Climate Threats: A More Inclusive Assessment Is Needed

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September 11 ,2015

By

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The Commonly Presented View of Climate Change

The focus is on CO2 and a few other greenhouse gases as the primary driver of changes in regional and global climate

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AGU Statement On Climate Change – 2013 -

http://onlinelibrary.wiley.com/doi/10.1002/2013EO340006/pdf

Amy Clement, Rosenstiel School of Marine and Atmospheric Science, University of Miami
John Farrington, Woods Hole Oceanographic Institute
Susan Joy Hassol, Climate Communication
Robert Hirsch, U.S. Geological Survey
Peter Huybers, Harvard University
Peter Lemke, Alfred Wegener Institute
Gerald North, Texas A&M University (panel chair)
Michael Oppenheimer, Princeton University
Roger Pielke Sr., University of Colorado at Boulder
Ben Santer, Lawrence Livermore National Laboratory
Gavin Schmidt, Goddard Institute for Space Studies, NASA
Leonard A. Smith, London School of Economics
Eric Sundquist, U.S. Geological Survey
Pieter Tans, National Oceanic and Atmospheric Administration

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"<u>Human-caused increases in greenhouse gases are responsible</u> for most of the observed global average surface warming of roughly 0.8°C (1.5°F) over the past 140 years"

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"Climate models predict that global temperatures will continue to rise, with <u>the amount of warming primarily determined by the level of emissions</u>"

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“Actions that could diminish the threats posed by climate change to society and ecosystems include <u>substantial emissions cuts to reduce the magnitude of climate change</u>”..

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An Important Underemphasized Caveat

"Climate change is not expected to be uniform over space or time. Deforestation, urbanization, and particulate pollution can have complex geographical, seasonal, and longer-term effects on temperature, precipitation, and cloud properties. In addition, human-induced climate change may alter atmospheric circulation, dislocating historical patterns of natural variability and storminess."

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Climate Change Risk Management – AMS Report 2014

http://www2.ametsoc.org/ams/index.cfm/policy/studies-analysis/climate-change-risk-management/

Climate change risk management approaches generally fall into four broad categories:

1) mitigation—efforts to reduce greenhouse gas emissions;
2) adaptation—increasing society's capacity to cope with changes in climate;
3) geoengineering or climate engineering—additional, deliberate manipulation of the earth system that is intended to counteract at least some of the impacts of greenhouse gas emissions; and
4) knowledge-base expansion—efforts to learn and understand more about the climate system, which can help support proactive risk management.

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"Climate change - caused by carbon pollution - is one of the most significant public health threats of our time,"

Environmental Protection Agency Head - Gina McCarthy

http://www.bbc.co.uk/news/business-24181341

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Obama states "changing climate" is more of a threat than "terrorism, instability, inequality, disease" [http://t.co/5gEdLwkEMl]

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This Changes Everything: Capitalism vs. The Climate by Naomi Klein

The most important book yet from the author of the international bestseller The Shock Doctrine, a brilliant explanation of why the climate crisis challenges us to abandon the core "free market" ideology of our time, restructure the global economy, and remake our political systems.

In short, either we embrace radical change ourselves or radical changes will be visited upon our physical world. The status quo is no longer an option.

.... Klein meticulously builds the case for how massively reducing our greenhouse emissions is our best chance to simultaneously reduce gaping inequalities, re-imagine our broken democracies, and rebuild our gutted local economies.

http://www.amazon.com/This-Changes-Everything-Capitalism-Climate/dp/1451697384/ref=sr_1_cc_1?s=aps&ie=UTF8&qid=1413385756&sr=1-1-catcorr&keywords=naomi+klein

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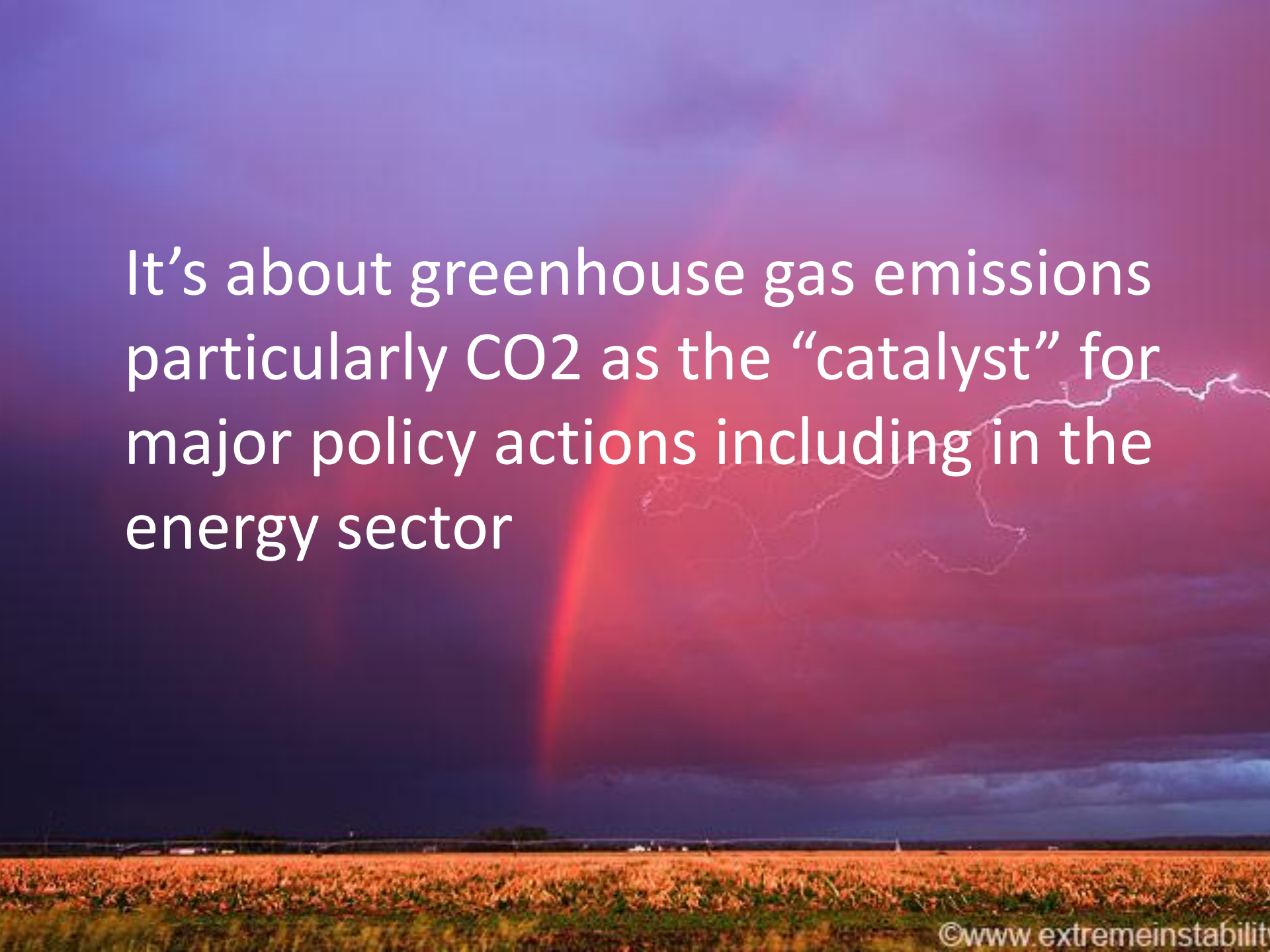
It’s about greenhouse gas emissions particularly CO2 as the “catalyst” for major policy actions including in the energy sector



We need, however, to more robustly address uncertainties

Where are we in our ability to assess the role of human climate forcings in climate and on predicting changes in the coming decades?

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First: How Are the IPCC Multi-Decadal Predictions (Projections) Performing?

This is an independent question from what should be done about added CO_2 emissions

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TWO DISTINCT HYPOTHESES

Hypothesis #1 The skill of initial value multi-decadal regional predictions of changes in climate statistics provide an upper bound on what is achievable using multi-decadal climate projections based on external forcings from added CO2 and other human climate forcings.

Hypothesis #2 Skill at projecting changes in regional climate statistics emerges on time period beyond a decade when the external forcings from added CO2 and other human climate forcings dominate over natural variability and initial value conditions.

Testing of these two hypotheses must be accomplished using hindcasts.

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Necessary Conditions For Skillful Multi-Decadal Predictions of Extreme Events

In hindcast runs (the last several decades), skillful predictions must be demonstrated which include:

1. *The average (annual, monthly, etc.) global, regional and local climate.*
2. *The changes in these averages over the past several decades*
3. *The statistics of extreme weather events*
4. *The changes in the probabilities of these extremes over the last several decades.*

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Citation for the following two slides

Pressure level temperature data provided through KNMI Climate Explorer. Calculation of satellite layer temperatures and plotting performed by J Christy, UA Huntsville.

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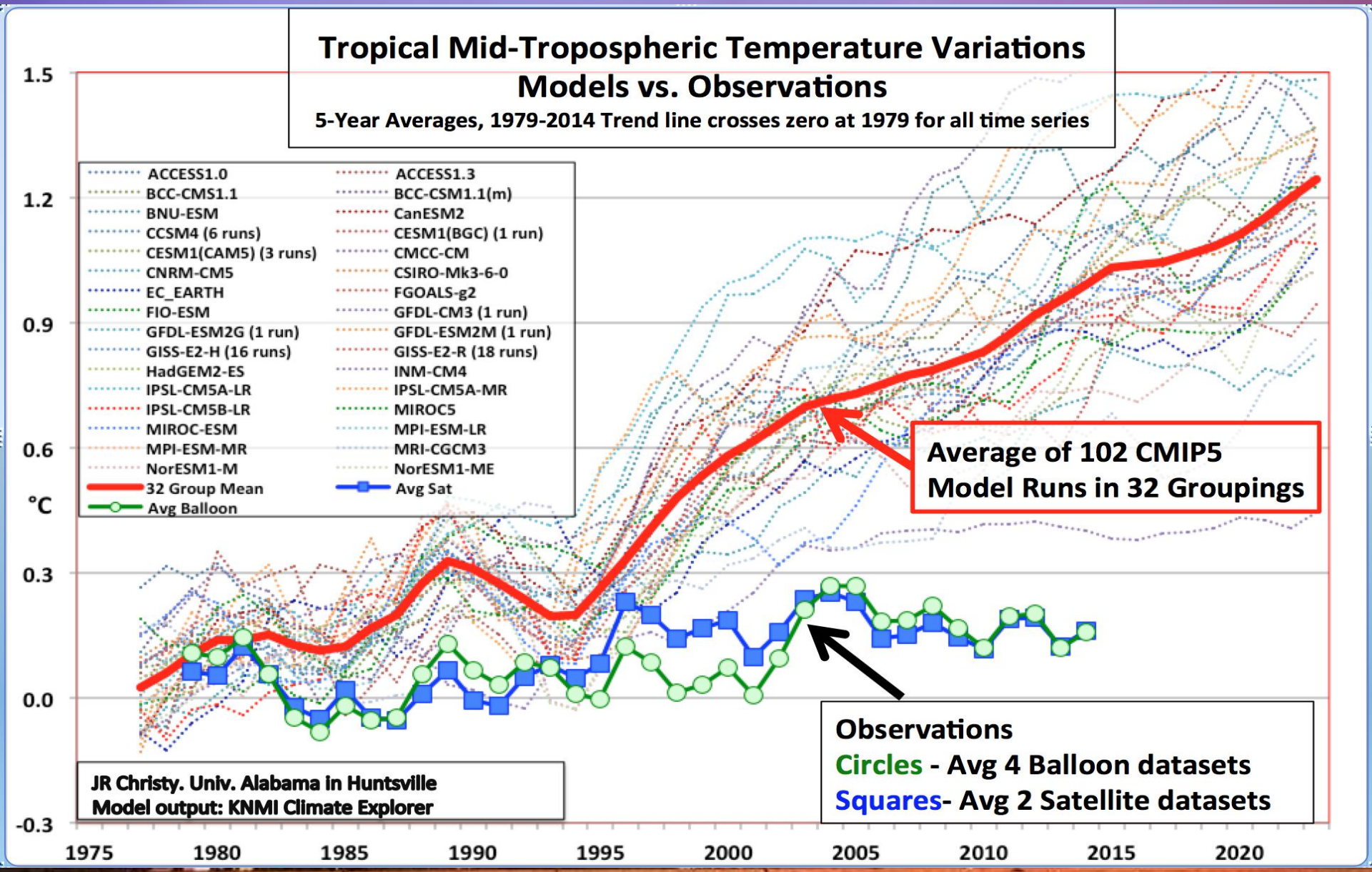

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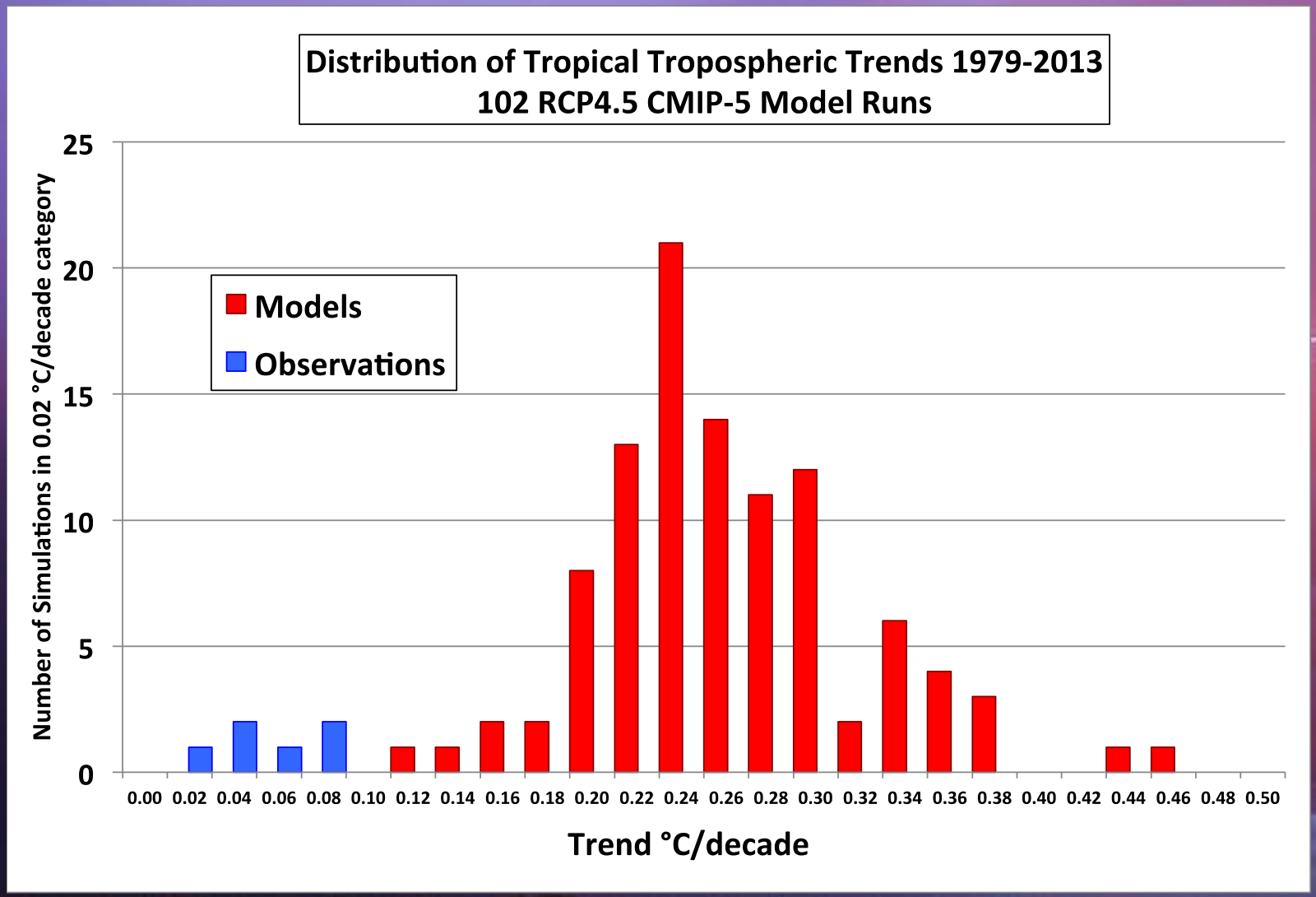

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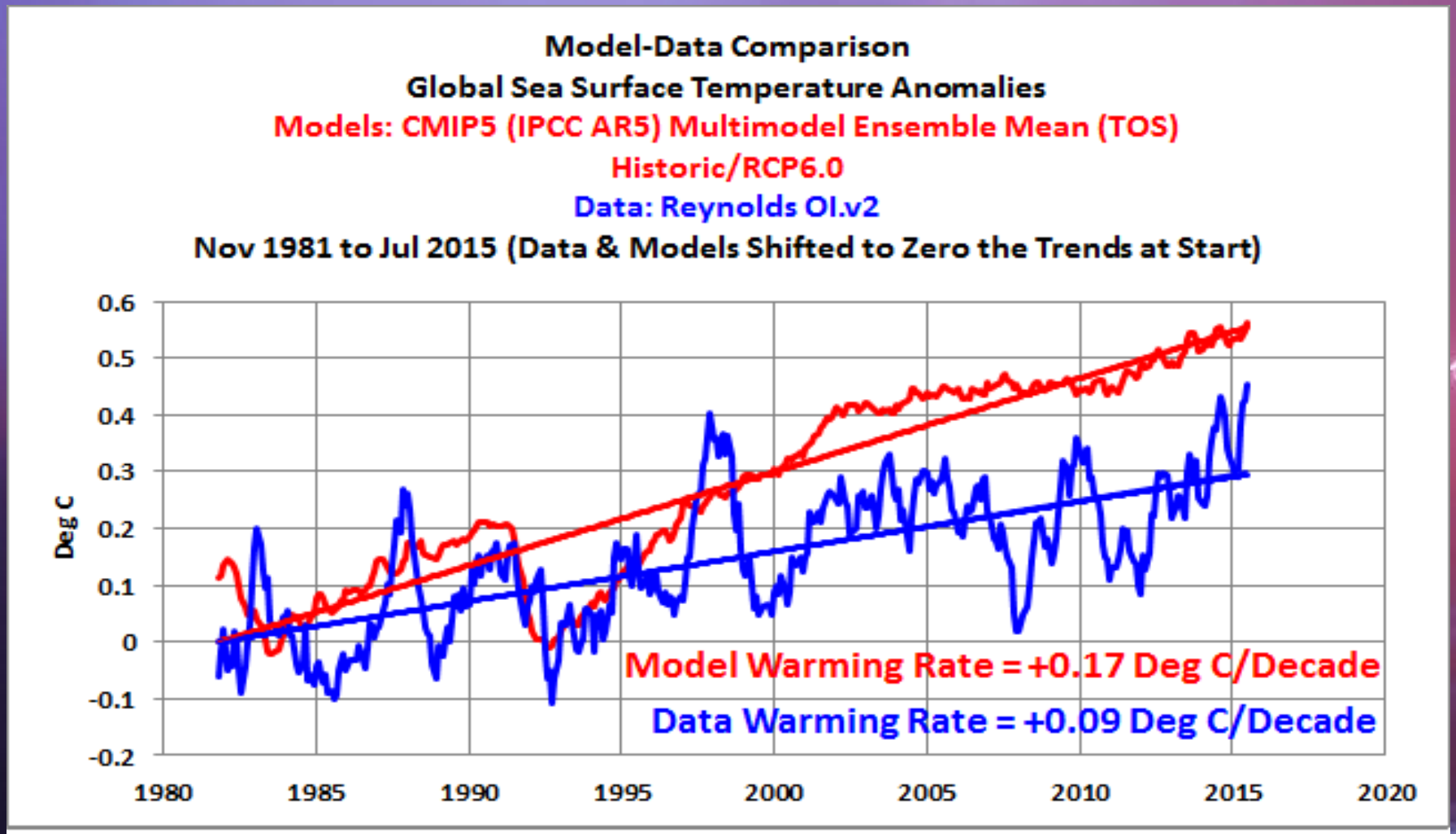

Bob Tisdale

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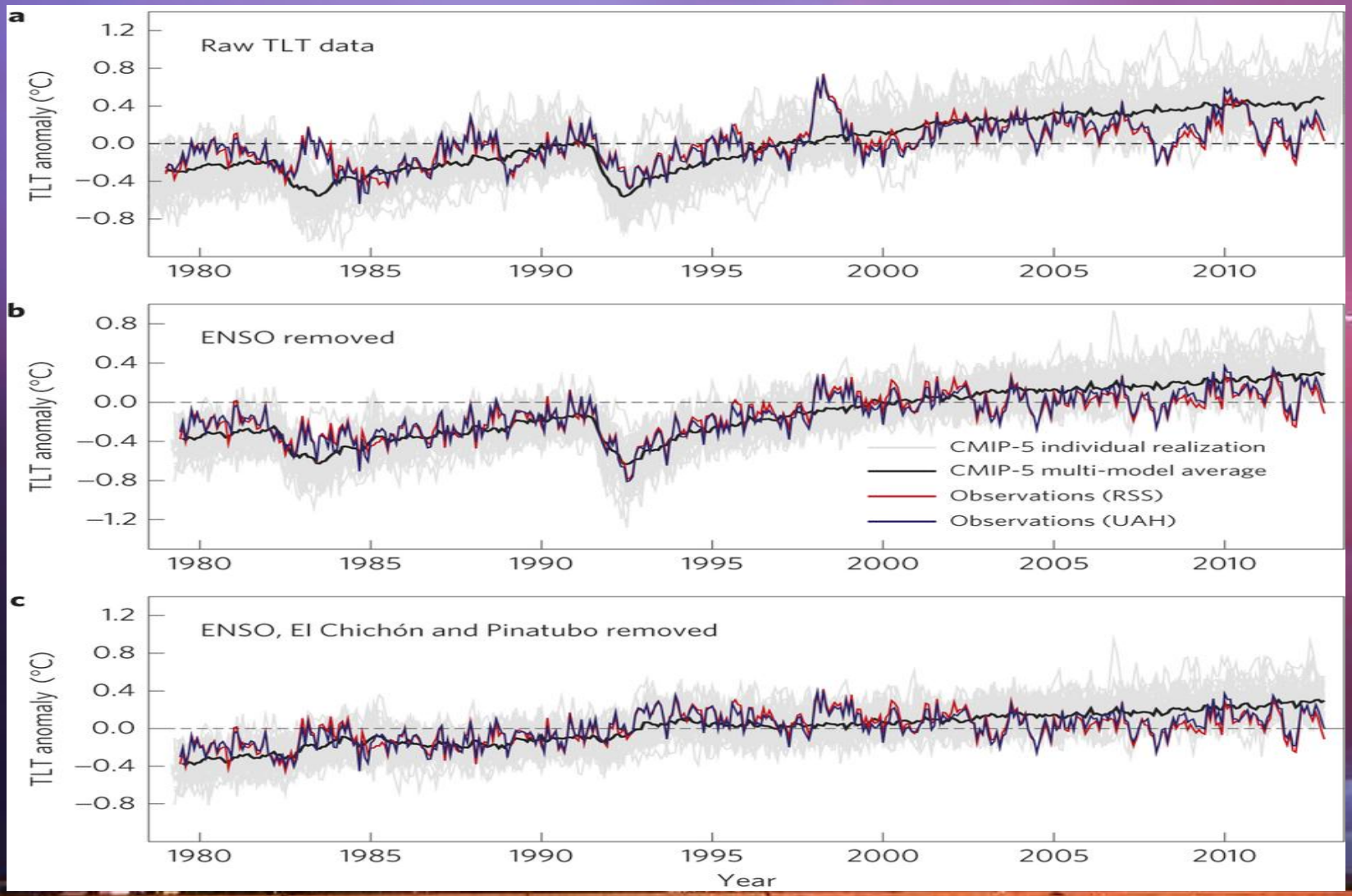
Santer et al 2014: http://www.nature.com/ngeo/journal/v7/n3/fig_tab/ngeo2098_F1.html



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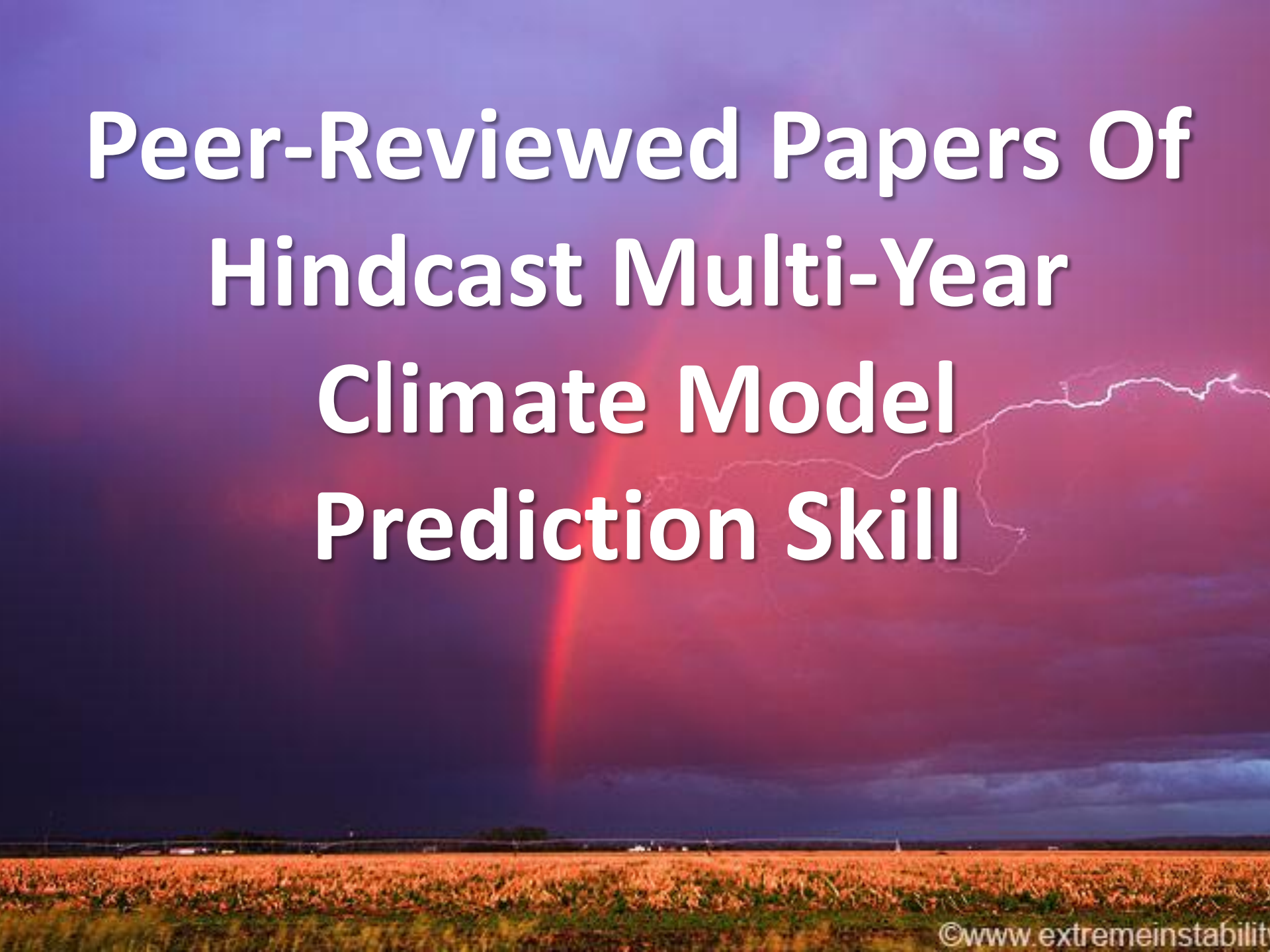
Peer-Reviewed Papers Of Hindcast Multi-Year Climate Model Prediction Skill



Ronald van Haren, Geert Jan van Oldenborgh, Geert Lenderink, Matthew Collins, and Wilco Hazeleger, 2012: SST and circulation trend biases cause an underestimation of European precipitation trends Climate Dynamics, DOI: 10.1007/s00382-012-1401-5

"To conclude, modeled atmospheric circulation and SST trends over the past century are significantly different from the observed ones. These mismatches are responsible for a large part of the misrepresentation of precipitation trends in climate models. The causes of the large trends in atmospheric circulation and summer SST are not known."

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Anagnostopoulos, G. G., Koutsoyiannis, D., Christofides, A., Efstratiadis, A. & Mamassis, N. 2010: A comparison of local and aggregated climate model outputs with observed data. Hydrol. Sci. J. 55(7), 1094–1110

".... local projections do not correlate well with observed measurements. Furthermore, we found that the correlation at a large spatial scale, i.e. the contiguous USA, is [even] worse than at the local scale."

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Sun, Z., J. Liu, X. Zeng, and H. Liang, 2012: Parameterization of instantaneous global horizontal irradiance at the surface. Part II: Cloudy-sky component, J. Geophys. Res., doi:10.1029/2012JD017557

"Radiation calculations in global numerical weather prediction (NWP) and climate models are usually performed in 3-hourly time intervals in order to reduce the computational cost. This treatment can lead to an incorrect Global Horizontal Irradiance (GHI) at the Earth's surface, which could be one of the error sources in modelled convection and precipitation. …… An important application of the scheme is in global climate models….<u>It is found that these errors are very large, exceeding 800 W m-2 at many non-radiation time steps due to ignoring the effects of clouds…."</u>

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Stephens, G. L., T. L'Ecuyer, R. Forbes, A. Gettlemen, J.-C. Golaz, A. Bodas-Salcedo, K. Suzuki, P. Gabriel, and J. Haynes , 2010: Dreary state of precipitation in global models, J. Geophys. Res., 115, D24211, doi:10.1029/2010JD014532.

"...models produce precipitation approximately twice as often as that observed and make rainfall far too lightly.....The differences in the character of model precipitation are systemic and have a number of important implications for modeling the coupled Earth system .....little skill in precipitation [is] calculated at individual grid points, and thus applications involving downscaling of grid point precipitation to yet even finer-scale resolution has little foundation and relevance to the real Earth system."

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Xu, Zhongfeng and Zong-Liang Yang, 2012: An improved dynamical downscaling method with GCM bias corrections and its validation with 30 years of climate simulations. Journal of Climate 2012 doi: http://dx.doi.org/10.1175/JCLI-D-12-00005.1

"…the traditional dynamic downscaling (TDD) [i.e. without tuning) overestimates precipitation by 0.5-1.5 mm d-1…..<u>The 2-year return level of summer daily maximum temperature simulated by the TDD is underestimated by 2-6°C over the central United States-Canada region</u>".

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Fyfe, J. C., W. J. Merryfield, V. Kharin, G. J. Boer, W.-S. Lee, and K. von Salzen (2011), Skillful predictions of decadal trends in global mean surface temperature, Geophys. Res. Lett.,38, L22801, doi:10.1029/2011GL049508

"….for longer term decadal hindcasts a linear trend correction may be required if the model does not reproduce long-term trends. For this reason, <u>we correct for systematic long-term trend biases."</u>

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Taylor et al., 2012: Afternoon rain more likely over drier soils. Nature. doi:10.1038/nature11377. Published online 12 September 2012

"…the erroneous sensitivity of convection schemes demonstrated here is likely to contribute to a tendency for large-scale models to `lock-in' dry conditions, extending droughts unrealistically, and potentially exaggerating the role of soil moisture feedbacks in the climate system."

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Driscoll, S., A. Bozzo, L. J. Gray, A. Robock, and G. Stenchikov, 2012: Coupled Model Intercomparison Project 5 (CMIP5) simulations of climate following volcanic eruptions, J. Geophys. Res., 117, D17105, doi:10.1029/2012JD017607.

"The study confirms previous similar evaluations and raises concern for the ability of current climate models to simulate the response of a major mode of global circulation variability to external forcings."

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<u>None of these papers are cited and commented on in the CMIP5 model assessment paper!</u>

Miller et al. 2014: CMIP5 historical simulations (1850–2012) with GISS ModelE2. Journal of Advances in Modeling Earth Systems. 10.1002/2013MS000266 Pg 441- 477.

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Stephens, G. L., D. O'Brien, P. J. Webster, P. Pilewski, S. Kato, and J.-l. Li (2015), The albedo of Earth, Rev. Geophys., 53, doi:10.1002/2014RG000449.

http://webster.eas.gatech.edu/Papers/albedo2015.pdf

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"Climate models fail to reproduce the observed annual cycle in all components of the albedo with any realism, although they broadly capture the correct proportions of surface and atmospheric contributions to the TOA albedo. A high model bias of albedo has also persisted since the time of CMIP3,mostly during the boreal summer season. Perhaps more importantly, models fail to produce the same degree of interannual constraint on the albedo variability nor do they reproduce the same degree of hemispheric symmetry."

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http://wind.mit.edu/~emanuel/Lorenz/Lorenz_Workshop_Talks/Stephens.pdf

Is the Earth's climate system constrained?

"models energy balance is not similarly constrained"

"Models don't have the same behavior as the observed Earth – they lack the same degree of regulation and symmetry. Does this really matter? It seems so."

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http://wind.mit.edu/~emanuel/Lorenz/Lorenz_Workshop_Talks/Stephens.pdf

"We can't use present models to test ideas because they are neither balanced nor in steady state (e.g. as in control). The hemispheric differences of models (historical) exceed that observed."

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- Here are Judy Curry's conclusions
- [http://judithcurry.com/2015/03/10/the-albedo-of-earth/]

"The implications of this paper strike me as profound. Planetary albedo is a fundamental element of the Earth's climate. This paper implies the presence of a stabilizing feedback between atmosphere/ocean circulations, clouds and radiation. Climate models do not capture this stabilizing feedback."

"The failure of models to reproduce this hemisphere synchronicity raises interesting implications regarding the fidelity of climate model-derived sensitivity to CO2."

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Necessary Conditions For Skillful Multi-Decadal Predictions of Extreme Events

In hindcast runs (the last several decades), skillful predictions must be demonstrated which include:

1. ***<u>The average (annual, monthly, etc.) global, regional and local climate</u>. POOR PERFORMANCE***
2. ***<u>The changes in these averages over the past several decades.</u> POOR PERFORMANCE***
3. ***The statistics of extreme weather events. NOT DONE YET?***
4. ***The changes in these extremes over the last several decades NOT DONE YET?***

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Hypothesis #1 The skill of initial value multi-decadal regional predictions of changes in climate statistics provide an upper bound on what is achievable using multi-decadal climate projections based on external forcings from added CO_2 and other human climate forcings. NEEEDED REGIONAL SKILL LACKING

Hypothesis #2 Skill at projecting changes in regional climate statistics emerges on time period beyond a decade when the external forcings from added CO_2 and other human climate forcings dominate over natural variability and initial value conditions. NOT SHOWN TO HAVE SKILL

Testing of these two hypotheses must be accomplished using hindcasts.

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Conclusion on Multi-decadal Climate Model Predictive Skill

Clearly the models do not pass the first two requirements required of hindcast predictions.

Without the models being constrained by real world observations, they cannot accurately even predict most aspects of regional and local climate in hindcast predictions, much less changes in climate including of extreme weather events.

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Self Regulation by the Climate System

http://wind.mit.edu/~emanuel/Lorenz/Lorenz_Workshop_Talks/Stephens.pdf

"The reflected energy from Earth is highly regulated & this regulation by clouds. The most dramatic example of this appears in hemispheric symmetry of reflected solar radiation – Hemispheric OLR also appears regulated by clouds"

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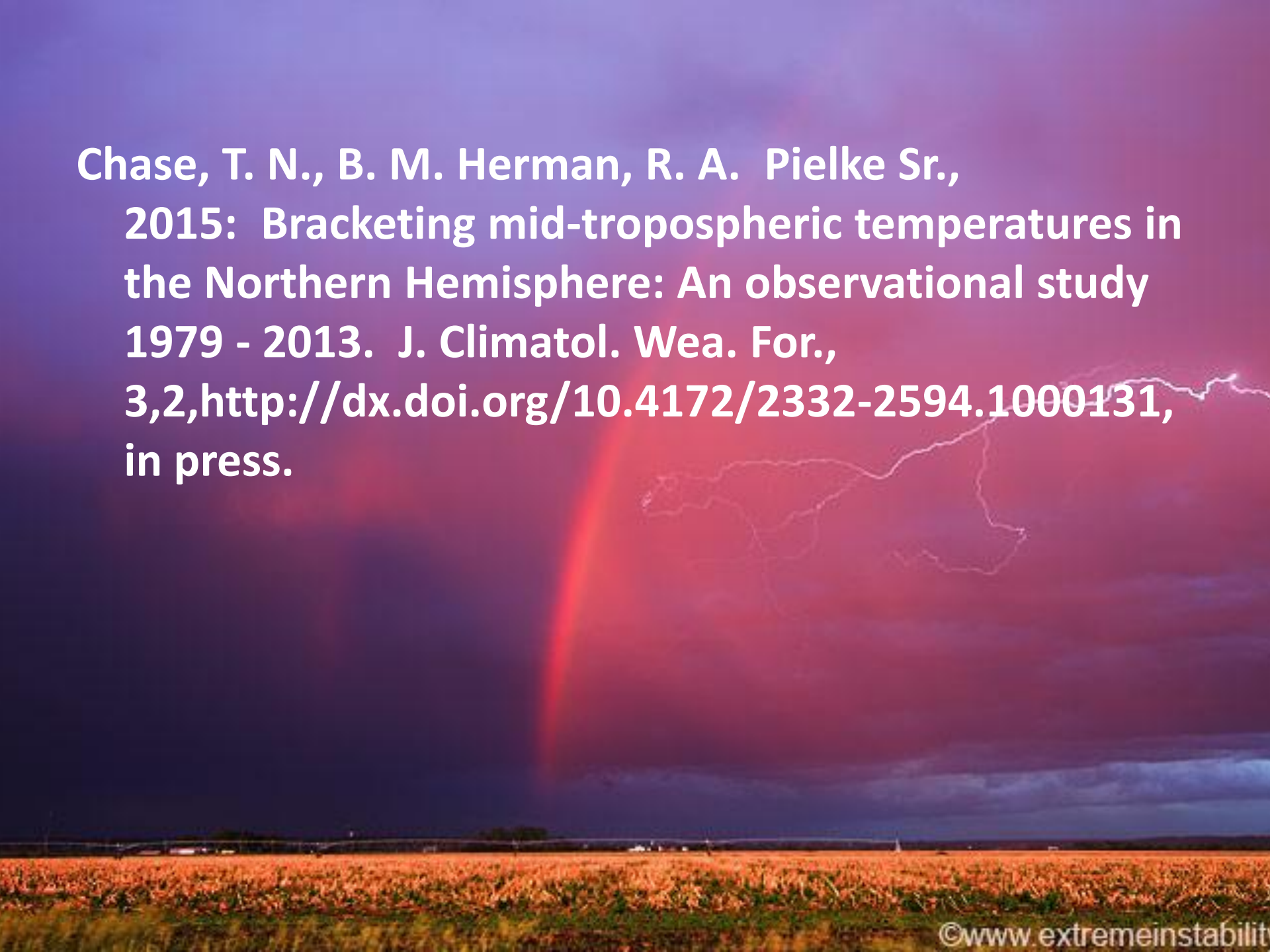
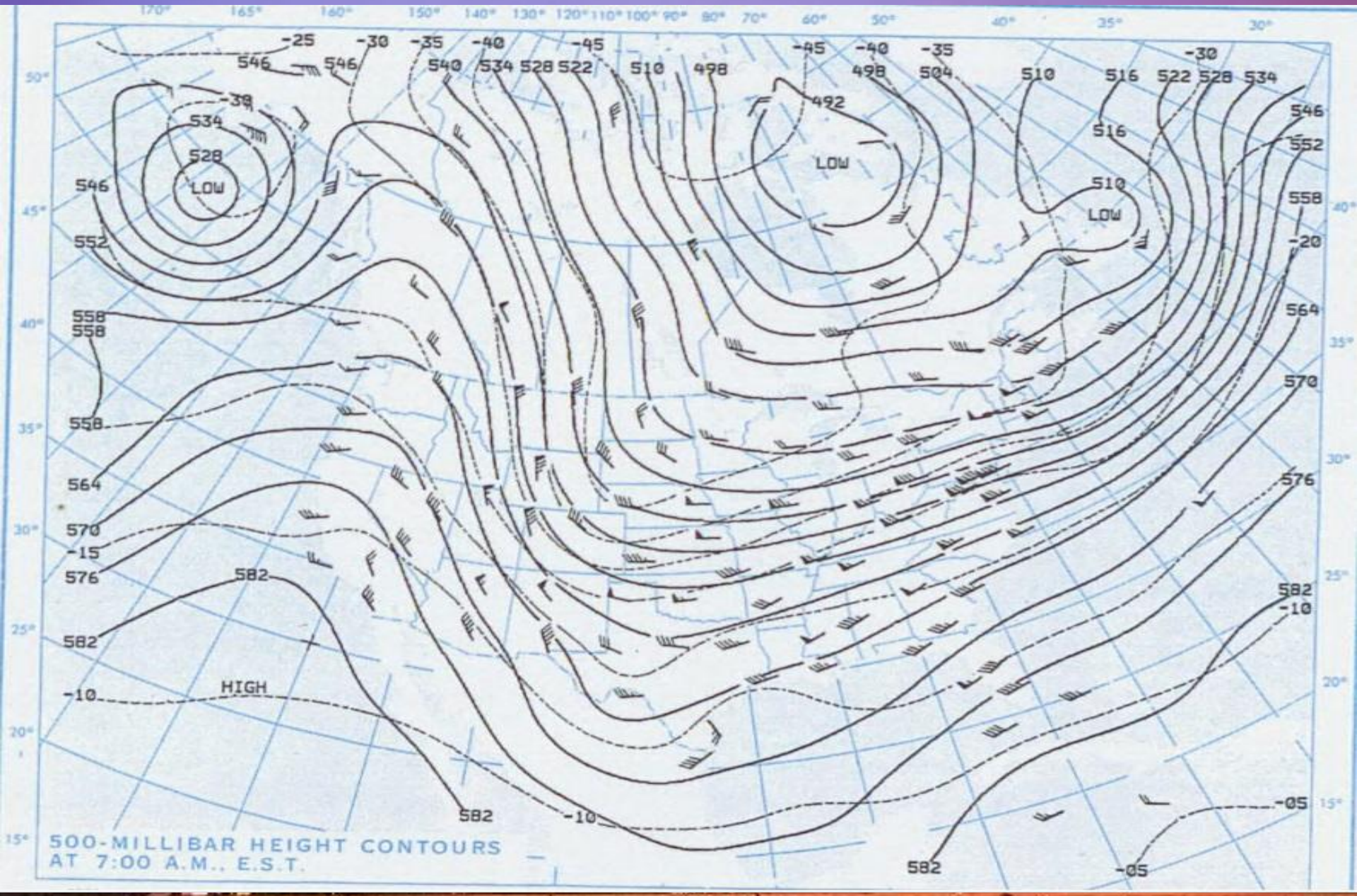
Chase, T. N., B. M. Herman, R. A. Pielke Sr., 2015: Bracketing mid-tropospheric temperatures in the Northern Hemisphere: An observational study 1979 - 2013. J. Climatol. Wea. For., 3,2,http://dx.doi.org/10.4172/2332-2594.1000131, in press.





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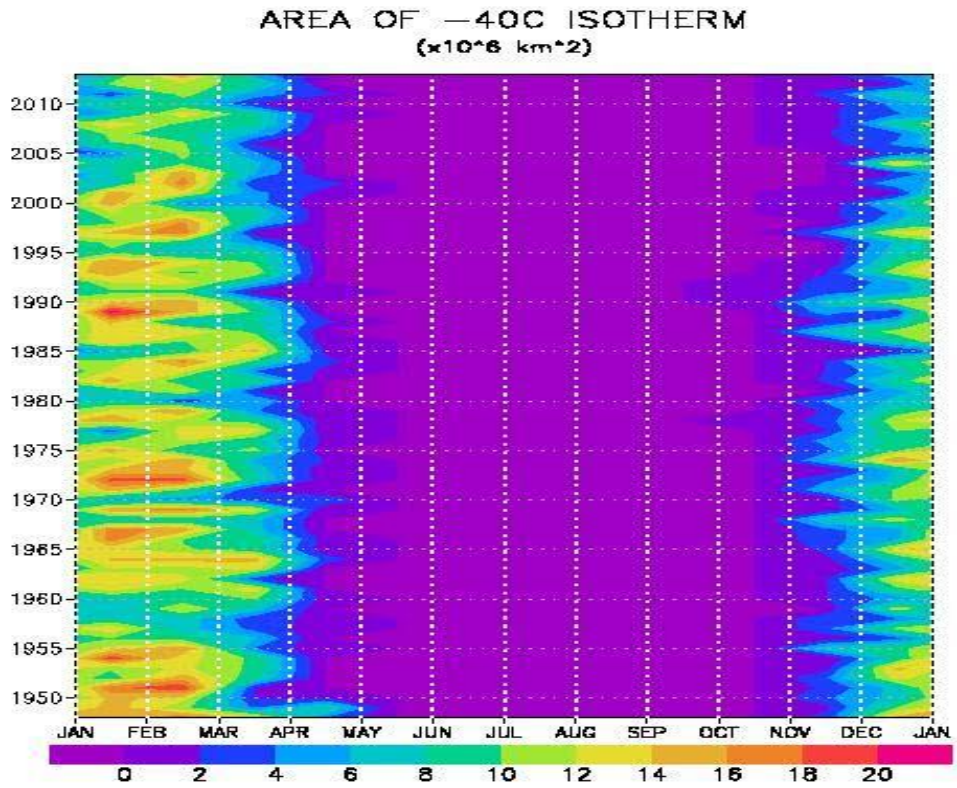

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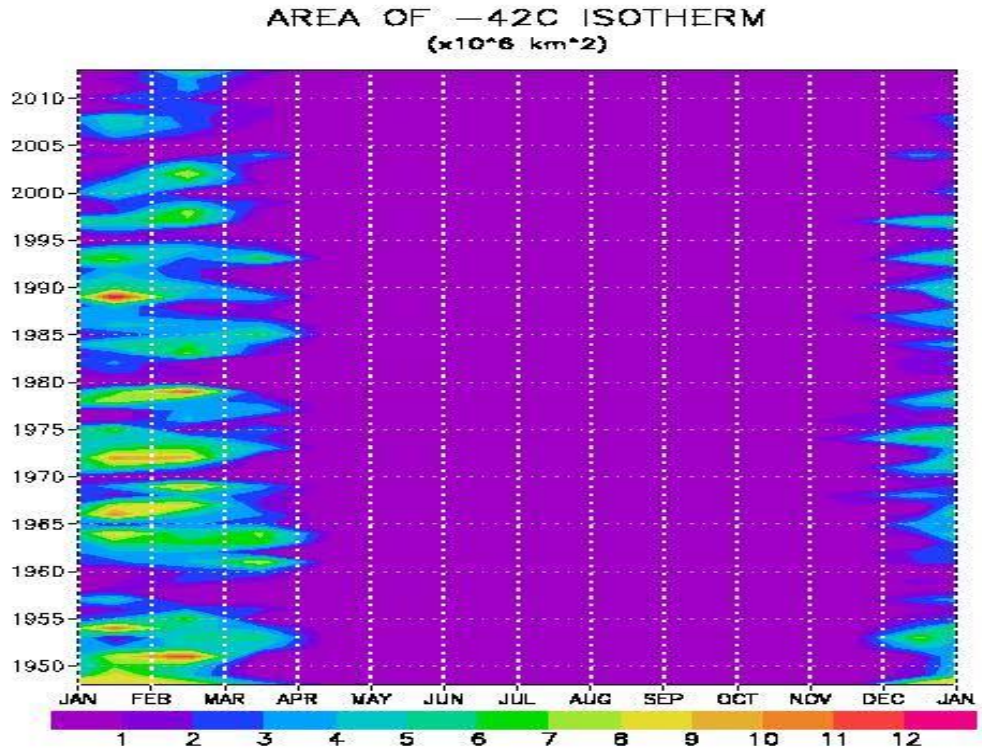

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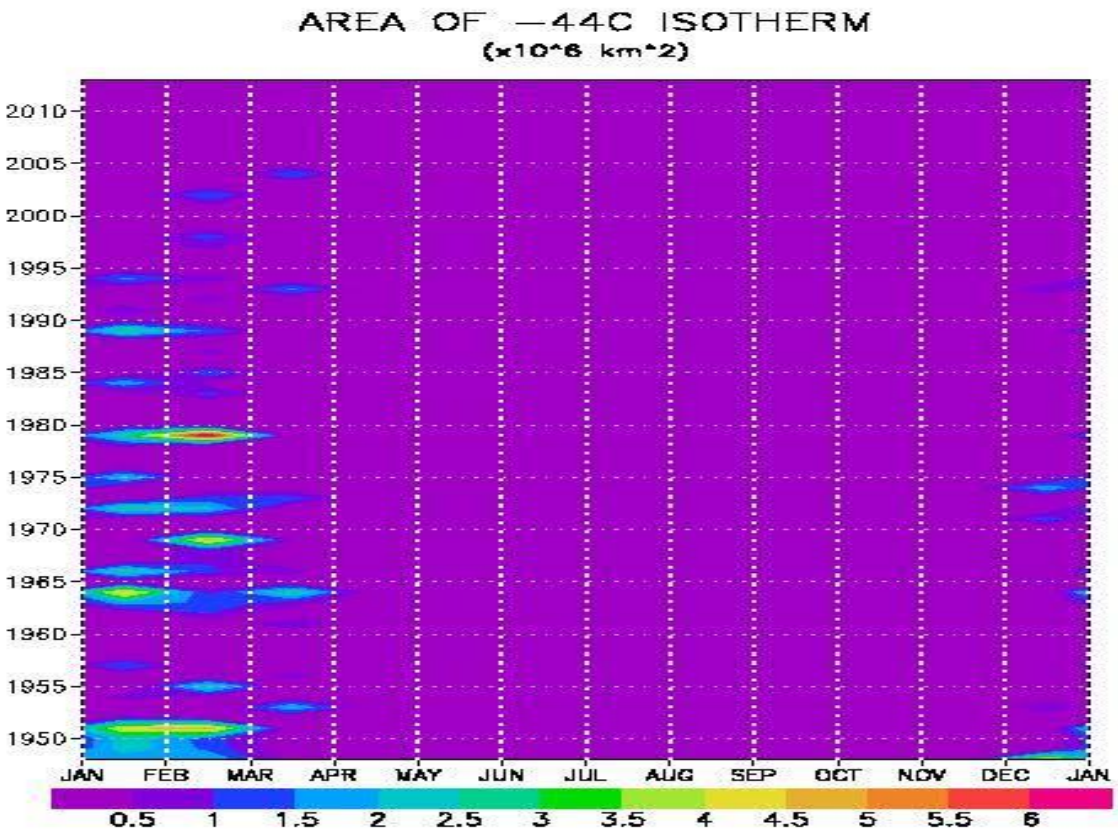

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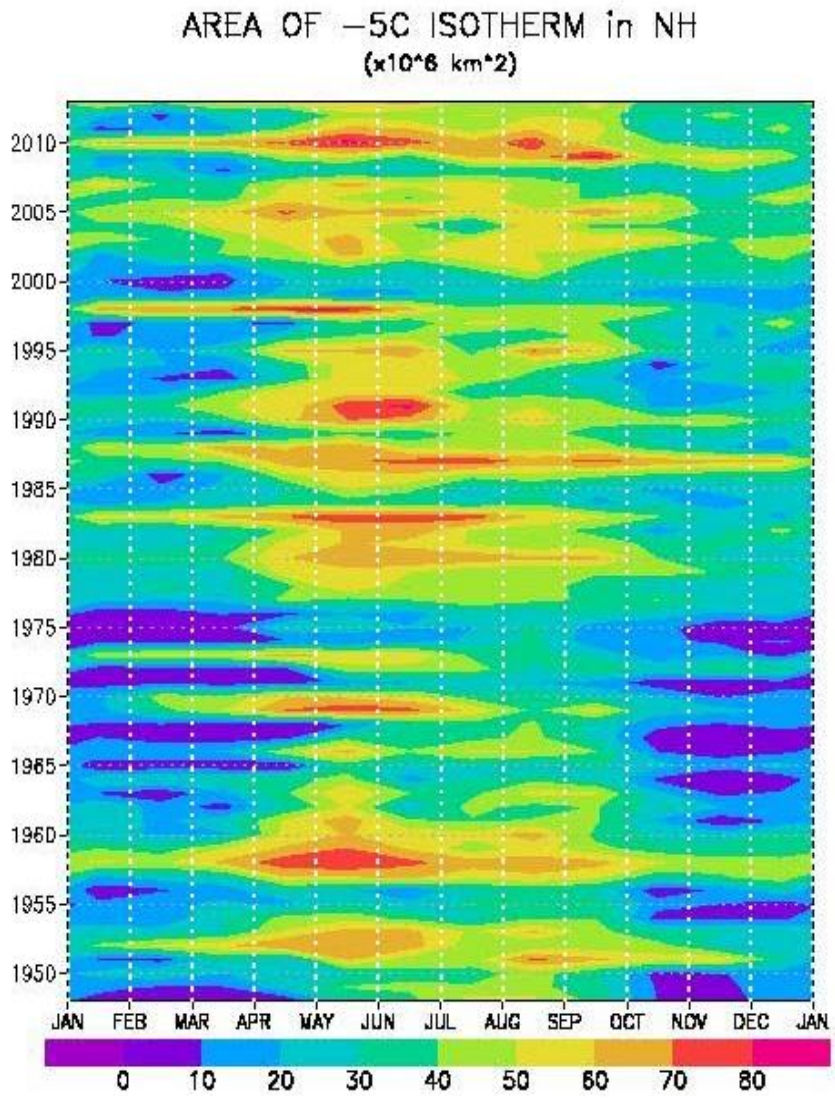

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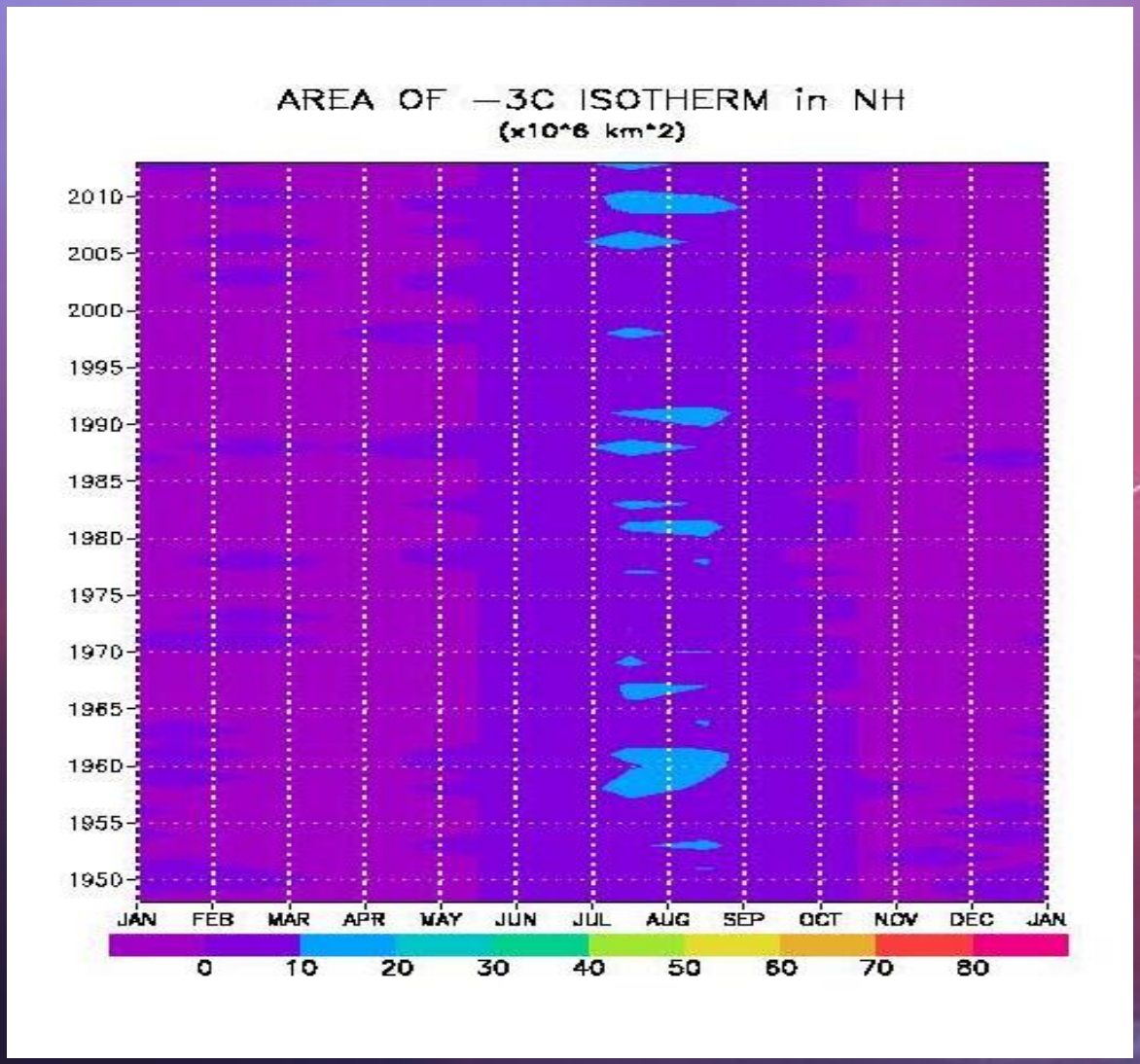

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<u>Conclusion</u> - There are self regulations in the climate system that are not properly handled by the models.

Next, Let's Look At "Climate Change"

Global Warming << "Climate Change"

But lets look at Global Warming since that is where so much attention has been concentrated.

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Global Warming/Cooling

Global warming involves the accumulation of heat in Joules within the components of the climate system.

This accumulation is dominated by the heating and cooling within the upper layers of the oceans.

The global average surface temperature trend is an inadequate metric to diagnose this warming/cooling

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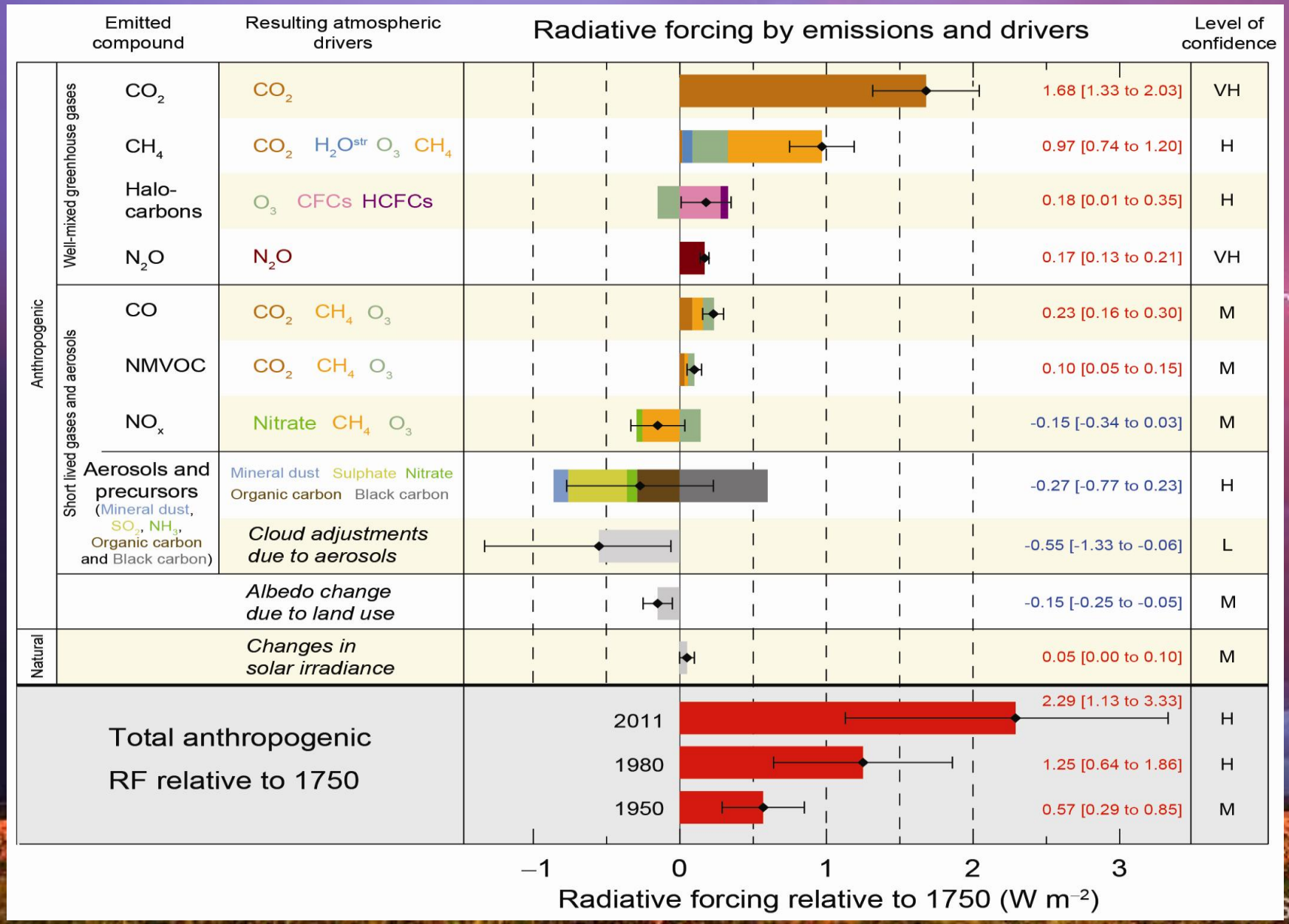
http://www.climatechange2013.org/report/reports-graphic/report-graphics/



Palmer et al. 2015: Ocean heat content variability and change in an ensemble of ocean reanalyses. Climate Dynamics

"Accurate knowledge of the location and magnitude of ocean heat content (OHC) variability and change is essential for understanding the processes that govern decadal variations in surface temperature, quantifying changes in the planetary energy budget, and developing constraints on the transient climate response to external forcings. "

Finally accepts what is written in

Pielke Sr., R.A., 2003: Heat storage within the Earth system. Bull. Amer. Meteor. Soc., 84, 331-335.

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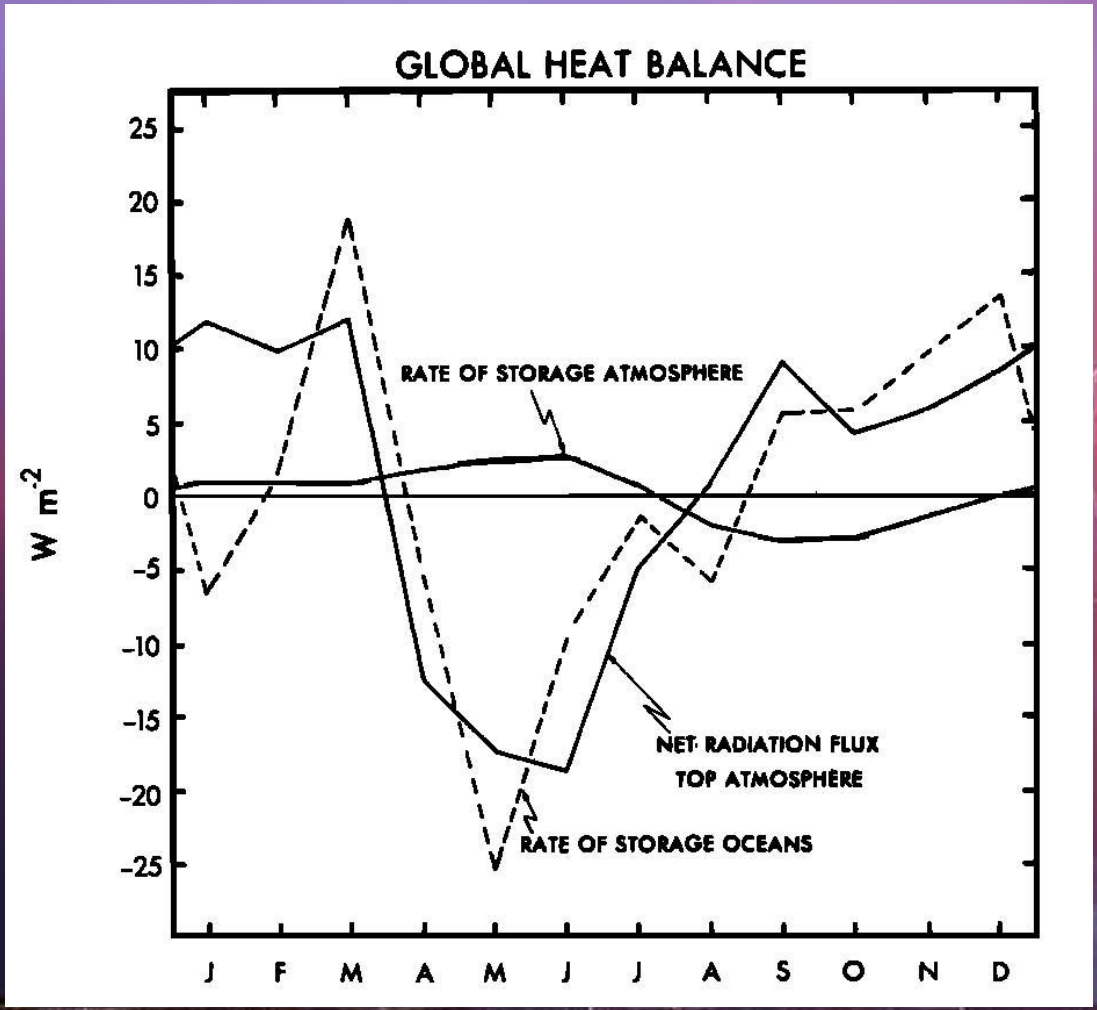
Seminal paper on this subject: Ellis . J.S., T.H. Vonder Haar, S. Levitus, and A.H. Oort 1978: The annual variation in the global heat balance of the Earth. J. Geophys. Res., 83, 1958-1962.



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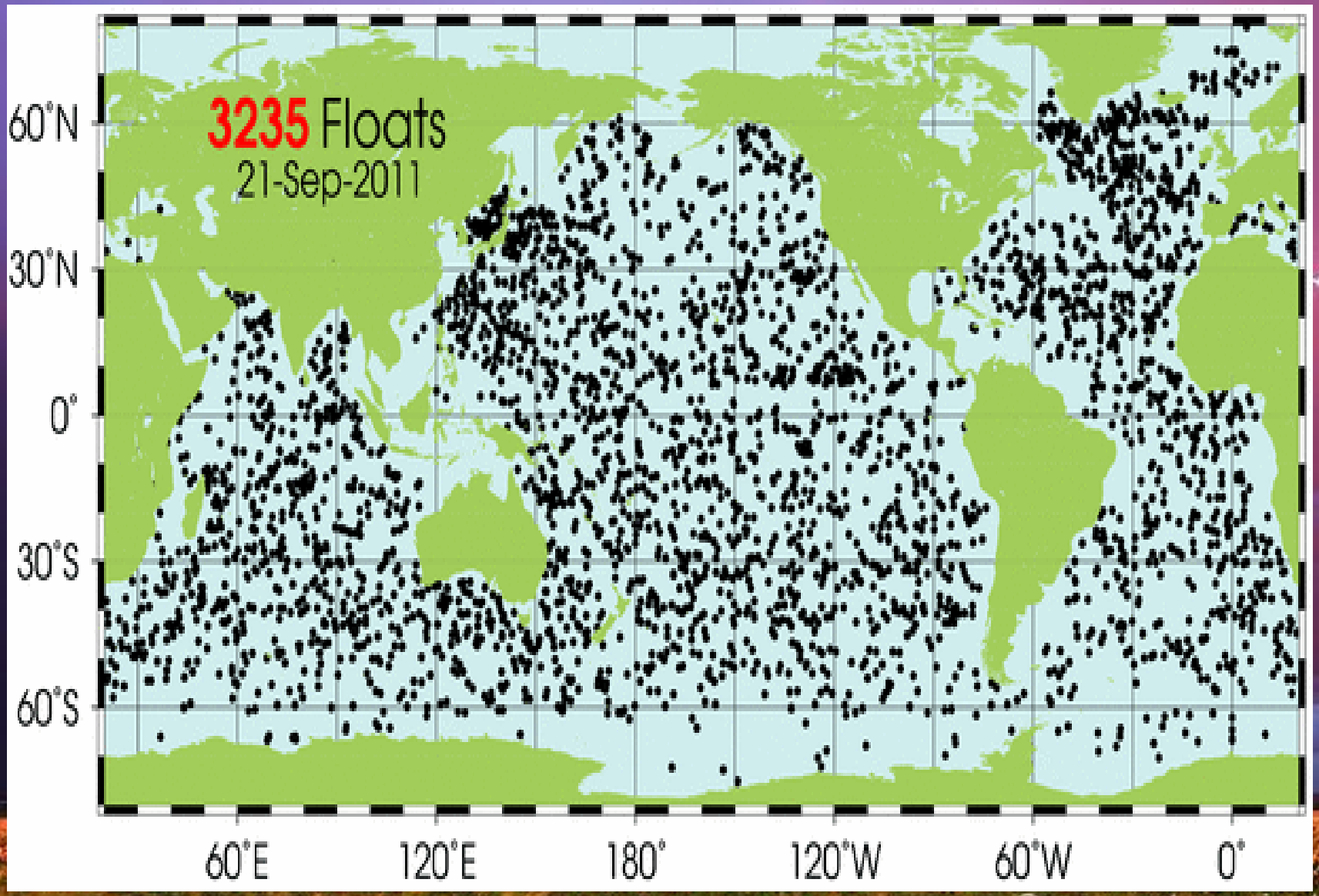
Argo Network



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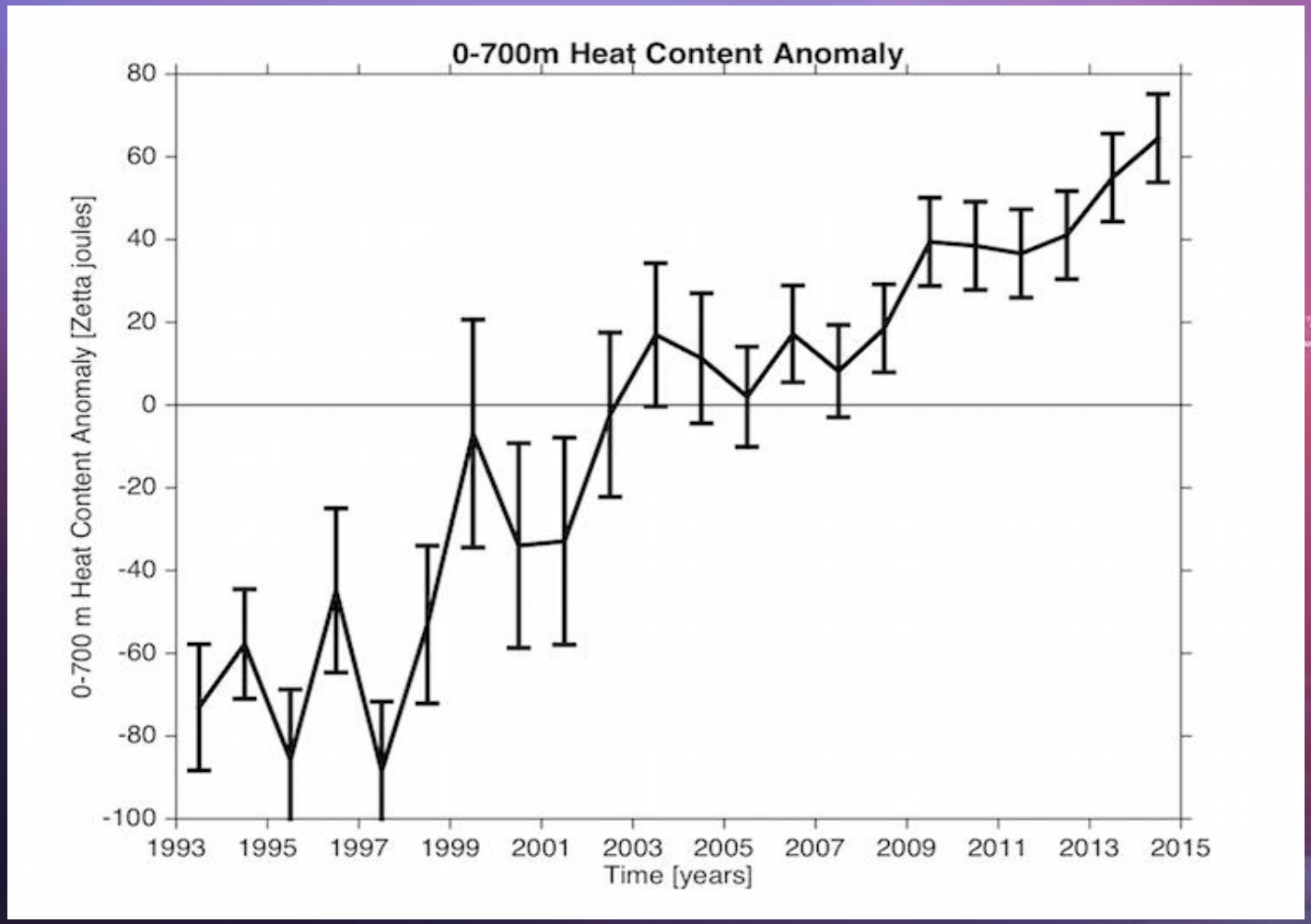
http://oceans.pmel.noaa.gov/sites/default/files/atoms/files/OHCA_curve_2015_2.pdf



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Global Radiative Imbalance [Most Accurately Diagnosed from OHC changes] = Global Radiative Forcings + Global Radiative Feedbacks

Better reconciling the two terms on the right is needed

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Magnitude Of Global Warming

"0.85 W/m^2 is the imbalance at the end of the decade [end of the 1990s]" Jim Hansen

"The net warming of the ocean implies an energy imbalance for the Earth of 0.64 ± 0.44 W m^{-2} from 2005 to 2013." Llovel et al 2014

"the [global]1955-2010 warming rate is 0.43 W m^{-2} ± 0.031 W m^{-2} Levitus et al 2012

"a fairly steady mean global rate of 0.9 ± 0.8 W m−2 for the period 1995–2002 that drops to 0.2 ± 0.6 W m−2 for the period 2004–2006" Palmer et al 2015

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Real world data also shows a more complex behavior than is commonly communicated by the media and in professional society statements.

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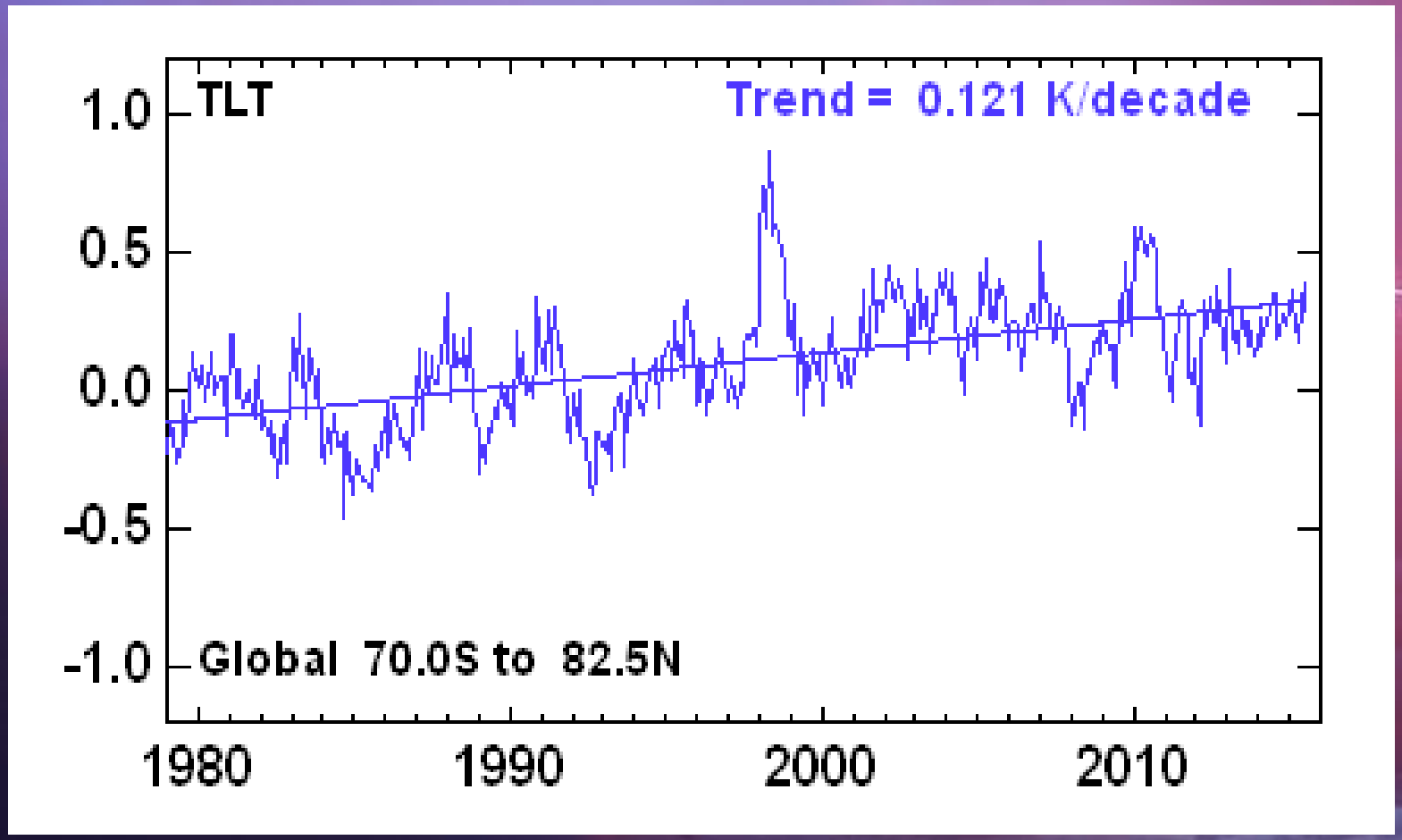
http://www.remss.com/measurements/upper-air-temperature



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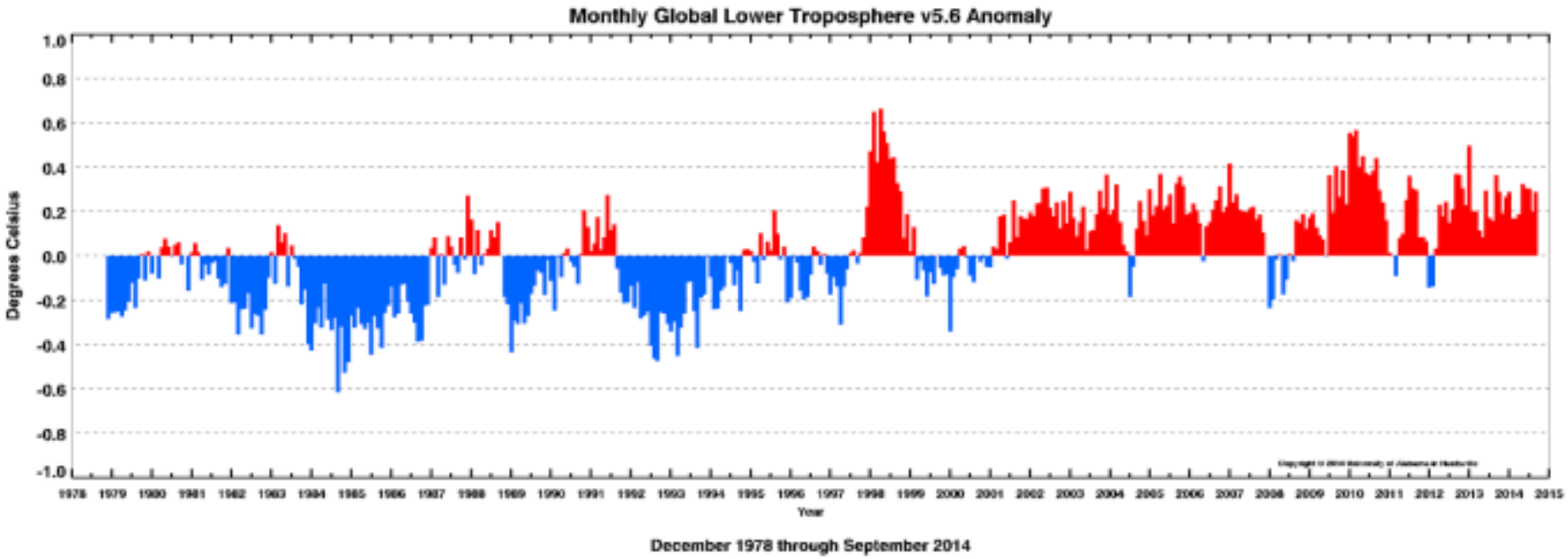

http://wattsupwiththat.com/2014/10/07/uah-global-temperature-report-september-2014/

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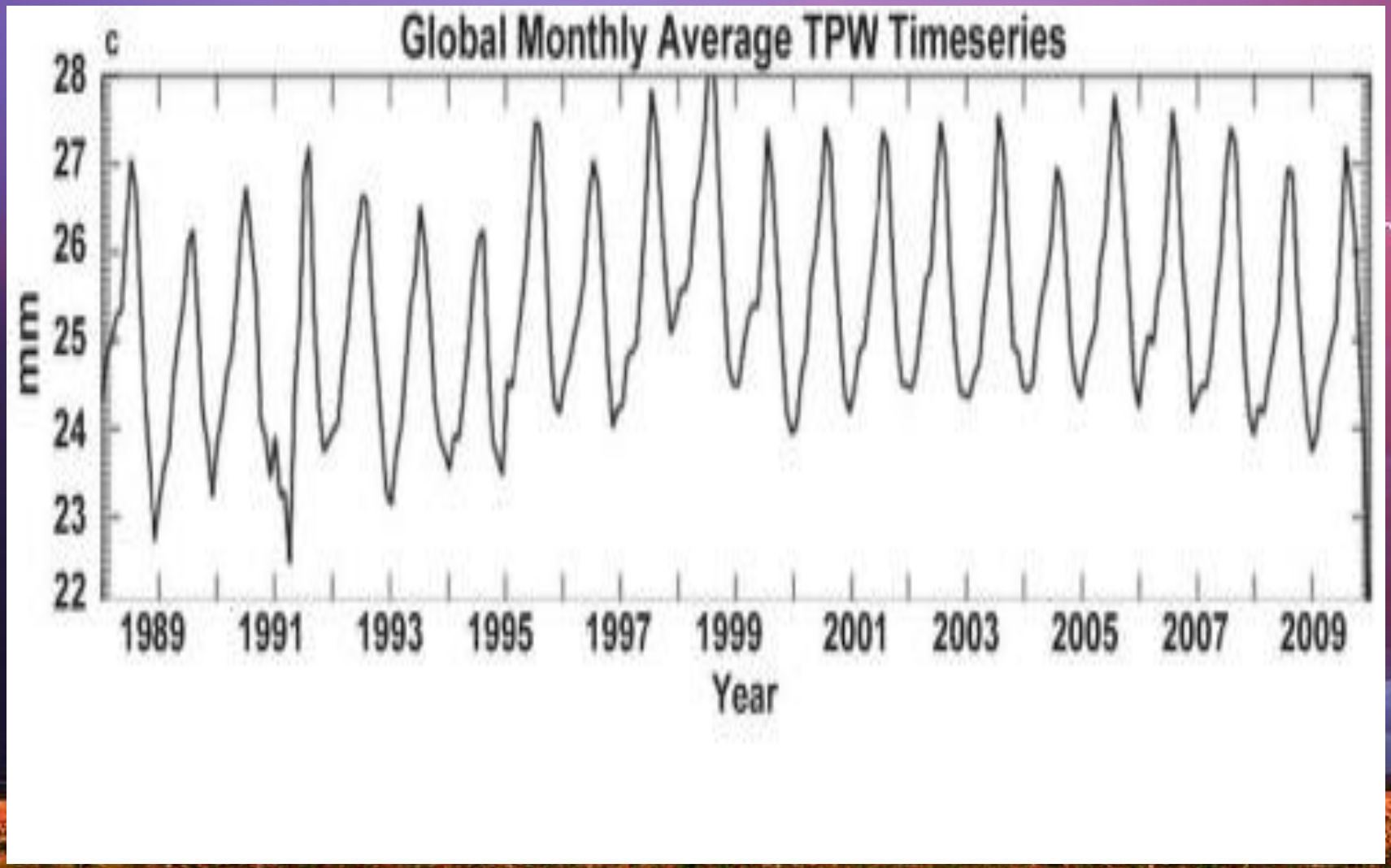
Vonder Haar, T. H., J. Bytheway, and J. M. Forsythe (2012), Weather and climate analyses using improved global water vapor observations, Geophys. Res. Lett.,doi:10.1029/2012GL052094.



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Moreover, climate change is much more than global warming

However, what is “climate change”?

Climate Change is any multi-decadal or longer alteration in one or more physical, chemical and/or biological components of the climate system.

Climate change includes, for example, changes in fauna and flora, snow cover, etc which persist for decades and longer. Climate variability can then be defined as changes which occur on shorter time periods.

Also Climate Is Much More Than Climate Change.

Indeed, the addition of the word “Change” is redundant. Climate is always changing, just like the weather.

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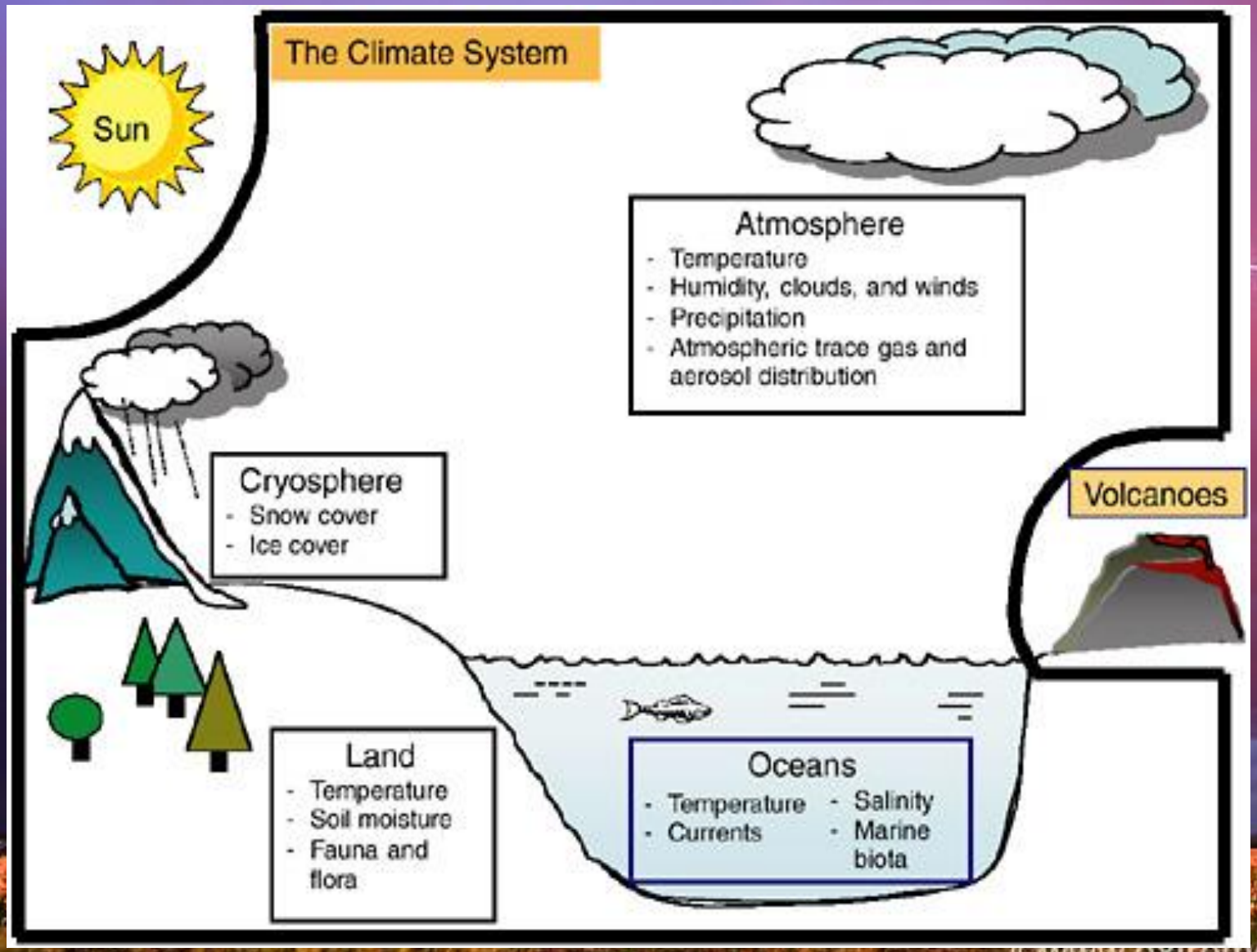
Source: National Research Council, 2005: Radiative forcing of climate change: Expanding the concept and addressing uncertainties.



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Human Climate Forcings

Human Climate Forcings

- The influence of the human input of CO_2 and other greenhouse gases on regional and global radiative heating
- The influence of human-caused aerosols on regional (and global) radiative heating
- The effect of aerosols on clouds and precipitation
- The influence of aerosol deposition (e.g. soot; nitrogen) on climate
- The effect of land cover/ land use on climate
- The biogeochemical effect of added atmospheric CO_2

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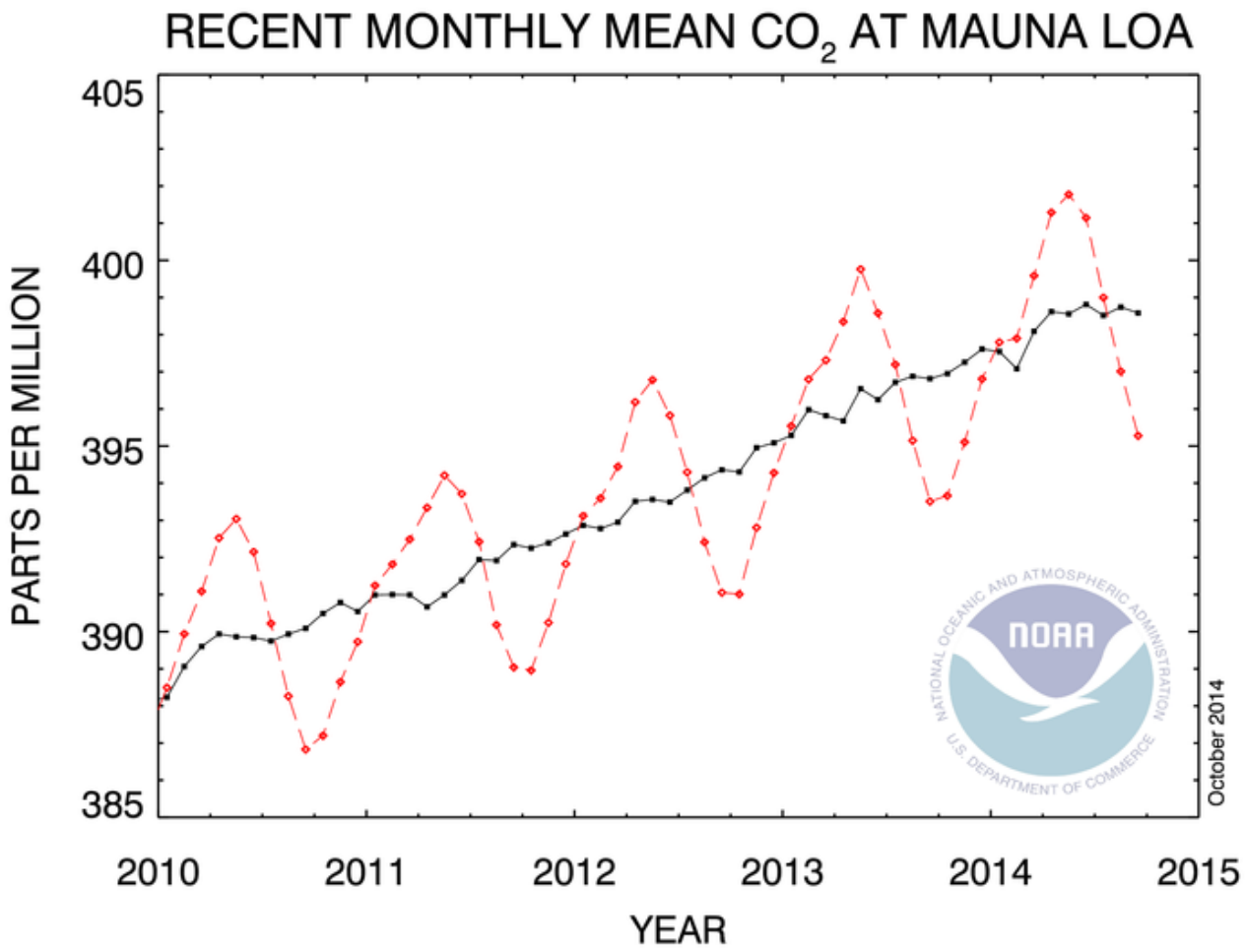
http://www.esrl.noaa.gov/gmd/ccgg/trends/



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Of course, CO2 is NOT a pollutant. Pollutants such as lead, mercury, sulfur dioxide etc have no positive benefits in the atmosphere. CO2 is essential for the biosphere.

CO2 is a human climate forcing

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EPA Criteria Pollutants -

http://www.epa.gov/air/criteria.html

Ozone
Particulate Matter – PM10 and PM 2.5
Carbon Monoxide
Nitrogen Oxides
Sulfur Dioxide
Lead

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An Aside: The CO2 part of climate change

- Instead of a tax on carbon, I recommend taxes on emissions into the atmosphere of pollutants such as mercury, lead, SO2, etc where reductions in CO2 would be a co-benefit.
- This may be a way to move forward to limit CO2 emissions with a broader group of support.

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LAND USE/LAND COVER CHANGE

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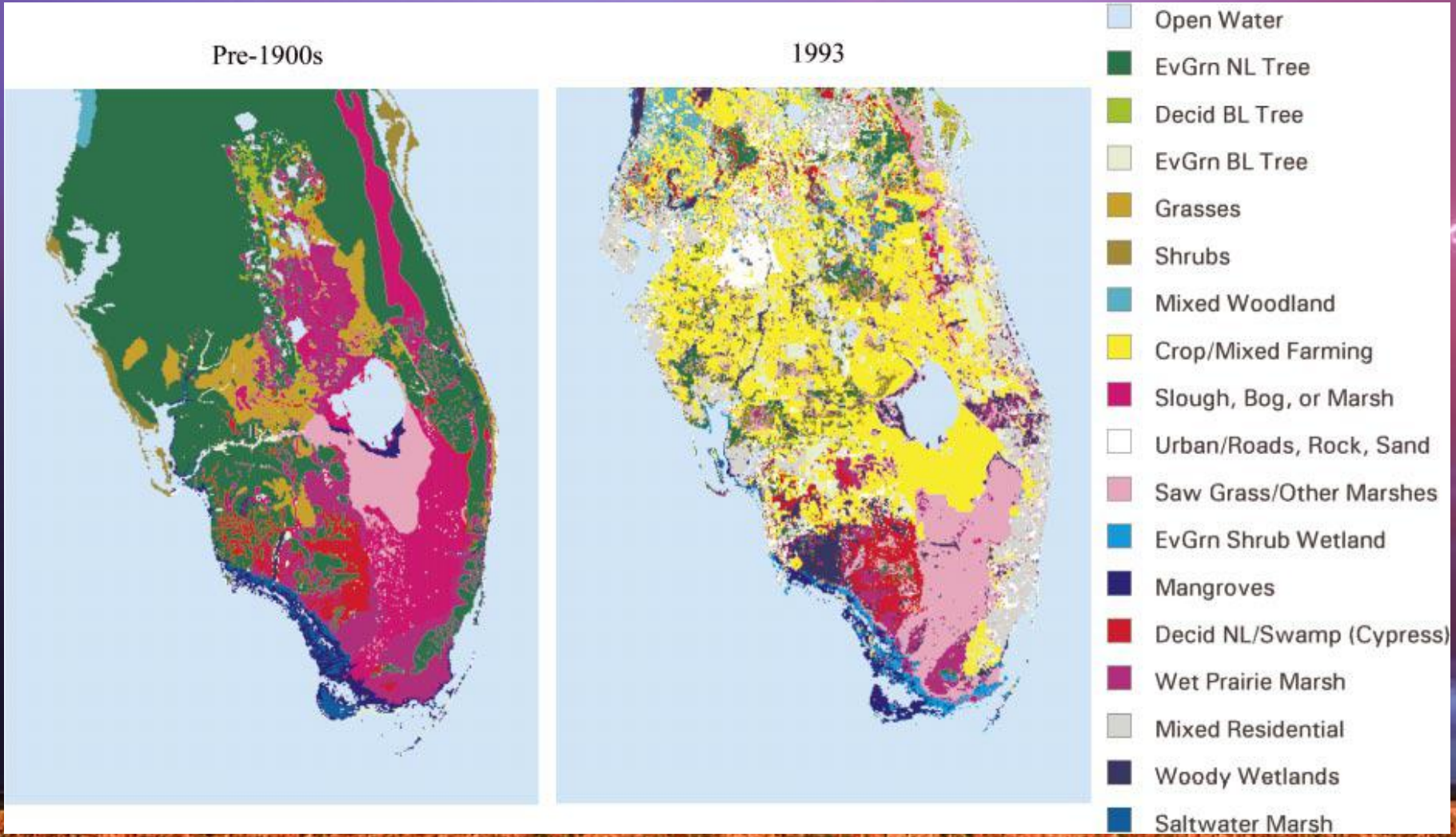
From Marshall et al. 2004



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Alter et al: 2015: Rainfall consistently enhanced around the Gezira Scheme in East Africa owing to irrigation. Nature Geosciences Sept 7 2015

"Land-use and land-cover changes have significantly modified regional climate patterns around the world"

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Aerosols

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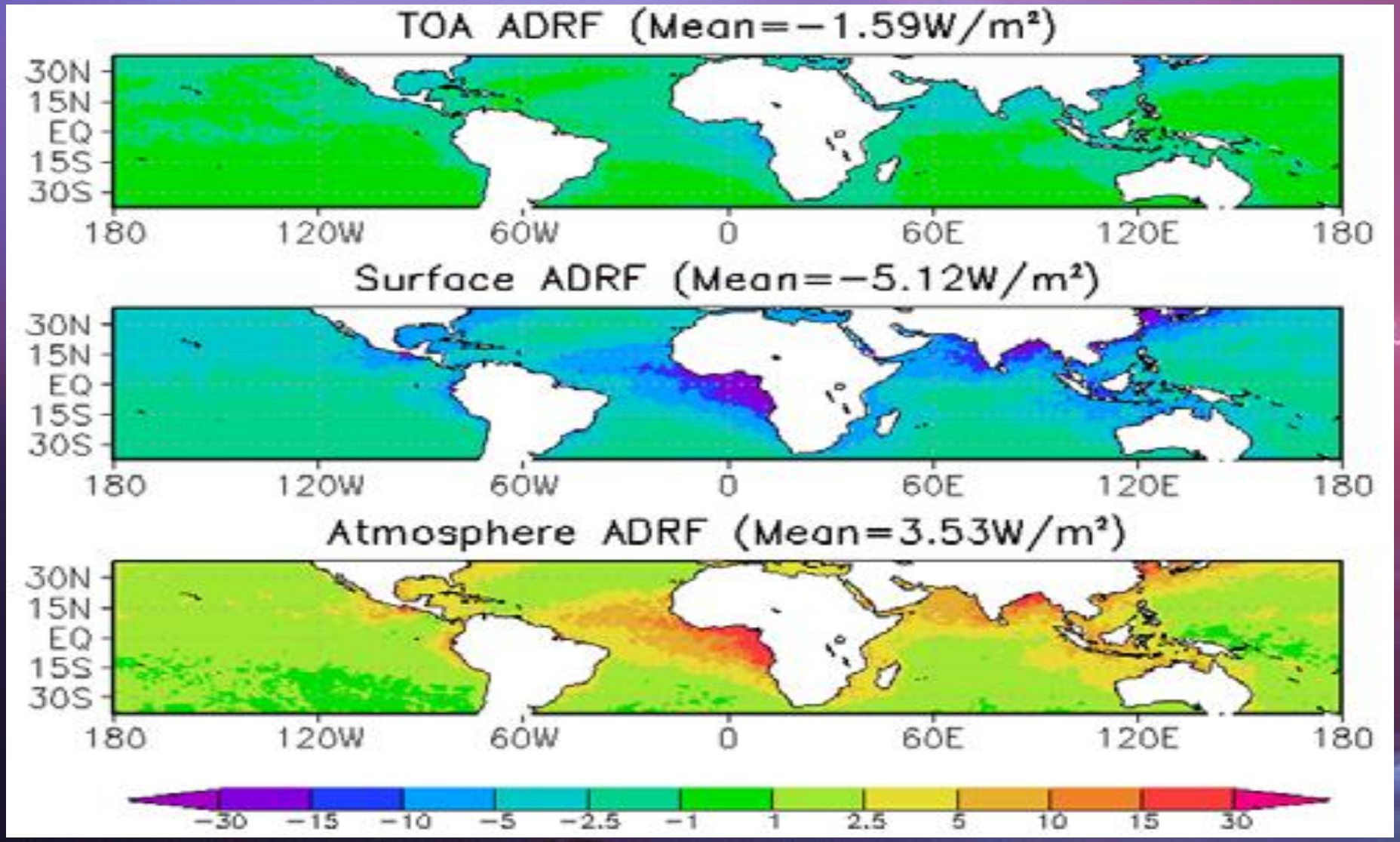
Matsui, T., and R.A. Pielke Sr., 2006: Measurement-based estimation of the spatial gradient of aerosol radiative forcing. Geophys. Res. Letts., 33, L11813, doi:10.1029/2006GL025974.



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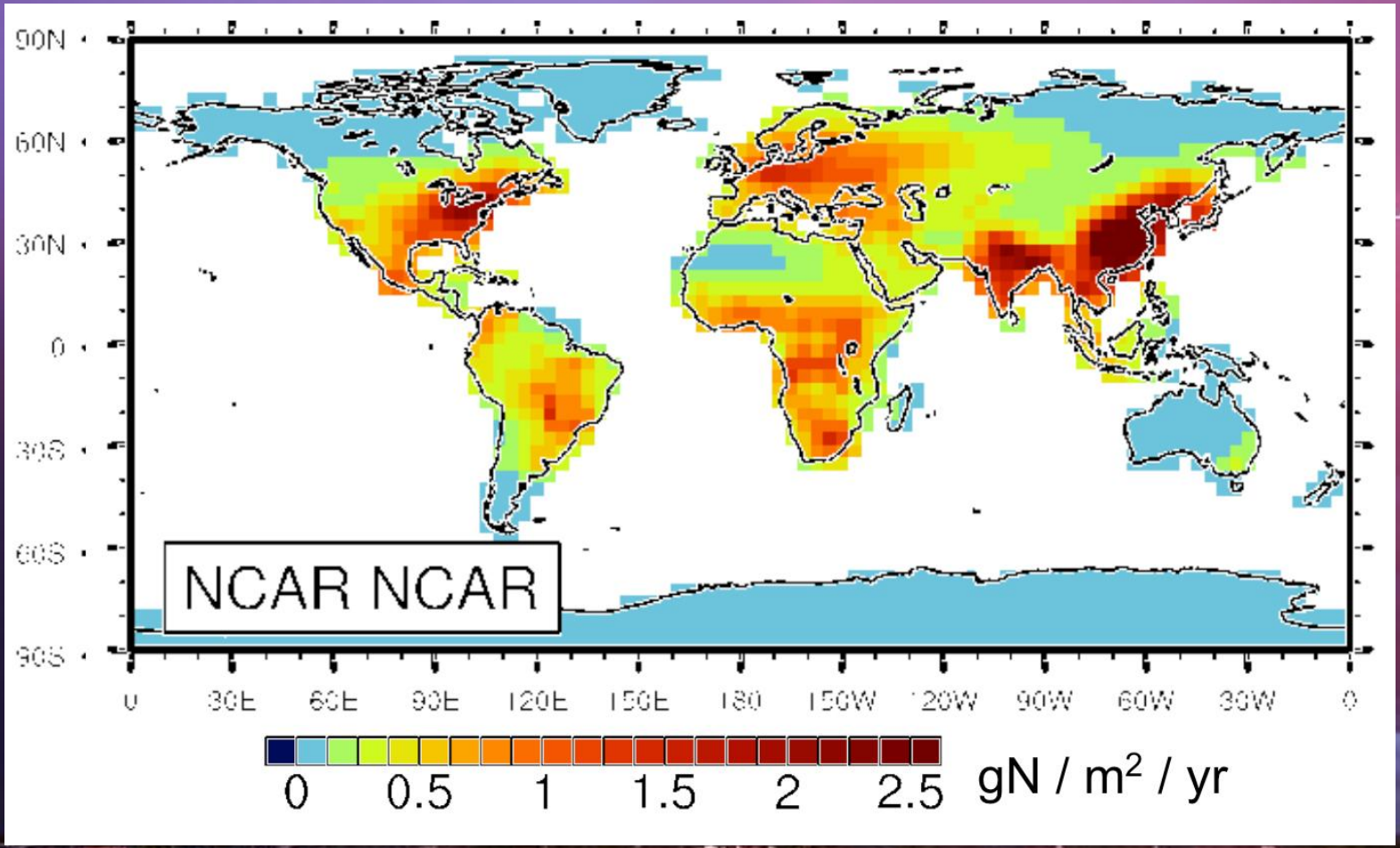
Nitrogen Deposition



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Largest effect of human forcing of the climate system may not Be global warming from added CO_2 but from the effect of the more heterogeneous climate forcings In altering major atmospheric circulation features.

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The Human Influence on Climate is Everywhere!

The IPCC and other assessments have failed to properly assess these influences.

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And Then There Are The Natural Climate Forcings

- Solar
- Volcanic
- Internal atmospheric/ocean circulation variability [PDO, NAO, ENSO, etc]
- Other

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Three Hypotheses

- Hypothesis 1: Human influence on climate variability and change is of minimal importance, and natural causes dominate climate variations and changes on all time scales. In coming decades, the human influence will continue to be minimal.

- Hypothesis 2a: Although the natural causes of climate variations and changes are undoubtedly important, the human influences are significant and involve a diverse range of first- order climate forcings, including, but not limited to, the human input of carbon dioxide (CO_2). Most, if not all, of these human influences on regional and global climate will continue to be of concern during the coming decades.

- Hypothesis 2b: Although the natural causes of climate variations and changes are undoubtedly important, the human influences are significant and are dominated by the emissions into the atmosphere of greenhouse gases, the most important of which is CO_2. The adverse impact of these gases on regional and global climate constitutes the primary climate issue for the coming decades. [IPCC]

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Three Hypotheses

- ~~Hypothesis 1: Human influence on climate variability and change is of minimal importance, and natural causes dominate climate variations and changes on all time scales. In coming decades, the human influence will continue to be minimal.~~

REJECTED

-

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REJECTED

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As Mike Hulme of the University of East Anglia writes of two views:

1) "The overwhelming scientific evidence tells us that human greenhouse gas emissions are resulting in climate changes that cannot be explained by natural causes. Climate change is real, we are causing it, and it is happening right now."

or

2) "The overwhelming scientific evidence tells us that human greenhouse gas emissions, land use changes and aerosol pollution are all contributing to regional and global climate changes, which exacerbate the changes and variability in climates brought about by natural causes. Because humans are contributing to climate change, it is happening now and in the future for a much more complex set of reasons than in previous human history."

As Mike Hulme writes

"….these two different provocations – two different framings of climate change – open up the possibility of very different forms of public and policy engagement with the issue. They shape the response.

http://theconversation.edu.au/youve-been-framed-six-new-ways-to-understand-climate-change-2119

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A New Approach Is Needed!

We Need To Replace The IPCC Top-Down Approach To Predict Future Environmental And Social Risk With A Bottom-Up Resource-Based Assessment of Vulnerability

Our Key Resources Are Water, Food, Energy, Ecosystem Function and Human Health

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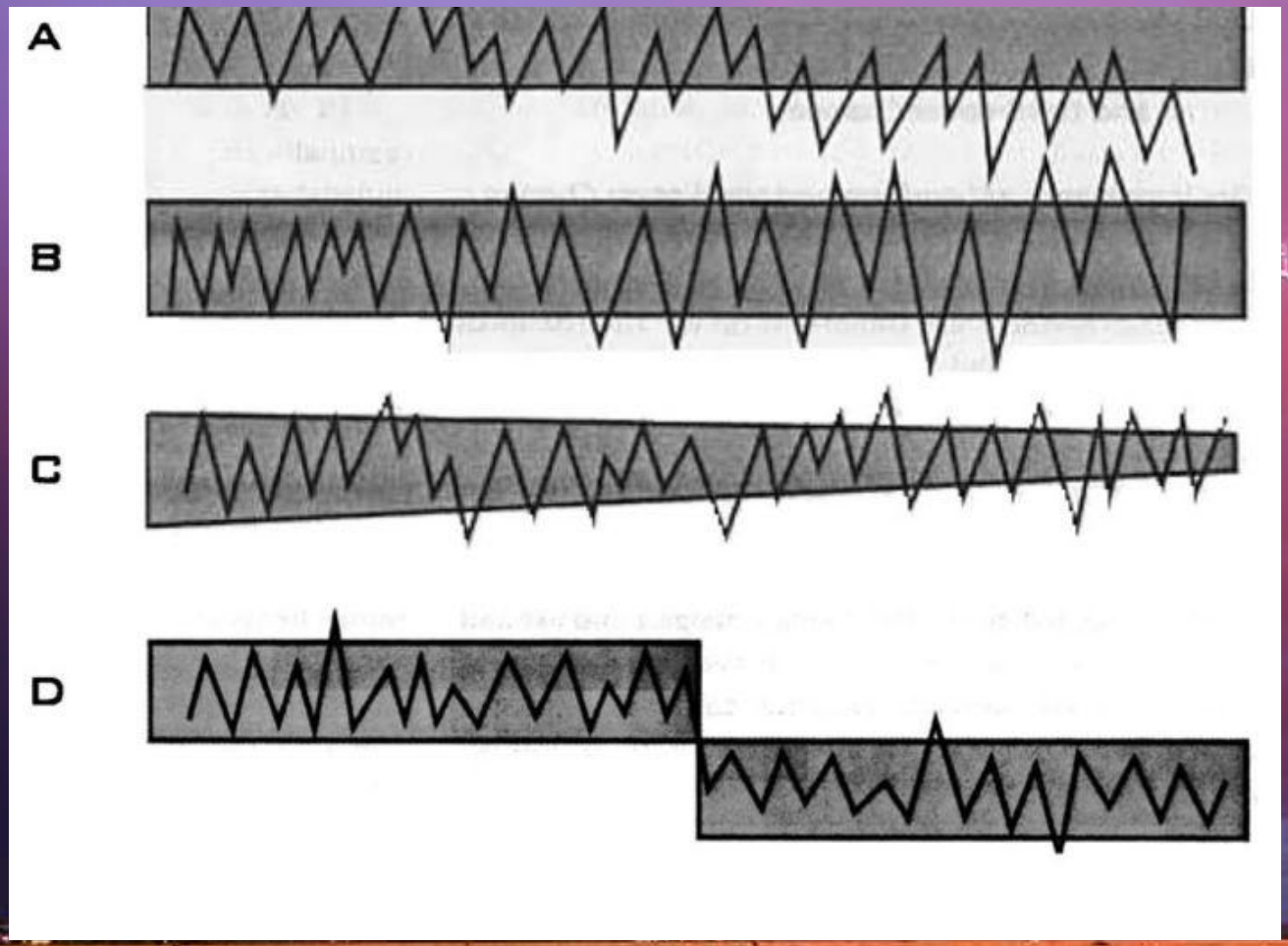
How Vulnerability Can Change Over Time



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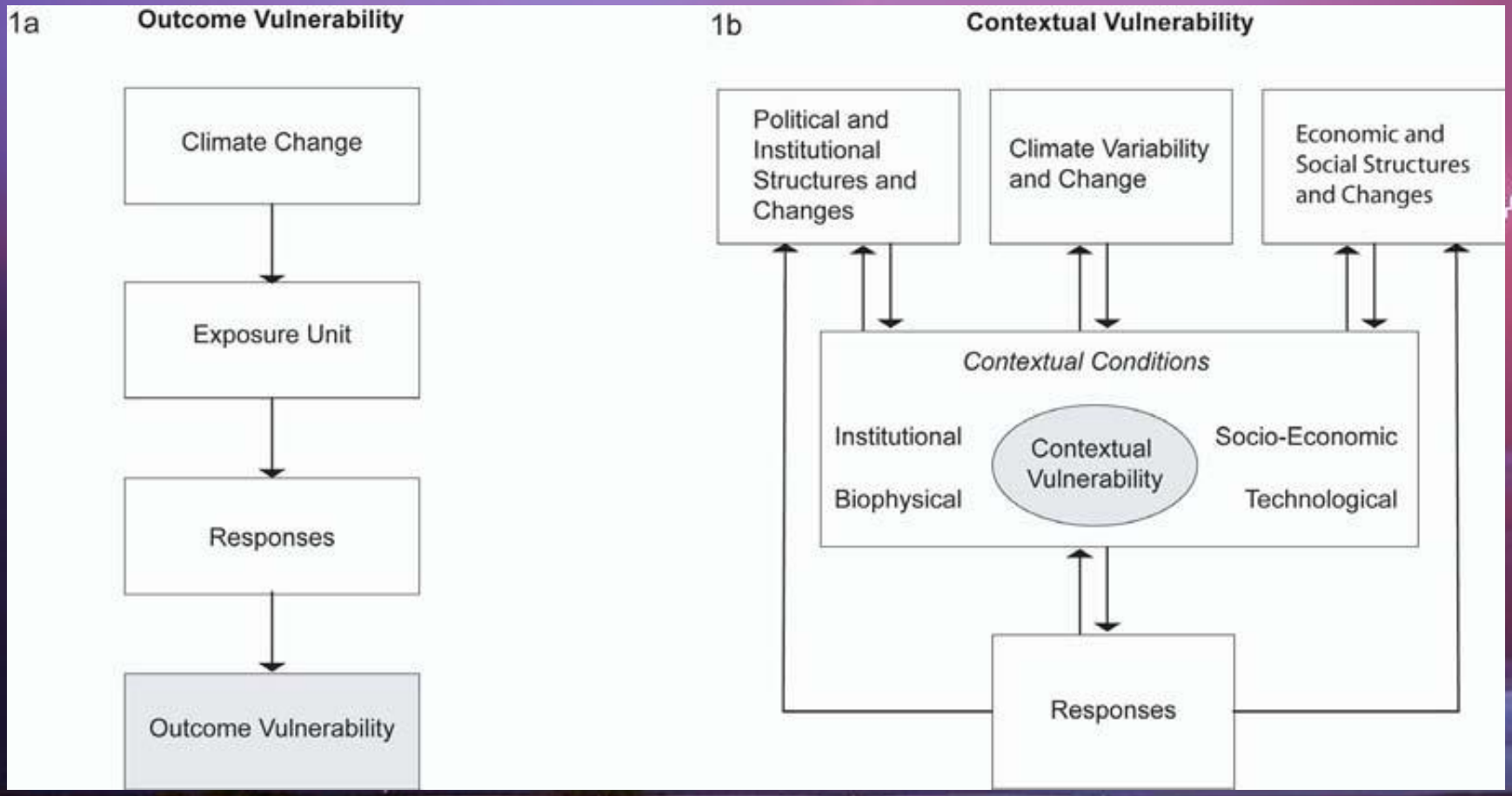
O'Brien et al., 2007: Why different interpretations of vulnerability matter in climate change discourses. *Climate Policy* 7 (1): 73–88



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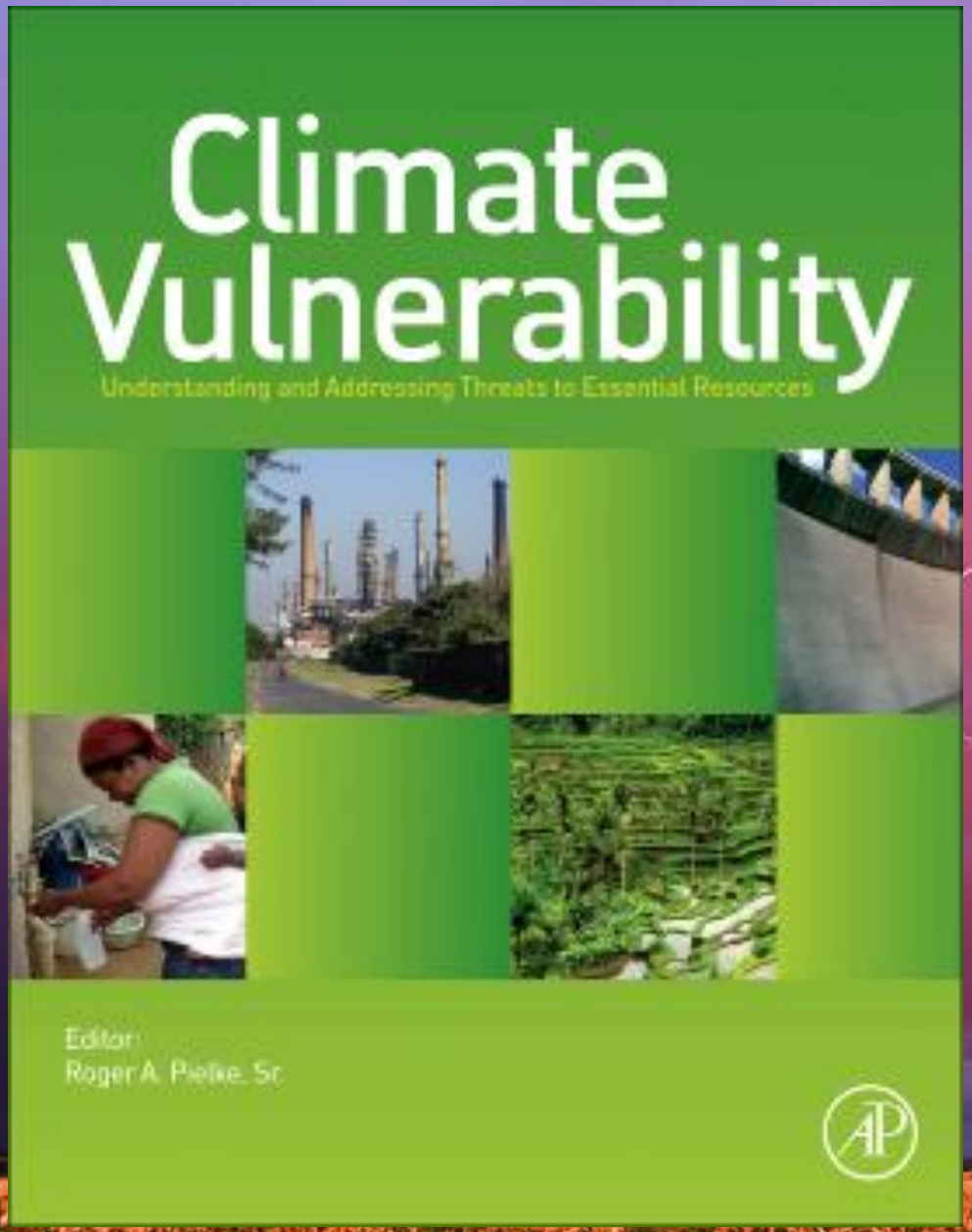

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Questions For Stakeholders On The Bottom-Up Approach

1. Why is this resource important? How is it used? To what stakeholders is it valuable?
2. What are the key environmental and social variables that influence this resource?
3. What is the sensitivity of this resource to changes in each of these key variables? (This may include but is not limited to, the sensitivity of the resource to climate variations and change on short (days); medium (seasons) and long (multi-decadal) time scales).

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4. What changes (thresholds) in these key variables would have to occur to result in a negative (or positive) outcome for this resource?
5. What are the best estimates of the probabilities for these changes to occur? What tools are available to quantify the effect of these changes? Can these estimates be skillfully predicted?
6. What actions (adaptation/mitigation) can be undertaken in order to minimize or eliminate the negative consequences of these changes (or to optimize a positive response)?
7. What are specific recommendations for policymakers and other stakeholders?

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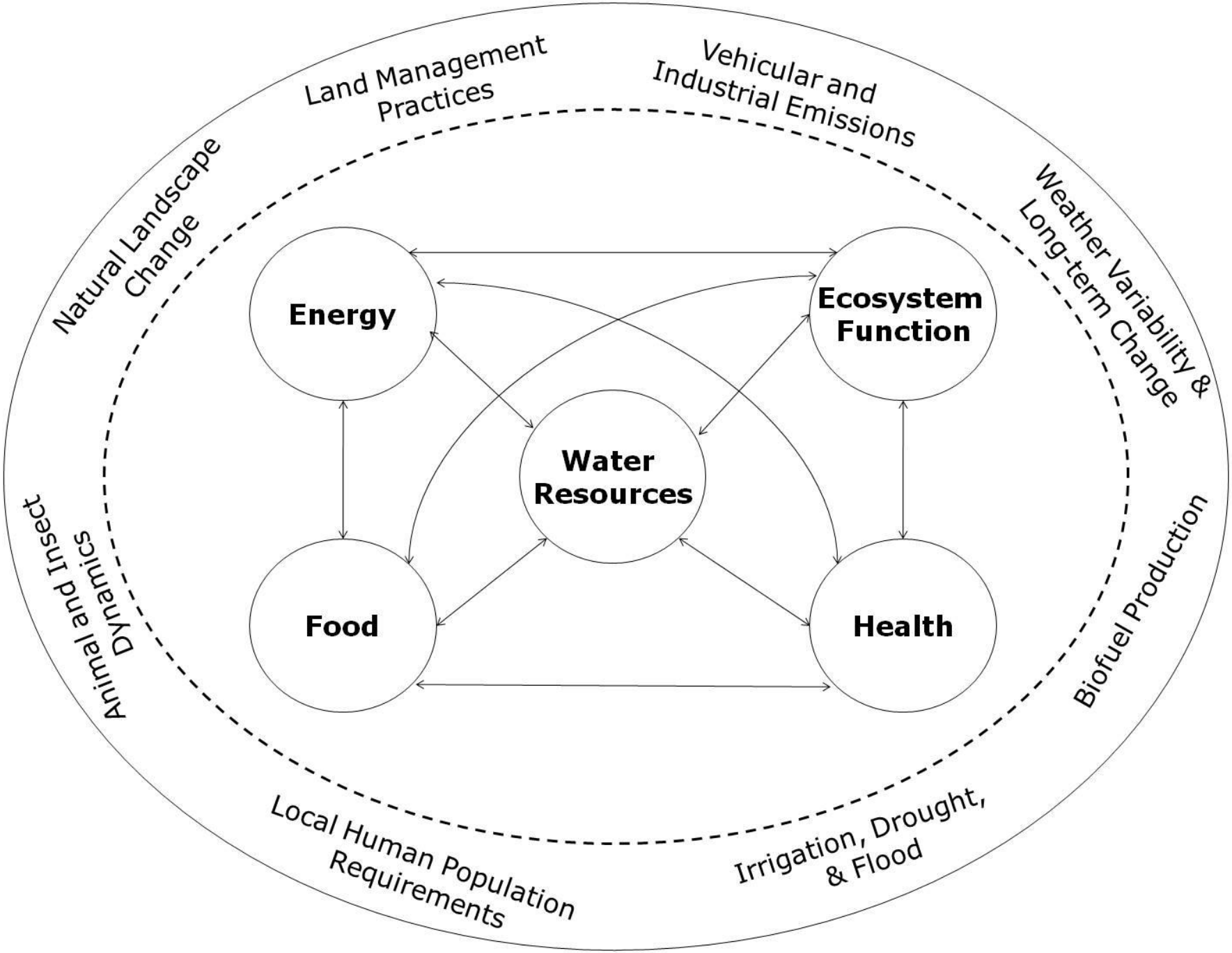
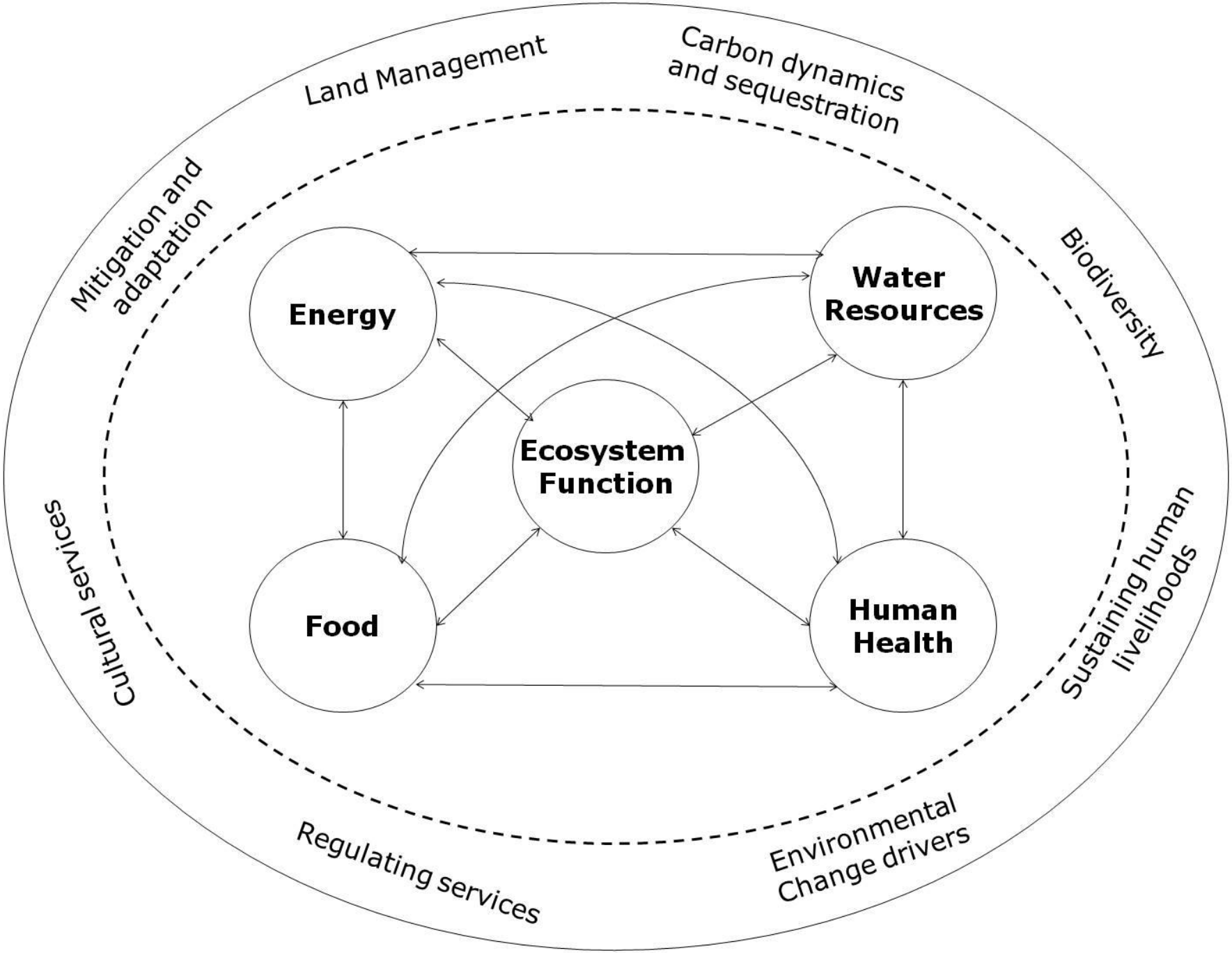
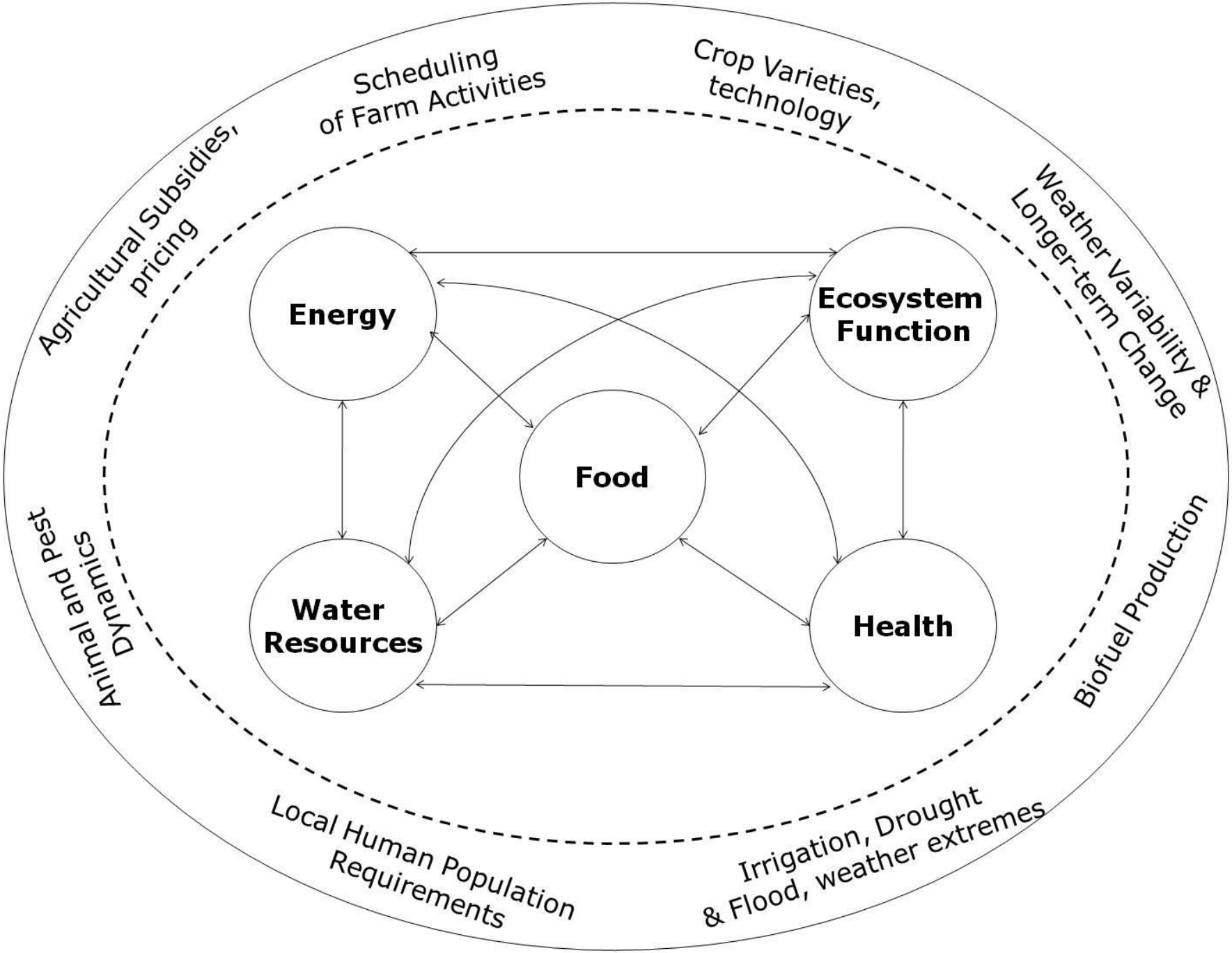
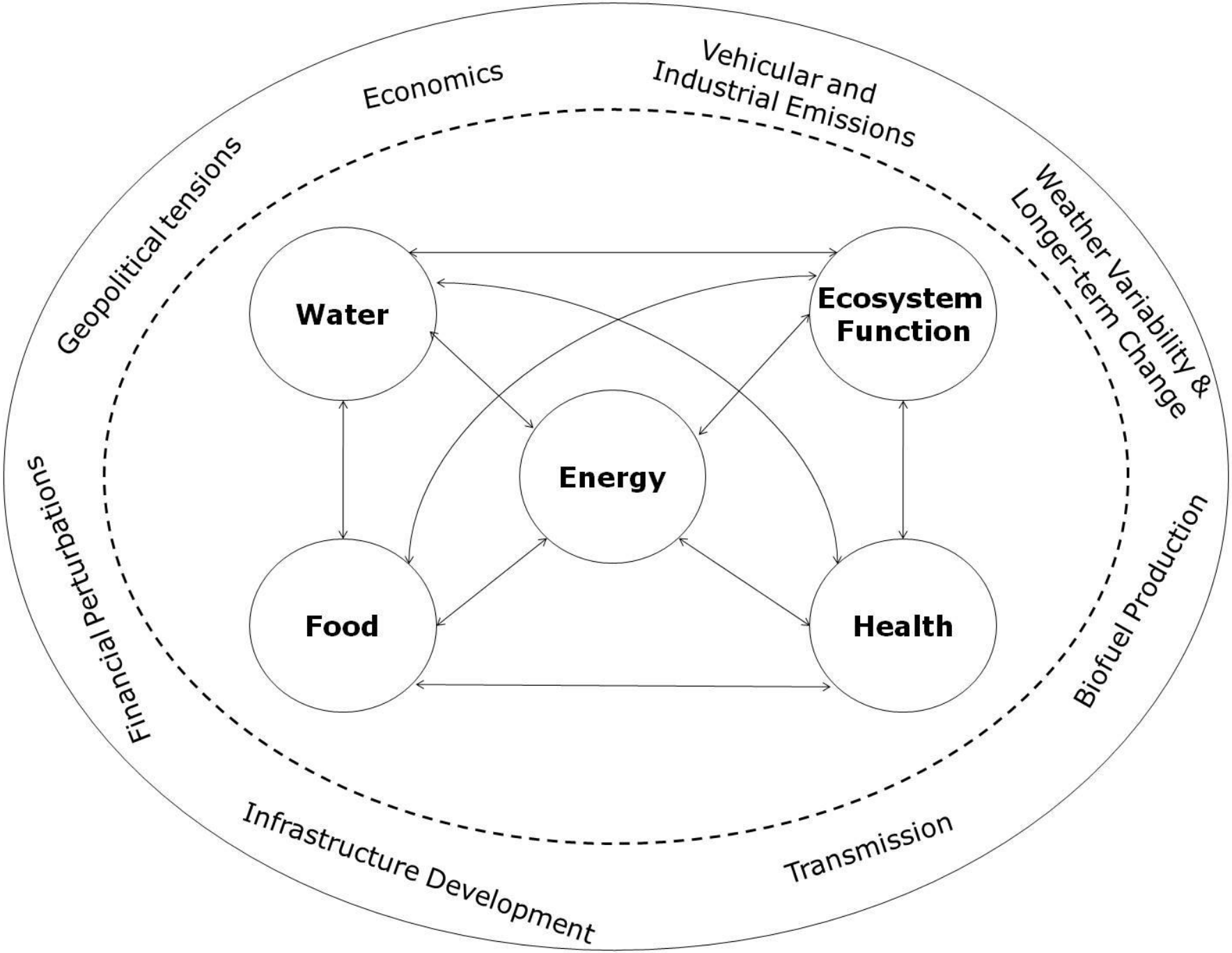
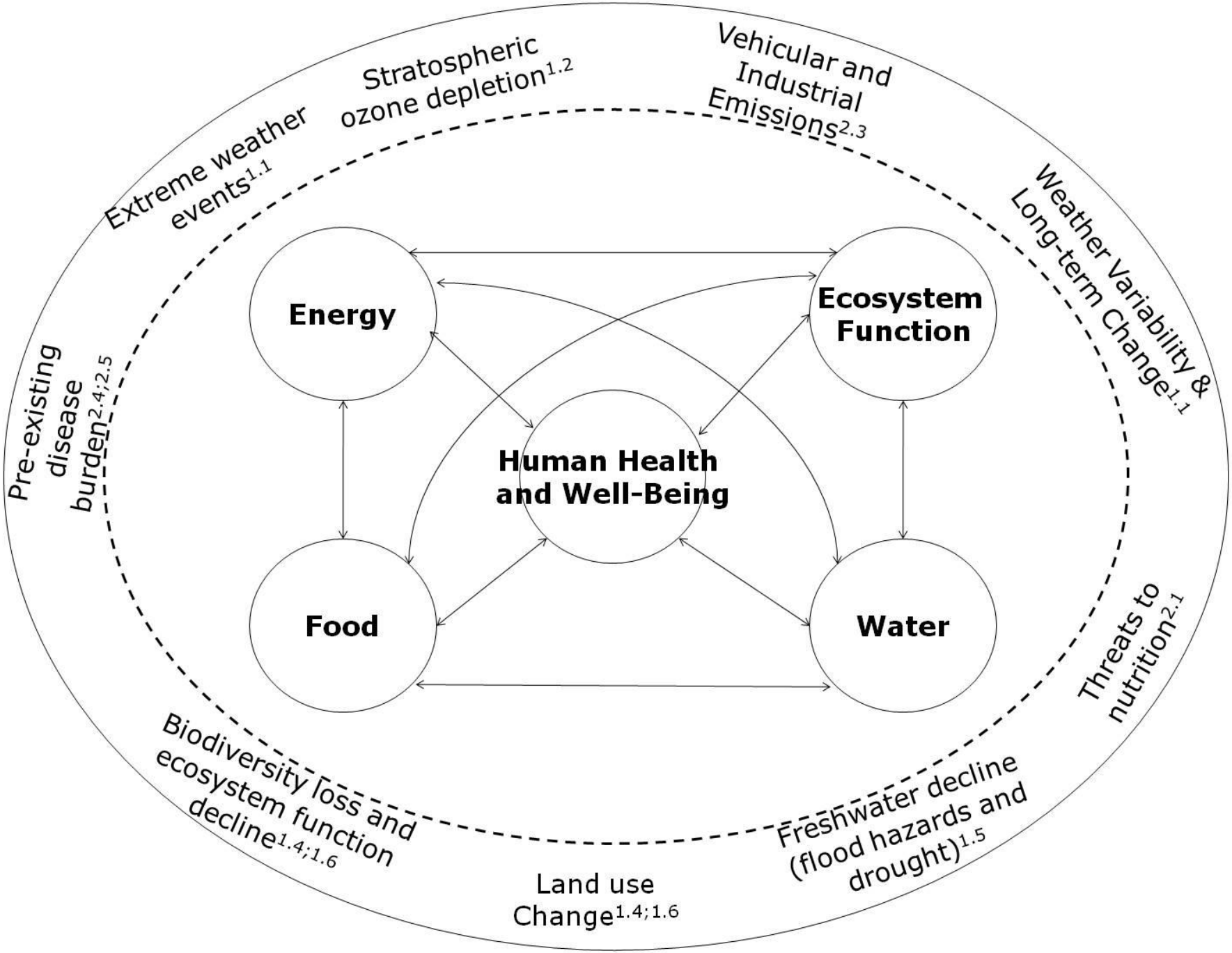

Land Management Practices
Vehicular and Industrial Emissions
Natural Landscape Change
Weather Variability & Long-term Change
Energy
Ecosystem Function
Water Resources
Food
Health
Animal and Insect Dynamics
Biofuel Production
Local Human Population Requirements
Irrigation, Drought, & Flood


Land Management
Carbon dynamics and sequestration
Mitigation and adaptation
Biodiversity
Energy
Water Resources
Ecosystem Function
Food
Human Health
Cultural services
Sustaining human livelihoods
Regulating services
Environmental Change drivers


Scheduling of Farm Activities
Crop Varieties, technology
Agricultural Subsidies, pricing
Weather Variability & Longer-term Change
Energy
Ecosystem Function
Food
Water Resources
Health
Animal and Pest Dynamics
Biofuel Production
Local Human Population Requirements
Irrigation, Drought & Flood, weather extremes


Economics
Vehicular and Industrial Emissions
Geopolitical tensions
Weather Variability & Longer-term Change
Water
Ecosystem Function
Energy
Food
Health
Financial Perturbations
Biofuel Production
Infrastructure Development
Transmission


Stratospheric ozone depletion1.2
Vehicular and Industrial Emissions2.3
Extreme weather events1.1
Weather Variability & Long-term Change1.1
Energy
Ecosystem Function
Pre-existing disease burden2.4;2.5
Human Health and Well-Being
Food
Water
Threats to nutrition2.1
Biodiversity loss and ecosystem function decline1.4;1.6
Freshwater decline (flood hazards and drought)1.5
Land use Change1.4;1.6

A bottom-up vulnerability perspective concept permits the determination of the major threats to local and regional water, food, energy, human health, and ecosystem function resources from extreme events including climate, but also from other social and environmental issues. After these threats are identified for each resource, then the relative risks can be compared with other risks in order to adopt optimal preferred mitigation/adaptation strategies.

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Summary

1. Climate models have not demonstrated skill at predicting changes in regional climate statistics on multi decadal time scales.
2. Climate is much more than climate change which is much more than global warming.
3. The climate system has self regulation mechanisms that are not properly simulated in the models.
4. A number of observed climate trends are not being properly predicted by the global models even in their global averages.
5. The regulation of CO2 and a few other greenhouse gases is much more than just about climate. It is a framework that is being used for a range of other policy and political actions including with respect to energy.
6. Added CO2 is just one of a diverse spectrum of human climate forcings.

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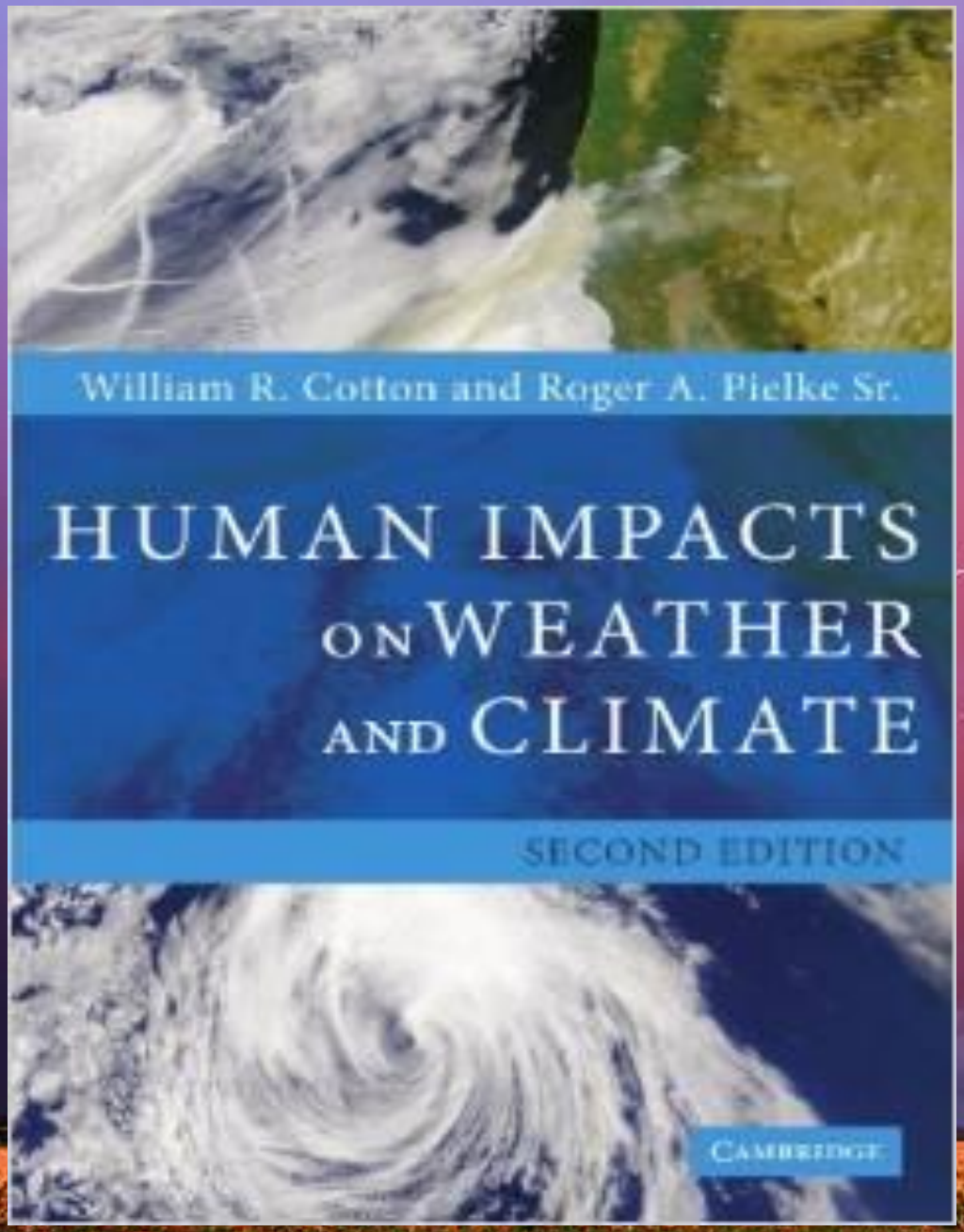

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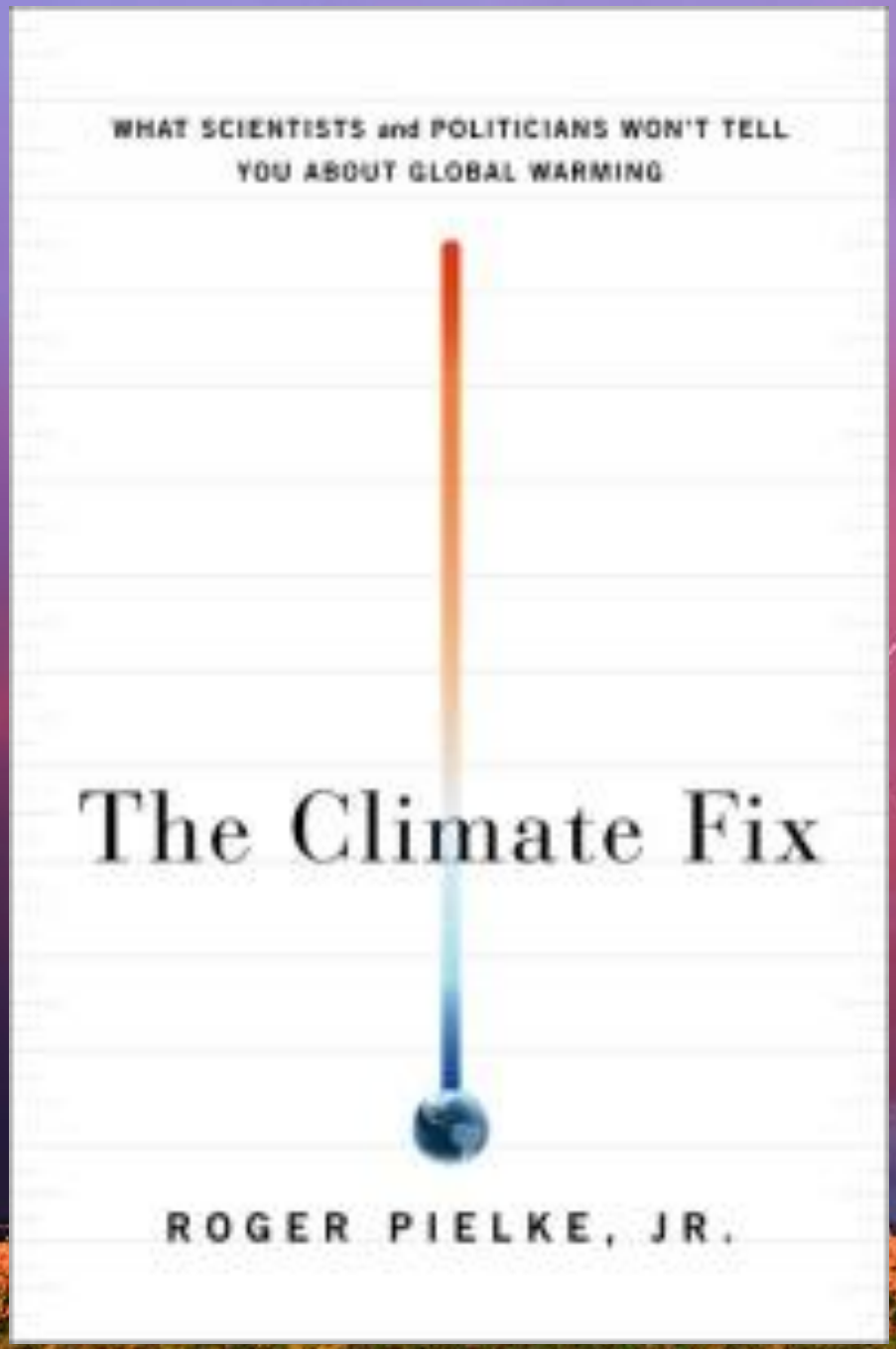

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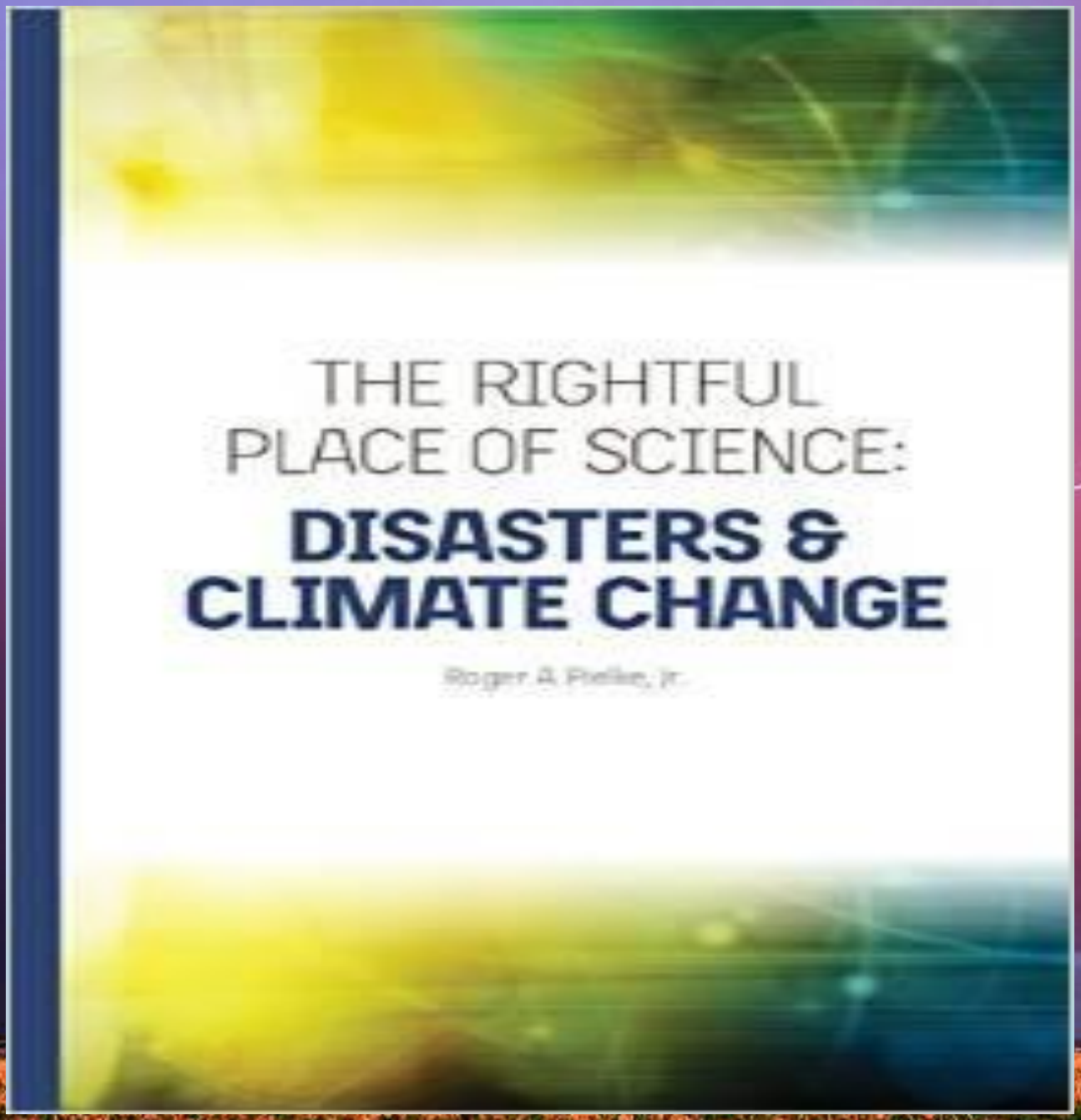

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- **Joanne Simpson said** **https://pielkeclimatesci.files.wordpress.com/2010/03/ppr-250.pdf**

- "It is a delight and stimulation for me to interact with these brilliant young people and to provide leadership and a quasi-academic atmosphere in order that they may develop their talents freely and fully. I have fought like an alley cat to secure them advancement and honors and have figuratively spilled my blood on the ground to shield them from the nightmare of the bureaucratic and political quagmire until they acquire the maturity and toughness to share this burden with me..." *"Develop a thick skin toward being disliked by some – even many – people. This is bound to happen if you are successful."*

- I was reminded of her quotes as I just completed reading the AMS autobiography of Bob Simpson - **http://www.amazon.com/Hurricane-Pioneer-Memoirs-Bob-Simpson/dp/1935704753/ref=sr_1_1?s=books&ie=UTF8&qid=1440172839&sr=1-1&keywords=robert+h+simpson**

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Thank You for the Opportunity to Revisit CSU!

Our websites

http://cires.colorado.edu/science/groups/pielke/

http://pielkeclimatesci.wordpress.com/

Thanks, as usual, to Dallas Staley in the preparation of the PowerPoint slides!

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Extra Slides

Cochran, L.S., R.A. Pielke, and E. Kovacs, 1992: Selected international receptor based air quality standards. J. Air Waste Mgt. Assoc., 42, 1567-1572.
http://pielkeclimatesci.files.wordpress.com/2012/01/r-167.pdf

on page 1571

"Need to Know" Versus "Right to Know"

In compiling this information, we found it easier to access the regulations from some countries as opposed to others. There is a major political difference between public rights to air quality information. In the United States, for example, the federal law mandates a "right to know," while the Seveso Directive (#67/548) of the European community permits access based on a "need to know." This fundamental difference provides further impetus for an ambient based standard, in addition to emission based standards, since the public and other interested parties could monitor air quality."

Thus in terms of modeling of the effect of air pollution that is used to determine a regulatory response by the EPA, there is a right to know in the USA. Since CO_2 has been labeled as a "pollutant", the rule should apply to the modeling of the effects from added CO_2.

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