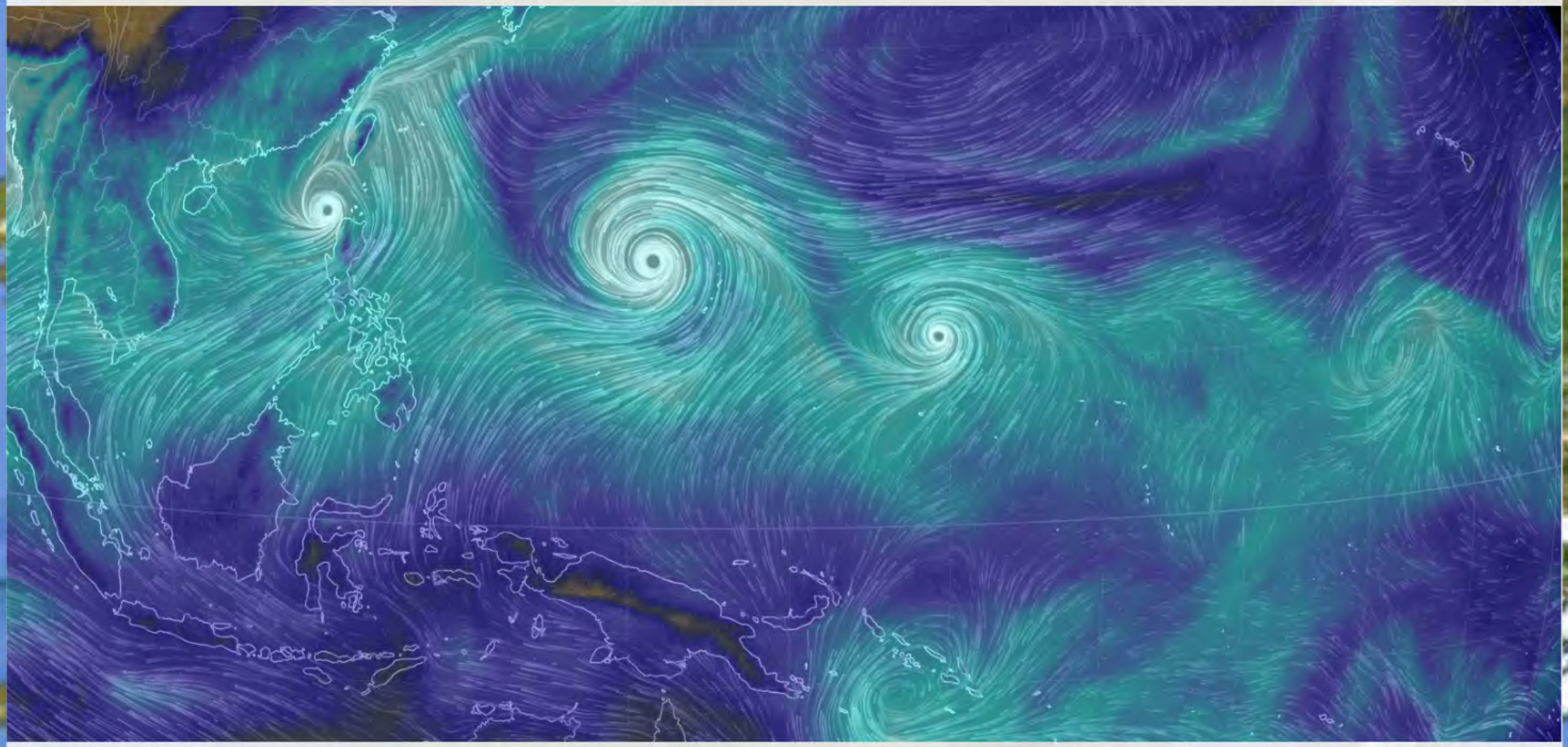
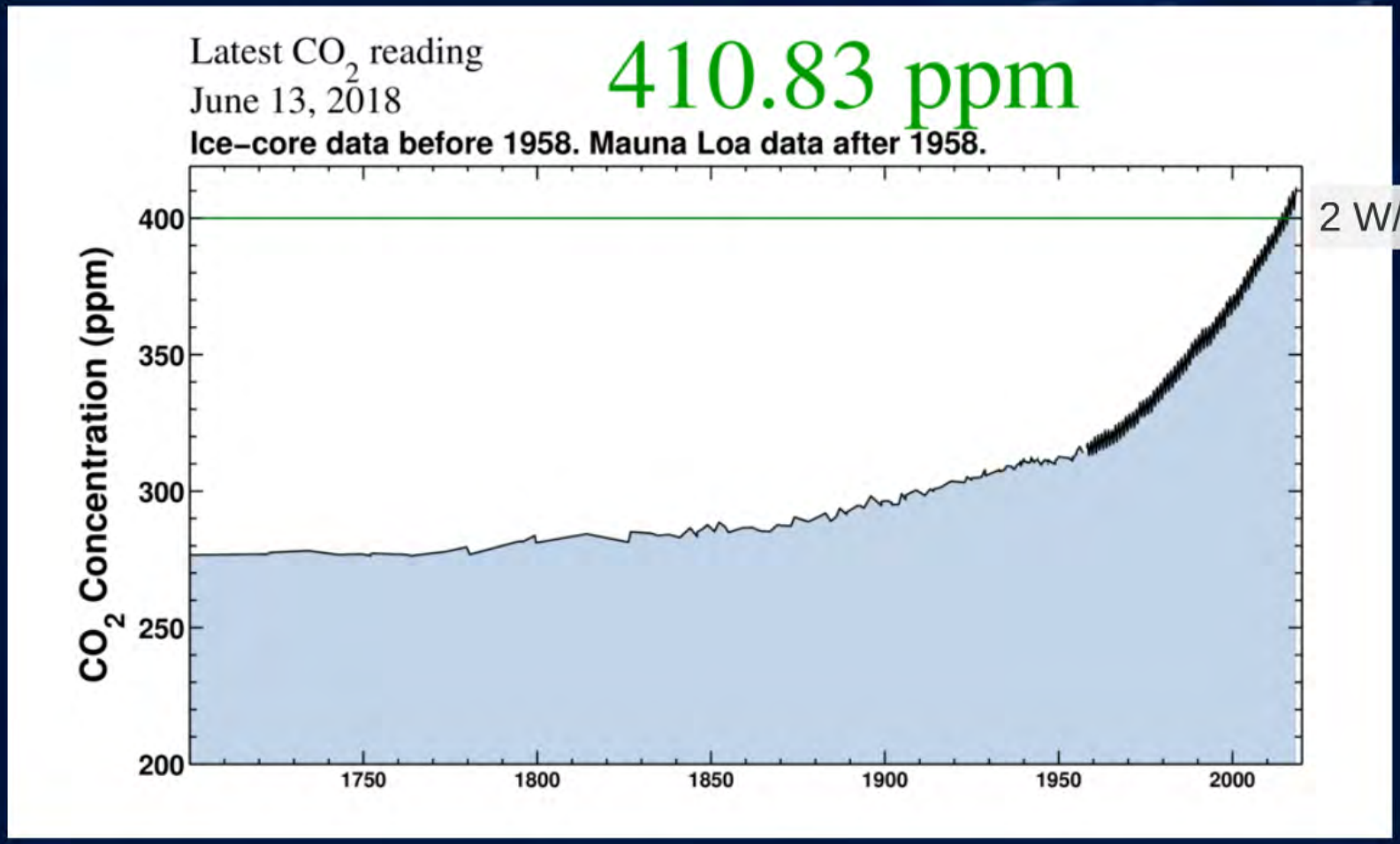
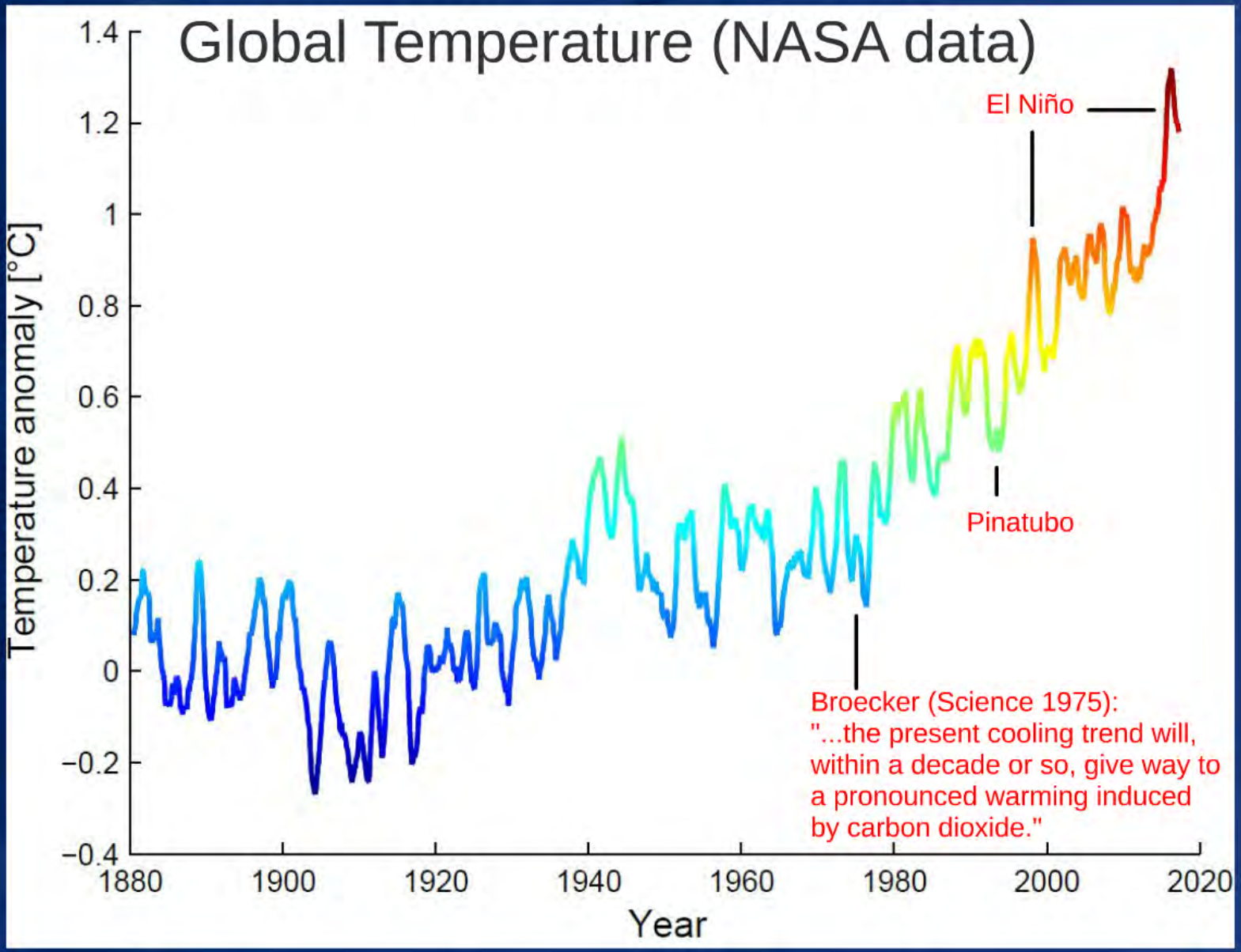
What investors need to know about climate change in 2018

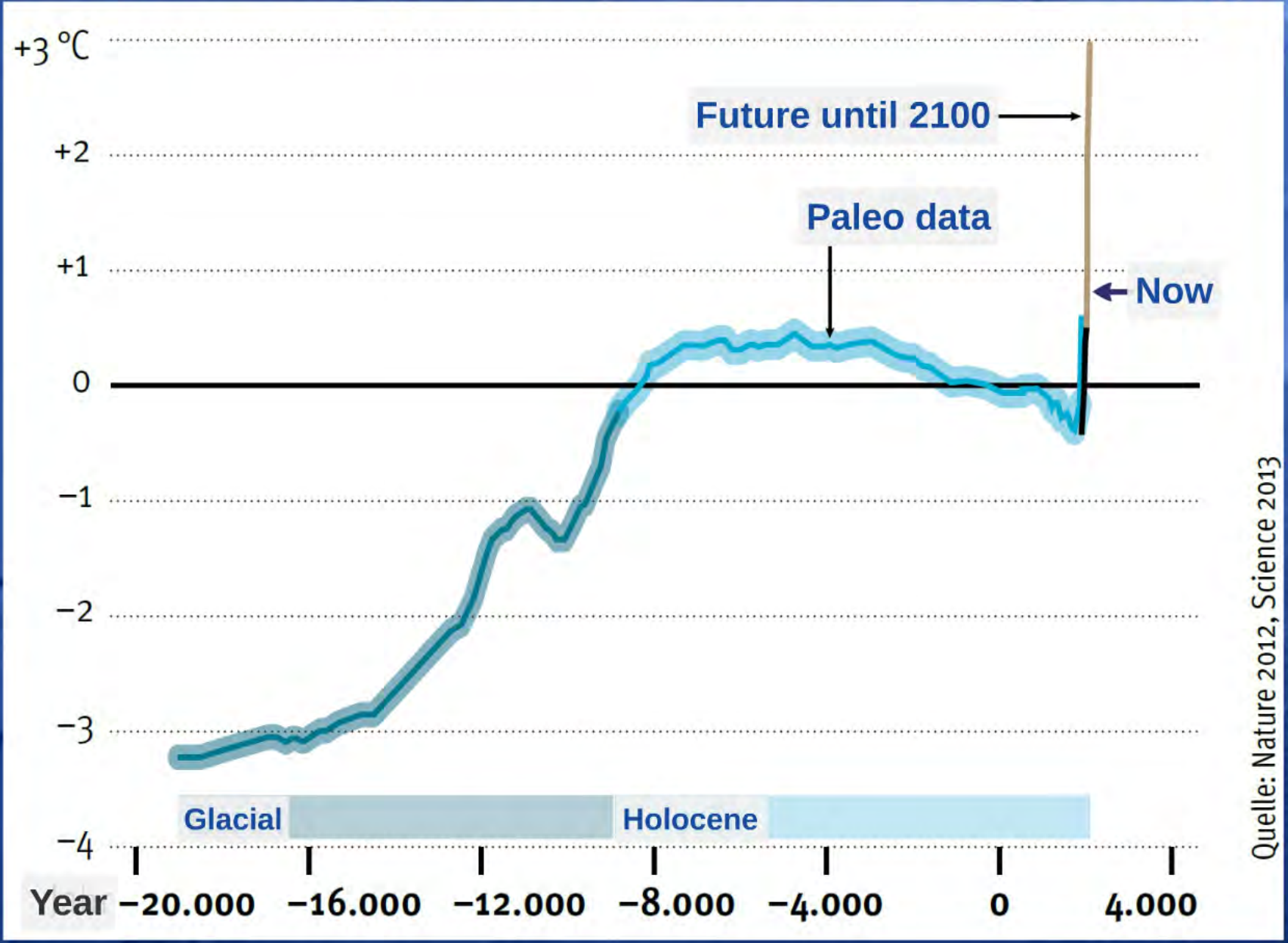


Prof. Stefan Rahmstorf
Potsdam Institute for Climate Impact Research

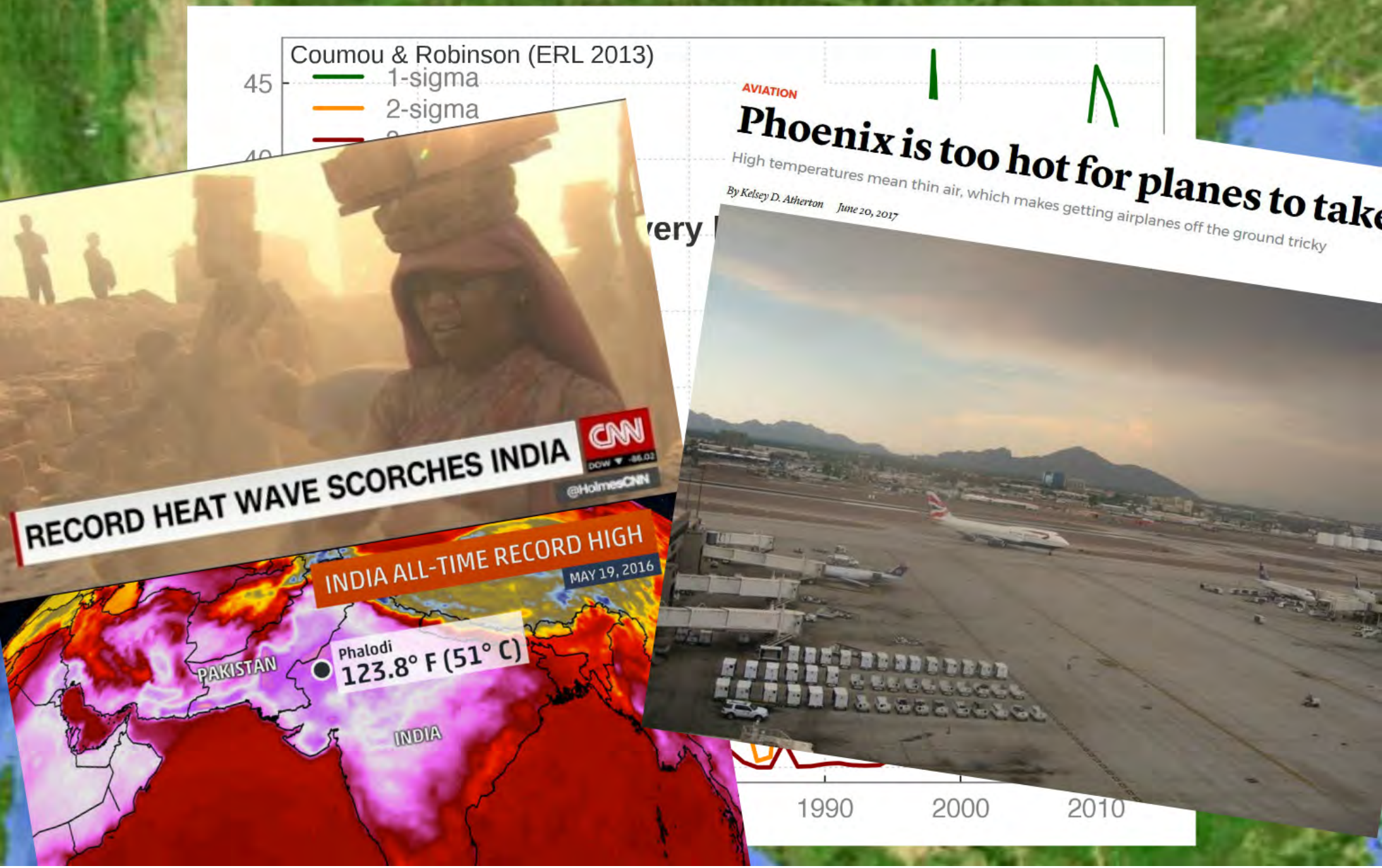

Latest CO_2 reading
June 13, 2018
410.83 ppm
Ice–core data before 1958. Mauna Loa data after 1958.
CO_2 Concentration (ppm)
400
350
300
250
200
1750
1800
1850
1900
1950
2000
2 W/m^2

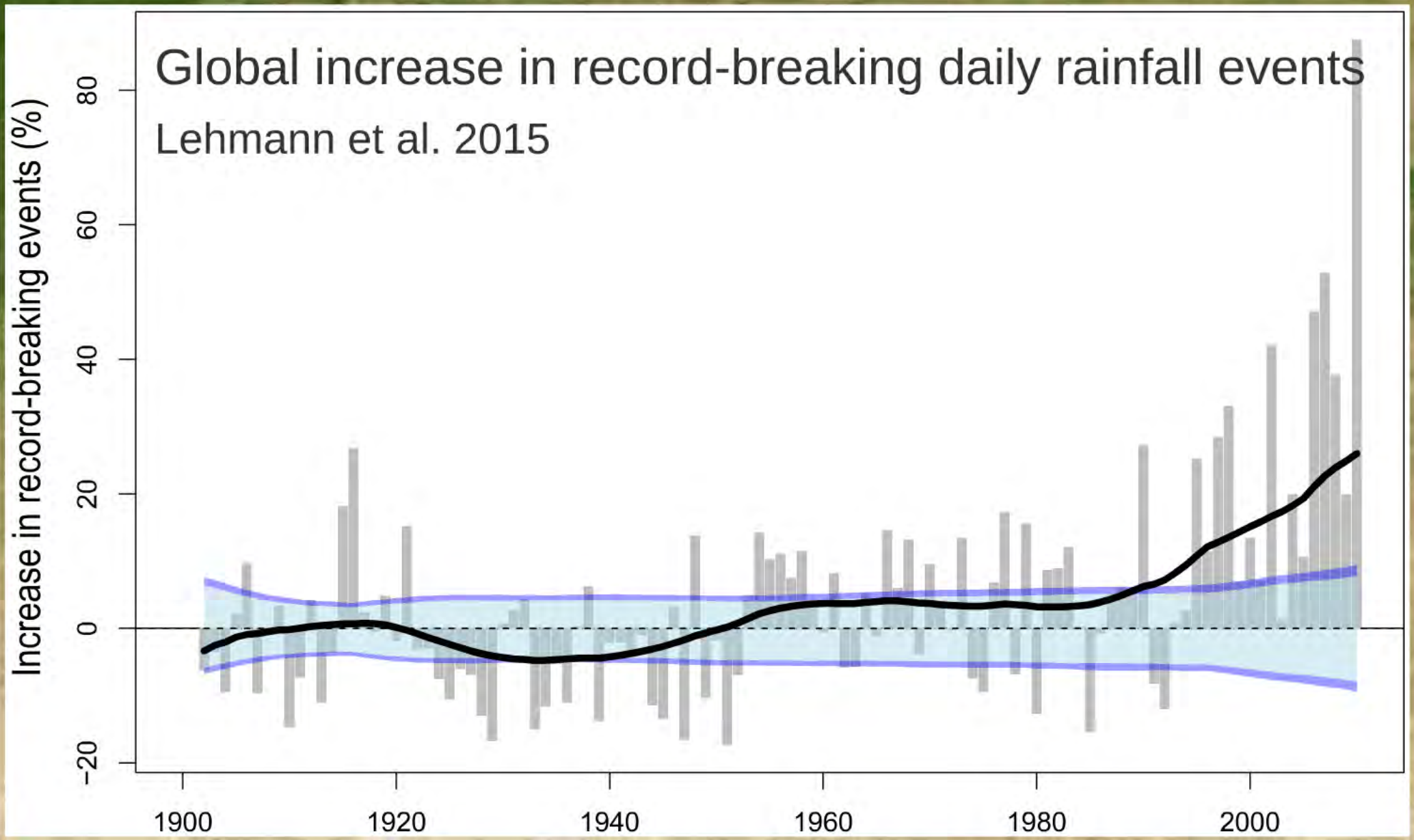

Global Temperature (NASA data)
Temperature anomaly [°C]
1.4
1.2
1
0.8
0.6
0.4
0.2
0
−0.2
−0.4
1880
1900
1920
1940
1960
1980
2000
2020
Year
El Niño
Pinatubo
Broecker (Science 1975):
"...the present cooling trend will, within a decade or so, give way to a pronounced warming induced by carbon dioxide."

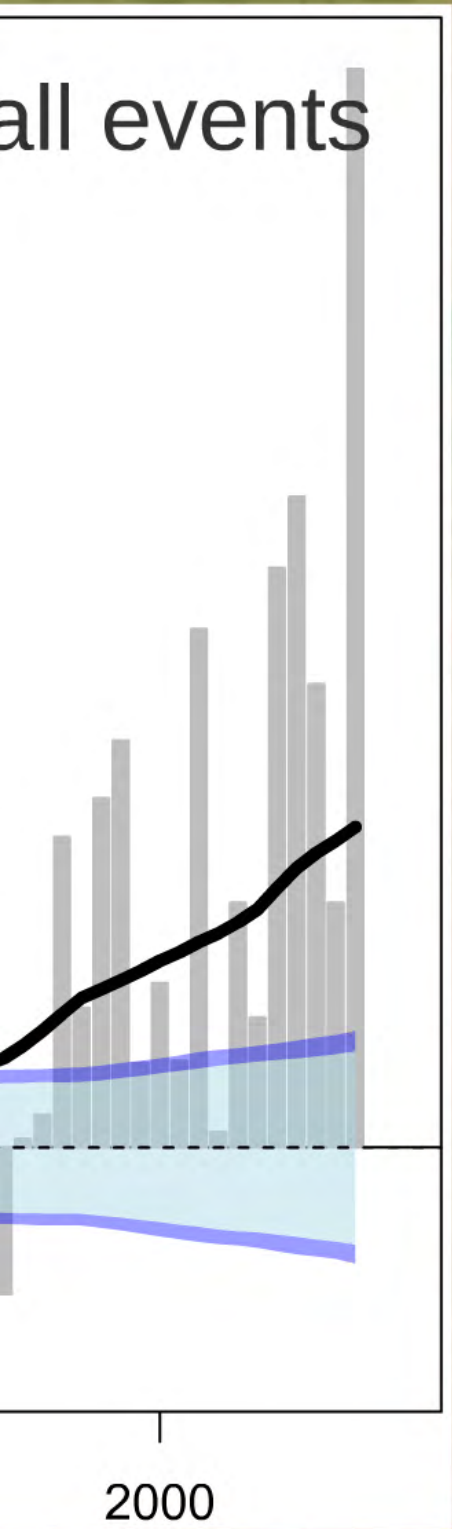
Global Temperature since the Ice Age



Increasing areas will get too hot to survive outdoors




Global increase in record-breaking daily rainfall events
Lehmann et al. 2015
Increase in record-breaking events (%)
80
60
40
20
0
−20
1900
1920
1940
1960
1980
2000



Sant'Agata, south Italy, 16 June 2018

Drought: a growing threat to food security and political stabililty

theguardian

home › environment › climate change wildlife energy pollution UK world ≡ all

Climate change

Climate change rate to turn southern Spain to desert by 2100, report warns

Mediterranean ecosystems will change to a state unprecedented in the past 10,000 years unless temperature rises are held to within 1.5C, say scientists

escent and implications

ger[c], and Yochanan Kushnir[c]

ffairs, Columbia University, New York, NY 10027; and [c]Lamont–Doherty

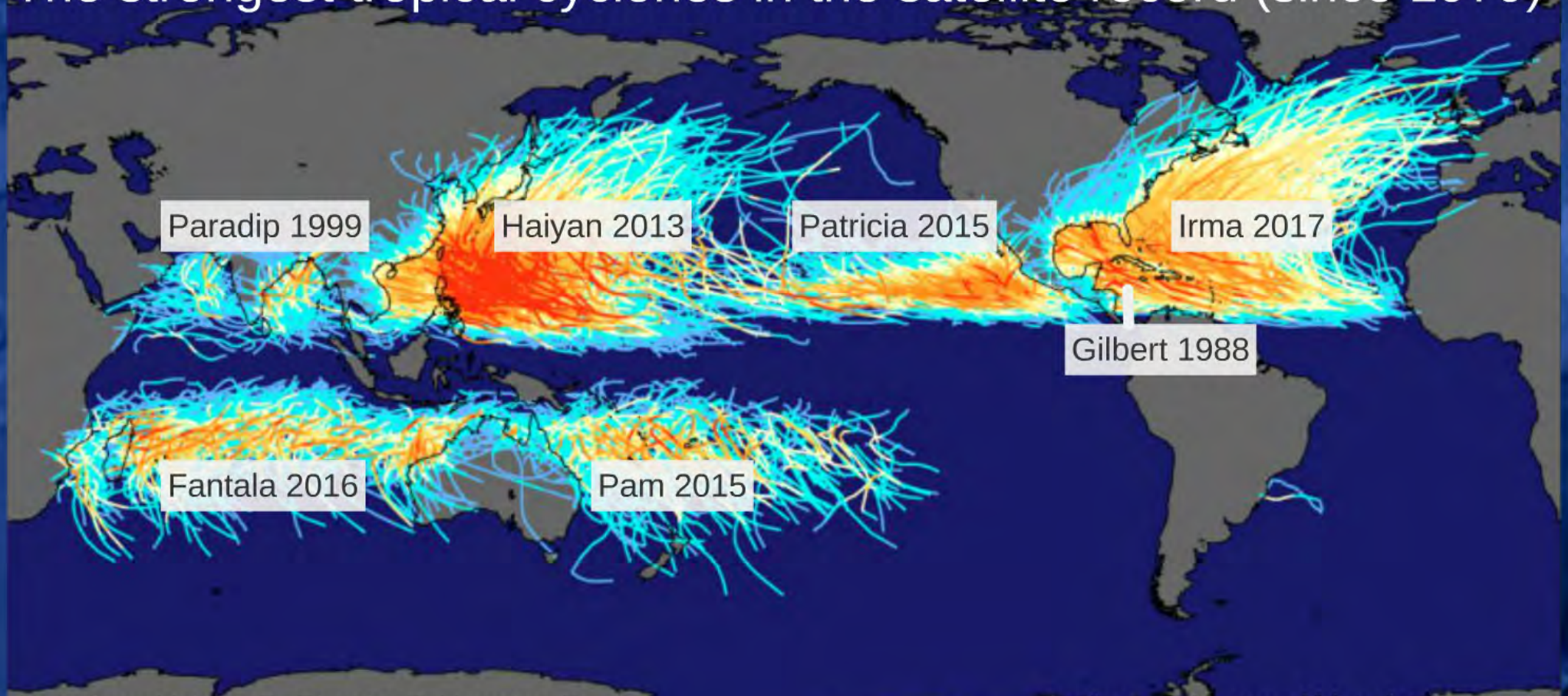
and approved January 30, 2015 (received for review November 16, 2014)

Syria's water security by exploiting limited land and water resources without regard for sustainability (10).

One critical consequence of these unsustainable policies is the decline of groundwater. Nearly all rainfall in the FC occurs during the 6-month winter season, November through April, and this rainfall exhibits large year-to-year variability (Figs. 1*A* and 2*A*). In Syria, the rain falls along the country's Mediterranean Sea coast and in the north and northeast, the primary agricultural region. Farmers depend strongly on year-to-year rainfall, as two thirds of the cultivated land in Syria is rain fed, but the remainder relies upon irrigation and groundwater (11). For those farms without access to irrigation canals linked to river tributaries, pumped groundwater supplies over half (60%) of all water used for irrigation purposes, and this groundwater has become increasingly limited as extraction has been greatly overexploited (4). The government attempted to stem the rate of groundwater depletion by enacting a law in 2005 requiring a license to dig wells, but the legislation was not enforced (6). Overuse of groundwater has been blamed for the recent drying of the Khabur River in Syria's northeast (6). The depletion of groundwater during the recent drought is clearly evident from remotely sensed data by the

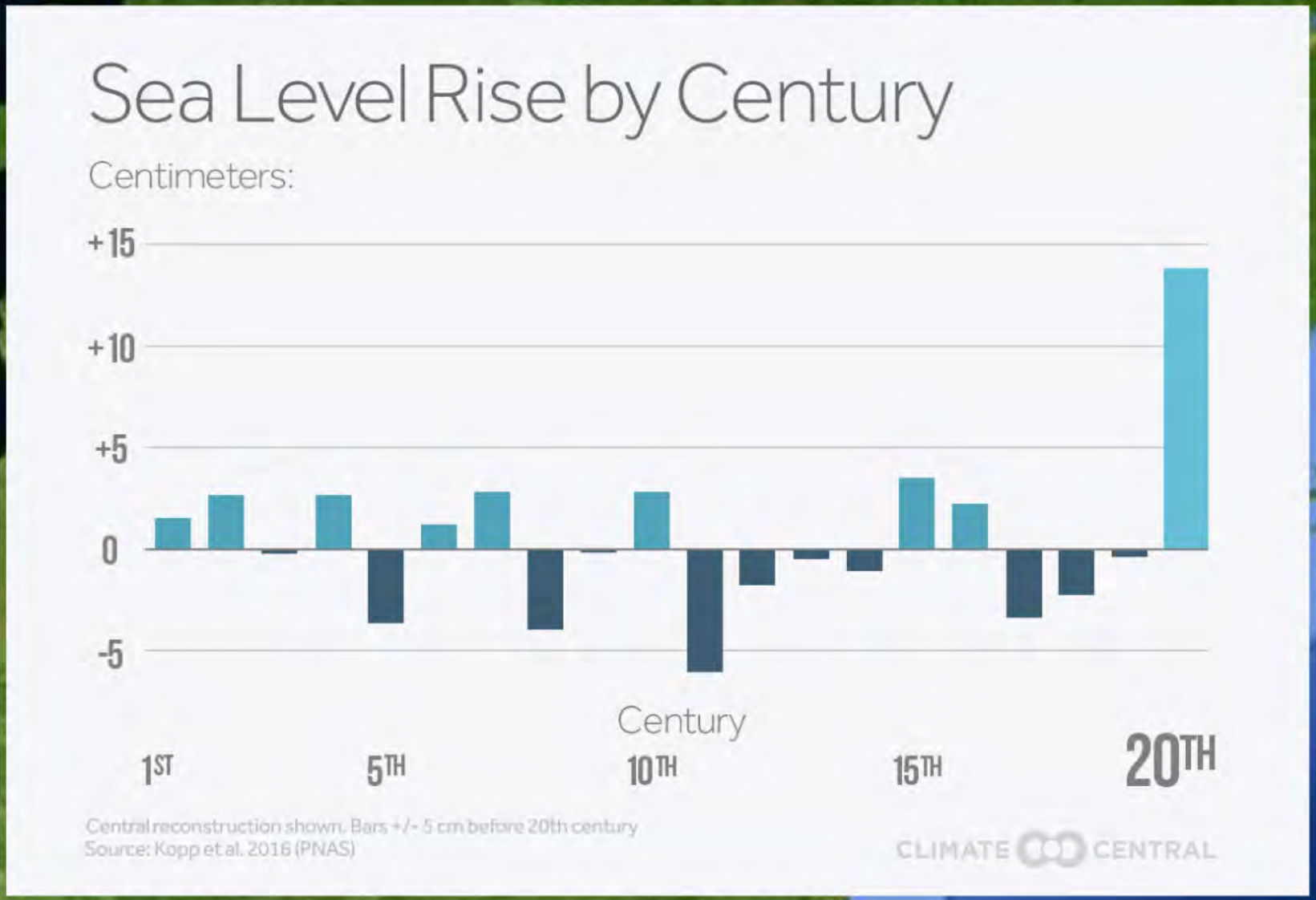
model studies ...
climate for the Eastern ...
model simulations indicate th...
duration of the recent Syrian drought, w...
current conflict, has become more than twice
a consequence of human interference in the climate system.

The strongest tropical cyclones in the satellite record (since 1979)



Data from Velden C, Olander T, Herndon D, & Kossin JP, *Mon. Weather Rev.* 2017

Background: map of historical tropical cyclone tracks, by Robert Rohde



k Times

ALEXANDROS AVRAMIDIS/REUTERS

government said that it
onomic migrants.

eel

Seas rising at fastest rate in nearly 3,000 years

Human emissions fueling increase that threatens coastal cities, report says

BY JUSTIN GILLIS

The ocean is rising faster than at any point in the last 28 centuries and human emissions of greenhouse gases are primarily responsible, scientists reported on Monday.

They added that the nuisance flooding that is starting to make life miserable in many coastal towns is largely a consequence of those same emissions, and likely to grow worse in coming years.

The scientists confirmed previous estimates that if global emissions were to continue at a high rate over the next few decades, the ocean could rise as much as three or four feet by 2100, as ocean water expands and the great ice sheets in Greenland and Antarctica begin to collapse. Experts say the situation would grow far worse in the 22nd century and beyond, likely requiring the abandonment of many of the world's coastal cities.

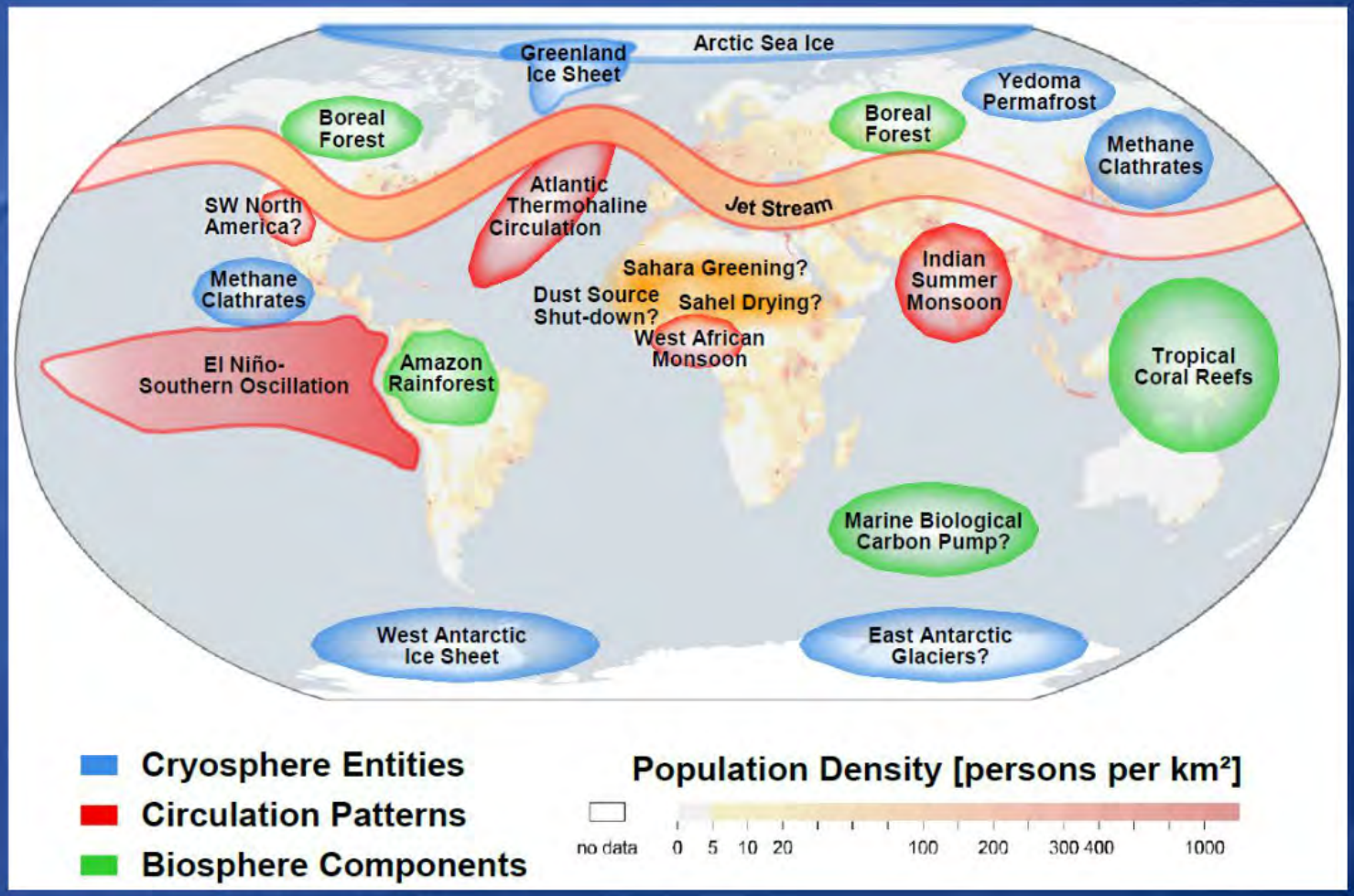
"I think we can definitely be confident that sea-level rise is going to continue to accelerate if there's further warming, which inevitably there will be," said Stefan Rahmstorf, a professor of ocean physics at the Potsdam Institute for Climate Impact Research, in Germany, and co-author of a paper released on Monday in an American journal, the Proceedings of the National Academy of Sciences.

"Ice simply melts faster when the temperatures get higher," Dr. Rahmstorf added. "That's just basic physics."

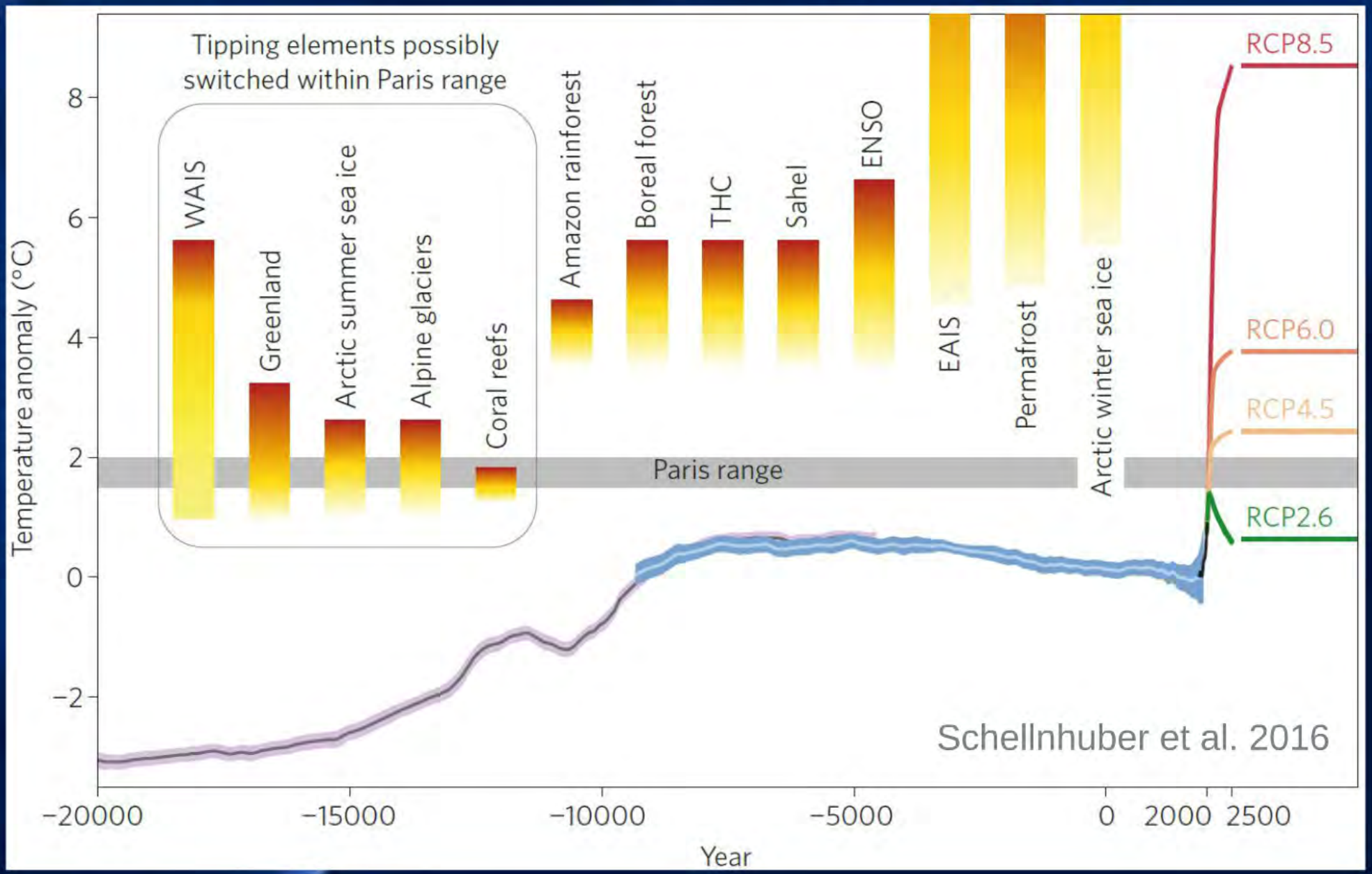
In a report issued at the same time as

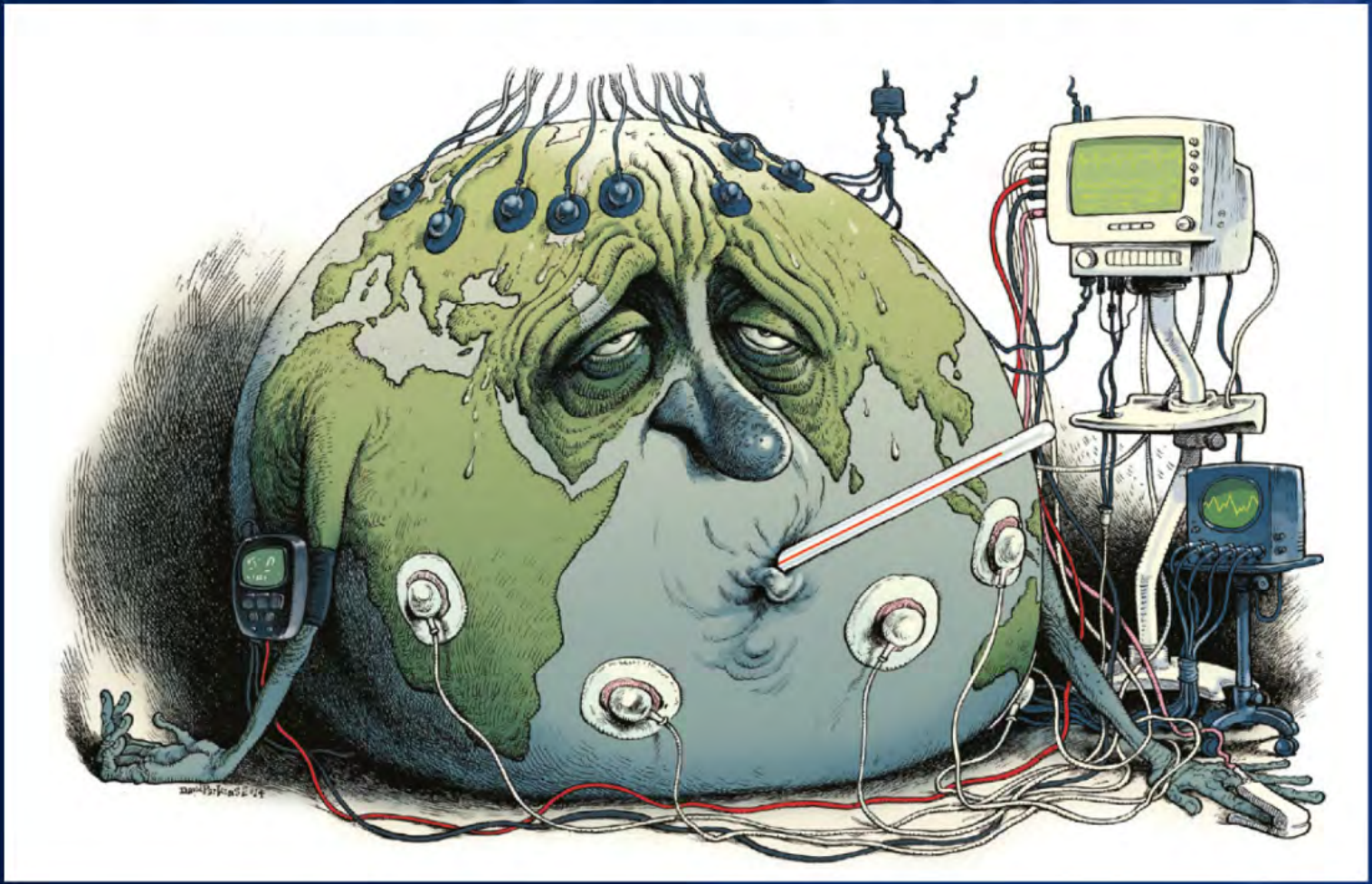
Tipping elements of the climate system

"radical uncertainty"



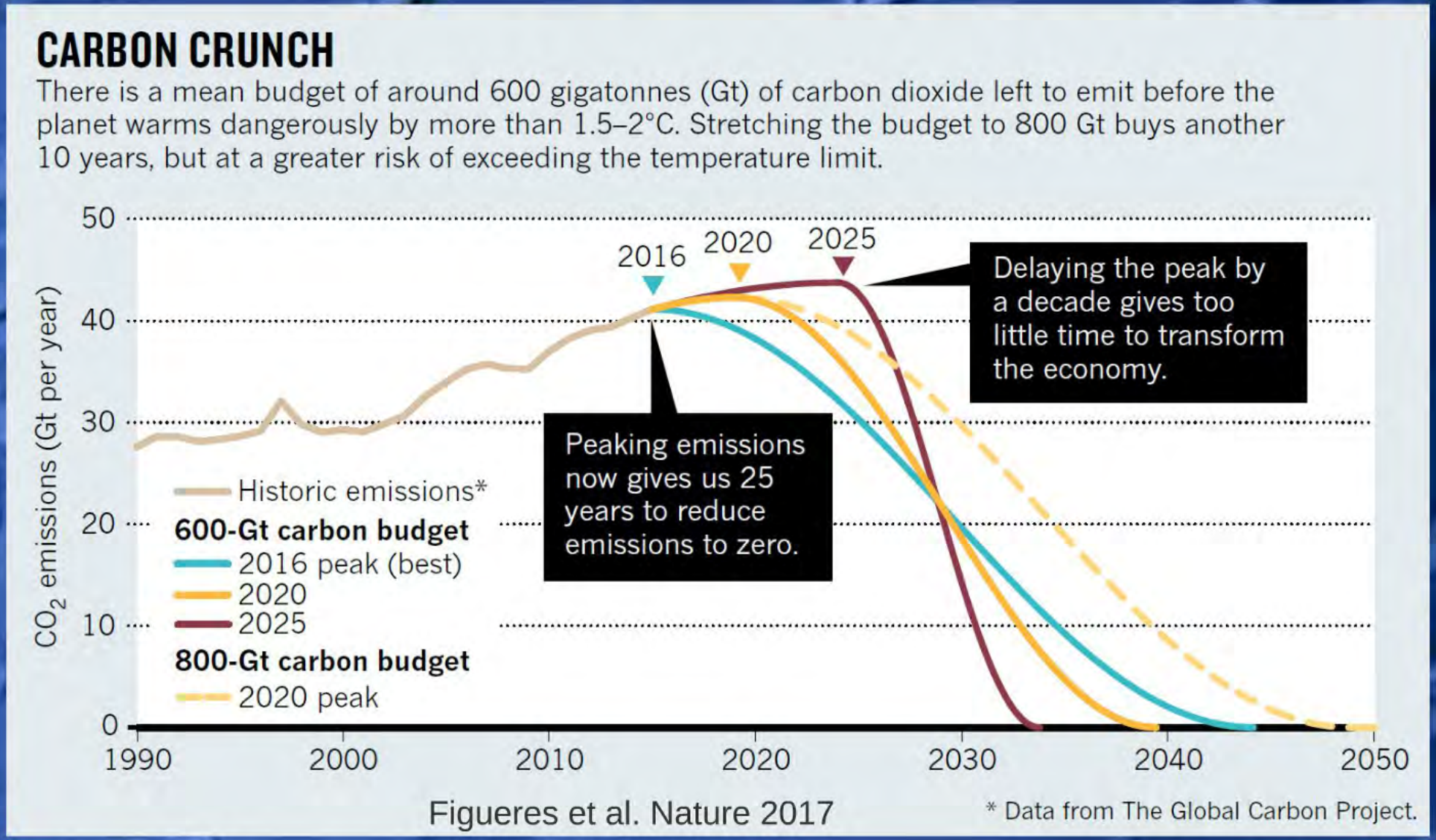
Even below 2°C we will very likely pass tipping points!





The Par

Paris-compatible global emissions paths



Large-scale BECCS deployment: a dangerous illusion

nature climate change

LETTERS

https://doi.org/10.1038/s41558-017-0064-y

Corrected: Author correction

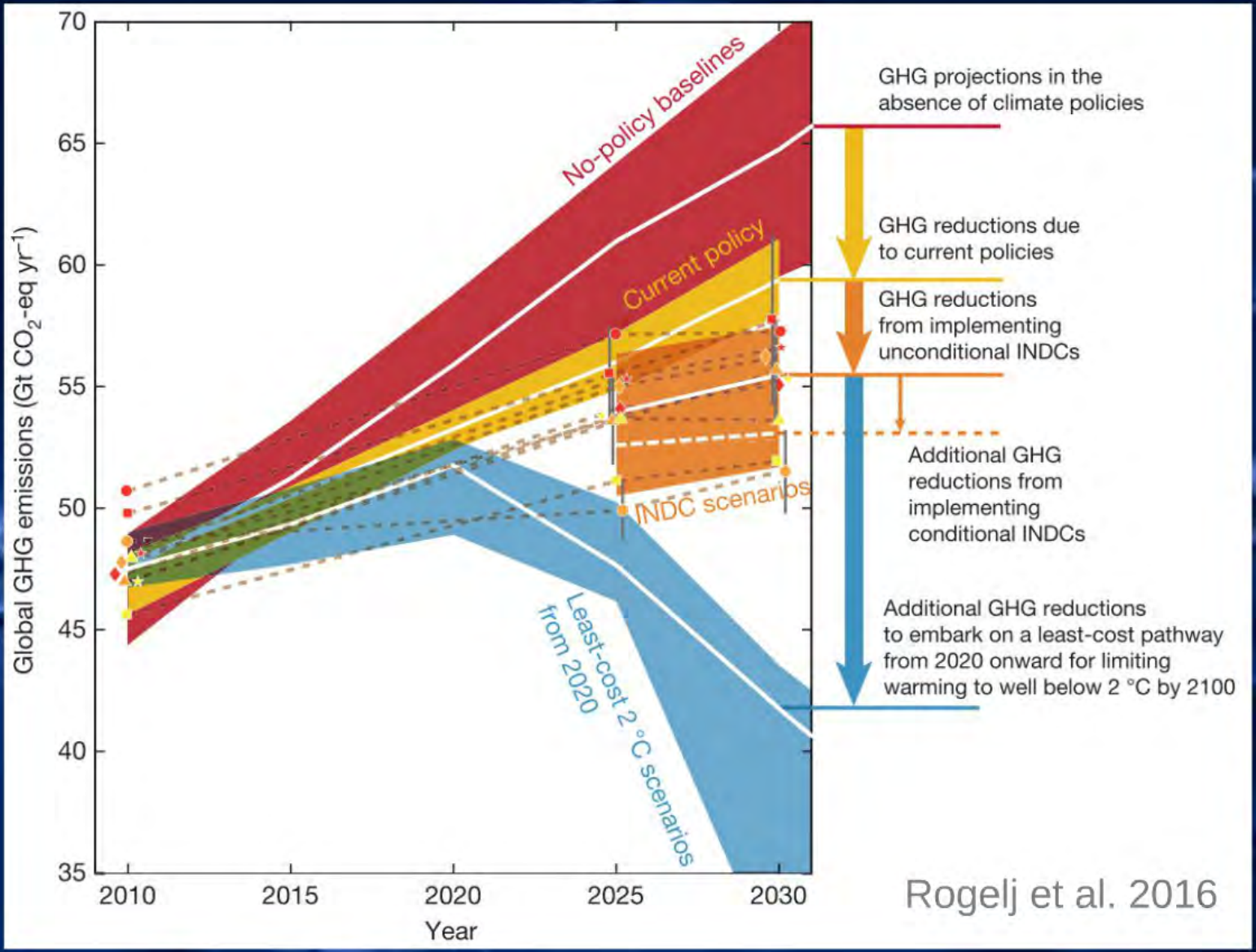
Biomass-based negative emissions difficult to reconcile with planetary boundaries

Vera Heck[1,2]*, Dieter Gerten[1,2]*, Wolfgang Lucht[1,2,3] and Alexander Popp[1]

Under the Paris Agreement, 195 nations have committed to holding the increase in the global average temperature to well below 2 °C above pre-industrial levels and to strive to limit the increase to 1.5 °C (ref. [1]). It is noted that this requires "a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of the century"[1]. This either calls for zero greenhouse gas (GHG) emissions or a balance between positive and negative emissions (NE)[2,3]. Roadmaps and socio-economic scenarios com-

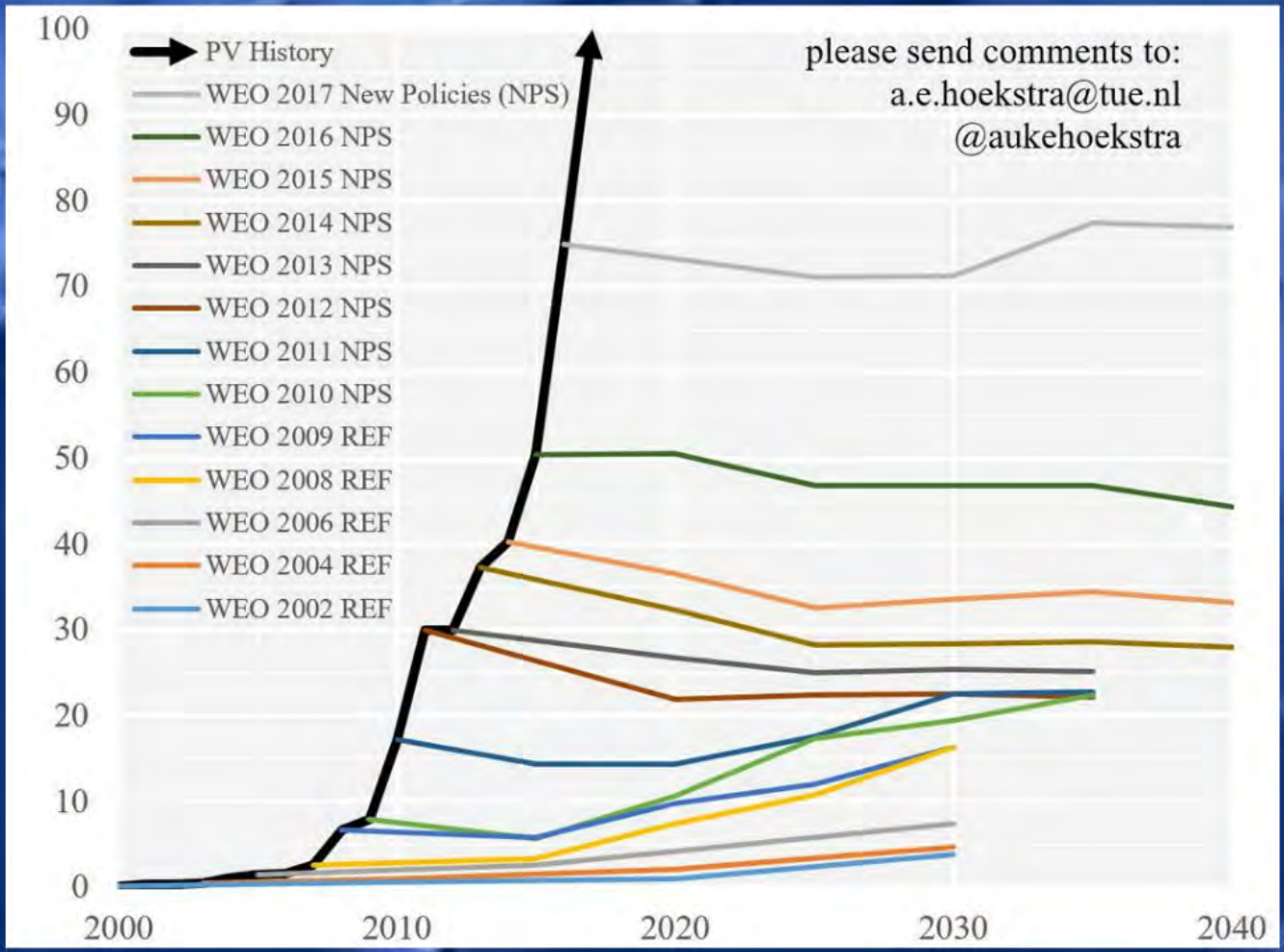
for the functioning of the Earth system we adopt the concept of a safe zone and a zone of increasing risk (uncertainty zone) also for the regional boundaries. These regional boundaries are: amount of remaining forest cover, biodiversity intactness index (BII), environmental flow requirements and imposed nitrogen fertilization limits, all calculated at the grid-cell level and subsequently aggregated to the analysis scale of regional boundaries (refer to Supplementary Table S2). We further compare our results to the originally defined global PBs.

The Paris NDCs are insufficient!



Rogelj et al. 2016

Mitigation potential or: How wrong can you get?



Photovoltaics added each year (GW)

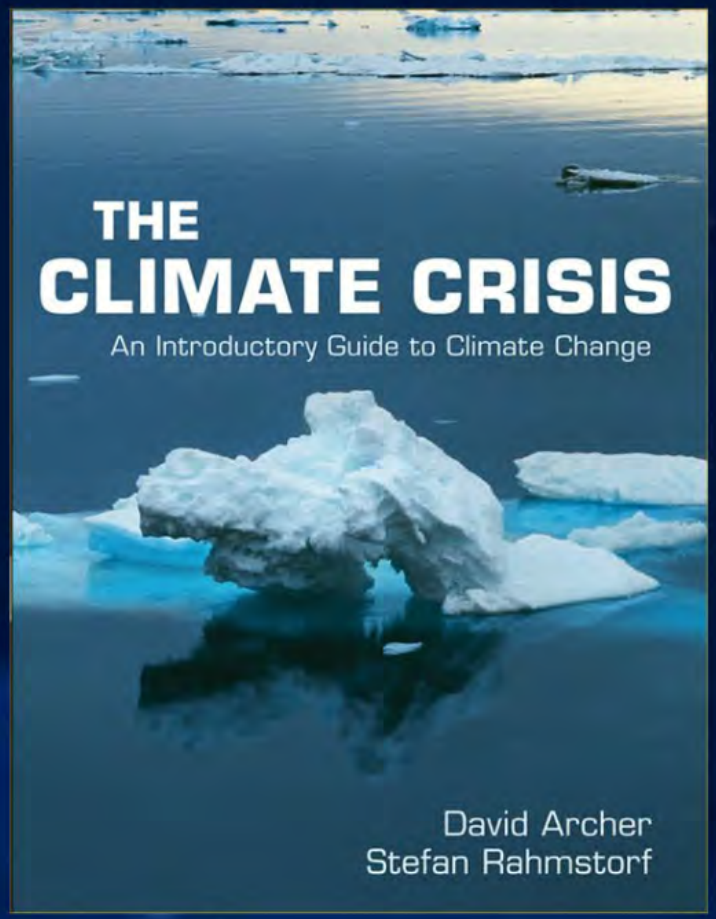
IEA World Energy Outlook vs reality

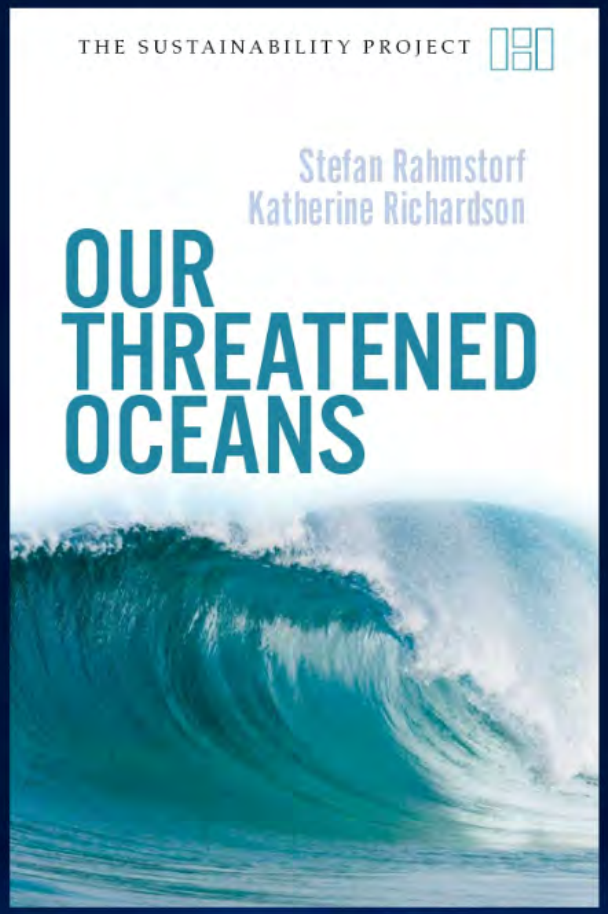
Conclusions

- Global warming is unequivocal and ongoing
- Impacts are not subtle and felt around the world
- The risks are far greater than the IPCC suggests
- Stopping global warming well below 2°C is a race against time to reach zero emissions
- Government commitment to this is far too weak

Crucial role for finance sector!

Thank you for your attention!





Blog: Realclimate

Follow me: