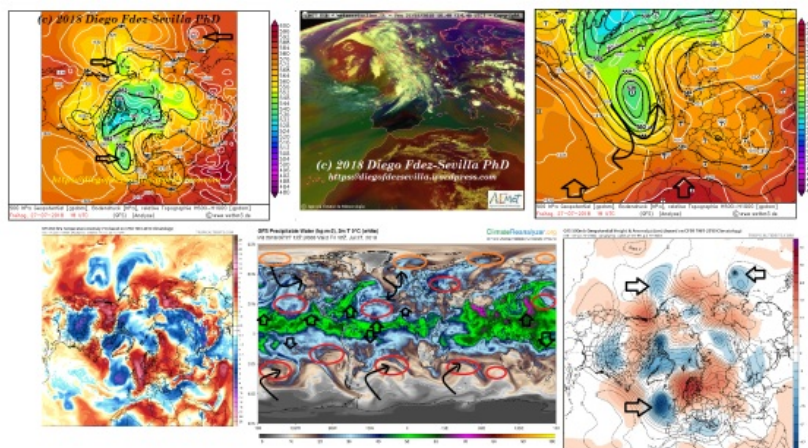
24 April 2019 Diego Fdez-Sevilla PhD Follow-Up_Between Global Warming and Global Cooling There Is Global Mixing



[Follow-up on previous assessments 17Sept 2018. About resilient Florence, super typhoon Mangkhut at West Pacific and Atlantic northward Tropical storm Helene. By Diego Fdez-Sevilla PhD. 17 Sept 2018](#)
Atmospheric Water Vapour Sat by Diego Fdez-Sevilla PhD. By Diego Fdez-Sevilla, PhD. Published September 17, 2018.

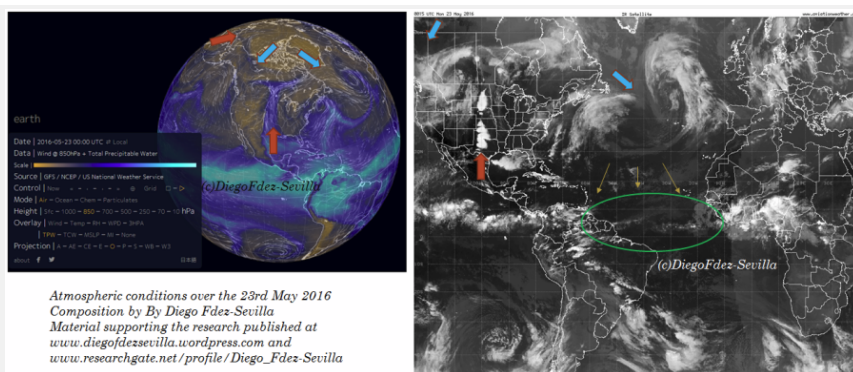


[Follow-up on previous assessments 17Sept 2018. About resilient Florence, super typhoon Mangkhut at West Pacific and Atlantic northward Tropical storm Helene. By Diego Fdez-Sevilla PhD](#) 22nd Sept 2018 South Europe Diego Fdez-Sevilla PhD By Diego Fdez-Sevilla, PhD. | Published September 17, 2018



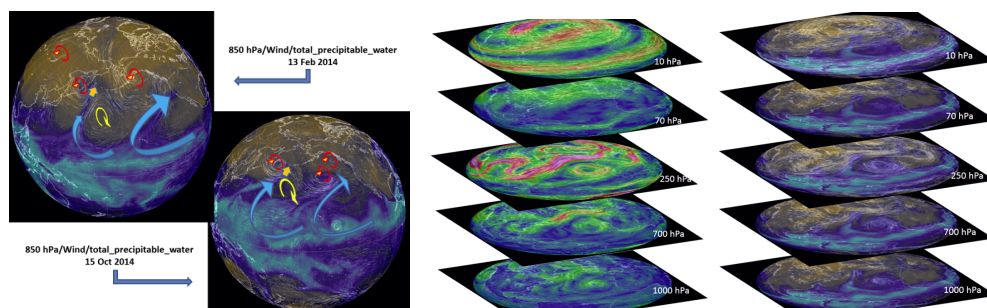
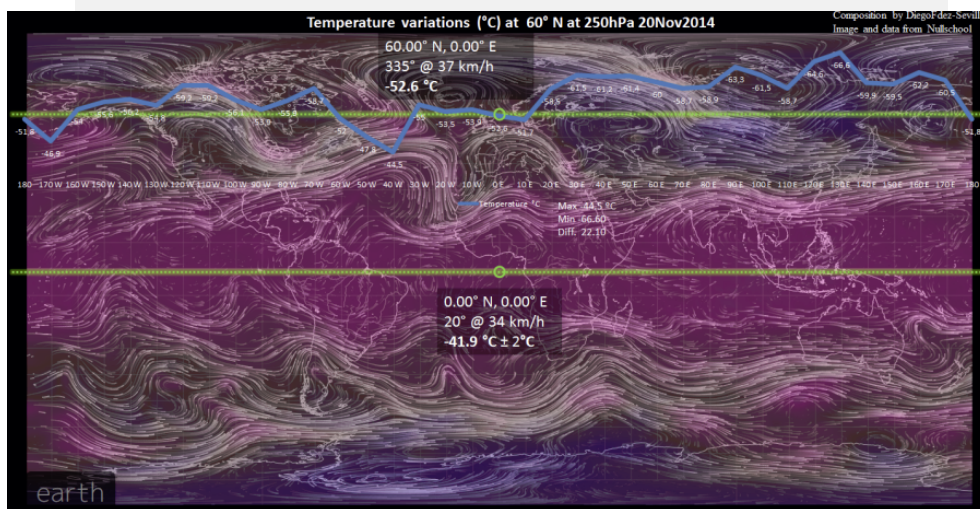
Follow-up 27 July 2018

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- University of York
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- Univision
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- Bayer Business Services GmbH
- Buhler AG
- Citigroup
- GIP Messinstrumente GmbH/Grimm-Aerosol Technik GmbH & Co. KG
- Infineon Technologies AG
- Intel Corporation
- L-OREAL HAARKOSMETIK UND PARFUEMERIEN GMBH & CO.
- Marriott International, Ic
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- Corporacion Nacional De Telecomunicaciones - Cnt E/Red Interministerial
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- Government Administration
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- Ministry of Public Administration/Republika Slovenija Ministrstvo za javno



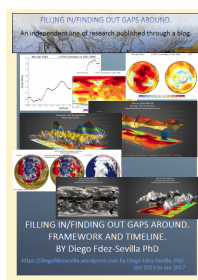
Atmospheric conditions over the 23rd May 2016
 Composition by By Diego Fdez-Sevilla
 Material supporting the research published at
www.diegofdezsevilla.wordpress.com and
www.researchgate.net/profile/Diego_Fdez-Sevilla

May 26, 2016 Atmospheric Circulation and the Mixing Zone. (by Diego Fdez-Sevilla PhD)
 ResearchGate DOI: [10.13140/RG.2.2.34019.04645](https://doi.org/10.13140/RG.2.2.34019.04645)



21 Oct 2014 Vertical Profile Atlantic NH Wind and TPW (NCEP/NOAA)

October 21, 2014 New theory proposal to assess possible changes in Atmospheric Circulation (by Diego Fdez-Sevilla PhD) Researchgate DOI: [10.13140/RG.2.1.4859.3440](https://doi.org/10.13140/RG.2.1.4859.3440)



Superficial Tension and Energy. A Theory Over Climatic Developments.

Superficial tension is the cohesive force between similar molecules in a liquid, and it can be represented as a force or an **area of energy**.

In the present line of research, in **2014** the idea of seeing the state of the Polar

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- Punjabi Univ/NKN Core Network
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- Federal Office of Information
- Technology, Systems and
- Telecommunication FOITT
- The Netherlands Institute of
- Ecology
- U.S. Department of Energy
- UK Meteorological Office
- United Nations Logistics Base
- Washington State Board for
- Community & Technical C
- From Institute Of Technology &
- Science_____
- “O.M.Marzeyev Institute for
- Hygiene and Medical Ecology,
- Academy of Medical Sciences of
- Ukraine”
- Alfred-Wegener-Institut,
- Helmholtz-Zentrum fuer Po
- Atlantic Oceanographic and
- Meteorological Laborato
- ATRIUM, l'Environnement
- Numérique Educatif des lycées
- Birla Institute Of Technology &
- Science
- ComClark Network & Technology
- Corp.
- Commissariat a l'Energie
- Atomique
- Computer Network Information
- Center
- Ecole des Mines de Nantes
- Ecole Normale Supérieure de
- Lyon
- ETHZ, Swiss Federal Institute of
- Technology Zurich
- European Space Agency (ESA)
- Forschungszentrum Juelich
- GmbH
- Fortech s.r.o.
- Hadara Technologies Private
- Shareholding Company/ Hadara
- Helmholtz-Zentrum Geesthacht
- Zentrum fuer Materia
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- Institut National d'Agronomie
- Paris-Grignon
- Institute of Atmospheric Physics
- RAS
- Leibniz Institute for Tropospheric
- Research/ Verein zur Foerderung
- eines Deutschen Forschungsne
- Massachusetts Institute of
- Technology
- Max Planck Institute for
- Meteorology-German Climate
- Computing Centre (Deutsches
- Klimarechenzentrum, DKRZ)
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- naturelle
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- Philips Campus-ICT
- Punjabi Univ/NKN Core Network

Jet Stream as a representation of an **Instability in energy distribution** across the **atmosphere** was applied in proposing a **New theory**.



In this theory it is suggested a reduction in the gradients of energy between latitudes and altitudes as a result of increasing the atmospheric energy pool by using water vapour as the carrier spreading the **extra energy** gained at Meridional Altitudes throughout the **three dimensions of the atmosphere**, (heat waves and SSW). A **pivoting point** followed throughout the analyses part of the framework presented in the current line of research since 2013.

In the following section there are some excerpts from previous analyses showing the evolution of the theoretical approach followed and its discussion against real-time developments through the years.

November 14,
2013

[Climate, “normal variability” or “change”? \(by Diego Fdez-Sevilla PhD\) DOI: 10.13140/RG.2.2.23557.86244](#)

About “normal variability” or “change”, I don´t like to characterize the grade of perturbation of any situation if it has not been defined its stable state first. Variability and change comes within any natural process and I believe sometimes we are limited by our capability to see further than our perceptive limitations to understand how things work in our natural environment. However, I would not be surprised if the grade of perturbation generated by the Human specie development in the global ecosystem (water cycles, land use and cover, global energy balance displacement, alterations in the biota regeneration cycles and biodiversity, displacement of natural resources part of soil regeneration, land features alteration in migration routes, ...) triggers reactions in the environment at global scale... would that be out of the plausible?

If we consider our atmosphere as the rechargeable battery that keeps our ecosystem running and that at the same time is getting recharged by the ecosystem functionality in itself, how much perturbation can adsorb the rechargeable cycle until both parts get compromised?

From an environmental point of view I understand that any ecosystem has a limited capacity to absorb perturbations. So, from an hypothetical approach to the subject on human impact versus environmental change I would like to see a case scenario study giving answer to three questions: Could humans alter the ecosystem at global scale? Which part of the ecosystem (soil, atmosphere, light and heat (from our sun), water or living organisms) would reflect primary the impact from human perturbation? What would have to do humans to alter the ecosystem at global scale? In case the answer is “yes” to the first question, how

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Amman Baccalaureate School
Assiniboine Community College
Baptist Healthcare System
Bibb County Schools
Bonn International School e.V.
Burnley College
Canadian Department of Education
Canterbury College
Catawba County Schools
Cherry Creek School District #5
Chesterfield County Public School
Clark County School District
Clinton Public Schools
College of Eastern Utah
Contra Costa County Office of Education
Cornwall College
Covina Valley Unified School District
Des Moines Public Schools
Edmonton Public School Board, District No. 7
Fairfax County Public Schools
Forest Hills Public Schools
Hogeschool West-Vlaanderen
Houston Independent School District
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iiNet Limited
Indiana Department of Education
Isd# 625 Saint Paul Public Schools
KWR Watercycle Research Institute
Linfield College.
Los Angeles Unified School District
Macomb Intermediate School District
Madison-Oneida Board of Cooperative Educational Services (BOCES)
Marist College
Mecklenburg County Public Schools
Middle Michigan Network for Educational
Telecommunications/Merit Network
Middlebury College
Montville High School
National Research Council of Canada
Network for Learning
New York City Public Schools
Non state educational institution
Educational Scientific and Experimental Center of Moscow In
Norfolk Public Schools Administration

much of the answer for the second and third questions matches with actual facts?

November 27,
2013

[Climate variability and energy balance. \(by Diego Fdez-Sevilla\)](#) At ResearchGate: DOI: [10.13140/RG.2.2.33706.11203](https://doi.org/10.13140/RG.2.2.33706.11203)

I think that we, as specie, are so used to adapt the environment to our needs that “we” might become the last living specie in the entire ecosystem identifying external interferences in our humanised local environment. It is like trying to identify the hottest day of the summer being all time at home with an air-conditioner keeping 22 Celsius.

Only when our local humanised environment gets affected by an uncontrollable change we start thinking that something must be going on. How hot has to be the day when the air-conditioner is not enough... I am afraid of that if external changes are strong enough to interfere into local ecosystems it means that the forces involved are strong enough to interconnect separated systems reflecting the need for a globalization in order to rebalance unstable situations.

The rest of the living species on earth are more sensitive to environmental changes than us. They feel the environment. If there is any evidence of that other living species are changing in the last decade in their live cycles, reproductive viability, capacity of adaptation, migration routes and timing and that there is a change in the survival success between already settled species I would be more than alert about something global being going on. My theory (sorry if I am terribly wrong or confused in my approach) is that the energy balance between planet's surface and atmosphere could be getting unstable. I believe water plays a major role transferring energy between systems and I wonder if the atmosphere is getting charged with more water/pressure than it used to (defined by the Vapour Pressure Deficit, I used this parameter to research about the moisture contain of [airborne pollen in the atmosphere vs aerodynamic properties](#)). An increase in atmospheric temperature would lead to an expansion in volume, lowering pressure and increasing capacity to retain water. This situation would be also affected by the increasing amount of aerosol in the atmosphere due to anthropogenic and natural sources and the drop nuclei properties of such particles. So I wonder if the alteration in the distribution and availability of the masses of water in the terrestrial surface plus the enhanced capacity of retaining water by the atmosphere could start changing in any way (shape, direction, strength, ...) the connections between atmospheric cells redistributing energy across the globe. This idea

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Suffield Public Schools
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The Lawrenceville School
Toronto District School Board
Township High School District 21
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Ventura County Office of Education
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Washington School Information Processing Cooperati
Wayne Township School
Wofford College
Wyke College

has been used about changing currents in the oceans, what do you know about same approach for the atmosphere?

Basically I see the role of water in our environment as Lithium in our batteries. The energy carrier of the environment. Water has potential energy in its three different stages as gas, liquid and solid. The potential energy carried in the structural properties of water intervene in all the processes of our environment. Physical, chemical and biological processes. The transformation from one stage to another keeps moving the energy cycle at the same time that distributes energy all over the environment. Deserts depend on energy availability same as our devices depend on battery supply if there is no electricity socket available. And, the daily cycles of the sun creates interruptions of energy supply with no element accessible to retain and transport energy during sun absence as effectively as water does.

The sun could be comparable to what electricity would do with our batteries (more efficiently actually). Thus, the cycle of energy carried by water gets recharged by the sun. The hardware would be the physical features in our environment which do not take energy actively for processing, meanwhile the software would be in the form of all those processes transforming resources actively (thus consuming energy such as plants in photosynthesis). Here we would have an Operative system defined by physical, biological, chemical and thermodynamic laws and applications with defined roles. Climate ultimately would be the alterations generated in the atmosphere as part of the process for transforming and transferring energy using water as the carrier.

More greenhouse gases in the atmosphere would induce an increased capacity of having water in the atmosphere trapping heat. This would seem as a logical mechanism for resilience against global temperature raising variations since atmospheric water would absorb heat consuming energy thus maintaining temperature values. However, more water in the atmosphere would increase the atmospheric potential energy load that triggers and charges atmospheric events.

October 21,
2014

[New theory proposal to assess possible changes in Atmospheric Circulation \(by Diego Fdez-Sevilla PhD\)](#) Researchgate [DOI: 10.13140/RG.2.1.4859.3440](#)

The theory of Arctic Amplification has introduced the considerations over feedback effects associated with temperature, water vapour and clouds due to

changes in the surface albedo feedback—the increase in surface absorption of solar radiation when snow and ice retreat—often cited as the main contributor.

The theory that I have developed follows “*in alignment*” with the work published previously by scientists [Judah Cohen](#), [Masato Mori](#), [Colin Summerhayes](#), [Columou](#) and [Ted Shepherd](#). Their work supported the theory of that early snowfall over Asia increases albedo leading to heat retention in the atmosphere provoking Arctic ice to melt. Their approach point to decreasing snow cover as the cause diminishing albedo enhancing heat absorption. Ultimately, their approach theorize that such enhanced capacity of the Arctic to absorb heat would lead to “amplify” atmospheric heat absorption already being fuelled with GHGs. And therefore, such increase in atmospheric temperature would reduce the thermal contrast required for a strong jet stream and consequently originating disturbance in atmospheric weather patterns associated.

What I propose with my hypothesis is that the so called “Arctic Amplification” is a synchronic consequence altogether with other environmental phenomena (ENSO, NAO, etc...) and not the trigger. I defend that “Arctic Amplification” is a symptom and not a causation of atmospheric dynamics. Arctic circulation does not amplify a process but on the contrary, it reflects the consequence of absorbing the influence from mid-latitude conditions. (updates can be found in the category [polar vortex and jet stream](#). 26/04/2016)

What I am trying to highlight in my theory are the possible mechanisms which would explain: changes in albedo which support the concept of “Arctic Amplification”, early snowfalls in central Asia, Arctic ice cover meltdown and oceanic increases in salinity and ultimately, the origin of atmospheric blocking patterns and a slow down or “pause” in T raise, unified in single principle: Increasing conc. of CO₂ and water vapour induce **a decrease in the differential gradients of energy** in atmospheric circulation.

I am looking at the implications of having the Arctic circulation not “Amplifying” but “Absorbing” constant increases in atm CO₂ and Water vapour. In my approach, instead of looking at what happens in the Arctic as the origin of a chain reaction, I look at what happens in the Arctic just as a side effect (with its own implications) of **a more wide process** resultant from **a reduction between the differential gradients of energy driving the atmospheric global circulation**, being **water vapour the carrier of the energy** being **dispersed all over the atmosphere.**

November
14, 2014

[Why there is no need for the Polar Vortex to break in order to have a wobbling Jet Stream and polar weather? \(by Diego Fdez-Sevilla PhD\)](#) Researchgate DOI: [10.13140/RG.2.1.2500.0488](https://doi.org/10.13140/RG.2.1.2500.0488)

Here I hypothesise that it can be considered that the volume of the atmospheric system accommodating increasing conc. of GHGs and water vapour has expanded from sub-polar regions into Polar Circulation. Consequently, following the second law of thermodynamics, an added space for those gasses to expand would allow for the atmosphere containing GHGs and water vapour to retain more heat with no increase in atmospheric temperature. Which it could explain why under increasing concentrations of atmospheric CO2 there has been a so called "pause" in global warming.

Increasing amounts of atmospheric CO2 and Water vapour would incorporate forms of energy not only into cyclonic events, increasing its strength, but also it would increment the energy in the atmosphere around it. A scenario in which the difference between the energy carried by an atmospheric event and the atmosphere surrounding it is high, the energy in a cyclonic event would dissipate faster, losing strength and resilience. However, we can see in the North Pacific and Atlantic Oceans, cyclonic and anticyclonic events building what it has being called "blocking patterns", growing from near surface level (1000 hPa) to levels as high as the Jet Stream (250 hPa).

For all of these reasons, I see a reasonable link between the recent observed disturbance in the atmospheric circulation of the Jet Stream, without the Polar Vortex being broken yet, and the possibility of being the result of a decrease in the differential gradients of energy between cyclonic events and atmospheric barriers like the Jet Stream. Under such scenario, the Jet stream loses stability becoming wobbly, allowing more frequent exchange of masses of air between both cold and warm sides. ...(see in full by following link at title)

February 10,
2015

[Revisiting the theory of "Facing a decrease in the differential gradients of energy in atmospheric circulation" by Diego Fdez-Sevilla PhD.](#) Researchgate: DOI: [10.13140/RG.2.1.1975.7602/1](https://doi.org/10.13140/RG.2.1.1975.7602/1)

Cohen et al.2011 proposed that early snowfall over Asia increases albedo leading to heat retention in the atmosphere provoking Arctic ice to melt and create heat absorption leading to jet stream weakening due to Arctic Amplification in atm heat absorption.

I believe that all of that is a consequence and not the trigger. That is a symptom and not the cause.

*In August 2014 Cohen et al, published a review over the state of knowledge on climatic research: DOI:10.1038/NGEO2234 "studies on related topics, especially other **observational studies, share some of the same shortcomings: lack of statistical significance, causality unclear, incomplete mechanistic understanding, and so on**".*

In October 2014 I published my theoretical explanation over the mechanism driving climatic alterations.

I am looking at the implications of having the Arctic circulation not "Amplifying" but "Absorbing" constant increases in atm CO2 and Water vapour. In my approach, instead of looking at what happens in the Arctic as the origin of a chain reaction, I look at what happens in the Arctic just as a side effect (with its own implications) of **a more wide process** resultant from **a reduction between the differential gradients of energy driving the atmospheric global circulation**, being **water vapour the carrier of the energy** being **dispersed all over the atmosphere.**

In **December 2014** I shared my theory and my point of view with **Prof Jennifer Francis** by [email](#). She replied saying: "*the topic you've written about is extremely complicated and many of **your statements have not yet been verified by peer-reviewed research.** You will need statements supported by published (or your own) analysis, (not just suggestive examples and anecdotal evidence)*"

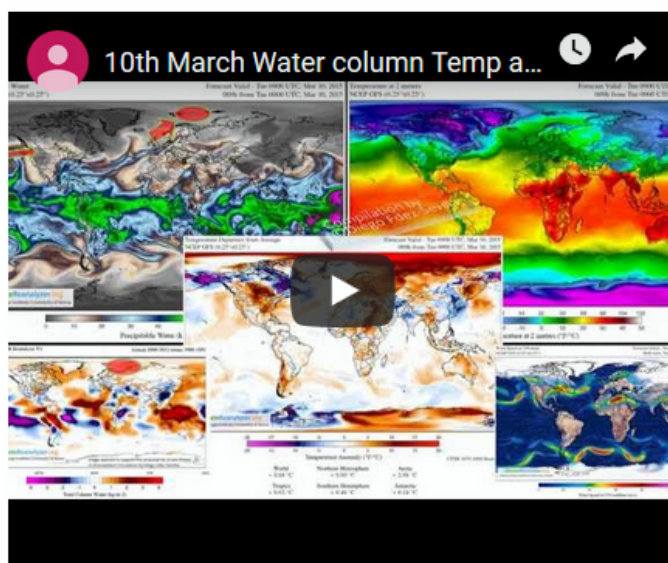
Following Jennifer comments I offer a review over the theory that I have proposed with new analyses.

*My theory tries to find common ground to **explain the cause leading to Arctic amplification, blocking patterns associated to deep cyclonic events, a pause in atmospheric T raise, increase in kinetic energy dispersed over the whole hemisphere, water flash floods, as well as frequent trans-equatorial circulation between hemispheres at jet stream level.***

*Throughout several posts in my blog, I have explored the connections between **Solar activity, Biological productivity, Polar vortex, Environmental Resilience, Inland Water Bodies and Water Cycle, Energy Balance and the Influence of Continentality on Extreme Climatic Events.***

*Based on my analyses I have developed a **theory***

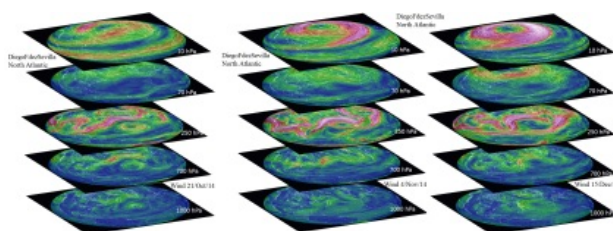
*about what I believe it has induced an **increase in atmospheric water vapor content** and, further I discuss **its implications in atmospheric circulation, Jet Stream behaviour and weather system's patterns.***



*Based on my previous research published in this blog and, the arguments pointed out in various assessment, **the implications of having the Arctic circulation not “Amplifying” but “Absorbing” constant increases in atm CO2 and Water vapour defines what is happening at the Arctic just as a side effect (with its own implications) of a more wide process resultant from a reduction between the differential gradients of energy driving the atmospheric global circulation (e.g. inducing a weak Polar Jet Stream), being water vapour the carrier of the energy being dispersed all over the atmosphere, in latitude and altitude.***

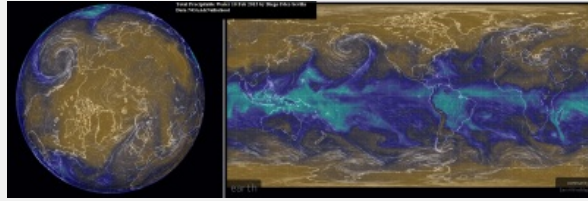
The most significant features indicating the potential validity of this theory are:

- The formation of deep and resilient cyclonic events holding enough energy to affect atmospheric circulation from Surface level all the way up to Jet Stream level (250 hPa).



- Moisture gained in the Equator getting introduced in atmospheric circulation carried by water vapour into higher latitudes incorporating more energy in atmospheric circulation in the form of latent heat.

Notice that the most predominant entrance of water vapour into high latitudes happens in the North Atlantic.



Actual state of atmospheric circulation for wind direction and Total Precipitable Water in the atmospheric column today 10th Feb 2015.
Data NOAA & Nullschool.

Persistent patterns in atmospheric circulation carrying water vapour in the NH Pacific have repeated similar to those from last year's winter: 2014 Feb and Oct. 2015 Nov, Dec, Feb and March.

... (see full analysis at source following link at the title)

June 18, 2015

[Extreme climatic events, implications for projections of species distributions and ecosystem structure \(by Diego Fdez-Sevilla PhD\)](#) Registered in pdf at ResearchGate [DOI: 10.13140/RG.2.2.19446.04161](#)

This post complements others published previously in this blog trying to highlight the increasing relevance of understanding [connecting patterns between non-biotic and biotic systems](#) involved in atmospheric developments. The weakening of the Polar Jet Stream (as consequence of seen reduced the thermal contrast between subtropical and polar masses of air) would potentially allow "out of season" exchanges of masses of air between both sides, triggering abrupt changes of temperature wherever they move.

[The weakening of the Polar Jet Stream](#) can be linked with the changing chemical composition of the atmosphere due to increasing CO2 concentrations. The level of [graduality in the transition between seasons](#) can be affected due to the burst of Atmospheric events. If these are strong enough to [alter the stability of biological systems](#) they well might also affect the synergistic feedbacks existent between [biological productivity](#) and the [thermodynamic atmospheric behaviour](#).

These synergistic feedbacks seem to not be of much part of the research available in the literature. Most studies are addressing the survival

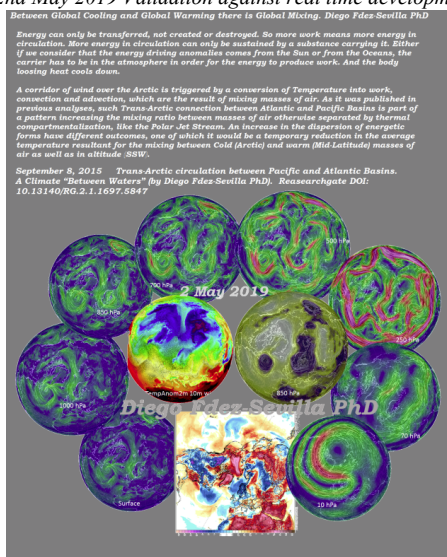
*of species and mechanisms of adaptation against changes in climate or atmospheric behaviour. And yet, I believe that the stability of an ecosystem, biotic and nonbiotic parts altogether, has to be considered as the result of receiving and absorbing perturbations by all sides, atmosphere, biotope and ecotope. **When a region losses the capacity to absorb perturbations and regenerate itself to its previous state, the whole balance between land cover and atmospheric behaviour above it will change.** And thus, the climatic parameters defining the region. Only by changing the species of vegetation covering land surfaces the albedo will change, inducing changes in convective circulation as well as the chemistry of the soil and its structure.*

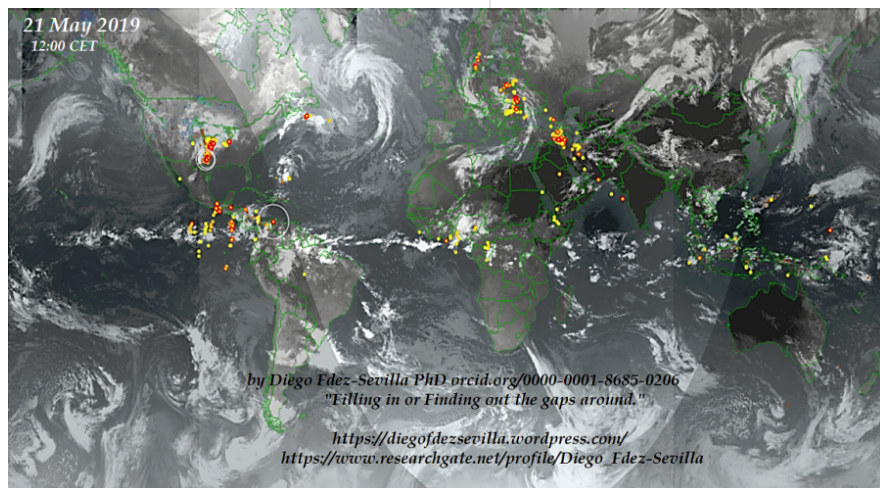
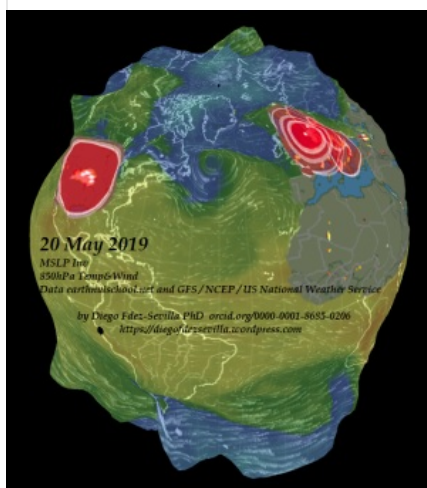
September 8,
2015

[Trans-Arctic circulation between Pacific and Atlantic Basins. A Climate “Between Waters” \(by Diego Fdez-Sevilla\).](#) Reasearchgate [DOI: 10.13140/RG.2.1.1697.5847](#)

I believe that the present weather events, altogether with the tornado seen in Venice on July, represent some of the new “Drops of Weather” coming over to say that the Summer, as we know it, is coming to an end. The reason behind it seems to be the sporadic and unpredictable behaviour of the Jet stream, which not only is wobbly in latitude, but also in the vertical profile of the atmosphere. Accordingly, we can see that when it comes to lower levels from 300hPa induces alterations in the thermodynamical behaviour of the tropospheric circulation. In turn, when this cold air touches the lower level of our atmosphere, activates the energy accumulated in the Water vapour contained in it as latent heat, delivering new forms of energy; kinetic provoking strong winds, electrostatic generating lightnings and potential carried in the mass of all the water coming from its gaseous state into liquid or solid precipitation.

(2nd May 2019 Validation against real time developments)





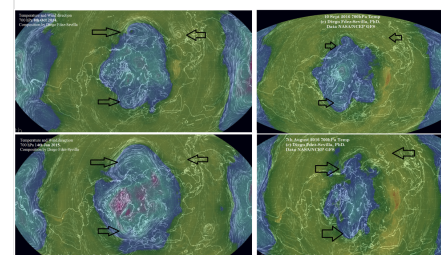
(May 2019 Validation against real time developments)

I have already discussed what is my theory about what it is happening that it is generating such a wobbly jet stream in latitude and altitude. This theory was published in a [previous post](#) and it points out the incorporation of masses of water vapour into polar latitudes as consequence of CO2 forcing as the cause wearing out the strength of the Polar Jet Stream.

I also have suggested that such incorporation of masses of water vapour into Polar Latitudes follow channels which are linked with persistent cyclonic events in the Atlantic and the Pacific. The present patterns seen in the circulation over the Pacific and the Atlantic are consistent with those proposed in this theory.

Ultimately, if [this theory](#) is right and weather patterns are incorporating water vapour into Polar latitudes, it would affect:

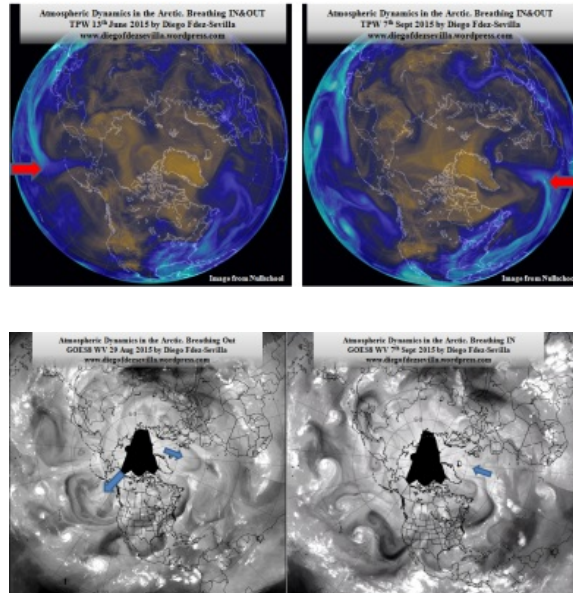
- **The strength of the Polar Jet Stream** becoming wobbly from the bottom up, from tropospheric circulation forcing instead of from the stratospheric Polar vortex, ([more here](#))
- Introduction of water vapour into Arctic Polar latitudes would decrease temperature gradients in the Pole reducing **ice and snow cover**, ([more here](#))
- that would induce ice melting which in turn would affect SST and Oceanic circulation in the Atlantic and Pacific. That would explain the cold **anomaly in SST in the North Atlantic**, thus the AMOC and global thermohaline circulation going around the Antarctic and arriving at the Pacific. ([more here](#))
- Arctic Polar masses of air getting warmed up would become involved in translational circulation from the Atlantic and the Pacific through the Arctic, in a breathing like cycle. That would open a new channel for balancing gradients of atmospheric pressure between the atmospheric masses of air above both Oceans. That would explain the **synchronicity between Low pressures observed in the North**



September 14, 2016 Between Global Cooling and Global Warming There Is "Global Mixing" (by Diego Fdez-Sevilla, Ph.D.)
Researchgate DOI: 10.13140/ RG.2.2.19874.63684

Atlantic and North Pacific, (more [here](#)).

- An **interconnection between Atlantic and Pacific atmospheric circulation through the Arctic** would affect **Equatorial winds**. That would have an impact over the distribution of SST being dominated by them, being the most relevant the **ENSO**.(more [here](#) and [here](#))



- Furthermore, **new channels breaking the restriction of keeping warm masses of air bellow Polar circulation** would release the thermodynamical limits for equatorial latitudes to absorb water and heat, therefore, increasing thermal conductivity towards upper latitudes. That would explain **heat waves moving upward in latitude**.(more [here](#) and [here](#))
- At the same time, incorporating the possibility for subtropical circulation to occupy the volume of space at Polar latitudes would allow the global circulation to **absorb more energy without steep increases in temperature** thanks to the extra volume added to be occupied.(more [here](#))
- An homogenization in the amount of energy carried in the atmosphere by water vapour would induce a decrease between gradients of energy. That would allow **atmospheric events to persist in location and time** due to the reduced capacity of the atmosphere to dissipate its energy.(more [here](#))
- The amount of energy being accommodated by the atmosphere would behave like electricity, being tamed by the capacity of the surroundings to absorb and conduct it. But, like a short circuit, the energy contained in the atmosphere, could overwhelm the capacity for the surroundings to cope with it in a smoothly manner, triggering **abrupt discharges from energy in latent heat form** carried by the water vapour, into potential energy carried by the masses of water in form of hail and rain, and kinetic energy

generating strong winds. All those forms of energy capable of decimating crops, houses and even killing animals as we have seen in some videos in this post. (more [here](#))

December
18, 2015

[Climate and weather December 2015. Another Polar Vortex another Heat Wave? \(by Diego Fdez-Sevilla, PhD\)](#) Researchgate [DOI: 10.13140/RG.2.2.19966.48968](#)

The most common form of analysis when addressing the conformation of the Polar Vortex is following the idea of considering that its configuration is the responsible for the conditions at Tropospheric level.

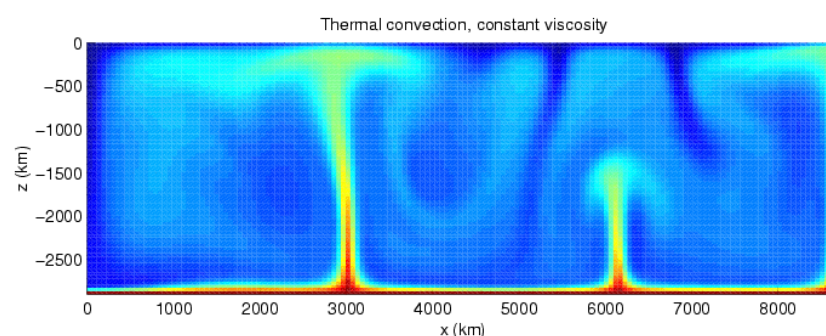
Why not the other way around?

Warm masses of air not only get into North latitudes but also in altitude when they become close to the Pole.

In 2014 I have already discussed the effect of having middle latitudes being warmed up from a pretty hot, long, summer-like fall period inducing the type of Polar Vortex configuration we see actually. ([ref](#))

At 70 hPa there is a ring of warm air around the Polar vortex and warmer than lower latitudes.

The warmer mass of air represents not only the conditions in heat transfer capabilities towards its surroundings but also the molecular density of the mass of air containing this energy and the convective processes which represents from low altitudes moving upwards.



Considering the conditions in temperature and [thermal conductivity at tropospheric level](#) I can only visualize the [movement of warm air towards high latitudes as much as in altitude](#).

The movement of tropospheric masses of air into high altitude was easily visible from the Spacial Station at the time when vast extensions of forests were being consumed by wildfires in Canada.

My interpretation of the behaviour of the Ecosystem as a whole is that the first and fastest medium reacting to the energy entering the system is the atmosphere. And therefore [the atmosphere leads](#), and [the events found in the other mediums follow](#).

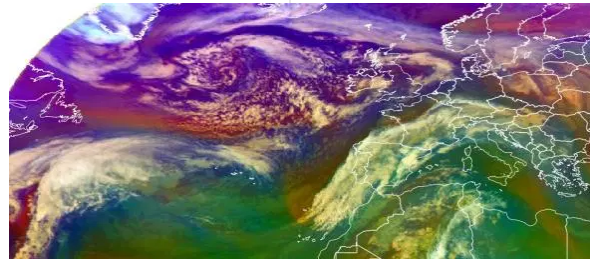
The events that I have explored seem to follow this interpretation. And new publications seem to support my point of view.

I look at those anomalies not by the amount of heat in itself but by the molecular composition of the mass of air holding it at such latitudes and time of the year. If this heat is there is because “thermodynamically” it can, the conditions allow it. And that is under my point of view the key in this matter. More radiation reaches out space but the molecular composition do not hold that temperature.

As I have tried to point out in this last publication, same patterns of atmospheric circulation moving masses of air to higher latitudes holding heat seem to be repeating since I started looking at it in 2013, over the Pacific and Atlantic, at tropospheric level as well as at stratospheric level. The gas with highest capacity to do it is water vapour, which furthermore, generates downpour rains and floods when releases part of the energy carried.

January 13,
2016

[Atmospheric Dynamics And Shapes \(by Diego Fdez-Sevilla\)](#) ResearchGate [DOI: 10.13140/RG.2.2.35973.65765](#)



The images from Eumetsat shows in a nicely way how two masses of air of different density interact giving the shape of a mushroom. Sure you have seen this shape in many other places, when you serve a drop or milk into coffee, when you breath out some steam into cold air in winter... it also happens when barriers like tissues exudate aqueous substances through pores, like your skin or in pollen grains. In this case, North America is blowing air into the ear of Europe.

*Even though the shape resembles somehow the mushroom shape coming from an atomic explosion, in atmospheric circulation this shape has different interpretations from what it happens in an atomic blast. We have to keep in mind that even though this image shows a 2D pattern, there is a three dimensional interaction in altitude between masses of air with different densities. **Rayleigh-Taylor Instabilities play a key role in this image,** altogether with rotation and kinetic energy as the main factors. A subject which can be studied with complex maths but also intuitively understanding some basic concepts.*

if we consider the present atmospheric phenomenons as part of a continuous movement

and we compare them with those seen since at least winter 2013/14 and winter 2014/15, I believe that there is a high probability of that there is not a new shape in the pattern followed due to Pacific SST but a common pattern throughout the last 3 years which only changes in frequency and intensity.

This approach releases ENSO from being a dominant feature driving atmospheric circulation and gives to it a subsidiary role. From my research since 2013 over climatic developments, I strongly believe that the main driver in atmospheric circulation are the properties defining the thermal contrast between mid-latitudes and polar circulation. Hence, the behaviour of the Polar Jet Stream dictates the behaviour of the circulation in our atmosphere. And localized perturbations, like the sign of the ENSO, would only contribute to the frequency and intensity of the weather events generated due to the behaviour of the Polar Jet Stream. Behaviour which is ultimately defined by the [composition of the atmosphere and the subsequent GHGs involved](#).

As I said in a different post, [I believe that the behaviour of the atmosphere leads and the rest of the mediums follow](#). An increase in SST at the Pacific would induce more water vapour in the atmosphere, but its distribution and release will be defined by the conditions and behaviour of the Polar Jet Stream, which it has been [behaving erratically with and without positive ENSO](#).

January 29,
2016

[Observed Atmospheric Dynamics. A follow-up assessment over the theory proposed on Energetic gradients by Diego Fdez-Sevilla](#). ResearchGate
[DOI: 10.13140/RG.2.2.28948.19843](https://doi.org/10.13140/RG.2.2.28948.19843)

*The first assessment included in the [theory proposed](#) in this line of research was the increasing probability of **seeing water vapour reaching higher Latitudes** and the patterns followed in both basins, Atlantic and Pacific.*

The presence of the [storm Alex](#) hovering over the Atlantic for over a week in the middle of January, the tropical storm [Pali](#) reaching the equator, [rain reaching Arctic latitudes](#) and [floods instead of snow in UK and Sweden in December](#), suggest that the approach followed in this theory is able to unify all events in a single principle:

The atmosphere has reached a tipping point in

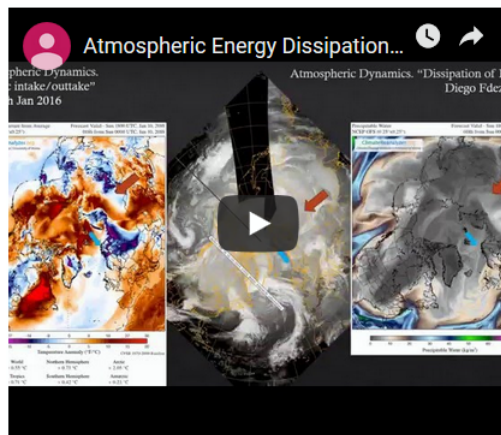
absorbing energy at mid latitudes and the constant contact of warm masses of air with those from polar latitudes has worn off the strength of the Polar Jet Stream.

Such circumstance has allowed the atmosphere to spread the energy carried by water vapour from mid latitudes into northern latitudes, being able of holding more energy than before since it is not dissipated into their surroundings when moving across latitudes.

This scenario has generated the possibility of observing:

- *lows moving large distances like those we see through this winter 2016 crossing from West Pacific to Eastern EEUU and the Atlantic.*
- *atmospheric water vapour rivers moving vast amounts of water vapour crossing Oceans, and even from Eastern Pacific to Western Europe.*
- *And also, Highs and Lows being able of maintaining their position against the Polar Jet Stream, inducing major disruptions on the path of the Polar Jet Stream inducing masses of air crossing from both sides, from Polar to Sub-Tropical latitudes and the opposite. Such scenario has become more frequent since 2013. As well as warm masses of air have reached the Arctic in December 2015, the polar influence has reached record low latitudes over Asia like at Taiwan the 25th January 2016 (more at [cnnnews here](#)). From my take, the trigger was from the bottom up due to Strat Sudden Warming generating a sucking effect, like in a vacuum flask (kitasato filtration). Warm air moving up displaced cold air moving down. If we look at two points for the same day 20th Jan 2016 and latitude, located just at the opposite side in the North Hemisphere, it is possible to see the temperature displacement over 850hPa and 10 hPa.*

As a whole, the research here presented points to a new scenario in atmospheric dynamics in which the Arctic circulation, previously isolated from Subtropical influence by the Polar Jet Stream, has become open to be involved in the atmospheric dynamics for the Pacific and Atlantic basins. This new interconnection will affect the atmospheric dynamics around the whole North Hemisphere. But also, by being our atmosphere a close system, subsidiary, such alteration would also affect dynamics at the Equator and due to symmetric compensation between Hemispheres, also into the South Hemisphere.



February 4,
2016

[Polar Vortex, Old News, Same News? \(by Diego Fdez-Sevilla PhD\)](#) ResearchGate DOI: [10.13140/RG.2.2.25779.12328](https://doi.org/10.13140/RG.2.2.25779.12328).

How can we find related events to help us understand this atmospheric dynamic?. Liquid motion lamps (which most people know as “lava lamps”) have been around for decades.

March 3,
2016

[Seasonality Spring 2016. Continuous follow-up on my previous research assessing atmospheric dynamics. \(by Diego Fdez-Sevilla\)](#) Researchgate DOI: [10.13140/RG.2.1.2833.8968](https://doi.org/10.13140/RG.2.1.2833.8968)

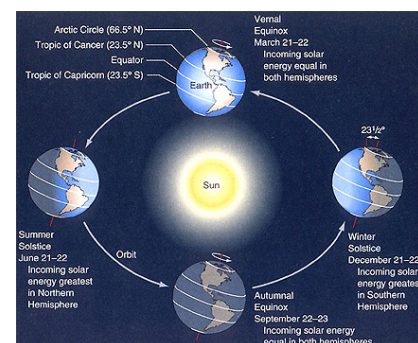
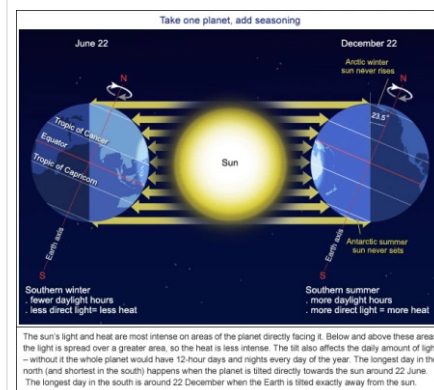
Seasonality is a characteristic of a time series in which the data experiences regular and predictable changes which recur every calendar year. Any predictable change or pattern in a time series that recurs or repeats over a one-year period can be said to be seasonal.

*The current situation through Feb/March 2016 in the atmospheric dynamics driving seasonality from Winter to Spring is bringing some interesting points around, and many of them are consistent with the developments expected from the line of research followed in this blog. So I want to share in this post the main principles which drive the standard interpretation of **seasonality**, the new outcomes from **current conditions** and the coherences found with my **previous research** published.*

There are several factors that affect the weather on the planets. Those factors are defined by two major characteristics.

*The astrological interactions derived from the planet's (**Earth**) **position, shape and motion**:*

- *the tilt of the planet's axis (which causes the seasons),*
- *the shape of its orbit around the sun,*
- *its average distance from the Sun,*
- *and, the length of its day as result of how fast it*



rotates over the planet's axis.

And, the presence/absence and composition of a significant atmosphere.

The current situation through Feb/March 2016 in the atmospheric dynamics driving seasonality from Winter to Spring is bringing some interesting points around, and many of them are consistent with the developments expected from the line of research followed in this blog.

The coldest part of a day cycle comes after the higher amount of hours in the dark, just before sunrise. The coldest part of the orbital cycle at the NH should be when we crossed over the winter solstice in Dec, and yet there is not enough differential in thermal contrast from low temp in the Arctic to build up a [steady Polar Jet Stream](#).

It is becoming a frequent scenario to see the displacement of cold air from the Arctic due to convective forcing from warmer masses of air getting into high latitudes and altitudes. The consequence from such dynamics is the alteration in the form, length and transition between seasons.

Based on previous assessments since 2013, I believe that the influence of the ENSO during the year 2015 only emphasise already existent patterns being developed in the atmosphere. And these events of cold masses of air crossing latitudes might be prolonged in time through spring.

As I said in a previous publication on the [Polar Vortex 2016](#), if you want to predict winter weather it might become useful to take a lava lamp and use it as a crystal ball to make predictions.

This type of situations brings back some [previous discussions](#) addressed in several posts, in which I have point out the relevance of facing changes in the severity for [the transition between climatic phases](#) due to [atmospheric alterations](#).

Based on my [observations and analyses since 2013](#), in 2014 I made an [assessment](#) over the atmospheric dynamics driving the weather systems across the NH which led me to propose a [theoretical approach](#) which could explain [new developments in climatic drifts](#).

In the following paragraphs I share bits of some of the most relevant publications to date addressing the coherence found between those and the current conditions.

- *The transition from Summer to Winter and from Winter to Summer will be a transition between*

“more frequent exchange of masses of air” to “less frequent”. Instead of having a constant gradual change in atmospheric conditions, we will have pockets of air moving across the Jet stream defining the weather wherever they move.”

- *“The implications raising from such type of atmospheric behaviour are yet to be fully understood. To begin with, the possibility of having sudden intrusions of masses of air inducing extreme changes in meteorological variables might affect the life cycle of the biota since the most of it, plants and animals, follows changes on Temp and Humidity suffering behavioural, hormonal and physiological alterations. Also it must be considered the rapid respond to those variables from species with a quick metabolism. Many of which, insects and fungi, might suffer blooming rates of growth coinciding with a vulnerable stage in the development of other species like crops and wild plants. This scenario opens questions which I believe are worthy to be included in a debate about “the possibility of its increasing frequency in the near future”, also discussed in previous posts*
- *The wobbliness of the Jet Stream means unstable interchange of masses of air between both sides. The cold air being pushed down is consequence of warm air moving up. The volume shared by both masses of air, at this level, is finite. So when a volume of air moves Northward, another volume of air has to move Southward. That opens the possibility of seeing warmer temp and colder temp in both sides of the Jet Stream, like those at UK. The question about where can we see patterns of cross latitudinal transport being repeated is what has pointed the attention to blocking patterns. And I propose that those blocking patterns are originated as a consequence of a decrease in the differential gradients of energy in atmospheric circulation.*

The transition from facing changes at a regional scale into changes at global scale only takes to have enough regional changes to coalescence. And that applies to all parts of the ecosystem, changes in the liquid phase (Oceans), the solid or terrestrial and the gaseous/the atmosphere.

What we see is a pattern in thermodynamic circulation and biotic reaction.

Plant cover over the Arctic will increase the potential for the atmosphere to retain water vapour through evapotranspiration so it becomes a positive feedback reaction towards extending the influence of the warmer masses of air transported from mid latitudes into polar circulation.

That will increase the amount of energy that the

atmosphere can hold and spread over the whole Hemisphere and beyond Equatorial limits extending to the South Hemisphere. There, water vapour will face [the contrast from the non-existence of continentality](#) so ice would increase like frost over the Antarctica. However, the Ocean circulation will be affected interacting with such transport creating a new scenario full of contrasts.

(see in full following the link at the title)

March 10,
2016

[Tangled in Words. Atmospheric Dynamics, Stefan Boltzmann Calculations and Energy Balance \(by Diego Fdez-Sevilla\)](#) Researchgate DOI: [10.13140/RG.2.2.28443.57120](https://doi.org/10.13140/RG.2.2.28443.57120)

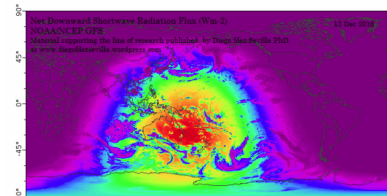
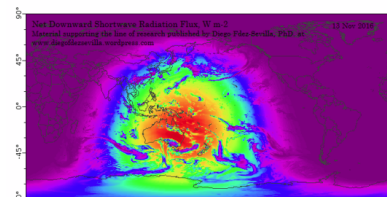
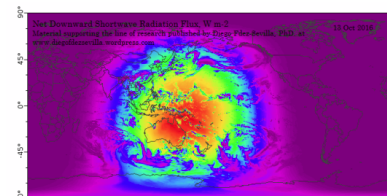
Recently I have been aware of the existence of a discussion about the validity of “applying Stefan Boltzmann calculations to explain that the whole radiative forcing greenhouse conjecture fails to explain reality”.

In a system at equilibrium the radiation is in equilibrium with the molecules, at the same temperature. Conversely, Temperature is a characteristic of an equilibrium system. Therefore, in a system at equilibrium the populations of energy levels are described by the black-body radiation law and Boltzmann statistics. Accordingly, a system at equilibrium may be described by a temperature. HOWEVER, without equilibrium, there is no defined temperature.

So I want to share what I said in a discussion about it and incorporate my thoughts into my research so any follower can have access to it.

*Since the original publication of my theory on energetic interactions and dynamics in the atmosphere back [in 2014](#), I have discussed the relevance of understanding the synergistic interaction between contrasts existent in our environment. Those contrasts are driving the dynamics of change in our weather patterns, atmospheric dynamics and climatic regimens. Our environment is characterised by being **non-uniform in composition, state, physical and energetic properties and distribution of matter**. But also, by the differences in the type and strength of **forces and interactions** present. Our environment is a complex mixture of different “systems”, each one with singular states of internal dynamics moving towards finding equilibrium within and with their surroundings.*

Through my career as Environmental Biologist and Aerobiologist I have studied the impact that [asymmetries](#) existent through space and time for atmospheric variables exert over the [composition and behaviour of the atmospheric medium](#)



[December 17, 2016 Orbital Seasonality vs Kinetic Seasonality. A Change Triggered from Changing the Order of The Factors \(by Diego Fdez-Sevilla, PhD\)](#) Researchgate: DOI: [10.13140/RG.2.2.20129.81760](https://doi.org/10.13140/RG.2.2.20129.81760)

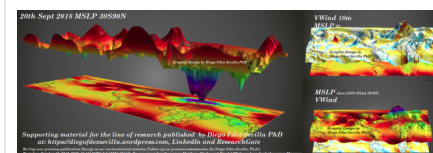
[influencing life cycles](#). Scenarios such as the Urban Heat Island Effect or the coastline/inland contrasts only highlight the strong connection existent [between biotic and non-biotic components](#).

I have also looked into the aerodynamic behaviour resultant from combining air masses with different properties (T, Humidity, velocity) and airborne particles with different aerodynamics properties (settling speeds). The broad sets of masses of air being formed in the atmosphere as a result of multiple sources and forces interacting (micro and macro, physical and physico-chemical) induce the development of boundary layers. Through [observing streamlines and particle positioning over trapping surfaces](#) I studied the behaviour resultant from the existence of boundary layers at [micro and macro scales](#), [identifying a strong influence between the aerodynamic behaviour of each component interacting in the atmosphere](#).

Those studies and the posterior research included in this blog only confirms the relevant role that boundaries play in understanding the dynamics of our atmosphere and the entire environment.

By applying my experience in observing the stream lines defined by water vapour through our atmosphere I have been studying the boundaries defining margins for systems with their own entropy state in the micro and macro world. The interactions between systems with different states of entropy generate an instability which creates a dynamic flow of energy inside different eco-“systems”, but also it serves to fuel the continuum momentum of the global atmospheric dynamics protecting natural cycles from stalling. Therefore, **the Stefan Boltzmann calculations** applied to describe feedbacks in an idealised system in thermodynamic equilibrium can not be applied to define the state of a global system for which its primary driving force is the mere existence of instability.

One of those relevant boundary layers found in our macro atmosphere is the Polar Jet Stream. A current of air moving West to East created by the thermal contrast generated between Arctic Polar Cold and dry air masses and Mid Latitude warm and wet air masses. The difference in the characteristics for the composition and thermodynamic behaviour of each mass of air had the tendency of generating such strong barrier that the mixture between both was a slow process due to the rigid configuration of the Polar Jet Stream blocking masses of air from crossing over. Such configuration kept atmospheric conditions within stable margins through gradual transitions over yearly cycles of seasonality generating different climatic regimes and the zonification of different terrestrial ecosystems.



March 14, 2018 Visualising Wind and Convective Forcing Driving Climatic Dynamics. Follow-up by Diego Fdez-Sevilla PhD DOI: 10.13140/RG.2.2.34233.06249



In my research I have discussed how such configuration has shown to have changed in the recent years with plenty of implications for the atmospheric dynamics and seasonal behaviour at the NH. (e.g. [Theoretical proposal](#), [Observational assessment](#) and [Seasonal developments](#)).

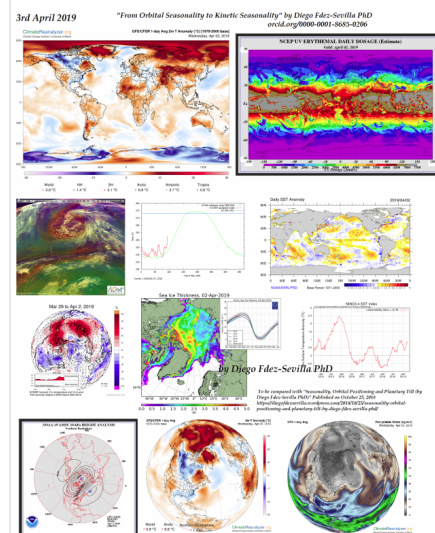
*In a system at equilibrium the radiation is in equilibrium with the molecules, at the same temperature and it may be described by temperature. HOWEVER, **without equilibrium**, there is no defined temperature.*

Not only the atmosphere is composed by gaseous compounds of different nature, molecular composition and thermodynamic behaviour but also by solid particles called aerosols.

If the medium includes inhomogeneities in the form of small particles, then radiation, while passing through this medium, will be scattered in all directions. For example, particles of dust or drops of water in the atmosphere scatter electromagnetic waves passing through such a medium, as well as the thermal radiation formed in other spatial parts of a medium. If the supposition of a local thermodynamic equilibrium is inapplicable for the studied system, then the emission of radiation by a substance becomes a function of energetic states in the system, and the problem of radiative transfer in such media is, at the least, complicated.

The expression of local thermodynamic equilibrium (LTE), particularly in astrophysics and atmospheric science, is simply a way of expressing that local behaviour (say at a certain altitude in the atmosphere) is reasonably well described as being in equilibrium and characterized by a temperature. And yet, on larger scales, as we know for the atmospheric structure, this cannot be the case, since the temperature, the molecular structure and composition, as well as the physical and energetic states and interactions of all the substances coexisting are far from uniform and distant from the behaviour expected from an ideal gas at constant pressure.

But moreover, we have to keep in mind the fact that the effect triggered by a concentration of molecules in the atmosphere, such as of those conforming a water clouds or from GHGs, is asymmetric over its surroundings. Consider a beam of radiation with intensity propagating in the absorbing, emitting and scattering medium in a given direction. The energy of radiation will decrease owing to its absorption by substance and owing to the deviation of a part of the radiation from the initial trajectory as a result of scattering in all directions. But, at the same time, the energy will increase because of thermal radiation

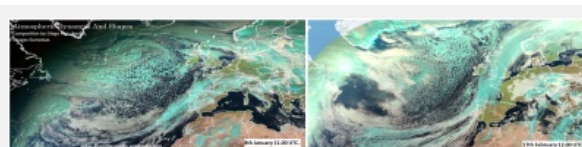


emission by the substance volume. The absorption, scattering and emission of radiation by a substance have effect on the energy of a radiation beam that propagates in it. In this case the total balance of change of the initial intensity can be, certainly, both positive and negative. Besides, a strong inhomogeneity of the energy balance, both over the substance volume and over the observation direction, is possible.

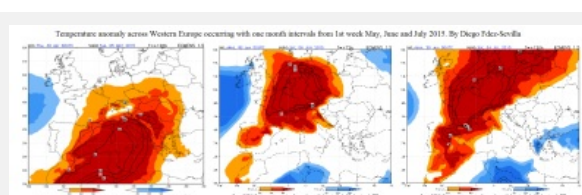
The same as when we address the effects at the atmosphere from the molecular composition in the absorbing, emitting and scattering gaseous medium, we have to include same considerations by the composition and structure of the solid phase at surface level.

The problem we face to define the behaviour of a dynamic, heterogeneous and multidimensional system is that few things keep constant through time and location, if any. The idealization required to apply a constant relationship demands to consider the behaviour of the atmosphere following idealized conditions impossible to be found outdoors.

*And those variations are getting wider and wilder through **latitudes and longitudes** creating hot and cold waves:*

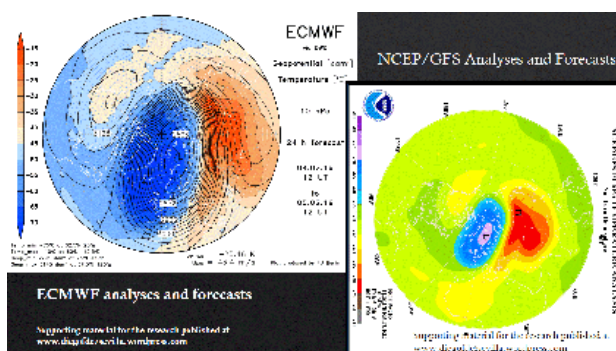


Cold bursts of Polar Air moving towards Europe on Winter 2016

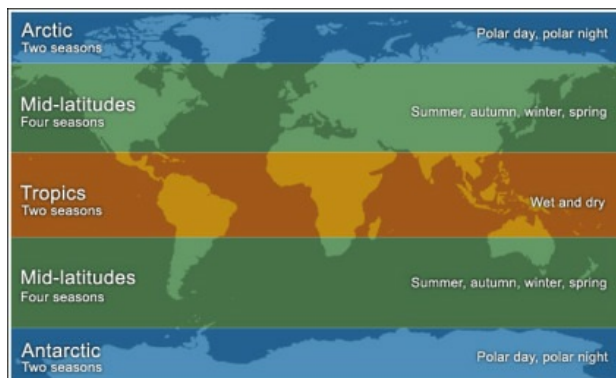


Heat waves through Europe over Summer 2015

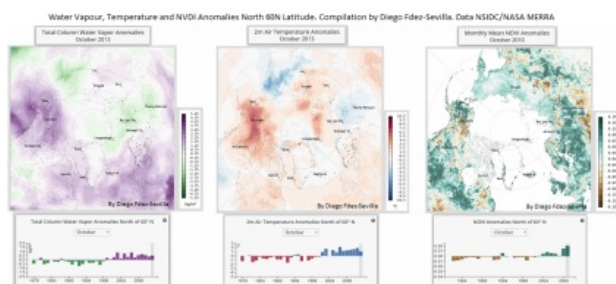
*As well as in **altitude**, generating what it is being to be called Sudden Stratospheric Warming processes.*



The conformation of our macro-climate is the result of the complex synergistic interaction of many micro-climates. The coalescence of those [micro-climates](#) creates regional climates and their interaction conform the global climate as we have been used to know it.



But things are changing not only over our heads, but also around our feet:



Looking at the bursts of polar cold air seen in Europe and

North America, my assessment for this Winter 2016 is that we have seen one after another [displacements of cold air from the Arctic due convective forcing from warmer masses of air getting into high latitudes and altitudes.](#)

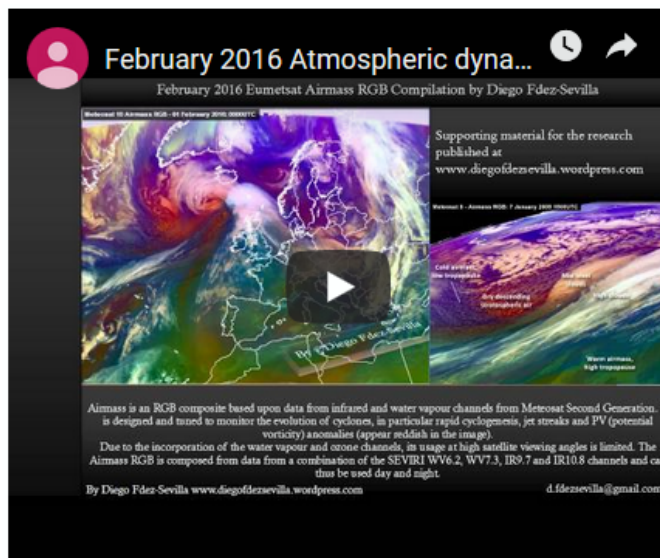


April 6, 2016

[Atmospheric Dynamics, GHG's, Thermal Conductivity and Polar Jet Stream \(by Diego Fdez-Sevilla\)](#)
ResearchGate [DOI: 10.13140/RG.2.2.33911.32167](https://doi.org/10.13140/RG.2.2.33911.32167)

I believe that the most visual representation of having the atmosphere increasing its thermal conductivity would be seen throughout the wobbling state of the Polar Jet Stream. As part of my research

since 2013 I have been following-up the state of the Polar Jet Stream. This is the latest animation that I have made over the period February 2016 at the Western Europe-East Atlantic.



For 13 years I have been looking into the synergies driving atmospheric dynamics and the particles contained within.

In my research it has become relevant the heterogeneous distribution, composition and behaviour of:

- *monoatomic and polyatomic molecules in the atmosphere;*
- *variations in pressure;*
- *location of events driven by the strength of winds and thermal contrasts;*
- *the enhanced atmospheric mixing ratio due to convective forcing and/or rain events*
- *increasing turbulence;*
- *the release transport and deposition of aerosols and their behaviour as rain drop nuclei due to their properties over clouds and rain drop formation, energy flows interacting from processes of evaporation and condensation as well as*
- *biological evapotranspiration and respiration, and*
- *biochemical processes affecting atmospheric composition (photosynthesis).*

Furthermore in my research it has become relevant the concentration and time of permanency for different molecular compounds and their different properties interacting in energy flows such as condensable (water) and not condensable gases (GHGs).

All those factors (at least) are relevant since they either define or indicate the state of heat transfer efficiency in the atmosphere.

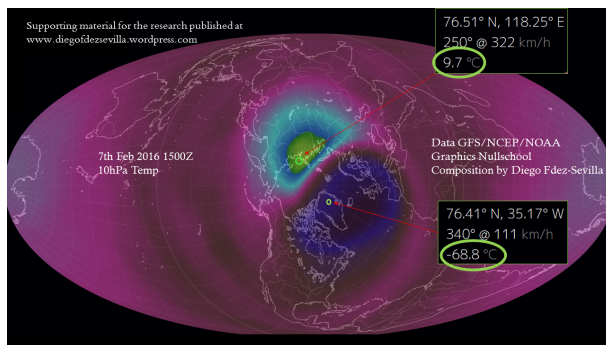
Derived from addressing synergies and feedbacks

between those factors discussed in previous posts, some of my conclusions are:

- *GHGs have the potential of enhancing the thermal conductivity of the atmosphere increasing the capacity of the system to absorb, contain, transport and release energy (in all its forms, kinetic (wind related), thermal (Heat) and potential (mass)) throughout latitudes, longitudes and altitudes.*
- *The most important component in the atmosphere carrying such intake of energy is water vapour due to the enhanced thermal conductivity of the atmosphere resultant from GHGs forcing.*
- *In a first stage, due to the compartmentalization of atmospheric circulation in the poles thanks to Polar Jet streams, the Equator and Midlatitudes absorb the major change in thermal conductivity (increase in temperature).*
- *Due to asymmetric distribution of land surface and GHGs conc between hemispheres, the NH receives the biggest impact than the SH.*
- *Once the thermal contrast in the NH Polar Jet Stream is worn out, the polar circulation opens its volume in the atmosphere to accommodate new forms of energy carried by water vapour and GHGs, increasing its thermal conductivity.*
- *As a result, the thermal transfer efficiency from mid latitudes would expand into polar latitudes, enhancing heat transfer processes northwards (heat waves) as well as the meltdown of ice caps and precipitation in liquid form out of season (already happened this winter 2015/16).*
- *Also, the frequency of masses of air from Polar and Mid Latitudes crossing over the Polar Jet Stream increases the level of exposure to extreme variations jeopardising the development of natural cycles in flora and fauna, when they occur out of season, due to a weak Polar Jet Stream. (see related posts)*
- *In other hand, masses of air and pressure systems containing more energy than its surroundings (Thermal/Kinetic/Potential), can create “blocking patterns”, or move higher in altitude instead of dissipating its energy when moving upwards in the atmosphere. Masses of air having the capacity of carrying such thermal energy without dissipating it when moving upwards generate what it is called Sudden Stratospheric Warming events. (also seen through this winter 2016).*

My approach towards understanding atmospheric and environmental developments is based on considering that temperature is not only a measure of Energy, it is a measurement of the state for the density of a particular type of matter.

*Without matter there is no temperature. So,
wherever we measure temperature there is matter.*



Which type of matter exists at each point where we measure temperature is the main relevant point in environmental assessments.

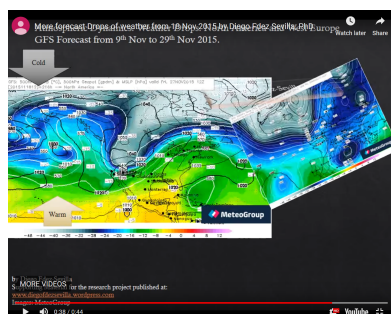
And then, which conditions allow for such matter to be there, in such concentration and physical state, latitude and altitude.

If temperature at Earth's surface is increasingly spread over higher latitudes and altitudes, as they are, it is because there is molecular matter holding it.

Seeing water vapour transferring heat reaching higher latitudes and altitudes it points to an enhanced thermal conductivity in the atmosphere only explained by higher conc of GHG,s getting mixed within the atmosphere chemistry.

GHG's have the capacity to absorb, retain and transfer heat radiated from above, below and within the atmosphere creating a positive feedback between water vapour and temperature through the whole atmospheric column and in latitude.

The most visual representation of having the atmosphere increasing its thermal conductivity would be seen throughout the wobbling state of the Polar Jet Stream.



May 6, 2016

[Climate and Hadley Circulation. Research Update May 2016 \(by Diego Fdez-sevilla\)](#)

Researchgate [DOI: 10.13140/RG.2.1.3627.7363](https://doi.org/10.13140/RG.2.1.3627.7363)

In order to avoid carrying unknown bias by following lines of research and conclusions adopted by other scientists, I decided to build my own

conceptual and experimental framework, define an independent line of research and choose my own methodology to perform data research and analyses.

So far my research has lead me to conclude that there is a real mechanism shifting the atmospheric circulation, primarily in the North Hemisphere. Such shift has shown through a major weakening in the barrier separating Arctic circulation from Mid-Latitudes and the Equator, the Polar Jet Stream.

This weakening in the latitudinal thermal contrast creating the steadiness of the Polar Jet Stream can be associated with the increase of anthropogenic GHG's (C13 and C12) being spread all over the atmosphere, not just at a specific altitude.

The incorporation of gases and aerosols into atmospheric circulation at equator and mid-latitudes (wild fires/industry) enhance the thermal conductivity of the atmosphere. Such effect increases the capacity for the atmosphere to carry energy, mostly identified in the form of temperature (but not only). An elevation of temperature in the atmosphere increments the capacity of the atmosphere to absorb and transport a strong natural GHG's which is water on its gaseous form. The process of evaporating water captures energy within water molecules. This energy gets incorporated in the energetic pool of the atmosphere as thermal energy (latent heat) also with the mass of water molecules increasing the gravitational energy available. The difference between the thermal energy carried by masses of air generate winds and ultimately, it is such contrast makes the fuel for the kinetic energy generating Jet Currents like the Polar Jet stream.

My approach, data, observations and analyses indicate that the weakening of the North Polar Jet Stream is not due to processes of early Asia snow precipitation as it proposes the theory of Artic Amplification, but instead, due to the weathering effect exerted by warmer mid-latitudes pushing towards the Poles.

Overall Conclusions

The developments in atmospheric circulation observed at the present time seem to keep supporting my assessments not only on the Hadley circulation. Accordingly, the evolution of the atmospheric dynamics addressed throughout my line of research highlights the dominance in the directionality of the influence of atmospheric conditions at Mid-Latitude into Arctic circulation. Something which goes opposite to the directionality defended by the Theory of Arctic

Amplification.

Ultimately, based on my research, the implications derived from seeing Mid-Latitudinal climatic regimes moving higher in latitude incorporates relevant uncertainties, not only over the developments of atmospheric dynamics, but more importantly, over the development of feedback loops with terrestrial ecosystems.

Considering atmospheric and terrestrial interactions conformed by Biotic and non-biotic components and processes, and based on the developments pointed out through my research, those synergistic interactions have the potential to develop patterns in environmental evolution which will be sustained only temporally, in a period of transition.

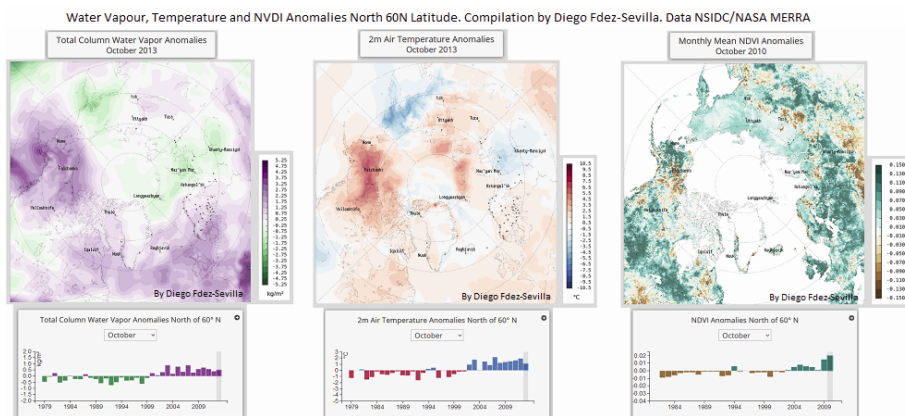
“Since the Arctic has the lowest energy pool of the entire North Hemisphere, and any process of amplification requires an investment of energy aside the energy being received, the conclusions delivered by my line of research dismisses any type of amplification in the Arctic circulation. Moreover, following the arguments applied in previous discussions over atmospheric dynamics and ENSO circulation ([ref1](#) and [ref2](#)), the amount of energy being absorbed at the Arctic would have an indirect effect over the conditions at the most energised part of the atmosphere, the Equator. **There, at the Equator, is where we might see in the near future, the use of energy amplifying processes yet being considered [too mild to become relevant.](#)”**

May
26,
2016

[Atmospheric Circulation and the Mixing Zone. \(by Diego Fdez-Sevilla PhD\)](#)
ResearchGate [DOI: 10.13140/RG.2.2.34019.04645](https://doi.org/10.13140/RG.2.2.34019.04645)

Through my research I have kept a close look into the behaviour of the Polar Jet Stream as the key feature pointing into the [mechanisms and forces driving the atmospheric circulation in the North Hemisphere.](#)

The instability over the configuration of the Polar Jet Stream is showing to be a more permanent and stronger configuration than any [variations over the ENSO](#) or any other atmospheric indices applied until today. Meanwhile the ENSO, NAO, PDO, etc... keep oscillating over time, the Polar Jet Stream has been wobbling year after year for a period of time which has not been characterised yet even though [I believe that the data available shows already its impact over the North Hemispheric ecosystems.](#)

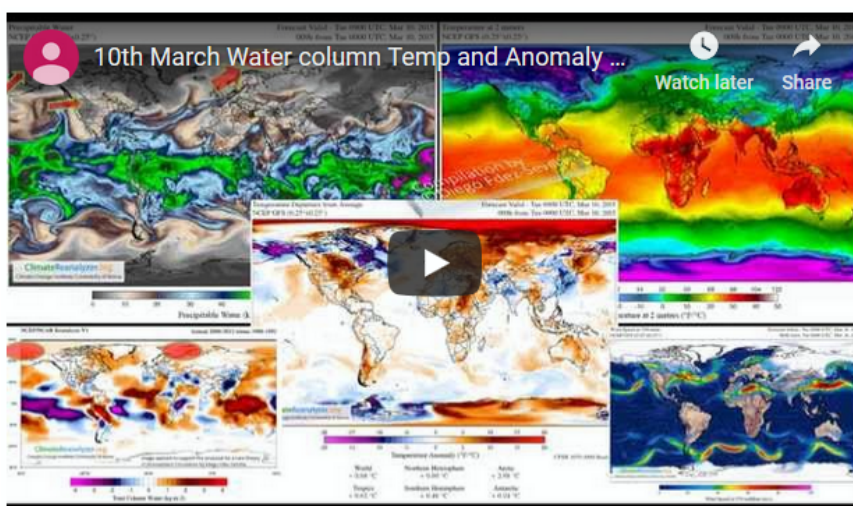


[Atmospheric Circulation and Climate Drift. Are we there yet? \(by Diego Fdez-Sevilla\)](#)

July 2, 2015

The results obtained from my research suggest strongly that the energy been captured by GHGs in the atmosphere would allow equatorial and mid-latitude circulation to expand over the Polar circulation in an intrusive way. Such intrusions would increment the energy pool of the Polar masses of air debilitating the thermal contrast which generates the Polar Jet Stream.

(The following animation contains statistical analyses showing atm increases of water vapour over higher latitudes, part of the assessment published on February 10, 2015 [Revisiting the theory of "Facing a decrease in the differential gradients of energy in atmospheric circulation"](#) by Diego Fdez-Sevilla. Researchgate: [DOI: 10.13140/RG.2.1.1975.7602/1](https://doi.org/10.13140/RG.2.1.1975.7602/1)



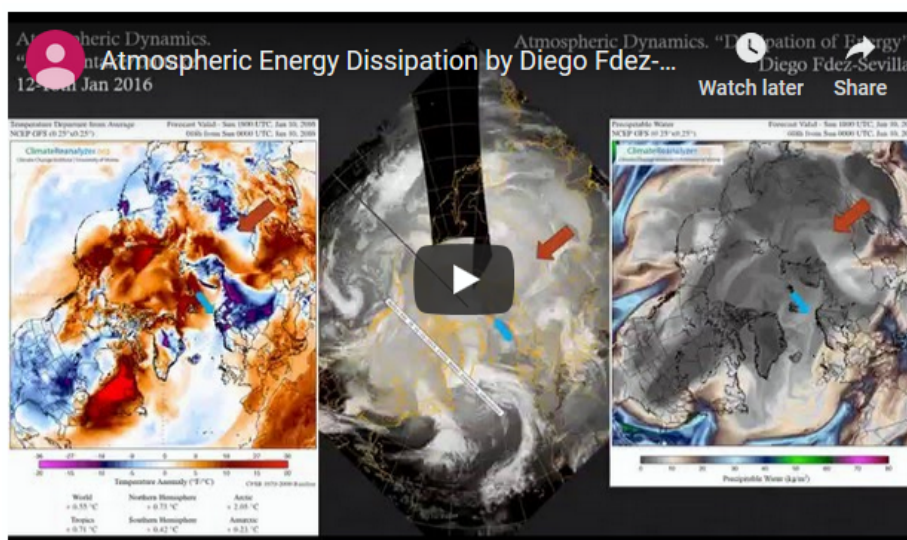
But at the same time, an increase in the amount of energy being captured by GHGs would induce different types of developments. I have discussed most of them in [previous publications](#), but some of those implicated in recent events could be the following:

- *An increase in temperature would allow an expansion of the volume occupied by masses of air between polar Jet Streams extending the influence of Hadley circulation and weathering off the thermal contrast between Polar and Mid latitudinal circulation.*
- *Also an increase of temperature due to GHGs would allow the atmosphere to carry more water vapour. Water can absorb more amounts of energy than other greenhouse gases with the particularity of having a minor time of permanency in the atmosphere. Such particularity implies that water has the property of absorbing, carrying and releasing energy between locations, and therefore, it becomes part of a mechanism transferring energy through the whole globe.*
- *Having an increase in the energy pool available in the atmosphere will*

induce changes in the interaction between phenomena for which their origin, time permanency and stability lies on contrast with its surrounding. Thus, persistent features will become more frequent since in order to release their energy into the surroundings and disappear will become more difficult. But also, the moment in which the conditions allow for the atmosphere to discharge its cargo, the amount of energy ready to be liberated could easily overcome any expectations. Already we can see some example of such potential through blocking patterns and persistent cyclones moving through latitudes and longitudes.

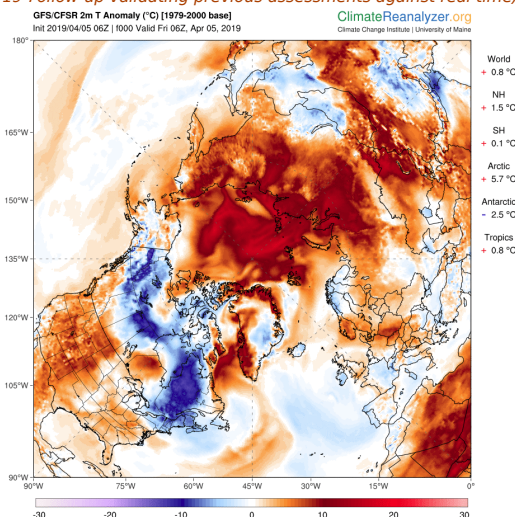
The turbulent motion of the Polar Jet Stream has increased its mixing velocity with the masses of air interacting with the Polar Jet stream. This situation has mostly diluted the plume of smoke generated in Canada through previous days and yet, the 21st May 2016, smoke from western wildfires could be easily seen across the Atlantic Ocean.

Until the 26th May 2016, the number of Low Pressures hovering over the Atlantic have increased with a new low system located in the same location in front of the Iberian peninsula as to the previous ones. But if we look at the start of the transition out of Earth's tilt winter 2016, we can count the first low pressure moving through latitudes at middle north Atlantic in January with the storm called Alex.



Furthermore, contrasts of temperature continue to be associated with the behaviour of the weak Polar Jet Stream in agreement with previous assessments which point to a [seasonal transitions](#) driven by the frequency of isolated masses of air crossing in Latitude between mid-latitudes and polar circulation.

(April 2019 Follow-up validating previous assessments against real time) developments.



February 2016 Eumetsat Airmass RGB Compilation by Diego Fdez-Sevilla

February 2016 Atmospheric dynamics Western ...

Supporting material for the research published at www.diegofdezsevilla.wordpress.com

February 8 - Airmass RGB, 7 January 2016 0000 UTC

Airmass is an RGB composite based upon data from infrared and water vapour channels from Meteosat Second Generation. It is designed and tuned to monitor the evolution of cyclones, in particular rapid cyclogenesis, jet streaks and PV (potential vorticity) anomalies (appear reddish in the image).

Due to the incorporation of the water vapour and ozone channels, its usage at high satellite viewing angles is limited. The Airmass RGB is composed from data from a combination of the SEVIRI WV6.2, WV7.3, IR9.7 and IR10.8 channels and can thus be used day and night.

By Diego Fdez-Sevilla www.diegofdezsevilla.wordpress.com d.fdezsevilla@gmail.com

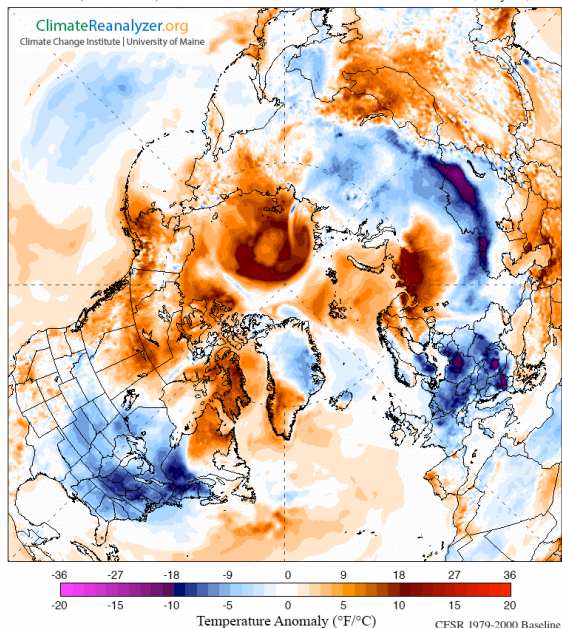


Polar displacements derived from mid-latitude intrusions on the 8th January and 17th February 2016

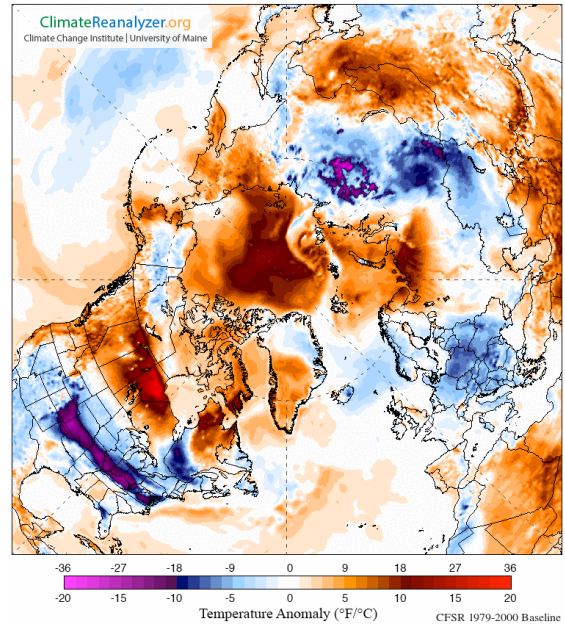


Polar displacements triggered due to mid-latitude intrusions on 23rd May 2016

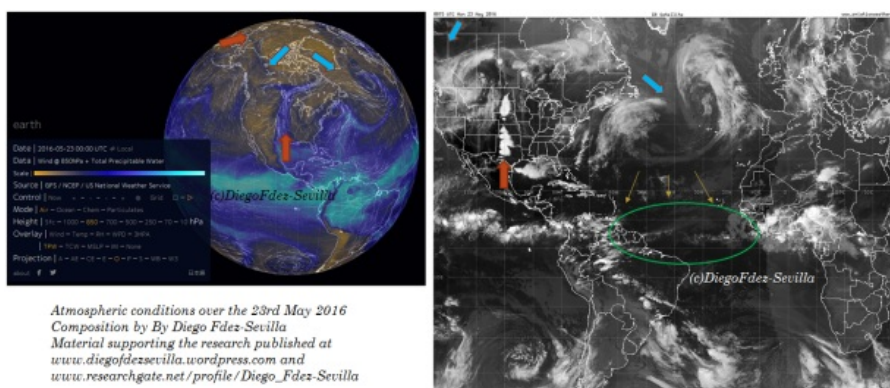
Temperature Departure from Average NCEP GFS (0.25°x0.25°) Forecast Valid - Mon 1200 UTC, May 16, 2016 012h from Mon 0000 UTC, May 16, 2016



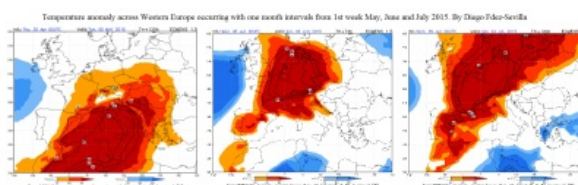
Temperature Departure from Average NCEP GFS (0.25°x0.25°) Forecast Valid - Tue 1800 UTC, May 17, 2016 042h from Mon 0000 UTC, May 16, 2016



Understanding the ways how Mid-Latitudinal circulation affects the Polar circulation will help to understand other meteorological phenomena evolving through the whole hemisphere, including the development of T-Storms and tornadoes over North America (image showing conditions over 23rd May 2016),

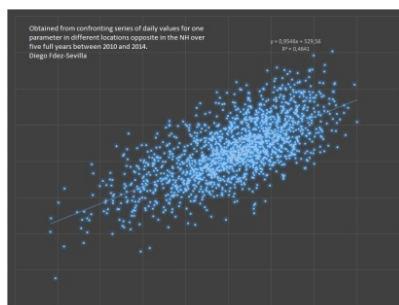


the development of cold bursts out of season, [heat waves like the ones occurring at India last May 2015 and the present May 2016](#) or the heat waves moving northwards across Europe in 2015 (see following image, charts by Giulio Betti).



I believe that also will help to understand the bipolarity seeing over [the behaviour found between the Arctic and Antarctic developments](#).

Within the limitations (an freedom) of performing my line of research independently from any institution and single handed the level of confidence that I have over my assessments are described by the following chart:



Timing the pace at which our environment evolves is crucial in order to adopt measures to adapt and mitigate possible synergistic interactions between human activities and threats raising from environmental changes.

The dynamics shown in the integration of the smoke originated by wildfires into atmospheric circulation indicates how fast the mixing rate at the mixing zone absorbs everything being released into the atmosphere. Now we only can expect that variations in the composition of the atmosphere will also trigger variations over its behaviour and the pace at which processes develop, in other words, variations in speed and maybe even directionality. And all of that in conjunction with other factors such as albedo, SST and the interaction from biological processes.

If you want to know more over my assessments over those interactions you should follow the links through the present text and explore the rest of publications and categories described in the top menu of this blog.

The aim of publishing my work openly is to allow for it to be exposed for an open review. So any constructive feedback is welcome. After a period of time of at least a month from the publishing date on this blog and at LinkedIn, if no comments are found discussing the value of the piece published I then publish it at ResearchGate generating a DOI for posterior references.

May 30, 2016

[When Temperature Becomes Something Else](#)
[\(by Diego Fdez-Sevilla\)](#) Researchgate DOI:
[10.13140/RG.2.2.12586.82888](https://doi.org/10.13140/RG.2.2.12586.82888)

The most common parameter applied to talk about climate is Temperature, and yet, that is not the same [when we talk about weather](#). But, are both so distant one from each other that it can make any sense adopting such discrepancies?

Such assessment might sound too extreme among many however, it seems to be the case of that Temperature is assumed to be the responsible driver behind of all events concerning our atmosphere but, what would happen when temperature becomes something else and something else becomes temperature? Where should we focus our attention?

Through my research I have tried to point out the relevance of adopting a different approach towards understanding atmospheric developments from focusing our attention over temperature as a parameter on its own. Even though variations in temperature are the easiest to determine in the first instance, those also deviate our attention from addressing what temperature really means: where does it comes from and where does it go when we can not longer measure it?

One example, we can look at ENSO as half empty/half full scenario. Either we can look at how powerful are El Niño / la Niña or, how much power it is required to generate those conditions. The implications and interpretations derived are quite different.

What does it mean that temperature drops? If we know that temperature is just an expression of energy, and that energy does not disappear, where is that energy going? Out space? And then, when temperature raises, where is that energy coming from? Is it getting colder some other place in order to generate such increase in a different location?

But again, why temperature has to be the answer? What does it happen when temperature becomes something else and something else becomes temperature?

I have tried to avoid this weakness in the approach that I apply to study climatic developments through my [research since 2014](#). In my last publication [Atmospheric Circulation and the Mixing Zone. \(by Diego Fdez-Sevilla\)](#) May 26, 2016, I have

specifically pointed out the relevance of considering the implications from seeing an increase in the area occupying the mixing zone of the atmosphere between Mid-Latitudes and Polar circulation triggered by a wobbly Polar Jet Stream.

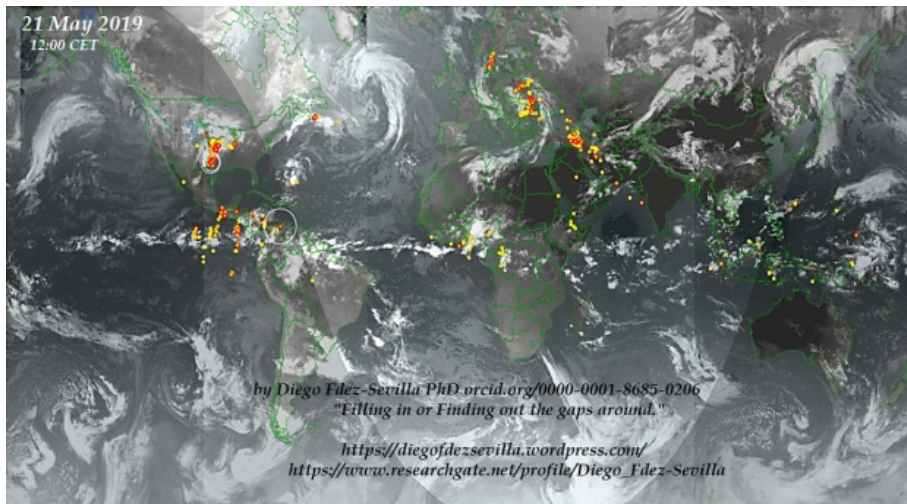
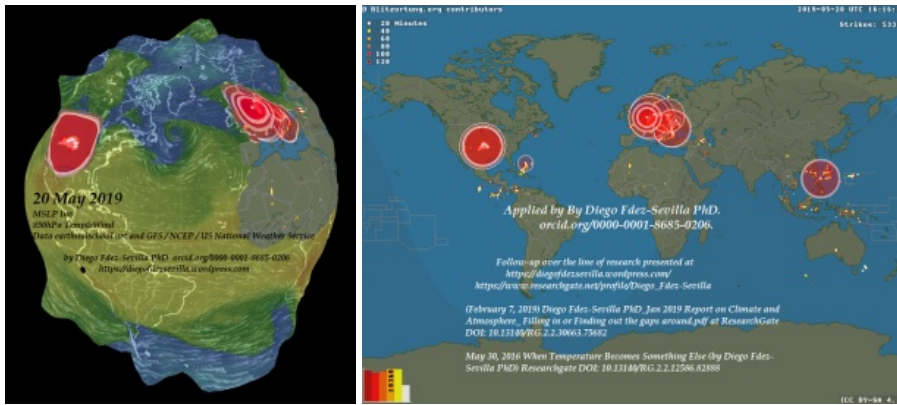
Considering that the state of knowledge is built only by research published under “official channels”, it is expected that it will take that some relevant names get to publish in relevant journals something really relevant in order to find a common ground between disciplines and scientists. But, at the moment, using temperature as the focus point, it feels like we are chasing a tail. Because if studying temperature requires for some people to wait 30 years “under the weather”, maybe, we should change the approach and take a closer look at what is [that it makes the weather](#). Because Temperature is just one expression of the energy being carried within the atmosphere, altogether with, wind, electricity and gravimetric volumes of water delivering precipitation.

A New Climatic Regime. By Diego Fdez-Sevilla Ph.D. Maybe you did not know, maybe because nobody told you.

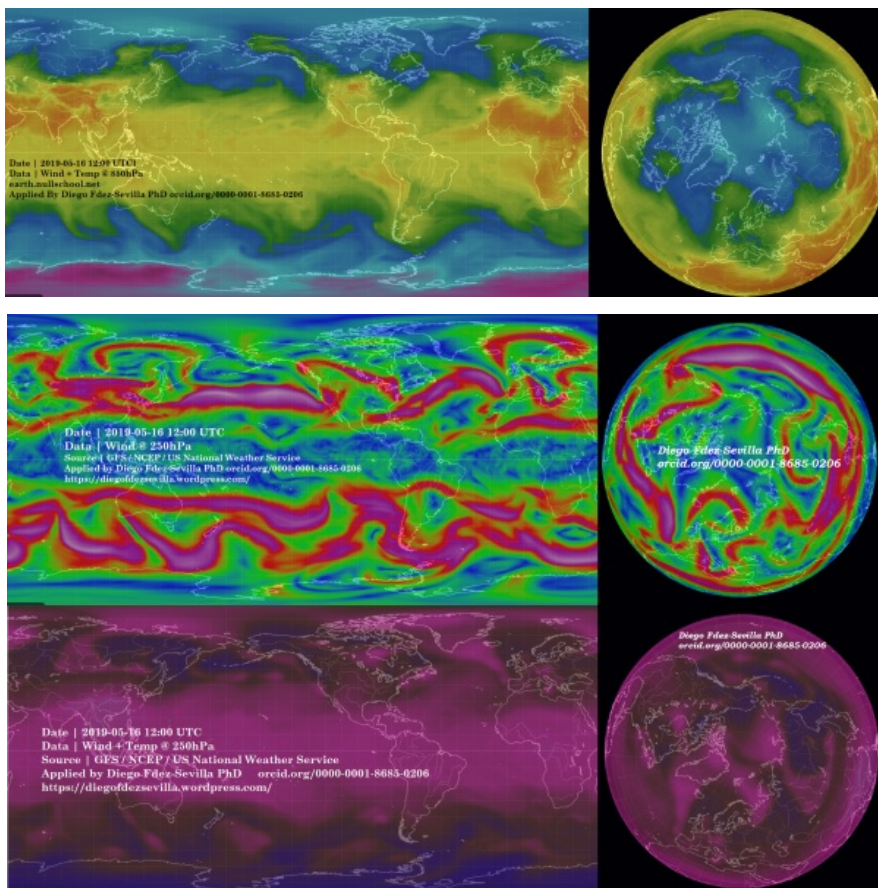
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The following developments observed in the atmospheric circulation since then show to support the validity of this approach. Proof of concept?

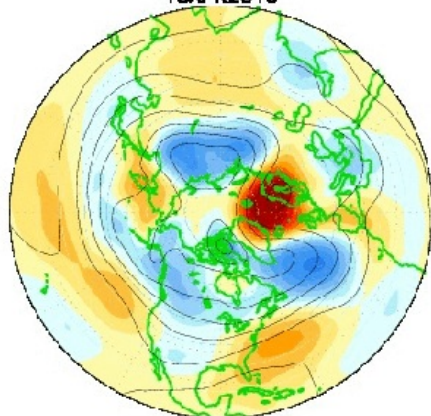
State of the Atmosphere 20th/21st May 2019. Lightning, MSLP(z), 850hPa Temp and Wind.



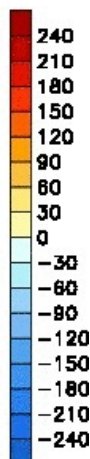
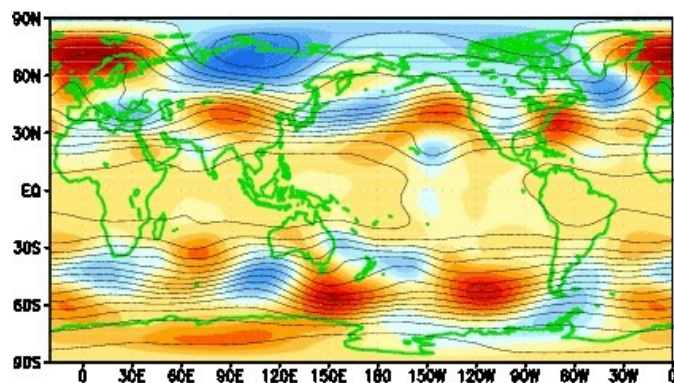
State of the Atmosphere 16th May 2019. 850hPa Temp, 250hPa T and Wind.



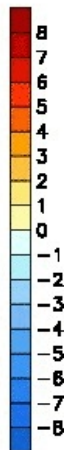
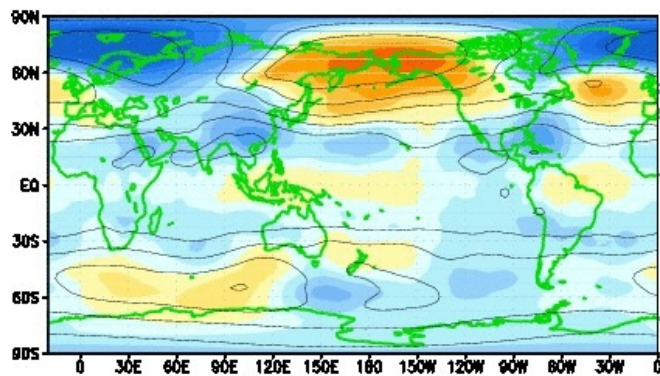
CDAS 600–hPa HT Anoma (5d rm)
15APR2019



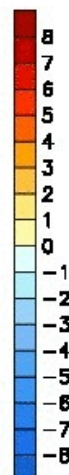
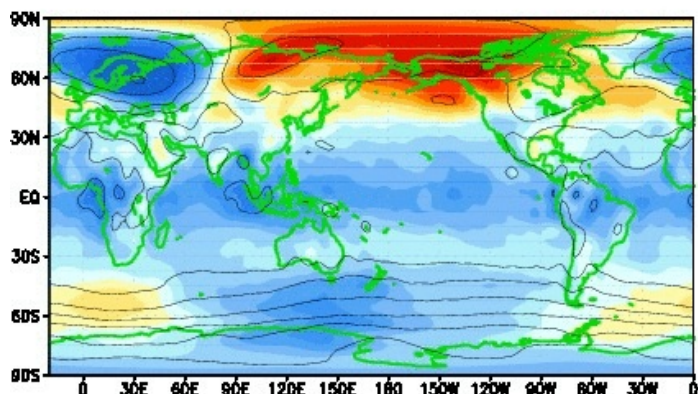
CDAS 200–hPa HT Anoma (11d rm)
15APR2019



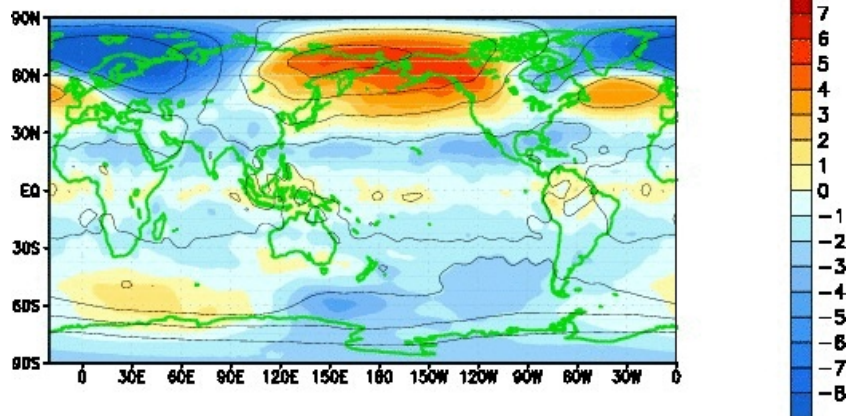
CDAS 50–hPa Temp Anoma (11d rm)
15APR2019



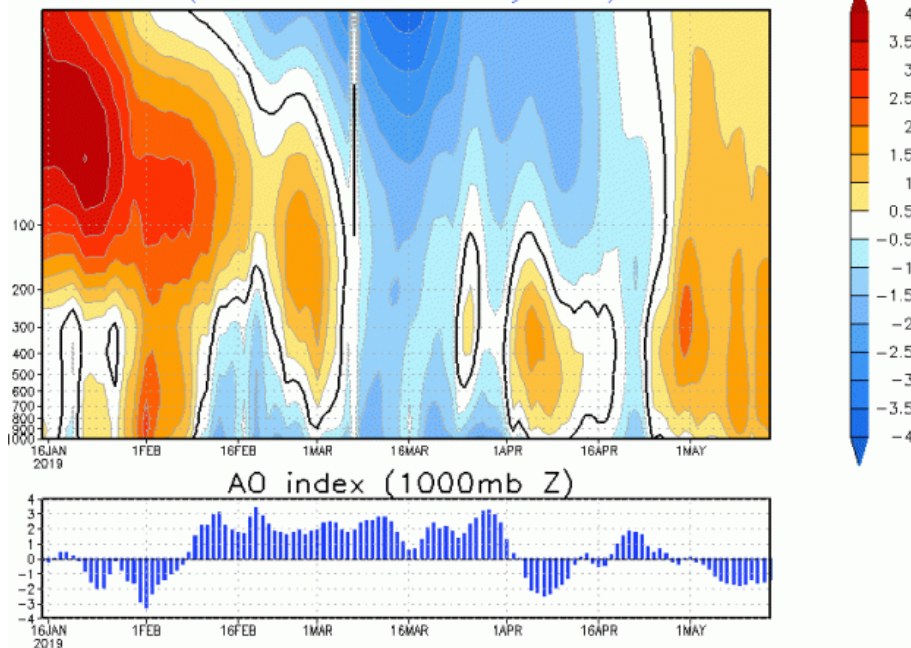
CDAS 10–hPa Temp Anoma (11d rm)
15APR2019



**CDAS 30–hPa Temp Anoma (11d rm)
 15APR2019**



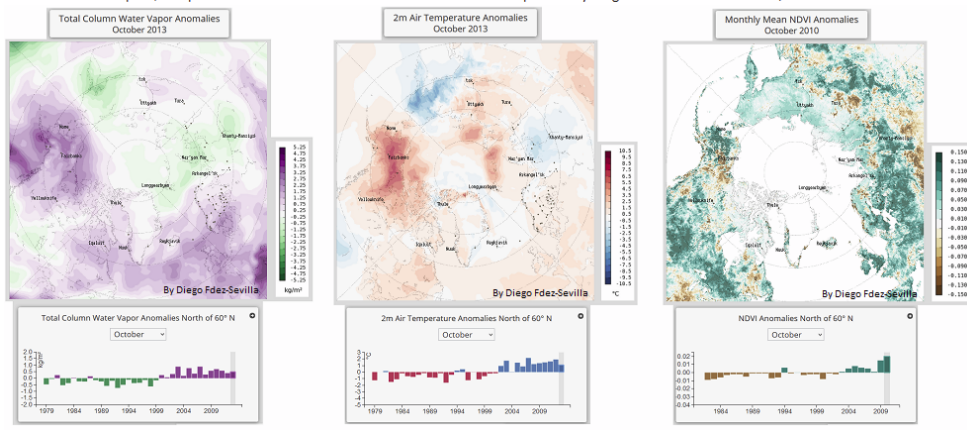
**Normalized GPH anomaly (65°N–90°N)
 (15Jan2019 – 14May2019)**



Atmospheric Dynamics and Climatic Implications

Overall, the line of research here presented between 2013-2019 points to an increasing instability of *the interface between two fluids of different densities, Meridional Planetary air masses and Polar air masses. And the resulting implications affect de synergies existent between biotic activity and the physical behaviour resultant from the three states of matter in our planetary thermodynamic system.*

Water Vapour, Temperature and NVDI Anomalies North 60°N Latitude. Compilation by Diego Fdez-Sevilla. Data NSIDC/NASA MERRA



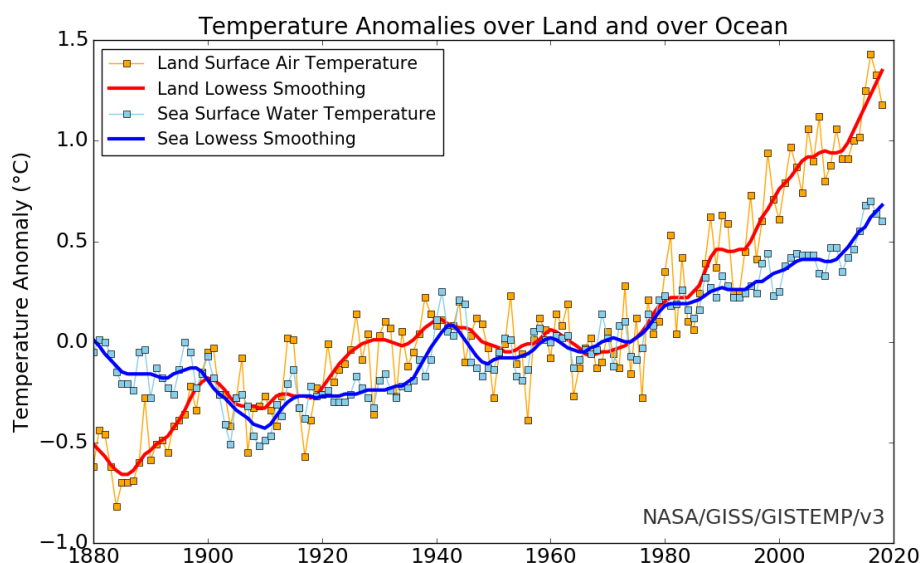
Atmospheric Circulation and Climate Drift. Are we there yet? (by Diego Fdez-Sevilla)

July 2, 2015

Based on the line of research presented between 2013-2019 **the processes dominating current developments** would be described as:

The **global Temperature** measured is the resultant of **mixing patterns** in the atmosphere, Therefore an increase in mixing dynamics creates a pause in temperature raise, An increase in mixing dynamics show an increase in convective forcing, Convective forcing is the work resultant from an increase in atmospheric energy being incorporated in free state, The incorporation and spread of energy in free state into the atmosphere is carried and released by water vapour, An increase of water vapour in atmospheric circulation requires an increase in the thermal capacity of the atmosphere, The process of enhancing the thermal capacity of the atmosphere comes by increasing the concentration of GHGs, conc of aerosols and land surface albedo.

Anthropogenic activity is linked with those processes.



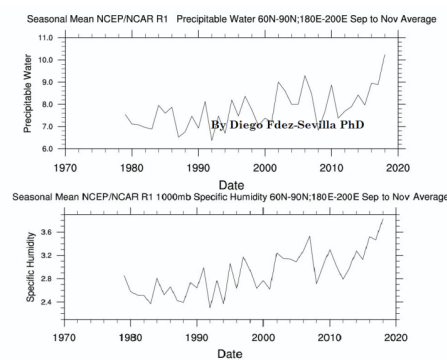
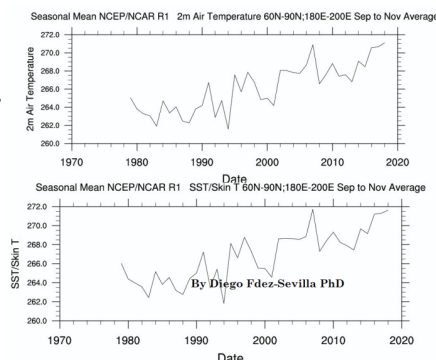
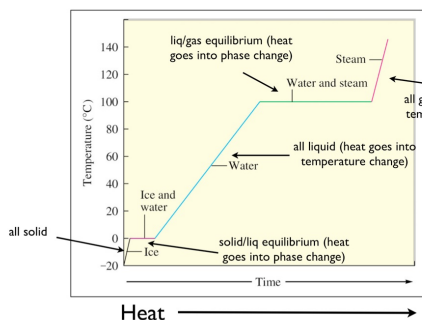
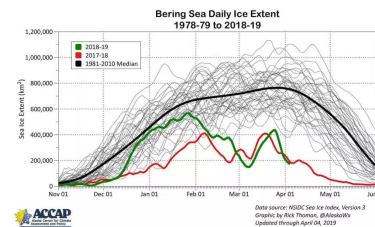
The Arctic case

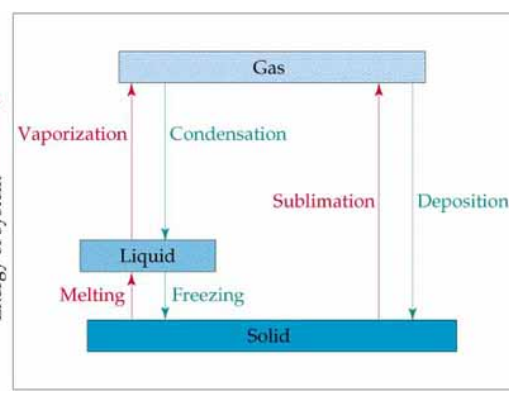
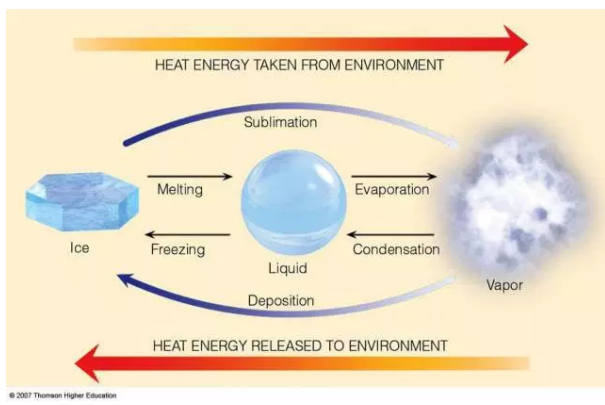
While the correlation over time between SST and Atmospheric Temp at the **Arctic** is a “constant” defined by the behaviour of water in its transition between physical states, the concentration of water vapour at Arctic latitudes shows that the expansion of Mid-Latitudinal forcing has increased in time, supporting the validity of previous analyses presented in the current line of research.

2019 Follow-up and Validation against real-time developments. Bering sea Ice extent, SST, 2m Temp, Precipitable Water and Specific Humidity.

Related analysis:

March 15, 2019 *Misleading Concepts in Arctic Circulation (by Diego Fdez-Sevilla, PhD) Registered DOI: 10.13140/RG.2.2.11085.69600*



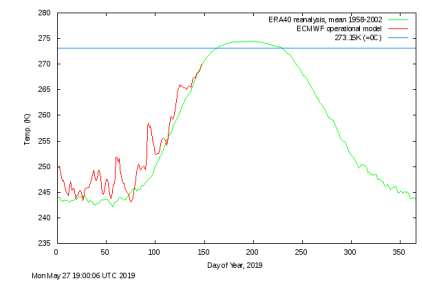


November 17, 2016

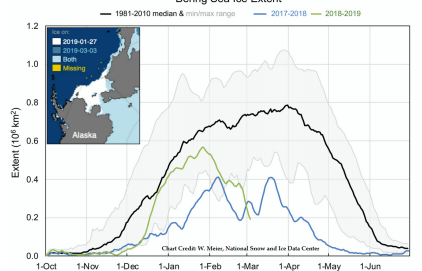
[Arctic Amplification versus Arctic Absorption \(by Diego Fdez-Sevilla, PhD.\)](#) Researchgate: DOI: [10.13140/RG.2.2.24688.35848](https://doi.org/10.13140/RG.2.2.24688.35848)

Temperature is measured through an atmosphere with a molecular composition thermically active. The atmosphere is nitrogen, oxygen, and argon. The molecular composition which absorb and retain radiation affecting climatic regimes and ice cover anomalies are GHGs (CO2) being water vapour the major component as part of a feedback with the other GHGs. Through periods of low radiation (winter) temperature drops enough (as in the Arctic should be) so the molecular composition would be mostly N and O without water vapour since it would freeze. So the atmosphere in itself loses its thermal conductance by drying out. However, if there is a forced increment of GHGs, like the increase in water vapour measured in the latest decades, the thermal conductance of the air increases, carrying more energy in circulation by water vapour. Being increased the pool of energy carried at the Arctic decreases the amount of energy which the atmosphere can absorb from the oceans. Water releases energy until it freezes only if the surrounding medium can take all the energy supplied by the ocean. Otherwise it absorbs energy only up to thermal equilibrium. If this equilibrium is higher than freezing there is no ice.

2019 Follow-up and Validation against real-time developments. Arctic T and Bering sea Ice extent.



Follow-up over the line of research presented by Diego Fdez-Sevilla PhD [orcid.org/0000-0001-8685-0206](https://doi.org/10.13140/RG.2.2.24688.35848) February 25, 2019 Arctic Warming as a Result of Convective Forcing by Diego Fdez-Sevilla PhD [DOI: 10.13140/RG.2.2.20129.81760](https://doi.org/10.13140/RG.2.2.20129.81760)



December 17, 2016

[Orbital Seasonality vs Kinetic Seasonality. A Change Triggered from Changing the Order of The Factors \(by Diego Fdez-Sevilla, PhD\)](#) Researchgate: DOI: [10.13140/RG.2.2.20129.81760](https://doi.org/10.13140/RG.2.2.20129.81760)

“The Arctic is warming faster than other latitudes in the planet, like when you pour water into a glass continuously, there will be a moment in which the amount of water will start increasing faster outside the glass than inside. Equatorial and Mid latitudes have already taken what they can from Kinetic energy. This volume is overloaded and it is expanding to higher latitudes and longitudes. This has increased the mixing ratio between parts of the atmosphere otherwise compartmentalised through thermal contrasts.”

February 28, 2018

[Arctic Warming as a Result of Convective Forcing by Diego Fdez-Sevilla PhD](#) Pdf at ResearchGate DOI: [10.13140/RG.2.2.34551.73125](https://doi.org/10.13140/RG.2.2.34551.73125)

The energy contained by Mid-Latitudinal masses of air is strong enough to work its way towards the North Pole generating warm anomalies in the Arctic at tropospheric and stratospheric levels.

*The power expressed for such **convective motion** is enough to displace Cold Dense masses of air from the Arctic into lower latitudes. The feedback loop resultant addressed in [previous assessments](#) is showing throughout this winter 2018. **Energy is being released from Latent Heat carried by water vapour at Arctic latitudes** (as it can be seen in the Pacific and Atlantic intrusions) and **more latent heat is also being released at Mid Latitudes with the intrusion of cold masses of air.***

*Altogether, **convective motions moving towards the Arctic are triggering the release of Latent heat simultaneously in the Arctic and at Mid Latitudes.***

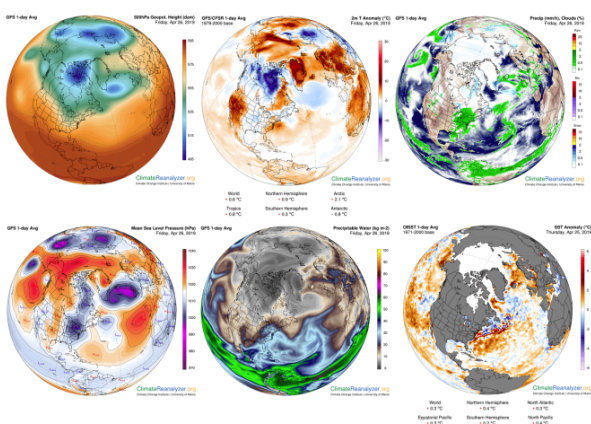
The incoming energy released into the atmosphere has the potential of fuelling more convective motion in the atmosphere to the point of self perpetuation, inducing changes in the ENSO phase and all the other Indexes as well as promoting Heat waves towards [the seasonal increase in Solar Radiation.](#)

March 3, 2019

[A pattern of change in the atmosphere beyond considering global warming or cooling. That is, global mixing. \(by Diego Fdez-Sevilla PhD\)](#)
Registered DOI: [10.13140/RG.2.2.32693.73445](https://doi.org/10.13140/RG.2.2.32693.73445)

(26 April 2019 Follow-Up) Arctic Warming as a Result of Convective Forcing by Diego Fdez-Sevilla PhD
orcid.org/0000-0001-8685-0206 <https://diegofdezsevilla.wordpress.com/> & ResearchGate

November 17, 2016 Arctic Amplification versus Arctic Absorption (by Diego Fdez-Sevilla, PhD.) Researchgate: DOI: 10.13140/RG.2.2.24688.35848
December 17, 2016 Orbital Seasonality vs Kinetic Seasonality. A Change Triggered from Changing the Order of The Factors (by Diego Fdez-Sevilla, PhD)
Researchgate: DOI: 10.13140/RG.2.2.20129.81760
February 28, 2018 Arctic Warming as a Result of Convective Forcing by Diego Fdez-Sevilla PhD Pdf at ResearchGate DOI: 10.13140/RG.2.2.34551.73125



Temperature is measured through an atmosphere with a molecular composition thermally active. The atmosphere is nitrogen, oxygen, and argon. The molecular composition which absorb and retain radiation affecting climatic regimes and ice cover anomalies are GHGs (CO2) being water vapour the major component as part of a feedback with the other GHGs. Through periods of low radiation (winter) temperature drops enough (as in the Arctic should be) so the molecular composition would be mostly N and O without water vapour since it would freeze. So the atmosphere in itself loses its thermal conduction by drying out. How ever, if there is a forced increment of GHGs, like the increase in water vapour measured in the latest decades, the thermal conduction of the air increases, carrying more energy in circulation by water vapour. Being increased the pool of energy carried at the Arctic decreases the amount of energy which the atmosphere can absorb from the oceans. Water releases energy until it freezes only if it the surrounding medium can take all the energy supplied by the ocean. Otherwise it absorbs energy only up to thermal equilibrium. If this equilibrium is higher than freezing there is no ice.

* [26April 2019 by Diego Fdez-Sevilla PhD Follow-up Arctic Warming as a result of Convective Forcing](#)
* [March 15, 2019 Misleading Concepts in Arctic Circulation \(by Diego Fdez-Sevilla, PhD\)](#) Registered DOI: [10.13140/RG.2.2.11085.69600](https://doi.org/10.13140/RG.2.2.11085.69600)

Main Conclusions

The main conclusion reached in the current line of research points out that; an increase in the amount of energy being in “free” state means that kinetic processes will increasingly dominate thermodynamic processes, inducing a transition in our Seasonal and Climatic regimes from being driven by Orbital Positioning to be driven by more erratic Kinetic processes. ([see more related analysis](#))

In a process of change **Tipping points** come as stations in a train journey. Under the current atmospheric dynamics April 2019 we can say that we have passed couple of stations or tipping points already. First the system become overloaded warming up anomalously and next it has become unstable. Ultimately, the biggest implication raising from the current developments would not be found in seeing a gradual increase in atmospheric temperature **BUT INSTEAD** from seeing an increase in **Atmospheric Global Mixing accelerating soil weathering**. Such implications touch directly the survival capabilities of the human specie, and it concerns all strategies proposed to tackle the impact from climatic deviations which rely on keeping deteriorating the capabilities of the soils to sustain [the biotic performance fighting towards reducing the increasing entropy](#)/instabilities promoted [from increasing the atmospheric pool of energy in free state](#).

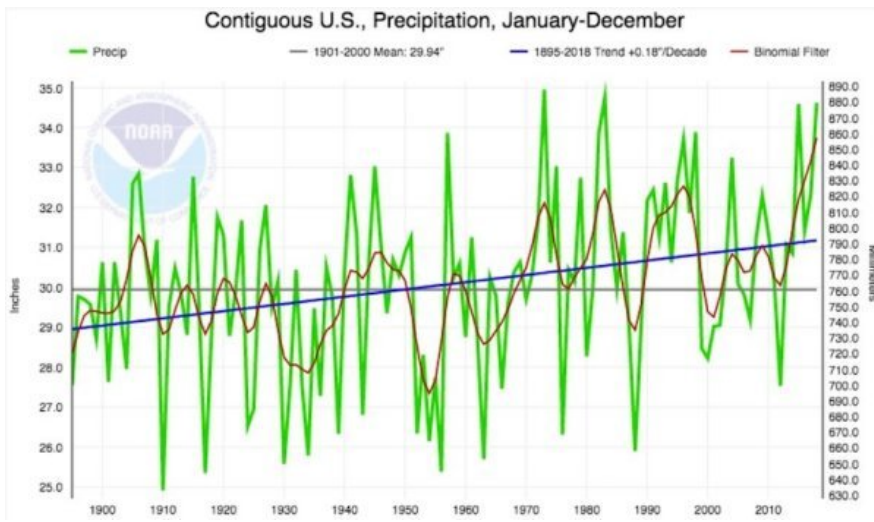
The whole approach described in my theory can be observed by the increasing dynamics displayed in the atmosphere as Rayleigh-Taylor Instabilities due to an increase in global mixing between two fluids with different densities, those from the MidLatitudes and the Arctic.

Seasonal weather across latitudes shows to be increasingly driven by kinetic dynamics independent of planet tilt. Atmospheric dynamics through seasons keep momentum delivering patterns of global mixing between latitudes. While precipitation changes from solid to liquid based on Solar radiation, water vapour shows to have an increasing role in fuelling mid-latitudinal convective forcing dominating all seasons and latitudes, from Turkey to Alaska, from heavy snow to flooding. And all [dissociated from Climate Indexes](#). This pattern has been discussed in my line of research 2013-2019.

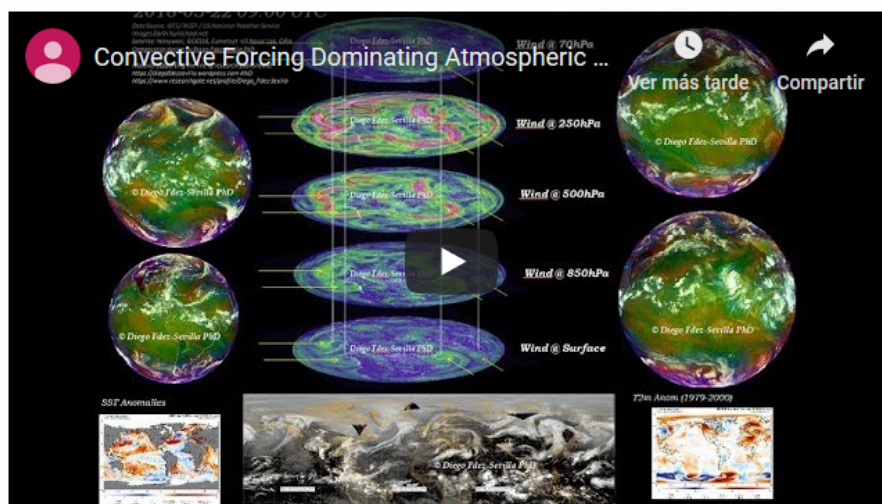
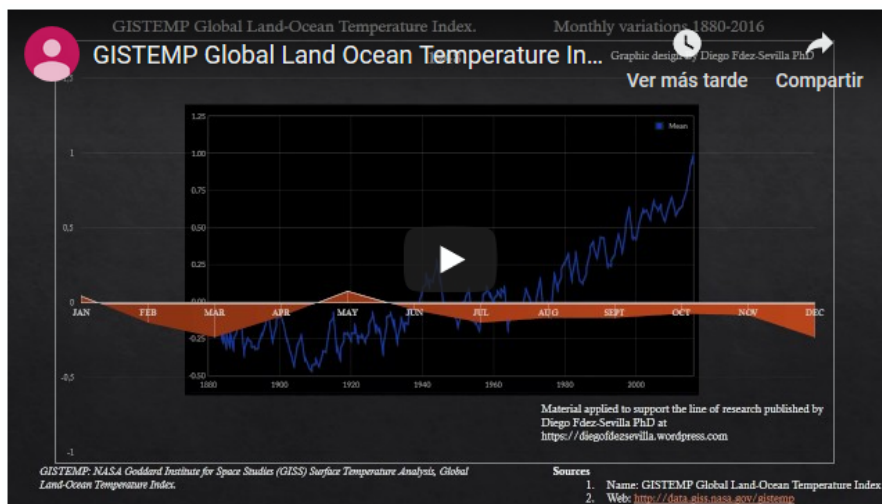
Would the current developments show Proof of concept?

- **November 14, 2013**. [Climate, “normal variability” or “change”? \(by Diego Fdez-Sevilla PhD\)](#) ResearchGate **DOI:** [10.13140/RG.2.2.23557.86244](https://doi.org/10.13140/RG.2.2.23557.86244)
- **November 27, 2013**. [Climate variability and energy balance. \(by Diego Fdez-Sevilla PhD\)](#) DOI: [10.13140/RG.2.2.33706.11203](https://doi.org/10.13140/RG.2.2.33706.11203)
- **October 21, 2014**. [New theory proposal to assess possible changes in Atmospheric Circulation \(by Diego Fdez-Sevilla PhD\)](#) DOI: [10.13140/RG.2.1.4859.3440](https://doi.org/10.13140/RG.2.1.4859.3440)
- **Feb 2015** [Gradients of energy in atmospheric circulation Diego Fdez-Sevilla PhD](#). DOI: [10.13140/RG.2.1.1975.7602/1](https://doi.org/10.13140/RG.2.1.1975.7602/1)
- **December 17, 2016** Orbital Seasonality vs Kinetic Seasonality. Diego Fdez-Sevilla PhD DOI: [10.13140/RG.2.2.20129.81760](https://doi.org/10.13140/RG.2.2.20129.81760)
<https://wp.me/p403AM-1jd>
- **January 20, 2017** Climate and Indexes. A dashboard of Confusion. Diego Fdez-Sevilla PhD DOI: [10.13140/RG.2.2.25016.96007](https://doi.org/10.13140/RG.2.2.25016.96007)
<https://wp.me/p403AM-1mz>
- **June 29, 2018** Seasonal Transitions under a New Climatic Scenario. Diego Fdez-Sevilla PhD. DOI: [10.13140/RG.2.2.18385.22881](https://doi.org/10.13140/RG.2.2.18385.22881)
<https://wp.me/p403AM-1Xi>

December 12, 2018	Persistent Mixing Dynamics in Atmospheric Circulation Generates a Seasonal Transition Marked by Kinetic Processes, Exothermic in Nature (by Diego Fdez-Sevilla PhD) (pdf DOI: 10.13140/RG.2.2.29966.20804)
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The **overall conclusions** can be summarised in **five animations** from previous analyses: An increase in the atmospheric energetic pool (1) fuels convective dynamics(2) forcing intrusions over the Arctic (3) as part of a global enhanced motion in global mixing (4). Altogether, seasonal transitions, weather patterns and biotic performance are linked being involved in the composition of the matter transferring energy within the planetary system(5).
 (more animations at the youtube channel)



Arctic Absorption by Diego Fdez-Sevilla PhD by Diego Fdez-Sevilla, Ph.D. October 2015

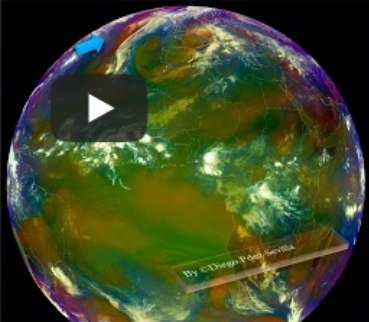
Ver más tarde Compartir

“Atmospheric Dynamics. Arctic Water Vapor Intake-Outtake” by Diego Fdez-Sevilla 13rd-15th October 2015 0600UTC

Airmass RGB

Airmass is an RGB composite based upon data from infrared and water vapour channels from Meteosat Second Generation. It is designed and tuned to monitor the evolution of cyclones, in particular rapid cyclogenesis, as tracks and PV (potential vorticity) anomalies (appear reddish in the image).

Due to the incorporation of the water vapour and ozone channels, its usage at high satellite viewing angles is limited. The Airmass RGB is composed from data from a combination of the SEVIRI WVR 2, WVP 3, IR3.7 and IR10.8 channels and can thus be used day and night.



20151013.0700 UTC
20151014.1000 UTC
Meteosat 0 degree
Airmass, global
Euromsat

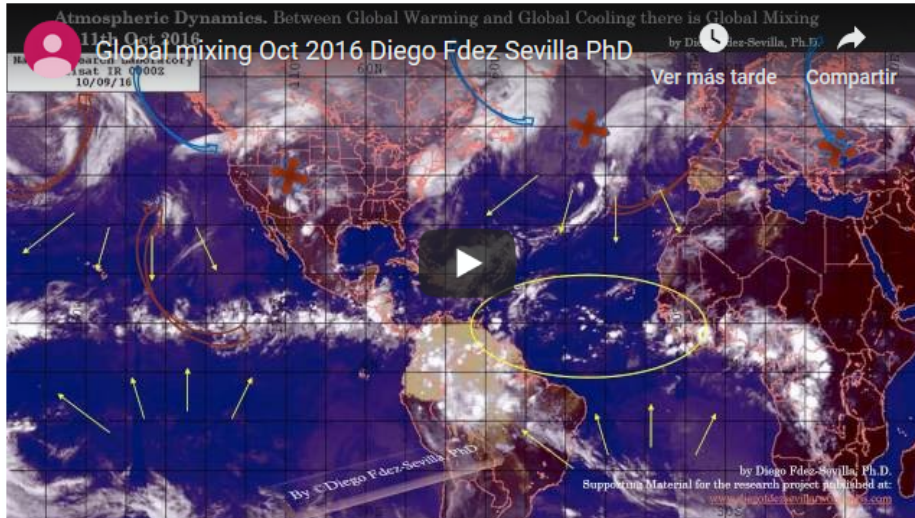
Supporting Activity for the research project published at: <https://diegofdezsevilla.wordpress.com>

By Diego Fdez-Sevilla PhD

Global mixing Oct 2016 Diego Fdez Sevilla PhD by Diego Fdez-Sevilla, Ph.D. Oct 2016

Ver más tarde Compartir

Atmospheric Dynamics. Between Global Warming and Global Cooling there is Global Mixing



Supporting Material for the research project published at: <https://diegofdezsevilla.wordpress.com>

By Diego Fdez-Sevilla PhD

Climate and Weather Patterns "In Transition" ... by Diego Fdez-Sevilla PhD

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A Point of View

Climate and Weather Patterns "In Transition"

“Filling In Finding Out Gaps Around”
A blog made from an Environmental Biologist

May 2017
by Diego Fdez-Sevilla, Ph.D.

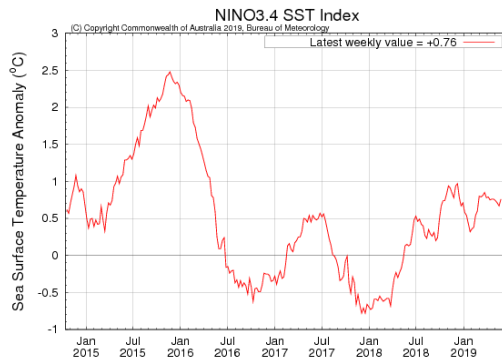
Supporting Material for the research project published at: <https://diegofdezsevilla.wordpress.com>

2019 Contextualization

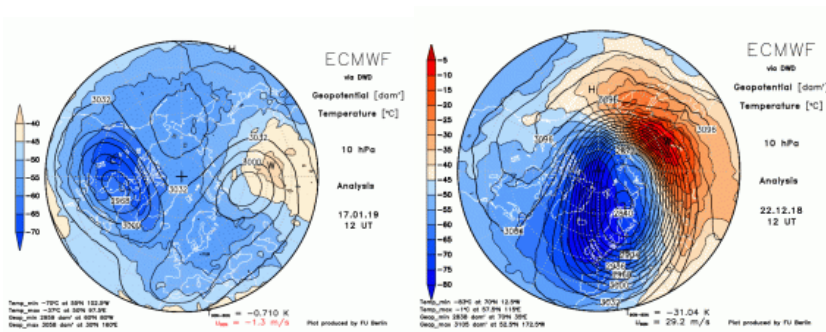
The Research

The approach followed in the line of research here presented has discrepancies with the path followed by mainstream in aspects as such:

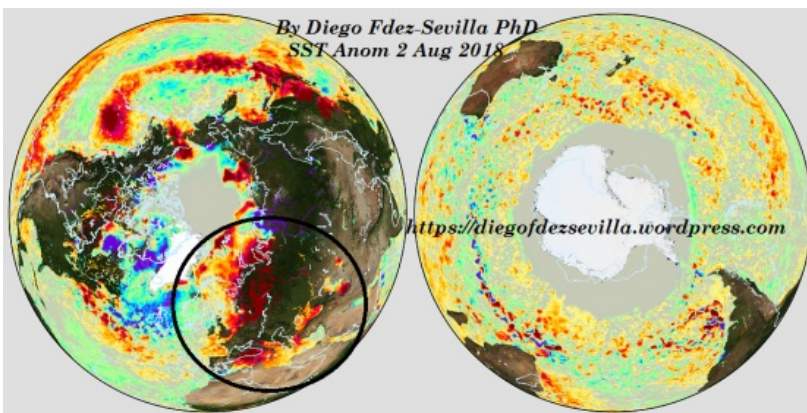
- **the ENSO** is not a driver of atmospheric dynamics but instead it is driven by them,



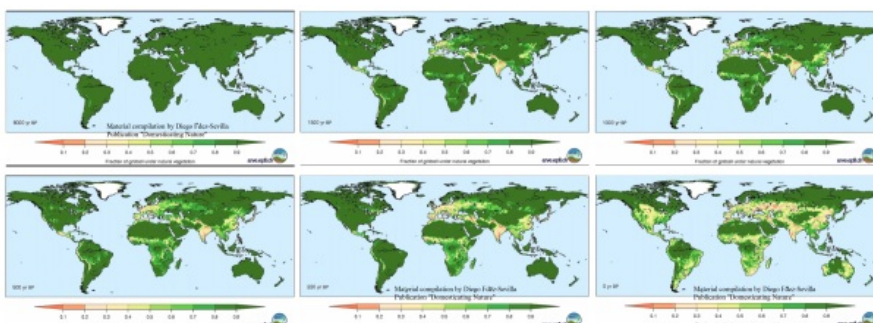
- that **the Polar vortex** configuration is not “the cause for” atmospheric dynamics but “the result of” them,



- that **SST** are a consequence of atmospheric dynamics and not the trigger, and



- that **the biotic component** in the planet is the only responsible for taming the atmospheric dynamics shaping our climate, avoiding a complete release of energetic discharges from **Sun's exposition**.



Furthermore, something in common for all previous **ice ages** is that none of them were an expansion in the territory for cold conditions while the centre of such area remained unaltered or even warmer than previous periods.

Something we see now for the first time as far as my knowledge goes on ice cores.

My interpretation is that never through the previous periods of time there has been a coalescence in time and space (geologically speaking) for a simultaneous alteration in the stratification of the composition, structure and concentration of the components part of the thermodynamic ecosystem built upon the synergistic interactions between soils, gases and water. In geological terms the only way to move backwards in time is by a sequence of events but never when everything happens at once.

Based on the line of research presented between 2013-2019 the processes dominating current developments would be described as: The global Temperature measured is the resultant of mixing patterns in the atmosphere, Therefore an increase in mixing dynamics creates a pause in temperature raise, An increase in mixing dynamics show an increase in convective forcing, Convective forcing is the work resultant from an increase in atmospheric energy being incorporated in free state, The incorporation and spread of energy in free state into the atmosphere is carried and released by water vapour, An increase of water vapour in atmospheric circulation requires an increase in the thermal capacity of the atmosphere, The process of enhancing the thermal capacity of the atmosphere comes by increasing the concentration of GHGs, conc of aerosols and land surface albedo. Anthropogenic activity is linked with those processes.

Body of Work 2013-2019

Between 2014 and 2016 I shared analyses over real time developments in order to validate the hypothesis behind the conclusions offered in 2013. After 2016 I incorporated the process of validating those against time by re-publishing them in contrast with the developments seen in the following years. For the Winter 17-18 I actually have re-published previous assessments with a month or two prior to the period of time addressed in order to evaluate its potential representing a pattern.

In **Feb 2017**, the line of research presented in this blog reached a **final stage** in which its framework has demonstrated to hold and support the **theoretical approach** behind the study bringing original and innovative insights into the state of knowledge addressing environmental synergies by “Filling in and Finding out gaps of knowledge”.

March 23, 2017 [Final Review in Progress. March 2017. From ENSO to Scientific Thinking by Diego Fdez-Sevilla PhD. ResearchGate DOI: 10.13140/RG.2.2.33915.82726](#)

February 7, 2019 [Diego Fdez-Sevilla PhD_Jan 2019 Report on Climate and Atmosphere_ Filling in or Finding out the gaps around.pdf at ResearchGate DOI: 10.13140/RG.2.2.30663.75682](#)

Theories have been formulated **to explain, predict, and understand phenomena** and, in many cases, **to challenge** and extend **existing knowledge** within the limits of critical bounding assumptions.

October 21, 2014	New theory proposal to assess possible changes in Atmospheric Circulation (by Diego Fdez-Sevilla) Researchgate DOI: 10.13140/RG.2.1.4859.3440
November 14, 2014	Why there is no need for the Polar Vortex to break in order to have a wobbling Jet Stream and polar weather? (by Diego Fdez-Sevilla) Researchgate DOI: 10.13140/RG.2.1.2500.0488
February 10, 2015	Revisiting the theory of “Facing a decrease in the differential gradients of energy in atmospheric circulation” by Diego Fdez-Sevilla. Researchgate: DOI: 10.13140/RG.2.1.1975.7602/1

October 21, 2015	Discussing Climatic Teleconnections. Follow Up On My Previous Research (by Diego Fdez-Sevilla) ResearchGate: DOI: 10.13140/RG.2.1.2962.7605
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January 20, 2017	Climate and Indexes. A dashboard of Confusion. (by Diego Fdez-Sevilla PhD) ResearchGate DOI: 10.13140/RG.2.2.25016.96007
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April 19, 2018	Climate, Weather and Energy. Using a Climatic Regime to explain Weather Events by Diego Fdez-Sevilla PhD Research DOI: 10.13140/RG.2.2.27923.58406
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Numerous **Follow-ups** over previous assessments have been published **contrasting** their **validity** against **real-time developments** (*in the [timeline section below](#) use ctrl+F: “follow-up”*) **challenging** and **legitimizing** the **conclusions offered**:

- **Models** confuse the science in which those are applied. Factions opposed in views will not come together by using models. And even there is no need for it. Darwin did not need an algorithm and a model to identify genetic evolution. The observational evidence was so strong that unified the scientific community. And evolution is a process comparable with climate, reacts to pressures.

“The Answer to the Ultimate Question of Life, the Universe, and Everything” is ... 42 (by Diego Fdez-Sevilla) Researchgate DOI: 10.13140/RG.2.1.2400.2324	May 15, 2014
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Debating Climate, Environment and Planetary evolution. Define your position. (by Diego Fdez-Sevilla) ResearchGate DOI: 10.13140/RG.2.2.27332.73603	October 2, 2014
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The scope of Environmental Science and scientific thought. From Thought-driven to Data-driven, from Critical Thinking to Data	June 26, 2015
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[Management. \(by Diego Fdez-Sevilla\)](#)

Researchgate: [DOI:](#)

[10.13140/RG.2.1.2007.0161](https://doi.org/10.13140/RG.2.1.2007.0161)

March 10, 2017

[Modelling the “Model” and the Observer \(by Diego Fdez-Sevilla PhD\)](#) ResearchGate [DOI:](#)
[10.13140/RG.2.2.17558.04169](https://doi.org/10.13140/RG.2.2.17558.04169)

February 6,
2018

[Feb 2018. Climate Drifts and The Scientific Method of Waiting 30 Years. Follow up on previous assessments by Diego Fdez-Sevilla PhD](#) Pdf at ResearchGate [DOI:](#) [10.13140/RG.2.2.18823.09122](https://doi.org/10.13140/RG.2.2.18823.09122)

- **Arctic Amplification** takes an assumption open for discussion: “sea ice acts as a barrier for the heat transport from the ocean to the atmosphere.” Actually, sea ice acts as a barrier for the heat transport *from the atmosphere to the ocean. The line of research offered taking Arctic SST as responsible for warming processes is not considering the thermodynamics behind changes in phase (liquid/solid/gas) and the difference between **condensable and not condensable GHGs**. Heat moves between locations AND phases. SST warming the atmosphere would loose heat, thus forming ice.

November 17,
2016

[Arctic Amplification versus Arctic Absorption \(by Diego Fdez-Sevilla, PhD.\)](#) Researchgate: [DOI:](#)
[10.13140/RG.2.2.24688.35848](https://doi.org/10.13140/RG.2.2.24688.35848)

December 17,
2016

[Orbital Seasonality vs Kinetic Seasonality. A Change Triggered from Changing the Order of The Factors \(by Diego Fdez-Sevilla, PhD\)](#) Researchgate: [DOI:](#)
[10.13140/RG.2.2.20129.81760](https://doi.org/10.13140/RG.2.2.20129.81760)

February 28,
2018

[Arctic Warming as a Result of Convective Forcing by Diego Fdez-Sevilla PhD](#) Pdf at ResearchGate [DOI:](#) [10.13140/RG.2.2.34551.73125](https://doi.org/10.13140/RG.2.2.34551.73125)

- Between global warming and global cooling there is **global mixing**.

September 8,
2015

[Trans-Arctic circulation between Pacific and Atlantic Basins. A Climate “Between Waters” \(by Diego Fdez-Sevilla\).](#) Reasearchgate [DOI:](#)
[10.13140/RG.2.1.1697.5847](https://doi.org/10.13140/RG.2.1.1697.5847)

May 26, 2016

[Atmospheric Circulation and the Mixing Zone. \(by Diego Fdez-Sevilla\)](#) ResearchGate [DOI:](#)
[10.13140/RG.2.2.34019.04645](https://doi.org/10.13140/RG.2.2.34019.04645)

July 1, 2016

[Atmospheric mixing. Indian Basin June 2016 \(by Diego Fdez-Sevilla, PhD.\)](#) ResearchGate [DOI:](#)
[10.13140/RG.2.2.11803.98088](https://doi.org/10.13140/RG.2.2.11803.98088)

August 26,
2016

[Aug 2016 Follow-up on previous assessments. Atmospheric Dynamics, Temperature](#)

[Displacements, Atmospheric Mixing \(by Diego Fdez-Sevilla, PhD.\)](#)

DOI [10.13140/RG.2.2.24586.36804](https://doi.org/10.13140/RG.2.2.24586.36804)

September 14,
2016

[Between Global Cooling and Global Warming There Is “Global Mixing” \(by Diego Fdez-Sevilla, Ph.D.\)](#) ResearchGate DOI: [10.13140/RG.2.2.19874.63684](https://doi.org/10.13140/RG.2.2.19874.63684)

October 13,
2016

[Global Mixing in Atmospheric Dynamics \(by Diego Fdez-Sevilla Ph.D.\)](#) ResearchGate DOI: [10.13140/RG.2.2.21255.60320](https://doi.org/10.13140/RG.2.2.21255.60320)

May 5, 2017

[Mixing Dynamics keep shaping A Roller coaster of Temperatures over South Europe. Follow-up on previous research 5th May 17. \(by Diego Fdez-Sevilla PhD\)](#) ResearchGate DOI: [10.13140/RG.2.2.16627.43043](https://doi.org/10.13140/RG.2.2.16627.43043)

June 9, 2017

[“Mixing Dynamics” in the Atmosphere. A follow-up on previous research by Diego Fdez-Sevilla, PhD.](#) ResearchGate DOI: [10.13140/RG.2.2.23548.03209](https://doi.org/10.13140/RG.2.2.23548.03209)

March 14, 2018

[Visualising Wind and Convective Forcing Driving Climatic Dynamics. Follow-up 14 March 2018 by Diego Fdez-Sevilla PhD](#) Pdf available at DOI: [10.13140/RG.2.2.34233.06249](https://doi.org/10.13140/RG.2.2.34233.06249)

April 19, 2018

[Climate, Weather and Energy. Using a Climatic Regime to explain Weather Events by Diego Fdez-Sevilla PhD](#) Research DOI: [10.13140/RG.2.2.27923.58406](https://doi.org/10.13140/RG.2.2.27923.58406)

- **Anthropogenic transformations** over the structure and composition of the three phases of the environment (Gaseous-Atmosphere, Solid- Land Use and Cover, Liquid-Water bodies) have reduced CxHxOx and increased CxOx+HxOx, CxHx, as well as albedo, ... altering the energetic balance in the thermodynamic system which conforms our Climatic regimes.

July 24, 2015

[Solar Activity and Human Activity, Settling Their Environmental Liability. \(by Diego Fdez-Sevilla\)](#) ResearchGate DOI: [10.13140/RG.2.2.36702.33606](https://doi.org/10.13140/RG.2.2.36702.33606)

March 3, 2017

[Thermodynamic Ecosystems by Diego Fdez-Sevilla PhD](#) ResearchGate DOI: [10.13140/RG.2.2.32238.10566](https://doi.org/10.13140/RG.2.2.32238.10566)

May 26, 2017

[The CO2 Greening Effect Review. CO2 Makes Headlines To Grow Like Trees, Shaping Different Forests Offering Different Views \(by Diego Fdez-Sevilla PhD\)](#) ResearchGate DOI:

[10.13140/RG.2.2.16286.33601](https://doi.org/10.13140/RG.2.2.16286.33601)

March 23, 2017

[Final Review in Progress. March 2017. From ENSO to Scientific Thinking by Diego Fdez-Sevilla PhD.](#)
ResearchGate DOI: [10.13140/RG.2.2.33915.82726](https://doi.org/10.13140/RG.2.2.33915.82726)

You can look at the whole project (more than 200 analyses published between 2013 and 2018) published at <https://diegofdezsevilla.wordpress.com> and also you will find some of those publications with a DOI in my profile at [ResearchGate](#)

Framework on Weather, Climate, Energy, Environment and Man

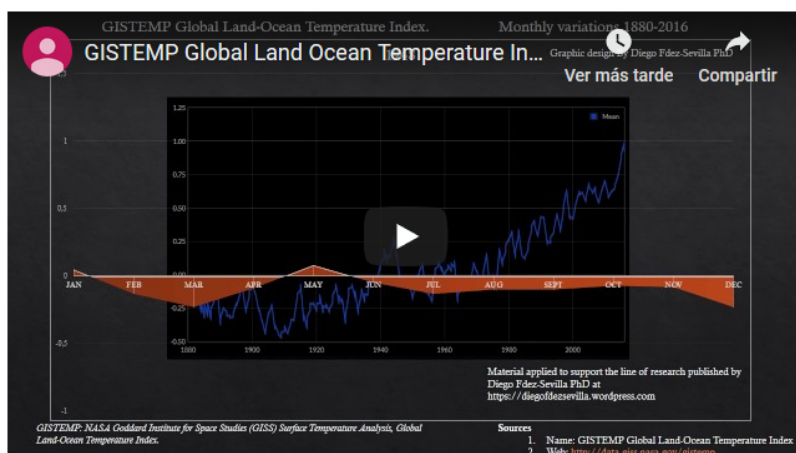
The question driving the whole debate on Climatic Deviations from “a Normal”, or Climatic Drift, focus most of the methodologies on temperature.

However I have followed a different approach in my analyses looking at **Gradients of Energy** in all its forms. That is why in 2014 I offered my thoughts as a [theory of practical applications addressing variations in the gradients of energy found in the atmosphere.](#)

Energy fuels the **work** done by warm masses of air displacing colder masses of air in their path. That increases **mixing patterns** generating **anomalies in temperature.**

The whole approach described in my theory can be observed by the increasing dynamics displayed in the atmosphere as **Rayleigh-Taylor Instabilities** due to an increase in global mixing between two fluids with different densities, those from the MidLatitudes and the Arctic. ([January 13, 2016 Atmospheric Dynamics And Shapes \(by Diego Fdez-Sevilla PhD\)](#) ResearchGate DOI: [10.13140/RG.2.2.35973.65765](https://doi.org/10.13140/RG.2.2.35973.65765))

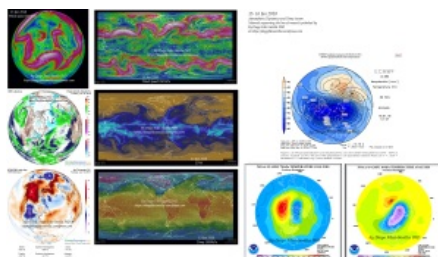
“Behind an increase in the amount of work carried out by masses of air there is an increase in the energy fuelling such dynamics.”



[Energy can only be transferred, not created or destroyed.](#) So more work means more energy in circulation. [More energy in circulation can only be sustained by a substance carrying it.](#) Either if we consider that the energy driving anomalies comes [from the Sun or from the Oceans, the carrier has to be in the](#)

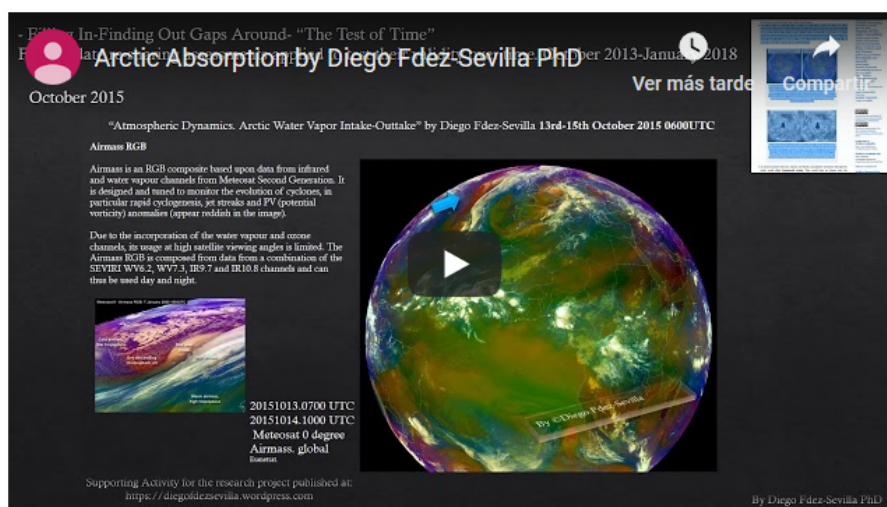
[atmosphere](#) in order for [the energy to produce work](#). And [the body loosing heat cools down](#).

A corridor of wind over the Arctic is triggered by a conversion of Temperature into work, convection and advection, which are the result of mixing masses of air. As it was published in [previous analyses](#), such [Trans-Arctic connection](#) between Atlantic and Pacific Basins is part of a pattern increasing the mixing ratio between masses of air otherwise separated by thermal



compartmentalization, like the Polar Jet Stream. An increase in the dispersion of energetic forms have different outcomes, one of which it would be a temporary reduction in the average temperature resultant for the mixing between Cold (Arctic) and warm (Mid-Latitude) masses of air as well as in

altitude (SSW).



Subsequently, "temperature" is less reliable than looking at "work" seen even in [the "mild" events](#).

(see ref- Statistical Significance. The Scary Side of Being Mild (by Diego Fdez-Sevilla PhD) [ResearchGate DOI: 10.13140/RG.2.2.21934.61767](https://www.researchgate.net/publication/312193461767)

In the framework presented throughout the line of research published in this blog (and researchgate) it has been considered **"Climate" as being defined by the amount of energy free to do work**. In other words, energy free to promote weather events. Accordingly, in my research I define **Climate** by the **amount and state** of energy in circulation, and **Weather** by the **use** of this energy. ([ref](#))

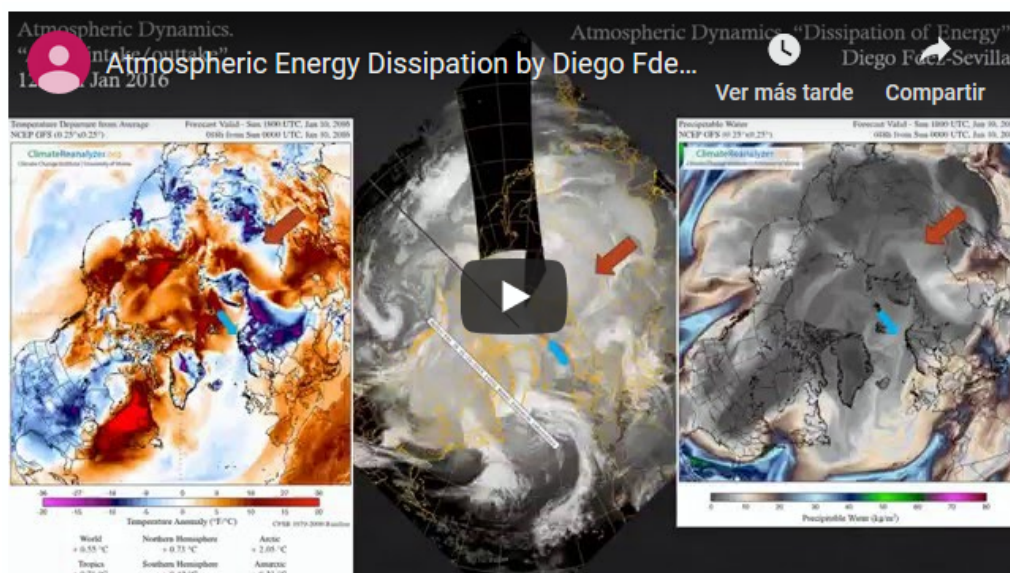
Consequently, with the definition applied for Climate and Weather, my [definition](#) of **Climate Drift** is:

"the deviation from equilibrium of the conditions allowing the perpetuity of an established symbiotic relationship between biotic and none biotic components in a micro and macro ecosystem. This situation can be due to changes in any component of the ecosystem playing a synergistic effect over the rest. And the causes can be either a change in the magnitude of the already implemented forces in place, changes in the directionality or rates in the flows of energy pre-established OR/AND the impact suffered by the incorporation of new components/forces and energy sinks or sources in any part of the system interfering with the previously established order and balance."

In my assessments I have defended that the [increase in the energy pool at mid-latitudes](#) would ultimately create an scenario with an [overcharged atmosphere](#). That would reduce the contrasts with which to create and maintain stability in the structure required to [condense energy in singular events](#), like hurricanes. Giving more relevance to the single [contrast between Ocean/continental masses](#). However, the [opening of the Arctic circulation through a weak Jet Stream](#) would reduce the pressure in the containment absorbing the condensation of energy at mid-latitudes, expanding into a new volume.

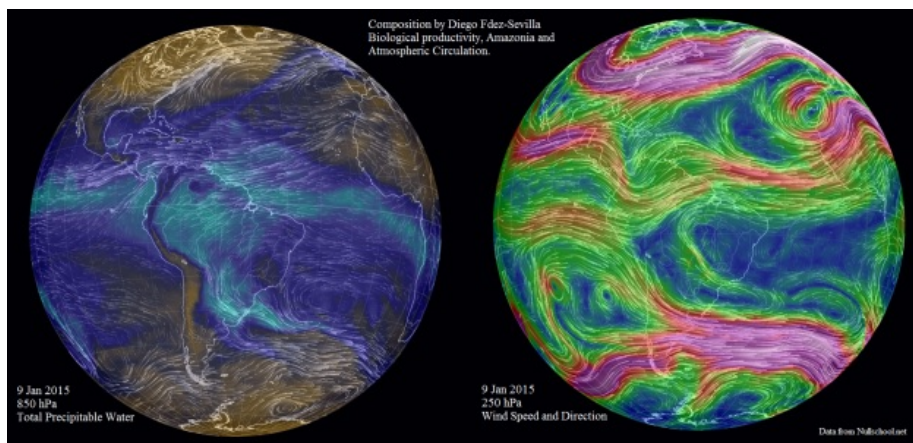
Accordingly, [hadley circulation gets affected](#) (see [also](#)) generating new patterns of [turbulence at the ITCZ \(hurricanes, typhoons, ...\)](#) as well as it gets [influenced Arctic mixing zones with lower latitudes](#).

In this [scenario](#) TCs are generated under an increase in the [mixing ratio](#) of an unstable atmospheric circulation [dominated by kinetic energy](#) transferred by water vapour thanks to GHGs, and immersed in an [overcharged atmosphere](#) with no place where to diffuse its energy, becoming [resilient as long as they stay over the ocean](#). So they endure like a piece of an ice rock in cold water.



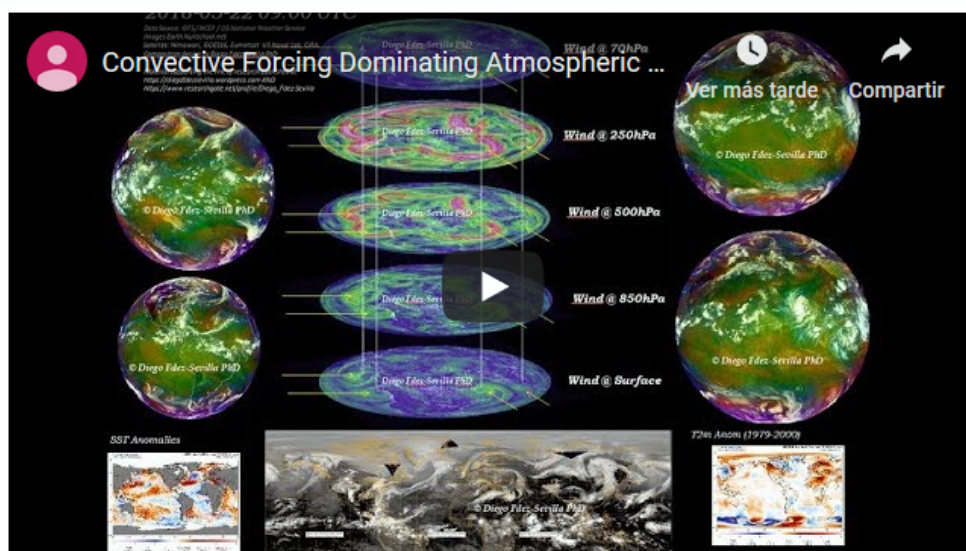
About Sea Surface Temperatures, my assessments take [SST as subsequent conditions driven by wind shear](#). So the interaction between masses of air in circulation allows or inhibits SST developments. Once the scenario is built on SST this becomes a “battle field” conditioning the subsequent interaction between the following masses of air and the characteristics of the “grounds” where the game will be played (sort of speak). Like the effect of the ice conditions in an ice hockey match.

El Niño is an event which happens in a very small portion of the Earth, it is related to the temperature of a very thin layer of the Ocean in depth, a small percentage of the area occupied by the whole Oceanic masses, and even smaller when it is integrated in the multidimensional space combining Ocean and Atmosphere.



It is kind of intriguing to think why it has been so easy to conclude that such small portion of the entire system is driving it as a whole. It is like considering that the flowering of plants drives the seasons. Similarly it could be said about using SST at the Arctic to justify altogether; the lack of ice, warmer temperatures at tropospheric level and even at stratospheric level. There is not enough energy in the SST of such small area as it is the Arctic to justify [all those convective dynamics](#).

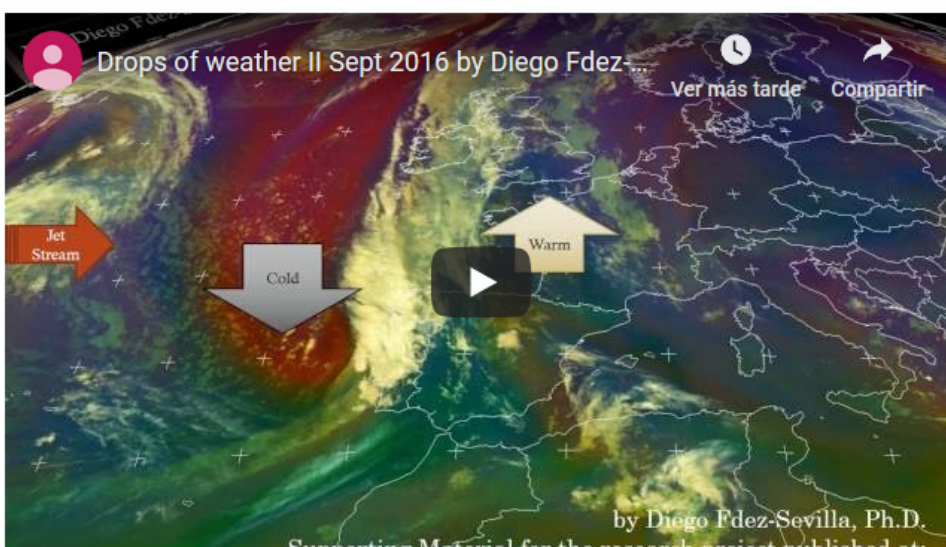
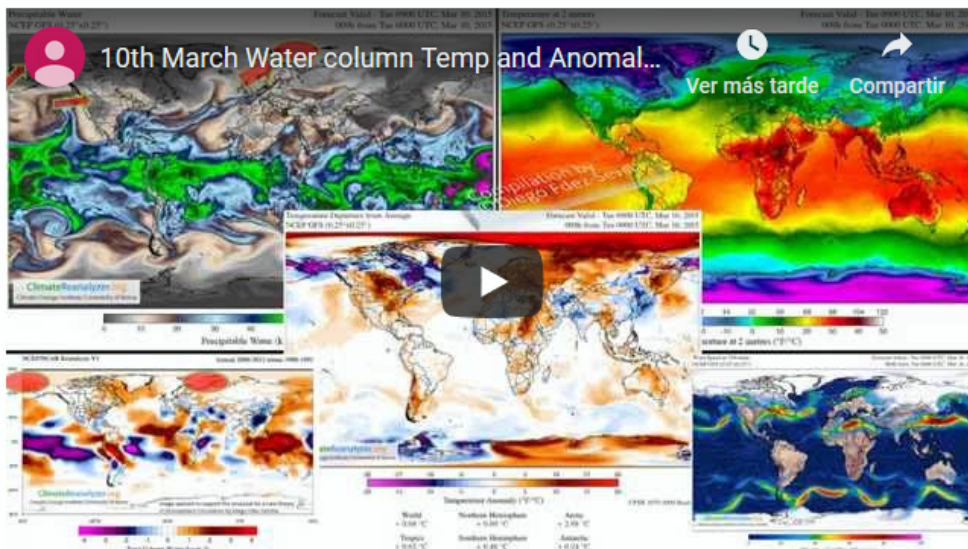
- March 22, 2016 [Pacific atmospheric dynamics with and without a positive ENSO \(by Diego Fdez-Sevilla, PhD\)](#) Researchgate DOI: [10.13140/RG.2.1.1968.5521](https://doi.org/10.13140/RG.2.1.1968.5521).
- February 28, 2018, [Arctic Warming as a Result of Convective Forcing by Diego Fdez-Sevilla PhD](#) ResearchGate DOI: [10.13140/RG.2.2.34551.73125](https://doi.org/10.13140/RG.2.2.34551.73125)
- May 23, 2018, [Convective Forcing Dominates Atmospheric Circulation NH \(By Diego Fdez-Sevilla PhD\)](#) ResearchGate DOI: [10.13140/RG.2.2.23043.20002](https://doi.org/10.13140/RG.2.2.23043.20002)



It can not surprise me enough the fact that there is a scientific agreement followed by [theories such the Arctic Amplification and Stephan Boltzmann black body radiation](#), which focus on single locations as sources of energy triggering warming events. Arctic amplification focus the attention in the Arctic, and the absence of ice decreasing albedo, to justify the location for the source of energy warming the atmosphere in the Sea Surface Waters. And it does it even considering the absence of Solar radiation, which in itself discards any process of albedo absorbing and re-emitting energy. Accordingly with their theory, Arctic amplification suggests that Arctic circulation affects circulation at mid-latitudes, however, all the dynamics we see point in the opposite direction. Mid latitudinal forcing pushes against Arctic restrictions through the Jet Stream, displacing cold masses of air in their path, using water

vapour as the carrier of the energy feeding convective motions.

Animations from previous publications:



Stephan Boltzmann relation describing radiative gradients of temperature rely entirely on an idealized body homogeneous in composition and even pressure. Such statement neglects the nature of the processes involved in the transference of energy found in the atmosphere where there are simultaneously three states of matter, gaseous, liquid and solid, numerous compounds different in molecular composition and behaviour, as well as an active thermodynamic system made of heterogeneous cells containing independent microsystems of entropy, interacting in a macro system out from equilibrium. (more [here](#)).

So opposite from a black body, the distribution of radiation and heat across an

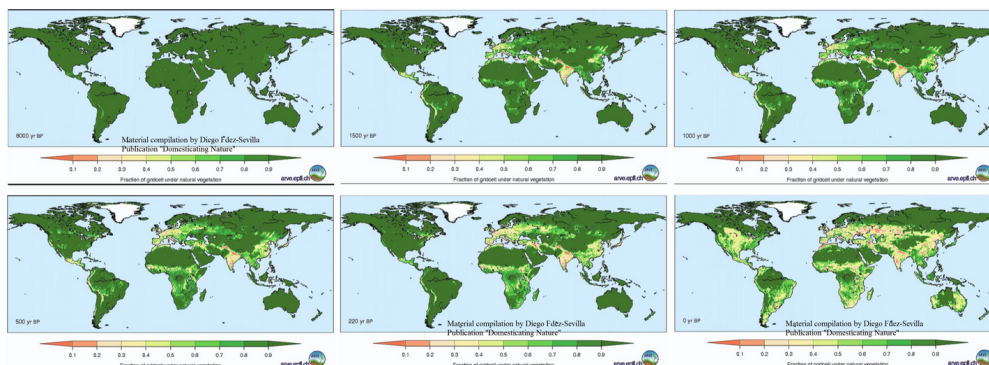
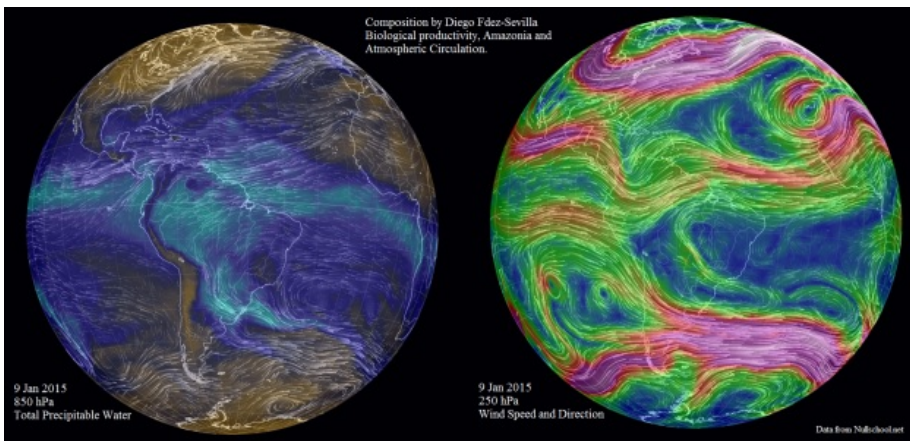
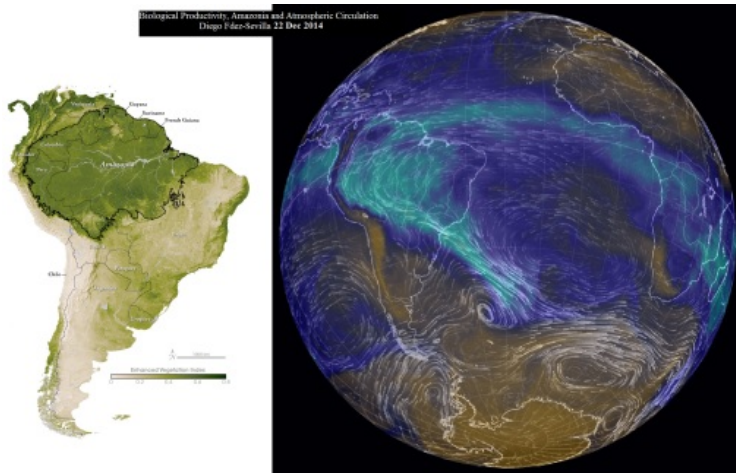
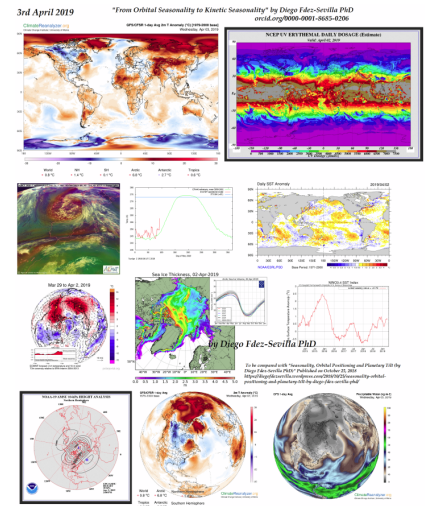


heterogeneous system delivers an uneven distribution marked by the nature of the connections built between micro and macro systems, ecosystems and abiotic systems, gaseous, liquid, solid and multi-estate systems. It becomes evident that there

is not a distribution of temperatures following a gradient defined by Stephan-Boltzmann estimations because the transference of energy is heterogeneous due to the heterogeneous composition and disposition of the matter states in the planetary system.

By understanding those limitations we can identify the expansion of energetic pulses throughout the atmosphere avoiding focusing the attention over the temperatures and instead, focusing the attention into identifying the “work” expressed by the dynamics in motion, either as forms of precipitation, translatitudinal transportation of matter (Water Vapour), transference of radiation (SSW), discharges of electricity and displacements of cold and heat waves.

In my research I have been very persistent trying to highlight how much relevance it is given to a small area in size and depth driving global circulation as it is the SST at the Eq Pacific while an area of the same size and even more depth could be identified in the Amazon or by the change suffered in Land cover by agriculture at global scale.



We have to consider that SST are measured in the 5 or less m of the Ocean meanwhile Forests can occupy more than 15 meters in depth. And both are



sources of the latent heat carried out in the atmosphere which fuels convective dynamics dominating intrusions over the Arctic.

Among those analyses published in my line of research some time ago studying the impact from changes in Land cover over atmospheric dynamics:

- April 23, 2015 Matching Features Between Land Surface and Atmospheric Circulation (by Diego Fdez-Sevilla) ResearchGate DOI: 10.13140/RG.2.2.20035.30247. <https://wp.me/p403AM-xK>
- June 10, 2016 The Butterfly Effect on Arctic Circulation. (by Diego Fdez-Sevilla, PhD) <https://wp.me/p403AM-12H>

Discussion

There have been **some assessments showing major discrepancies** between the line of research presented here and main stream scientific coverage. The assessments are about the concept of [climate drift](#), [the link between the Polar Vortex and tropospheric circulation](#), the role played by SST and the ENSO, [the dynamics explaining abnormal Arctic Warming and sea ice cover](#), the synergistic implications from the biotic component, solar forcing and the scientific methodology applied.

Polar Vortex

November 14,
2014

[Why there is no need for the Polar Vortex to break in order to have a wobbling Jet Stream and polar weather? \(by Diego Fdez-Sevilla PhD\)](#) Researchgate DOI: [10.13140/RG.2.1.2500.0488](https://www.researchgate.net/publication/261125004)

December 18,
2015

[Climate and weather December 2015. Another Polar Vortex another Heat Wave? \(by Diego Fdez-Sevilla, PhD\)](#) Researchgate DOI: [10.13140/RG.2.2.19966.48968](https://www.researchgate.net/publication/261199664)

October 25,
2016

[Another Heat Wave Another Polar Vortex II ... Broken \(by Diego Fdez-Sevilla, Ph.D.\)](#) ResearchGate DOI: [10.13140/RG.2.2.13418.93124](https://www.researchgate.net/publication/261134189)

Climate Drift

October 21,
2014

[\(Updated 22/Dec/14\) New theory proposal to assess possible changes in Atmospheric Circulation \(by Diego Fdez-Sevilla\)](#) Researchgate DOI: [10.13140/RG.2.1.4859.3440](https://www.researchgate.net/publication/261148593)

February 10,
2015

[\(UPGRADED 24th March2015\) Revisiting the theory of "Facing a decrease in the differential gradients of energy in atmospheric circulation" by Diego Fdez-](#)

Sevilla. Researchgate: DOI:
[10.13140/RG.2.1.1975.7602/1](https://doi.org/10.13140/RG.2.1.1975.7602/1)

[Atmospheric Circulation and Climate Drift. Are we there yet? \(by Diego Fdez-Sevilla\)](#) July 2, 2015

September 2, 2016 [Climate Drift, The True Meaning of Things and the Drift of Those. \(by Diego Fdez-Sevilla, PhD.\)](#)

February 6, 2018 [Feb 2018. Climate Drifts and The Scientific Method of Waiting 30 Years. Follow up on previous assessments by Diego Fdez-Sevilla PhD Pdf at ResearchGate DOI: 10.13140/RG.2.2.18823.09122](#)

Arctic Amplification

November 17, 2016 [Arctic Amplification versus Arctic Absorption \(by Diego Fdez-Sevilla, PhD.\)](#)

December 17, 2016 [Orbital Seasonality vs Kinetic Seasonality. A Change Triggered from Changing the Order of The Factors \(by Diego Fdez-Sevilla, PhD\) Researchgate: DOI: 10.13140/RG.2.2.20129.81760](#)

SST and ENSO

October 16, 2015 [SST Anomalies and Heat Waves. Are They Not All Just Heat Displacements? \(by Diego Fdez-Sevilla\)](#) Researchgate: DOI: [10.13140/RG.2.2.23741.05608](https://doi.org/10.13140/RG.2.2.23741.05608)

December 11, 2015 [Could It Be El Niño The New “Wolf” Coming? \(by Diego Fdez-Sevilla\)](#) Researchgate DOI: [10.13140/RG.2.1.3238.2801](https://doi.org/10.13140/RG.2.1.3238.2801)

March 22, 2016 [Pacific atmospheric dynamics with and without a positive ENSO \(by Diego Fdez-Sevilla, PhD\)](#) Researchgate DOI: [10.13140/RG.2.1.1968.5521](https://doi.org/10.13140/RG.2.1.1968.5521)

June 23, 2017 [“Seasonal Outlook. June 2017 \(By Diego Fdez-Sevilla PhD\) ResearchGate DOI: 10.13140/RG.2.2.25428.91528](#)

Solar Forcing

April 10, 2014 [Exploring the effects of humanly generated factors in the role played by Solar activity in the climate. \(by Diego Fdez-Sevilla\)](#)

July 24, 2015 [Solar Activity and Human Activity, Settling Their Environmental Liability. \(by Diego Fdez-Sevilla\)](#) ResearchGate DOI:

[10.13140/RG.2.2.36702.33606](https://doi.org/10.13140/RG.2.2.36702.33606)

September 22, 2016 [Solar Forcing in Our Climatic and Atmospheric Dynamics. Location, Location, Location \(by Diego Fdez-Sevilla, Ph.D.\) ResearchGate DOI: 10.13140/RG.2.2.10303.20647](#)

The Biotic Synergy

June 26, 2014 [Biological Productivity and its Influence on Cloud Formation. \(by Diego Fdez-Sevilla\)](#)

December 22, 2014 [Biological Productivity, Amazonia and Atmospheric Circulation. \(by Diego Fdez-Sevilla\) ResearchGate DOI: 10.13140/RG.2.2.10771.99363](#)

May 7, 2015 [Domesticating Nature. \(by Diego Fdez-Sevilla\) Rsearchgate DOI: 10.13140/RG.2.2.36812.51848](#)

April 22, 2016 [Plant an Idea and Then a Tree... But Which Ones? \(by Diego Fdez-Sevilla\) Reasearchgate DOI: 10.13140/RG.2.1.3977.0489](#)

March 3, 2017 [Thermodynamic Ecosystems by Diego Fdez-Sevilla PhD ResearchGate DOI: 10.13140/RG.2.2.32238.10566](#)

May 26, 2017 [Review. CO2 Makes Headlines To Grow Like Trees. Shaping Different Forests Offering Different Views \(by Diego Fdez-Sevilla PhD\) ResearchGate DOI: 10.13140/RG.2.2.16286.33601](#)

The Scientific Method

[The scope of Environmental Science and scientific thought. From Thought-driven to Data-driven, from Critical Thinking to Data Management. \(by Diego Fdez-Sevilla\)](#) June 26, 2015
Researchgate: DOI: [10.13140/RG.2.1.2007.0161](https://doi.org/10.13140/RG.2.1.2007.0161)

[Atmospheric Circulation and Climate Drift. Are we there yet? \(by Diego Fdez-Sevilla\)](#) July 2, 2015

March 10, 2017 [Modelling the “Model” and the Observer \(by Diego Fdez-Sevilla PhD\) ResearchGate DOI: 10.13140/RG.2.2.17558.04169](#)

February 6, 2018 [Feb 2018. Climate Drifts and The Scientific Method of Waiting 30 Years. Follow up on previous assessments by Diego Fdez-Sevilla PhD Pdf at](#)

ResearchGate DOI: [10.13140/RG.2.2.18823.09122](https://doi.org/10.13140/RG.2.2.18823.09122)

May 3, 2019 [Methodological Biases in Climatic Postures \(by Diego Fdez-Sevilla PhD\)](#)

Teleconnections

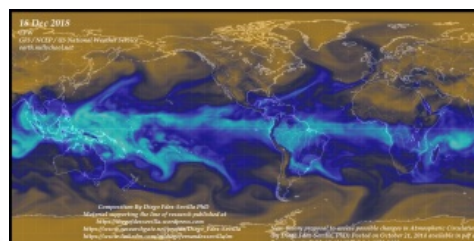
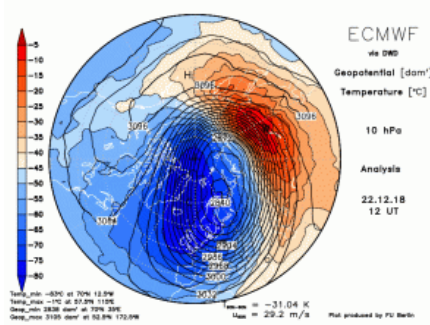
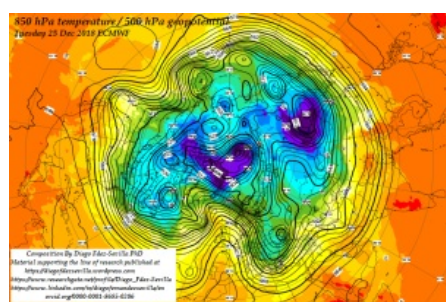
January 20, 2017 [Climate and Indexes. A dashboard of Confusion. \(by Diego Fdez-Sevilla PhD\)](#) ResearchGate DOI: [10.13140/RG.2.2.25016.96007](https://doi.org/10.13140/RG.2.2.25016.96007)

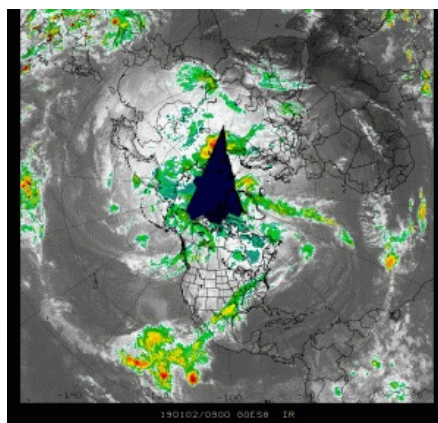
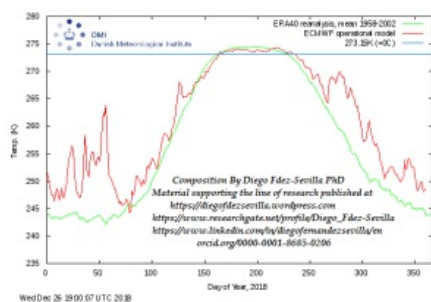
April 19, 2018 [Climate, Weather and Energy. Using a Climatic Regime to explain Weather Events by Diego Fdez-Sevilla PhD](#) Research DOI: [10.13140/RG.2.2.27923.58406](https://doi.org/10.13140/RG.2.2.27923.58406)

In the line of research presented in this blog it has been discussed the impact over energy flows derived from solar activity, land use and surface, atmospheric composition of GHGs and aerosols as well as the water cycle.

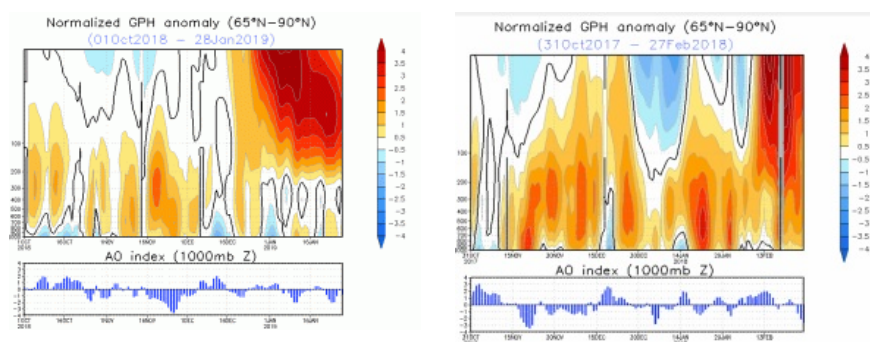
Based on the previous observations and assessments presented in this line of research, the state of the stratospheric circulation at both poles suggest that there is [no need to have sudden warming process at stratospheric level in order to have a broken polar vortex](#). Such scenario was observed in October 2016 by the configuration of the polar vortex split at the NH without a stratospheric localised strong warming meanwhile [the South pole was suffering a Sudden stratospheric warming without splitting the polar vortex](#).

But also, [neither is required a broken polar Vortex in order to have displacements of cold polar masses of air into lower latitudes](#). Such configuration comes from [the convective forcing triggered at lower altitudes by warm masses of air moving towards the poles in latitude and altitude](#).





A process of [convection and advection](#) moving warm masses of air towards the poles displacing cold masses of air in their way moving into Arctic circulation.



From In-Finding Out Gaps Around- "The Test of Time"
 February 2013-January 2018

Arctic Absorption by Diego Fdez-Sevilla PhD

October 2015

"Atmospheric Dynamics, Arctic Water Vapor Intake-Outtake" by Diego Fdez-Sevilla 13rd-15th October 2015 0600UTC

Airmass RGB
 Airmass is an RGB composite based upon data from infrared and water vapour channels from Meteosat Second Generation. It is designed and tuned to monitor the evolution of cyclones, in particular rapid cyclogenesis, jet streaks and PM (potential vorticity) anomalies (appear reddish in the image).
 Due to the interpretation of the water vapour and ozone channels, its usage at high satellite viewing angles is limited. The Airmass RGB is composed from data from a combination of the SEVIRI WV2, WV7, IR107 and IR108 channels and can thus be used day and night.

20151013.0700 UTC
 20151014.1000 UTC
 Meteosat 0 degree
 Airmass_global
 Rotation

Supporting Activity for the research project published at:
<https://diego.fdezsevilla.wordpress.com>

By Diego Fdez-Sevilla PhD

This behaviour can be explained by considering the thermal properties of the atmosphere as a system capable of carrying energy across higher latitudes and altitudes without dissipation and in enough concentration to affect the configuration of the polar vortex from the bottom up. Such capacity to keep momentum across latitudes and altitude conserving thermal energy can only be explained by an enhancement in the thermal properties of the atmosphere, which are directly related with its composition.

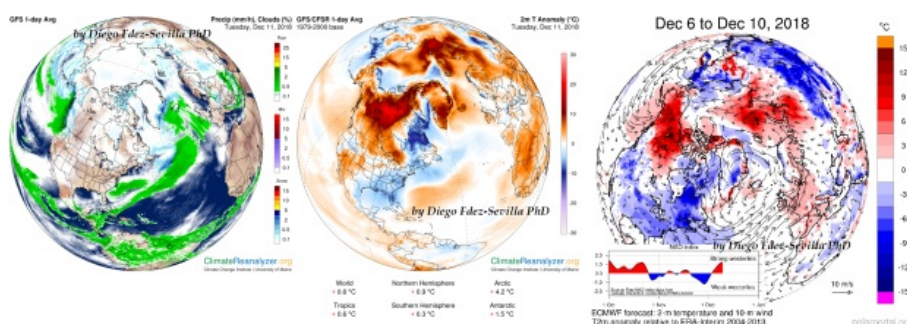
Throughout my line of research I suggest that there is one approach which is able to unify all events in a [single principle](#). The incorporation of energy into the atmosphere is shaping the atmospheric dynamics we see affecting the behaviour of currents, storms, rain rates, lightning events, wind regimes and temperature variations.

The atmosphere might have trespassed a tipping point absorbing energy making to tremble its previous structural configuration in Latitude and Altitude.

The constant contact of warm masses of air from Low and Mid-Latitudes with those from polar latitudes has worn off the strength of the [Polar Jet Stream](#). Such circumstance has allowed the intrusion of warm masses of air into higher latitudes and altitudes, increasing [atmospheric mixing dynamics](#). These [convective intrusions](#) are fuelled by the [energy](#) carried within [water vapour](#), inducing the displacements of other colder masses of air in altitude and latitude, [increasing the mixing ratio between otherwise compartmentalized parts of the atmosphere](#).

Such circumstance has allowed the atmosphere to spread the energy carried by water vapour from Mid Latitudes into Polar Latitudes (Arctic latitudes), being able of holding more energy than before since it is not dissipated into their surroundings when moving across latitudes.

[If rain at the deserts would be a strong indicator of something changing, increasing “rain” instead of snow at higher latitudes would have a post-effect over the atmospheric circulation, and generate feedback loops.](#)



This scenario has induced a [trans-Arctic interconnectivity between oceanic basins](#) which has happened with and [without the need for a strong sign of the ENSO](#). Therefore, this would suggest that exchange of masses of air between the Mid low latitudes with the Arctic, through the Polar Jet Stream, is the dominant driver in atmospheric circulation defining the behaviour of equatorial winds. But also, the configuration of the NH Polar Vortex.

Altogether the research here presented points to a new scenario in atmospheric dynamics in which the Arctic circulation, previously isolated from Subtropical influence by the Polar Jet Stream, has become open to be involved in the atmospheric dynamics for the Pacific and Atlantic basins. This new interconnection will affect the atmospheric dynamics around the whole North Hemisphere. But also, by being our atmosphere a close system, subsidiary, such alteration would affect dynamics at the Equator and due to symmetric compensation between Hemispheres, moreover into the Southern Hemisphere.

The Anthropogenic Link

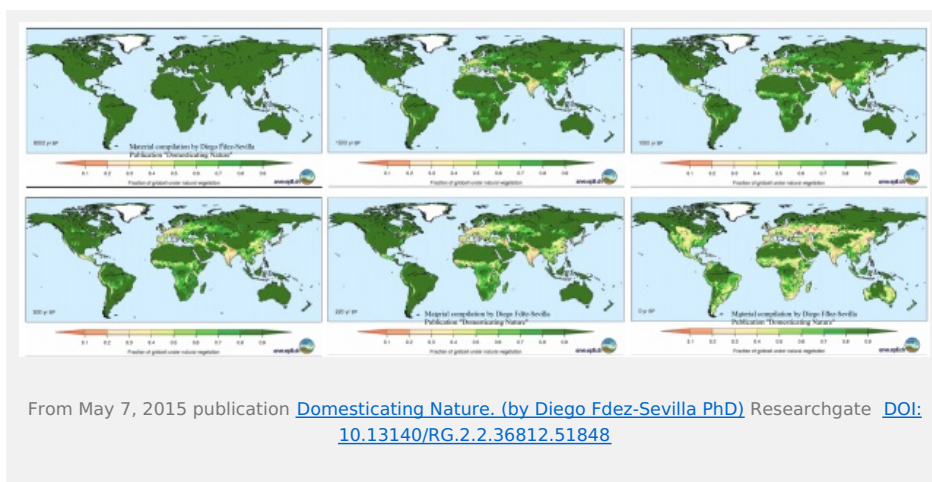
As a biologist myself I find intriguing to see that our environment is predominately not described in biological terms.

Einstein made it very clear, our environment is a relative proportion of free energy and fixed energy in mass. There is one process in our system fixing E into mass, and one releasing E from mass. The “relative efficiency” of both processes is what is defining the behaviour of our thermodynamic environment.

There is an interference from human activities changing the composition and

structure of the three phases of the environment:

- **solid**; land cover and use affects albedo and changes in evapotranspiration rates due to biotic disruptions on wild population functionality,



- the **liquid** phase through alterations over the water cycles, distribution of water bodies, and humidity of soils as well as affecting circulation patterns due to coastal deterioration and deformation, but also, indirectly due to alterations in the composition of the inert and biotic matter in the Oceans due to [pollution](#) and modifications in acidification and salinity related with atmospheric composition and thermal properties.
- and **gaseous** phase due to alterations in the composition of the atmosphere from GHGs as well as aerosols, altogether affecting its thermodynamic behaviour.

The deviation from equilibrium of those conditions disrupt the perpetuation of an established symbiotic relationship between biotic and none biotic components in the micro and macro ecosystem.

The definitive link between **human activities and atmospheric dynamics** is under constant **discussion** since climatic developments are mainly approached from the field of **physics**.

However, **the direct link between Anthropogenic activities and climatic developments are found in biological terms with thermodynamic implications**:

Human activity has reduced CxHxOx compounds and increased free CxOx+HxOx.

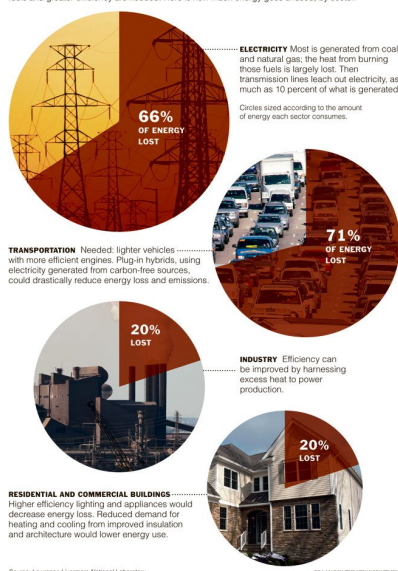
Furthermore, **anthropogenic activities release Energy** from breaking structures (C-C) while **biochemical processes assimilate energy fixing it into stable structures (CxHxOx)**.

Anthropogenic activity is simultaneously, **releasing energy** from a biochemically fixed state into the Planetary System's Pool, at the same time that, it **adds thermoactive compounds as CO2 and H2O**. But furthermore, through this activity of constant transformational and processing, human activities are **also debilitating** the functionality of the **biochemical processes capable of absorbing such perturbation**, the endogenous ecosystems.

Wasted Energy

About 56 percent of all energy in the U.S. economy is wasted. Some energy is always lost when fuels are burned and heat escapes. Inefficient technology and design are also culprits.

Efficiency's role in cutting emissions is a matter of debate. Most scientists agree that both cleaner fuels and greater efficiency are needed. Here is how much energy goes unused, by sector.



Einstein and his developments were mainly applied in physics due to the use that it was made of his work with the aim to manipulate energy in times of conflict, or to understand space. The equation is simple $E=mc^2$. The language of physics has dominated the discussion over physical developments since then and it has been established as the logical translation of climatic developments. However, in the current times, the role of scientific understanding demands to move beyond the barriers of language, either between semantic cultural languages and between disciplines.

Being myself a Biologist involved in Atmospheric dynamics applying physics to explain such a complex subject as it is climatic evolution might seem like the tale

of the child claiming that the Emperor has no clothes.

And yet, it seems to me evident that a thermodynamic system as it is our planet, can not scape from the most basic and powerful understanding of our contemporary scientific evolution. If $E=MC^2$, and the anthropogenic activity is increasing the transformation of M into Energy in the system (from burning Mass from fossils and vegetable components, as well as by liberating other forms of energy such as gravimetric in Dams, Solar, transformation of raw materials, etc,) such transformation rate will move the balance in the thermodynamic behaviour of the whole system, and the rate of such deviation from equilibrium will be related with the speed at which the transformation rate between E/M is performed: $M > (c)^2$

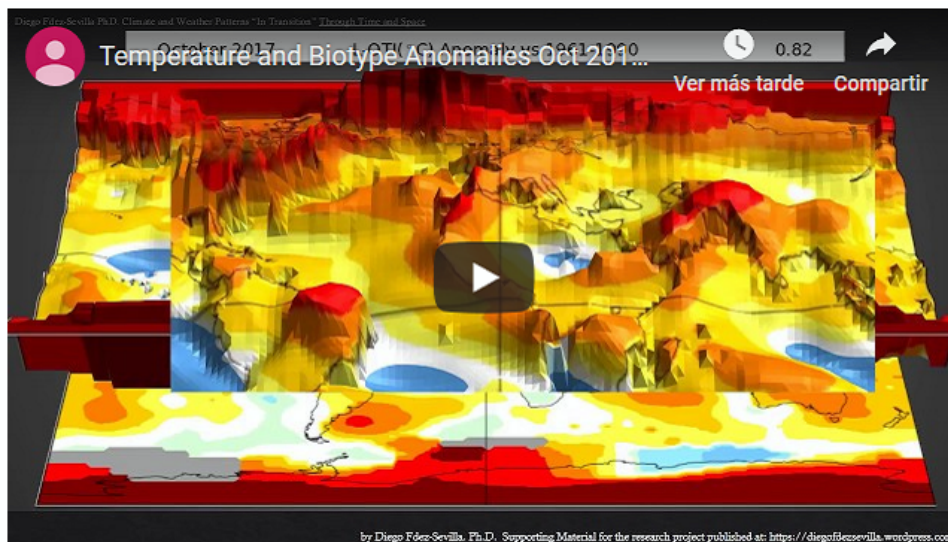
Conclusions

- March 23, 2017 [Final Review in Progress. March 2017. From ENSO to Scientific Thinking by Diego Fdez-Sevilla PhD. ResearchGate DOI: 10.13140/RG.2.2.33915.82726](#)
- February 7, 2019 [Diego Fdez-Sevilla PhD Jan 2019 Report on Climate and Atmosphere_ Filling in or Finding out the gaps around.pdf at ResearchGate DOI: 10.13140/RG.2.2.30663.75682](#)

The mere identification of seeing: [numbers of trees decreased over 46% from wild ecosystems](#) being affected through time due to agriculture, [increased levels of urbanization](#), deforestation, same for soil degradation, [decrease in O2 conc](#), and an increase in GHG, can not be left out of the equation when considering what it is and what it is not “natural variability”, and the future expected for our thermodynamic [planetary system](#).

Our planet is getting fat on GHG, [lacking O2](#), space to grow natural ecosystems and capacity to fix and store energy. Biology integrates all components in an ecosystem, yet it is missing in climatology assessments.

The main **conclusion** from the present study researching synergistic interactions between all [transformations seen over the Liquid, Gaseous and solid phases of our global Environment indicates that anthropogenic activity is forcing our environment into A System Becoming Dominated By Free Energy](#). (pdf Registered at ResearchGate DOI: [10.13140/RG.2.2.18509.13289](#))

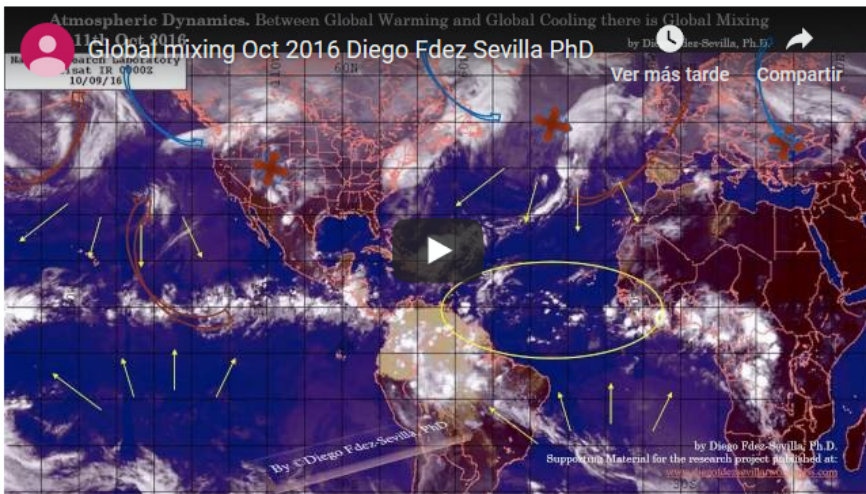
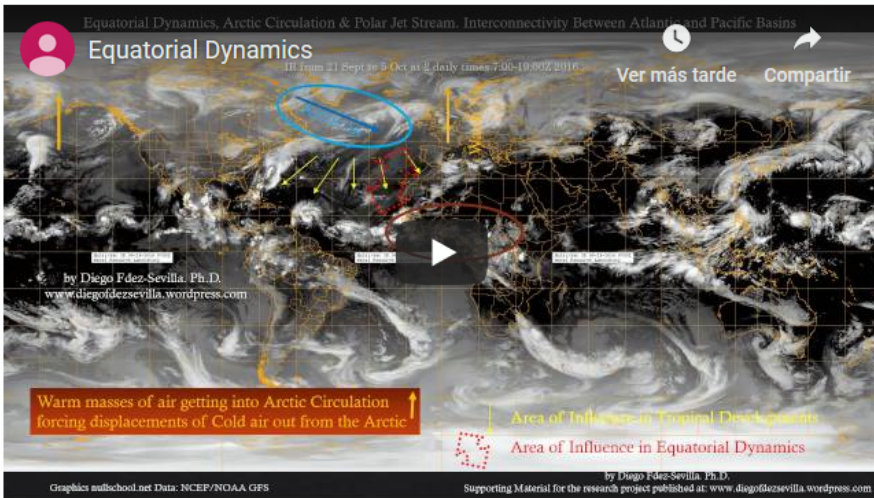


Our Planet is made from the combination of all the organisms in a given area and the abiotic elements which affect them. An ecosystem is an open system because it can exchange energy or materials with other ecosystems. Earth is a closed system with respect to nutrients and chemicals, but open with respect to energy. There is an underestimated synergistic relationship between biogeochemical energy flows and those identified in weather patterns and atmospheric dynamics. For too many years it has been considered that the Earth is a garden populated by “elements” offering colourful pleasure and comfort. In fact, the biochemical processes undertaken by our ecosystems function as the most advanced piece of technology known by Humans, responsible for the quality of our air, waters and soils, as much as the sole and unique mechanism capable of interacting with the thermodynamic pressure imposed by the constant exposure of the planet to Sun’s radiation. Until we see the real function of biological processes as climate regulators we will not realise in how much trouble we are.

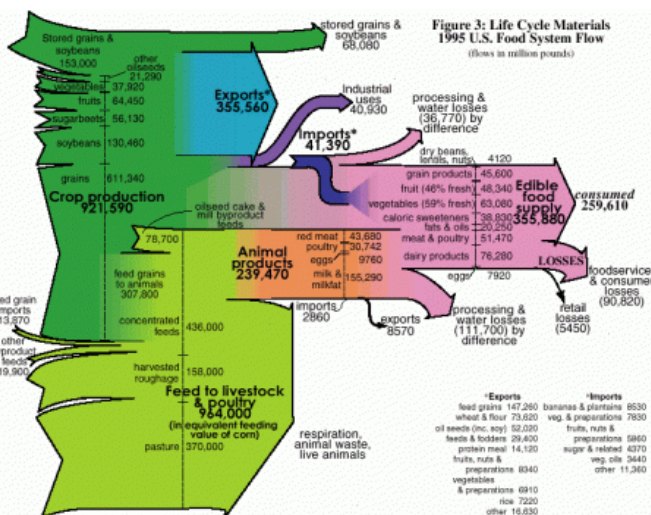
The biotic component of our environmental system is the only one capable of interacting against thermodynamic entropy, against instability. **And for as long as Human activity can not replicate such mechanisms in equilibrium with the resources consumed, it might be time to think about [domesticating Human Activities instead of following the obsession for Domesticating Natural Behaviour and Geengineer our Weather.](#)**

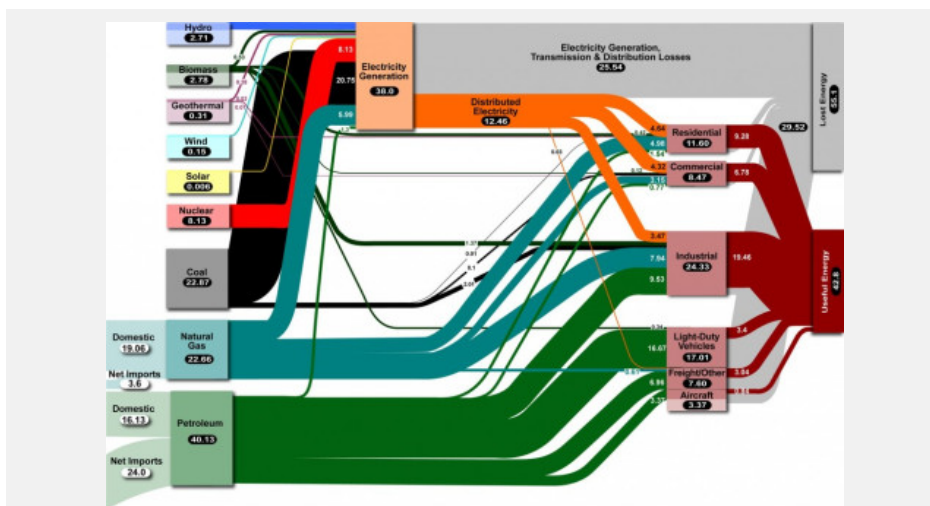
Overall Conclusions

An increase in the amount of energy being in “free” state means that kinetic processes will increasingly dominate thermodynamic processes, inducing a transition in our Seasonal and Climatic regimes from being driven by Orbital Positioning to be driven by more erratic Kinetic processes. ([see related analysis](#))



Examples of processes releasing ENERGY FROM ANTHROPOGENIC ACTIVITIES



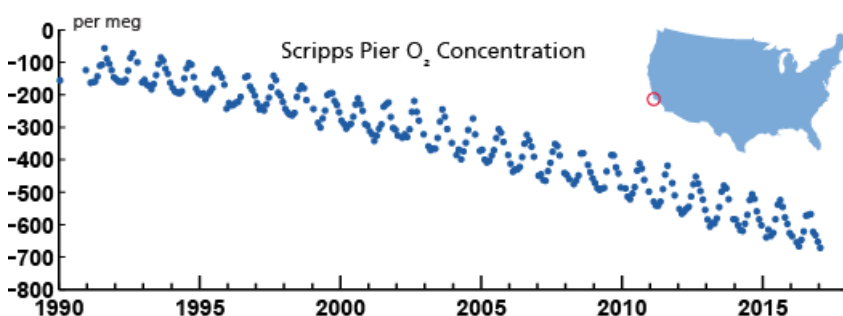
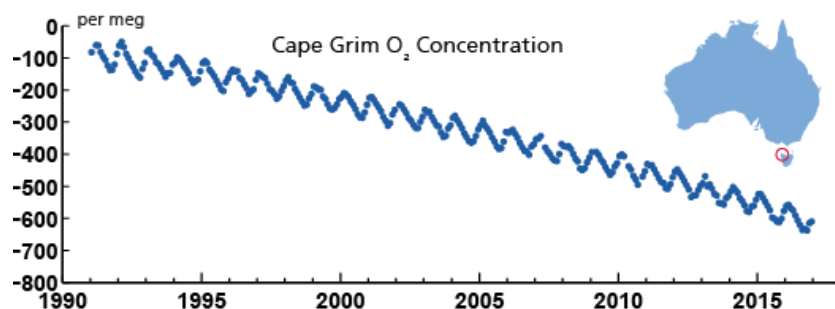


From previous publication "[Domesticating Nature](#)" (2015)

Atmospheric Oxygen Levels

Atmospheric Oxygen Levels are Decreasing Oxygen levels are decreasing globally due to fossil-fuel burning. The changes are too small to have an impact on human health, but are of interest to the study of climate change and carbon dioxide. These plots show the atmospheric O₂ concentration relative to the level around 1985. The observed downward trend amounts to 19 'per meg' per year. This corresponds to losing 19 O₂ molecules out of every 1 million O₂ molecules in the atmosphere each year.

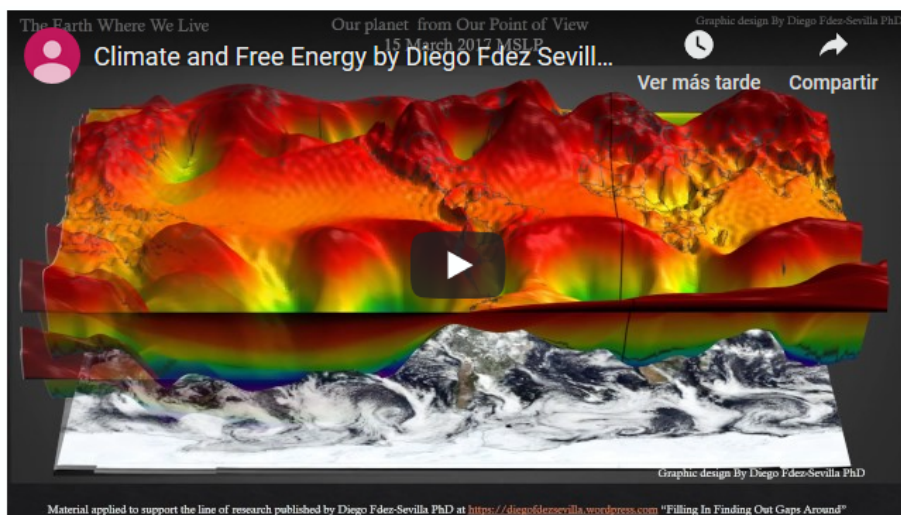
Scripps O₂ Global Oxygen Measurements The Scripps O₂ Program measures changes in atmospheric oxygen levels from air samples collected at stations around the world. This sampling network provides a global and hemispheric perspective on oxygen variability. The Scripps O₂ Program is based at the Scripps Institution of Oceanography at La Jolla, California and is under the direction of Professor Ralph Keeling.



Imagery and Methodology

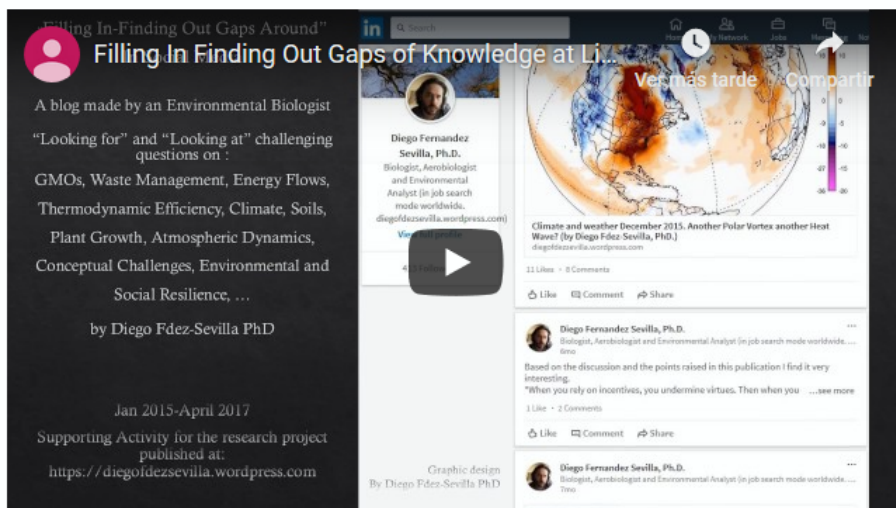
Nowadays, there are many divisions between disciplines due to the isolated nature of their specific language and methodologies. I might not use the right vocabulary for all the fields which I discuss, or the right data or the right reasoning. But when nobody is able to offer a consensus over what is going on, I wonder, what is right this days?.

The line of research presented in this blog [describes a scenario](#) where things happen for a reason, and where there are reasons for things to happen. No model offers that much. Meanwhile “reasons” explain probabilities, models use “probabilities” to let you figure out the reasons.



After leaving months, even years of time to expose my conclusions for public discussion and review, once those have no faced any criticism or arguments refuting their value, I create a pdf file and a DOI publishing them at my profile in Researchgate. In order to maintain their genuineness and legitimate innovative nature, I keep its original state so those can be compared with any copy made by any third party at any time. For your own references and review over its originality over time with respect to other publications via scientific papers and/or news reports, you can compare the publications at the blog and researchgate with the records archived:

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- NOAA: <https://www.linkedin.com/groups/156873/156873-5986214921963077634>



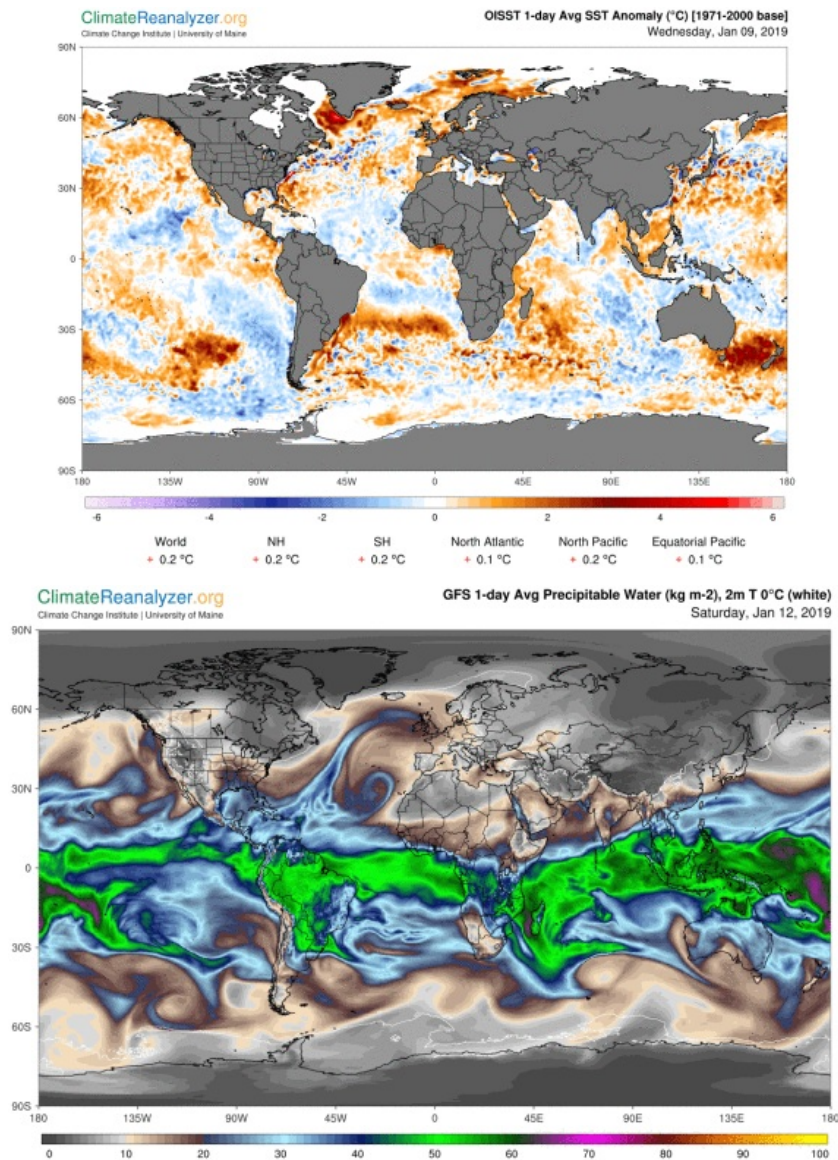
2019 Research FOLLOW-UP

In research what it is relevant it is not always what it is New, but what it doesn't get old. One stage of research comes when looking into offering something New; New data, New interpretations, New methods, making "the News", being the First ... And then, once the "New" has been offered, it is all about confirmation, re-evaluation, validation, review and application. In my line of research, at one stage I have offered New interpretations on climatic developments adopting New points of view addressing New synergistic interactions delivering New Conclusions and Implications in weather patterns, atmospheric circulation and biotic performance. In a following stage I have re-shared all those previous "New assessments" to be contrasted against real time developments been unfolded in the next years. In 2014 I was told by a lead scientist in climatic developments Prof. Jennifer Francis: ["The topic you've written about is extremely complicated and many of your statements have not yet been verified by peer-reviewed research."](#) I was challenged for a deeper understanding of the state of the research, knowledge of atmospheric dynamics and analyses supporting my statements.

[Revisiting the theory of "Facing a decrease in the differential gradients of energy in atmospheric circulation" by Diego Fdez-Sevilla.](#) Reply to Prof. Jennifer Francis (February 2015) Researchgate: [DOI: 10.13140/RG.2.1.1975.7602/1](https://doi.org/10.13140/RG.2.1.1975.7602/1)

After 200+ analyses 2014-18, have I done enough?diegofdezsevilla.wordpress.com

This year 2018/19 the progression of the climatic dynamics seen show to support the conclusions discussed throughout all the analyses performed in the line of research presented in this blog:

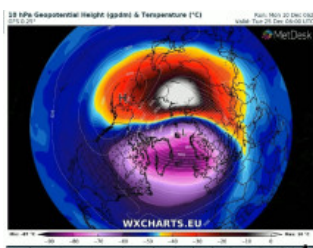


- The **ENSO** is not a driver of convective forcing over the NH,
- **Convective forcing** from Mid-latitude towards the Arctic circulation has worn off the gradients of temperature generating a strong Polar Jet Stream.
- **Arctic warming** occurs through atmospheric intrusions from Mid-Latitudes,
- The collapse of the **Polar Jet Stream** has opened Arctic circulation to Mid-Latitude circulation intrusions allowing **Trans-Arctic circulation between Pacific and Atlantic Basins**.
- The **global Temperature** measured is the resultant of mixing patterns in the atmosphere,
- Therefore an increase in **mixing dynamics** creates a **pause** in temperature rise,
- An increase in mixing dynamics shows an **increase in convective forcing**,
- Convective forcing is the **work** resultant from an increase in atmospheric **energy** being incorporated in **free state**,
- The incorporation and spread of energy in free state into the atmosphere is carried and released by **water vapour**
- An increase of water vapour in atmospheric circulation requires an increase in the **thermal capacity of the atmosphere**
- The process of enhancing the thermal capacity of the atmosphere comes by increasing the concentration of **GHGs, conc of aerosols and land surface albedo**.
- Several processes carried out by **human activity** are linked with the previous assessment: human activity reduces the capacity of the biotic environment to fix energy from free state into inert state by reducing **biochemical processing and storage** (CxHxOx photosynthesis

and biomass) and increases atmospheric concentrations of GHGs by releasing CO₂ and H₂O into the atmosphere. Also, **land use and cover** transformations increase albedo, **industrial activities** increase aerosols and the compartmentalization of water affects **water cycles**.

- In a **thermodynamic system** the **energetic pool** is the sum of the amount of **energy in free state** capable of doing work, and the energy fixed in an inert form as part of mass. The amount of energy in free state is proportional to the amount of energy fixed in inert form as mass ($E=mc^2$). The release of energy from its inert form increases the amount of energy in free state to do work. Energy is not created, neither destroyed. The transformation of the three phases of the environment forced by human activities, gaseous (atmosphere), liquid (water cycle) and solid (land use and cover), increases the amount of energy in free state capable of promoting all forms of work; convective forcing, strong winds, solid and liquid precipitation, lightning, dust storms, heat waves, cold displacements, and ultimately, and increase in atmospheric mixing in altitude and across latitudes.

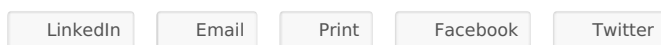
Throughout the Winter 2019, cold “and warm” dynamics at tropospheric and stratospheric levels have happened simultaneously. And if there is a progression it comes by seeing through the seasons warm temperatures moving north followed by a stratospheric Warming process which promotes a weak Polar Vortex configuration.



Despite all the theories available my interpretation is simple about what is happening, between global warming and global cooling we are living under a process of global mixing, promoted by an increase in the atmospheric energy pool, using water vapour as the carrier of such energetic extra thanks to an enhanced thermal capacity generated from increasing

GHGs, Albedo and Aerosols. The origin of this imbalance in the energetic pool driving the thermodynamic system can be associated with changes in the composition, structure, location and concentration of the components integrating the Planetary system. Human activities can be associated with all those changes.

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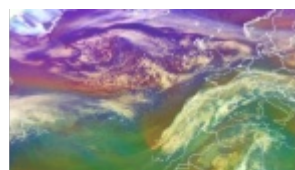


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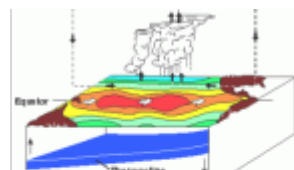
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In "Aerobiology"



About Diego Fdez-Sevilla, PhD.

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and ResearchGate. (c)Diego Fdez-Sevilla, PhD, 2018. Filling in or/and Finding Out the gaps around. Publication accessed 20YY-MM-DD at <https://diegofdezsevilla.wordpress.com/> ***
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1 Response to *Rayleigh-Taylor instabilities in Atmospheric Circulation. Follow-Up on Atmospheric Dynamics and Climatic Implications (By Diego Fdez-Sevilla PhD)*



Diego Fdez-Sevilla, PhD. says:

May 17, 2019 at 12:13

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Rayleigh–Taylor instabilities is what physicists call mixing. I have worked since 2013 trying to make my analyses open for all disciplines but it is time to show that whatever the name chosen, we all agree on something. The stratification of the composition, structure and concentration of the components part of the thermodynamic ecosystem build the synergistic interactions between soils, gases and water. The line of research present 2013-2019 describe an scenario where the processes dominating current developments are: The global Temperature measured is the resultant of mixing patterns in the atmosphere, Therefore an increase in mixing dynamics creates a pause in temperature raise, An increase in mixing dynamics show an increase in convective forcing, Convective forcing is the work resultant from an increase in atmospheric energy being incorporated in free state, The incorporation and spread of energy in free state into the atmosphere is carried and released by water vapour, An increase of water vapour in atmospheric circulation requires an increase in the thermal capacity of the atmosphere, The process of enhancing the thermal capacity of the atmosphere comes by increasing the concentration of GHGs, conc of aerosols and land surface albedo. Anthropogenic activity is linked with those processes.

hashtag

[#globalmixing](#)

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