

Michael E. Mann Tom Toles

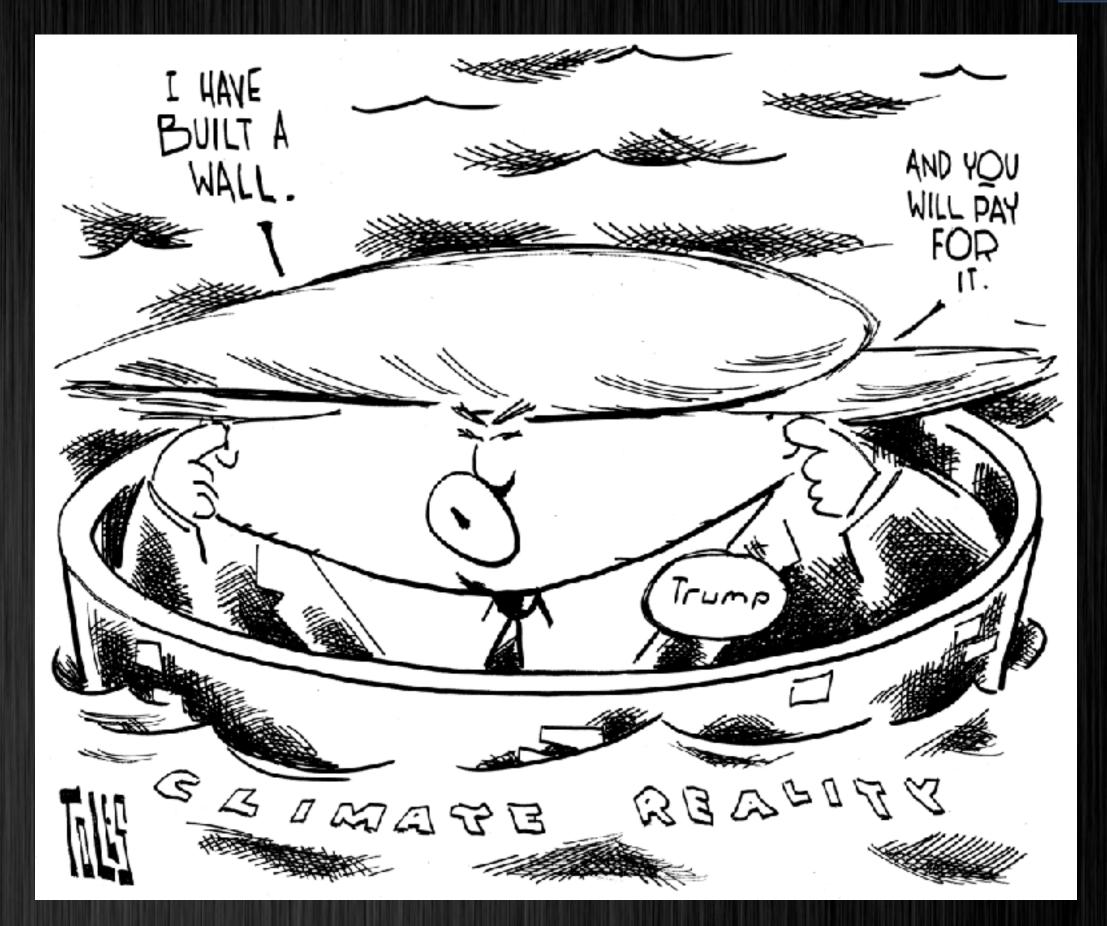




Michael E. Mann Director, Earth System Science Center Penn State University

Politecnico di Milano Milano, Italy June 18, 2018





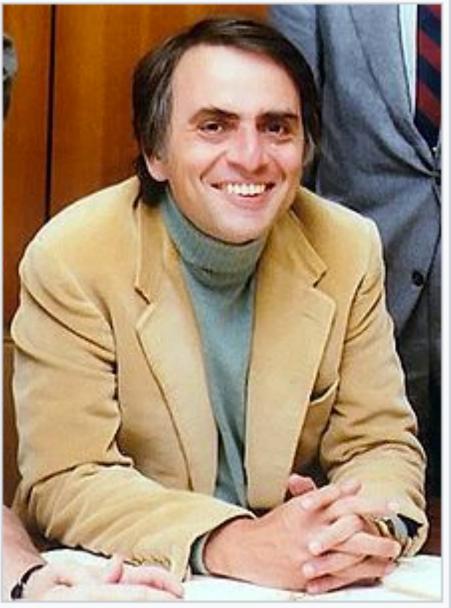
The monumental challenge of climate change after the Paris Agreement



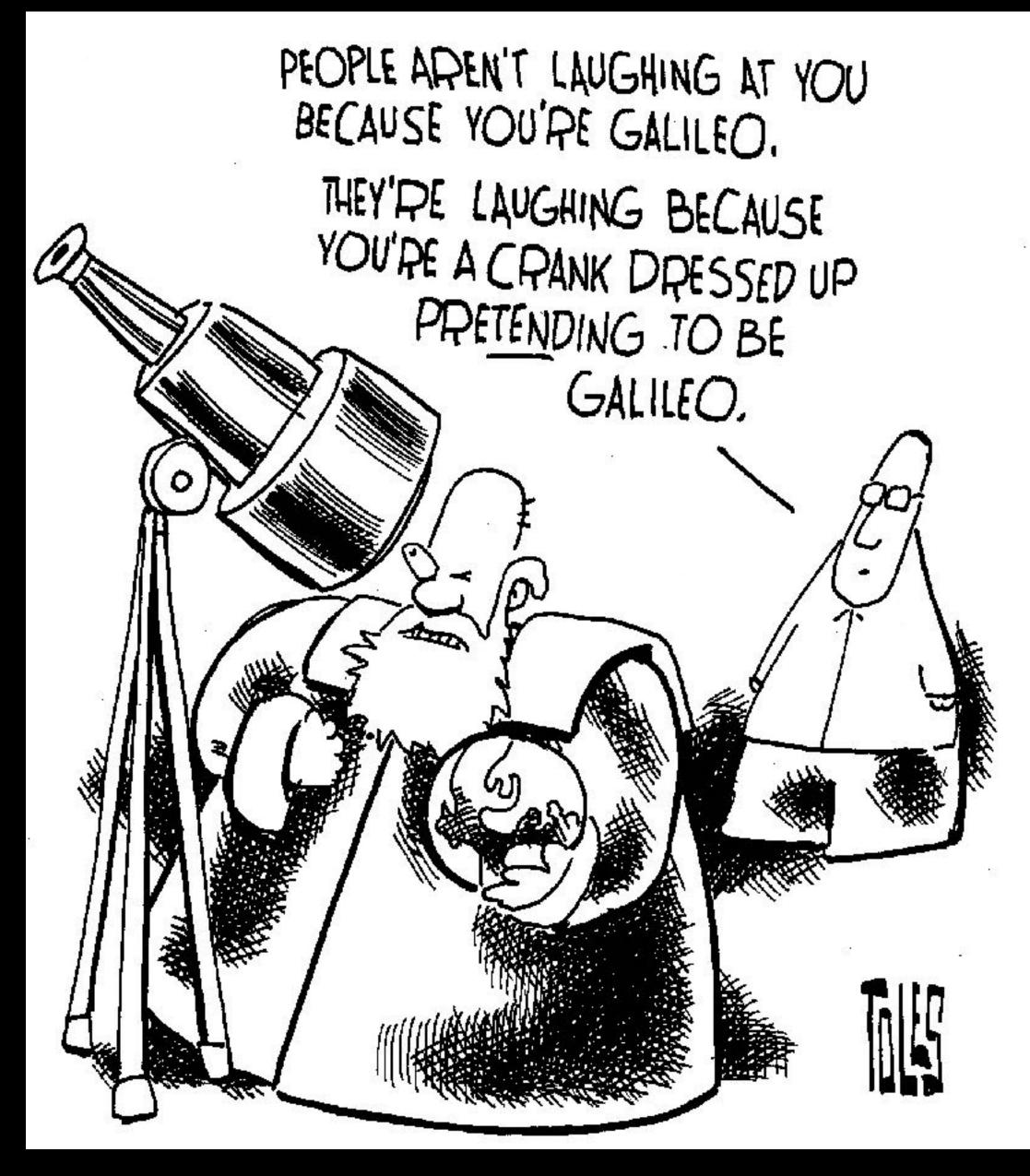
Michael E. Mann Director, Earth System Science Center Penn State University

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Chapter 1. Science: How It Works



The fact that some geniuses were laughed at does not imply that all who are laughed at are geniuses. They laughed at Columbus, they laughed at Fulton, they laughed at the Wright brothers. But they also laughed at Bozo the Clown.







11-15-10

False Balance

response to critics of Bret Stephens's op-ed on



Chapter 2. Climate Change: The Basics

"Next time you meet a climatechange denier, tell them to take a trip to Venus; I will pay the fare"



Consensus

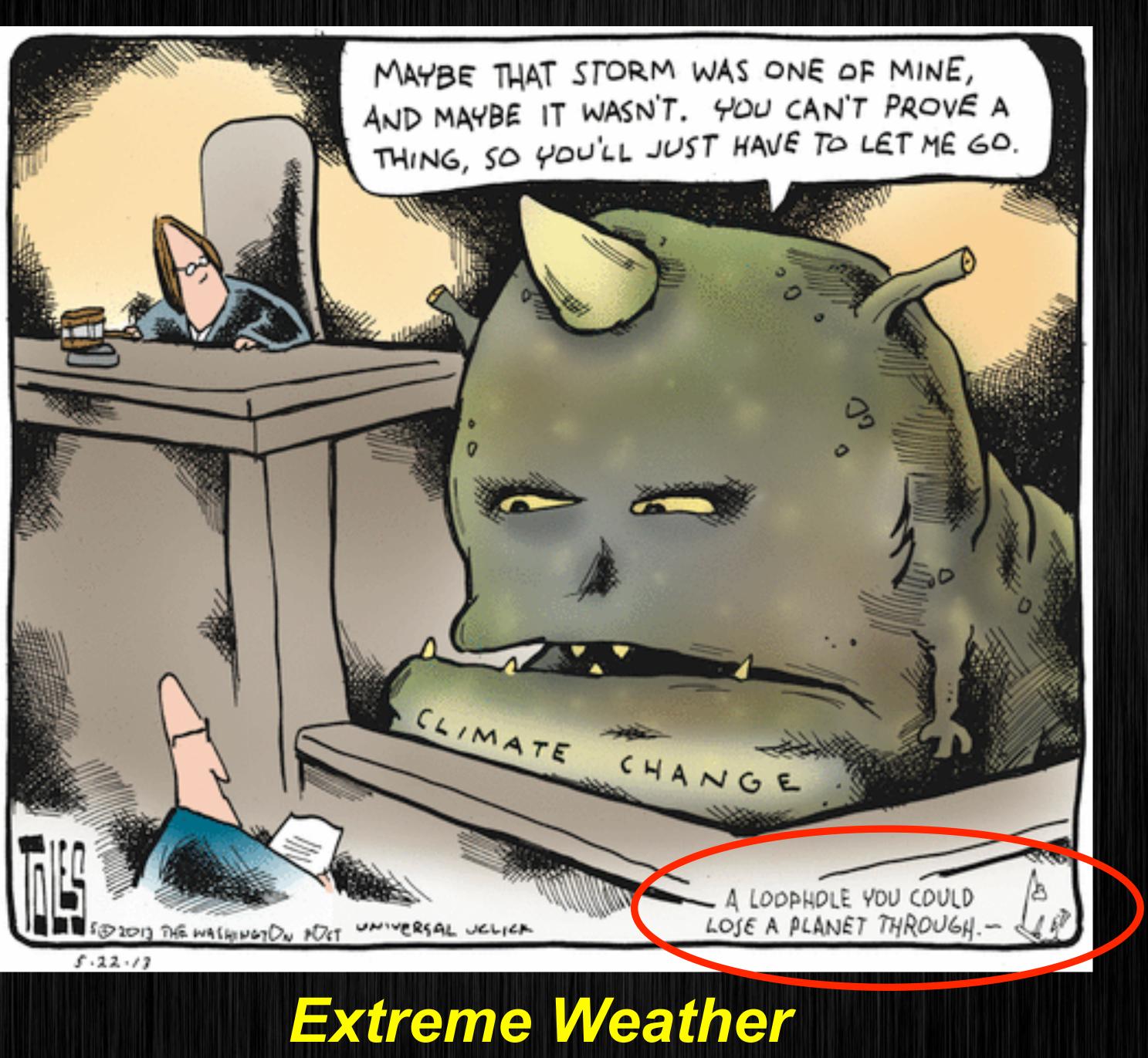


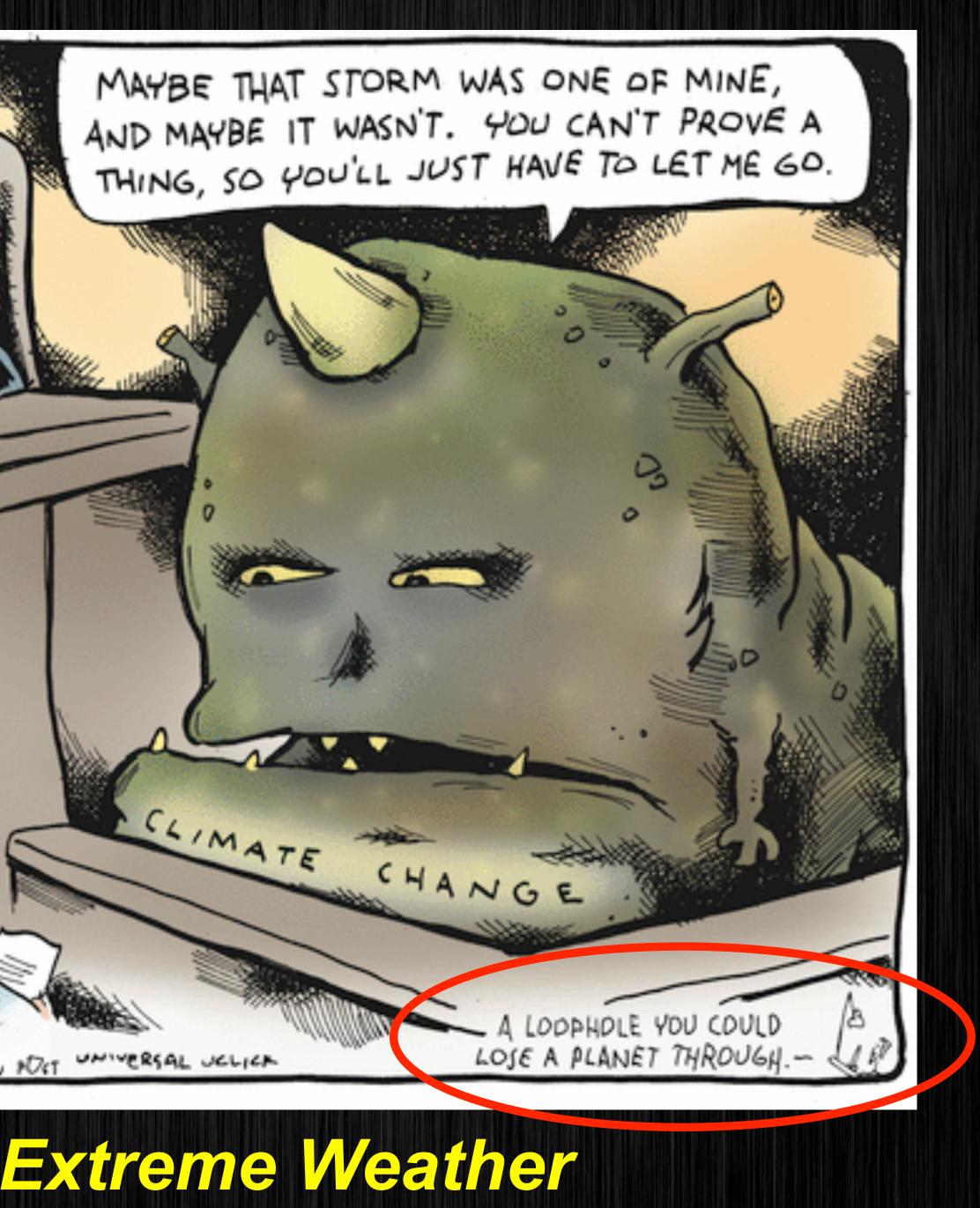




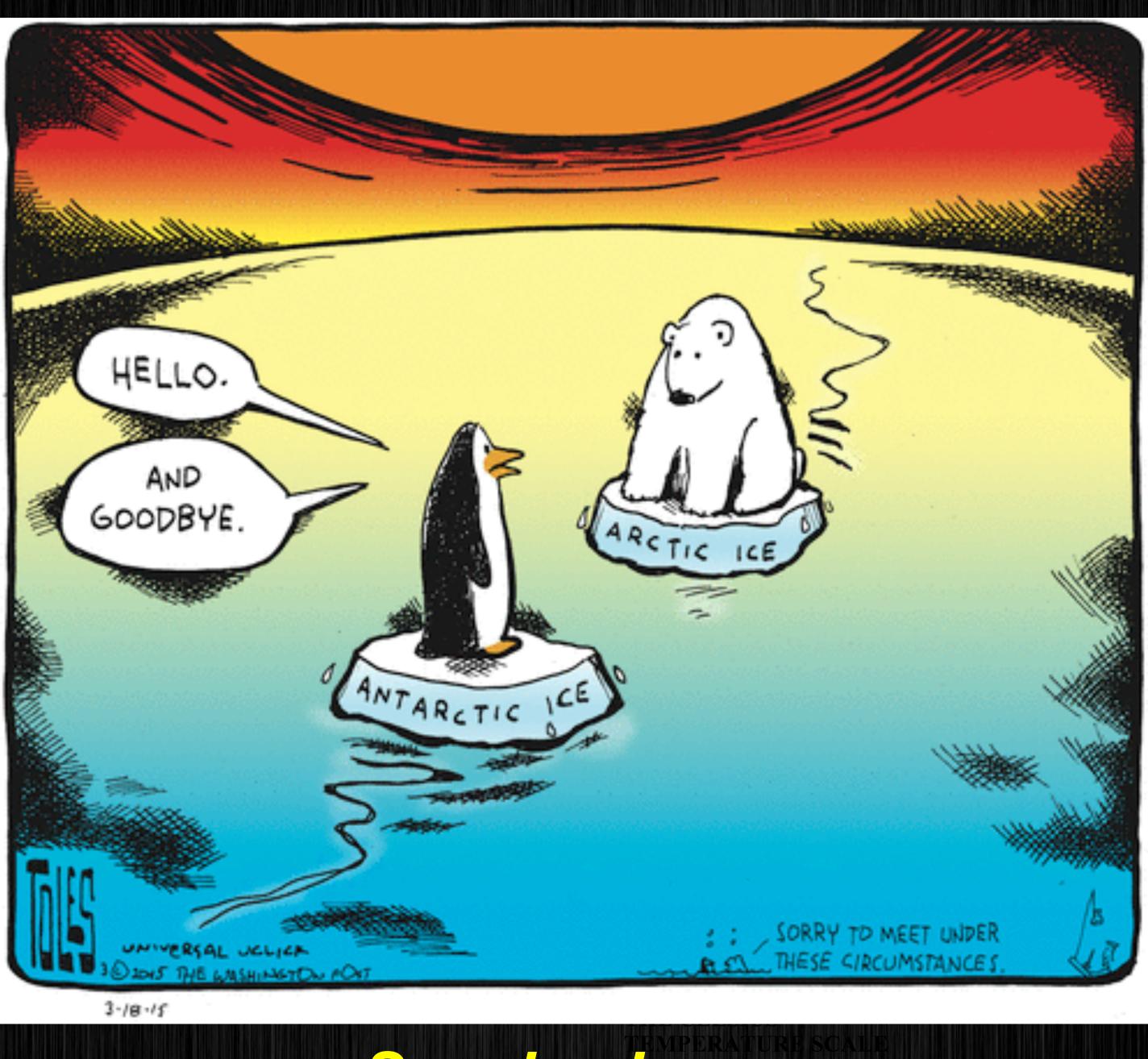








Chapter 3. Why Should I Give a Damn?

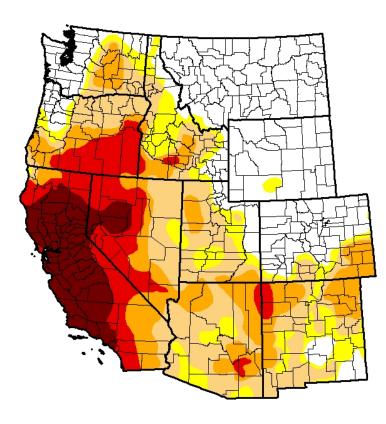


Species Loss





U.S. Drought Monitor West



December 2, 2014 (Released Thursday, Dec. 4, 2014) Valid 7 a.m. EST

	Drought Conditions (Percent Area)					
	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	34.32	65.68	55.16	34.01	18.98	8.45
Last Week 11/25/2014	34.72	65.28	54.99	33.88	18.75	8.45
3 Month s Ago 92/2014	28.38	71.62	57.74	40.04	20.16	8.90
Start of Calendar Year 1231/2013	22.20	77.80	51.44	31.11	7.75	0.63
Start of Water Year 930/2014	31.48	68.52	55.57	35.65	19.95	8.90
One Year Ago 123/2013	26.84	73.16	49.99	30.86	7.56	0.63

D0 Abnormally Dry D1 Moderate Drought D2 Severe Drought

The Drought Monitor focuse ocal conditions may vary. See acco r forecast statements.

Author: Anthony Artusa NOAA/NWS/NCEP/CPC



http://droughtmonitor.unl.edu

U.S. WORLD LOCAL POLITICS HEALTH



Geophysical Research Letters

AN AGU JOURNAL

Climate

Disappearing Arctic sea ice reduces available water in the American west

Jacob O. Sewall, Lisa Cirbus Sloan

Issue

Article first published online: 24 MAR 2004 DOI: 10.1029/2003GL019133

Copyright 2004 by the American Geophysical Union.



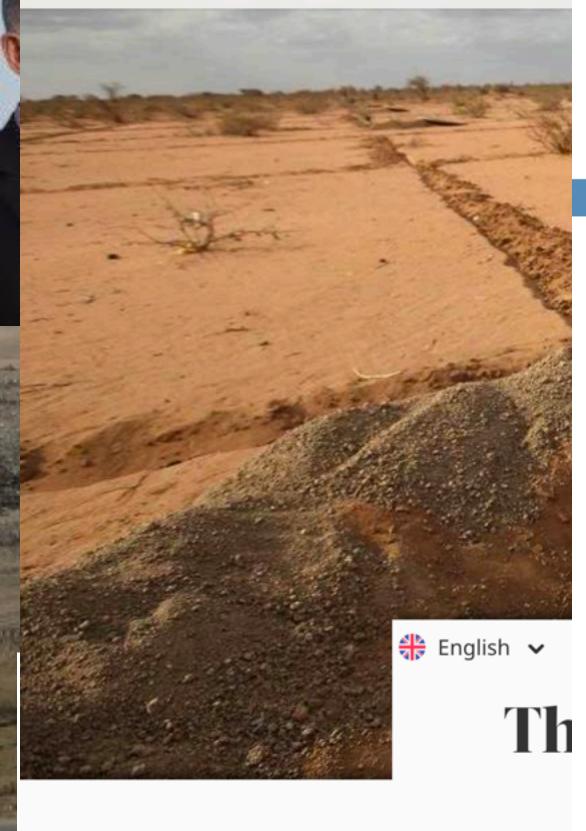
Geophysical Research Letters

Volume 31, Issue 6, March 2004



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ECONOMICS | POLITICS | TRADE WARS | THE EURO



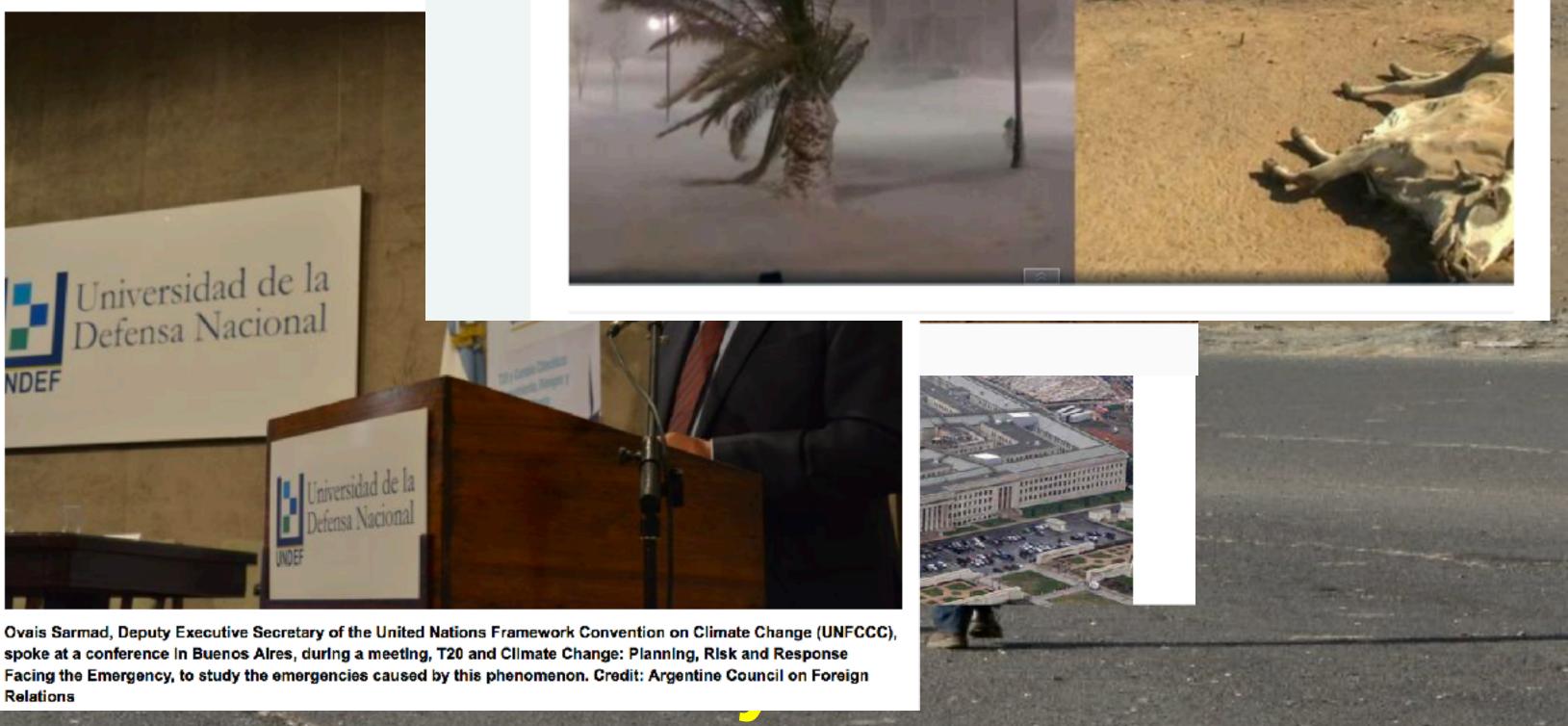


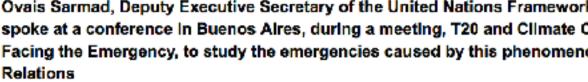
Climate Change, Development & Aid, Editors' Choice, Enviro Rights, IPS UN: Inside the Glasshouse, Migration & Refugee

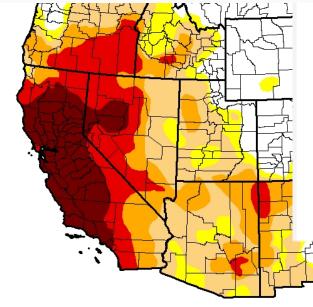
Will Climate Change Cause]

By Daniel Gutman

Reprint







🕑 @olliemilman

Wednesday 14 Septembe 00.01 EDT



http://droughtmoni

Newsweek

TECH & SCIENCE

NUMBER OF AFRICAN MIGRANTS WILL DOUBLE **BY 2050 AND CLIMATE CHANGE WILL MAKE IT** WORSE

BY DANA DOVEY ON 6/4/18 AT 12:34 PM



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ECONOMICS | POLITICS | TRADE WARS | THE EURO

Italy's New Populist Government Turns Away Ship With 600 Migrants Aboard

EUROPE

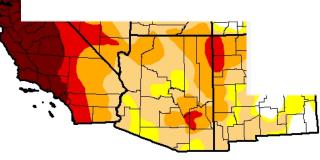
The New Hork Times



The populist Italian government refused to allow a rescue boat carrying hundreds of migrants from across Africa to dock in the country. Spain later offered to accept the ship. June 11, 2018 • Image by Karpov, via Reuters

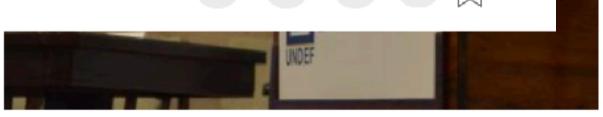
By Gaia Pianigiani, Jason Horowitz and Raphael Minder

June 11, 2018





http://droughtmo



Ovais Sarmad, Deputy Executive Secretary of the United Nations Framework spoke at a conference in Buenos Aires, during a meeting, T20 and Climate Change: Planning, Risk and Response Facing the Emergency, to study the emergencies caused by this phenomenon. Credit: Argentine Council on Foreign Relations

Newsweek



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UAE NEWS BUSINESS SPORT OPINION LEISURE LIFE&STYI

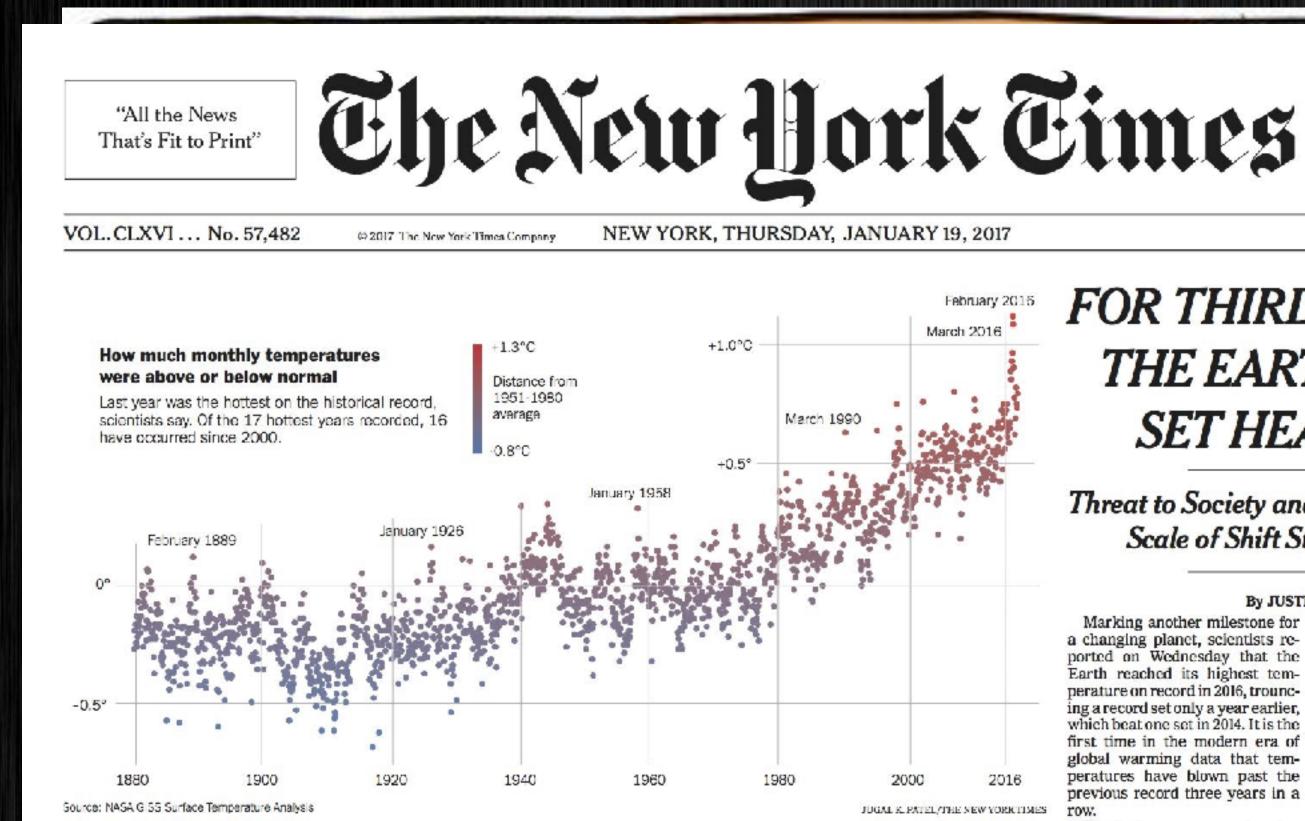
Refugee crisis on the menu as Macron meets Italian leader

Under the EU's Dublin Agreement, which is currently up for review, refugees hoping to apply for asylum must do so in the first country they enter





Chapter 4. The Stages of Denial



In Farewell, Obama Sets Red Lines That Would Pull Him Back

By MICHAEL D. SHEAR and PETER BAKER

WASHINGTON - When President Obama arrived in office eight years ago, the departing President George W. Bush essentially withdrew from public life, declaring that his successor "deserves my silence." It was an approach that Mr. Obama greatly appreciated but does not intend to follow.

At the final news conference of his presidency, Mr. Obama made clear on Wednesday that he finds some ideas advanced by President-elect Donald J. Trump so alarming that he laid out markers that would draw him back into the fray.

"There's a difference between

that normal functioning of politics and certain issues or certain moments where I think our core values may be at stake," Mr. Obama told reporters in the White House briefing room.

Mr. Obama continued: "I put in that category if I saw systematic discrimination being ratified in some fashion. I put in that category explicit or functional obstacles to people being able to vote, to exercise their franchise. I'd put in that category institutional efforts to silence dissent or the press. And for me at least, I would put in that category efforts to round up kids who have grown up here and for all practical purposes are American kids, and send them someplace else, when they love this Pledge to Re-enter Fray When 'Core Values May Be at Stake'

country."

All of his red lines seemed to refer to positions taken in the past by Mr. Trump, foreshadowing the possibility of a periodic clash of ideas over the next four years between current and past presidents. Unlike Mr. Bush, who retreated to Dallas, Mr. Obama plans to move just two miles from the White House after Friday's inauguration, the first president to stay in Washington after leaving

office since Woodrow Wilson. Mr. Obama did say he was looking forward to some quiet time and does not plan to stay involved in the hurly-burly of politics. He has told advisers and friends that he wants to be careful not to become such a regular public critic of Mr. Trump that he alienates the mercurial new president.

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LAST NOMINEE Sonny Perdue, ex-governor of Georgia, was picked for agriculture. PAGE AI5

Late Edition

Today, partly sunny, milder in the afternoon, high 50. Tonight, partly cloudy, low 37. Tomorrow, some sunshine, then clouds, showers late, high 46. Weather map, Page A28.

Since the election, the depart-Continued on Page All

HEALTH HEARING Representative Tom Price was vague on the Affordable Care Act. PAGE AI5

FOR THIRD YEAR, THE EARTH IN 2016 SET HEAT RECORD

Threat to Society and Nature Is Rising -Scale of Shift Startles Scientists

By JUSTIN GILLIS

gases.

Marking another milestone for a changing planet, scientists reported on Wednesday that the Earth reached its highest temperature on record in 2016, trouncing a record set only a year earlier, which beat one set in 2014. It is the first time in the modern era of global warming data that temperatures have blown past the previous record three years in a row

The findings come two days before the inauguration of an American president who has called global warming a Chinese plot and vowed to roll back his predecessor's efforts to cut emissions of heat-trapping gases.

In reality, the Earth is heating up, a point long beyond serious scientific dispute, but one becoming more evident as the records keep falling. Temperatures are heading toward levels that many experts believe will pose a profound threat to both the natural world and to human civilization.

In 2015 and 2016, the planetary warming was intensified by the weather pattern known as El Niño, in which the Pacific Ocean released a huge burst of energy and water vapor into the atmosphere. But the bigger factor in setting the records was the long-term trend of rising temperatures, which scientists say is being driven by increasing levels of carbon dioxide and other greenhouse

"A single warm year is something of a curiosity," said Deke Arndt, chief of global climate monitoring for the National Oceanic and Atmospheric Administration. "It's really the trend, and the fact. that we're punching at the ceiling every year now, that is the real indicator that we're undergoing big changes."

The heat extremes were especially pervasive in the Arctic, with temperatures in the fall running 20 to 30 degrees Fahrenheit above normal across large stretches of the Arctic Ocean. Sea ice in that region has been in precipitous decline for years, and Arctic communities are already wrestling with enormous problems, such as rapid coastal crosion, caused by the changing climate.

"What's going on in the Arctic is really very impressive; this year was ridiculously off the chart," said Gavin A. Schmidt, head of the Goddard Institute for Space Studies in Manhattan, a unit of the National Aeronautics and Space Administration that tracks global temperatures.

But Arctic people were hardly alone in feeling the heat. Drought and starvation afflicted Africa. On May 19, the people in the town of Phalodi lived through the hottest day in the recorded history of In-

Continued on Page A8

\$2.50



SCIENCE FOR THE CURIOUS

BLOGS



The record global warming streak of 2014-2016: a snowball's chance in hell that this was natural

By Tom Yulsman | August 11, 2017 1:30 pm

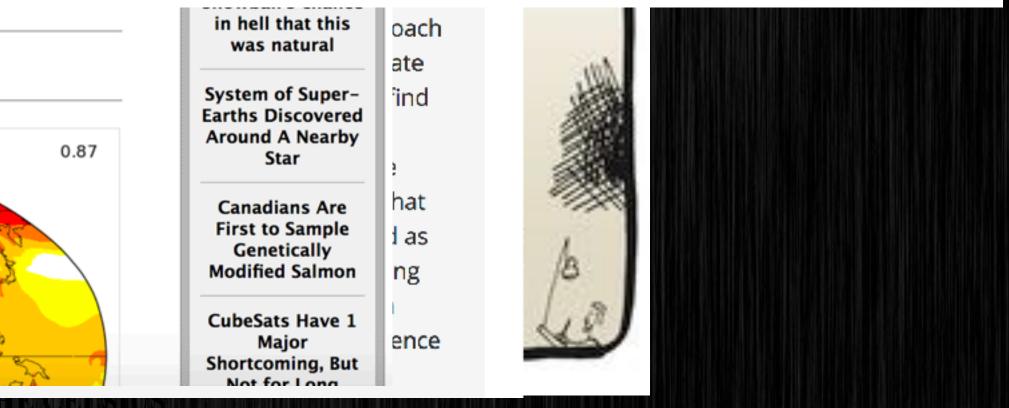
By Tom Yulsman | August 11, 2017 1:30 pm

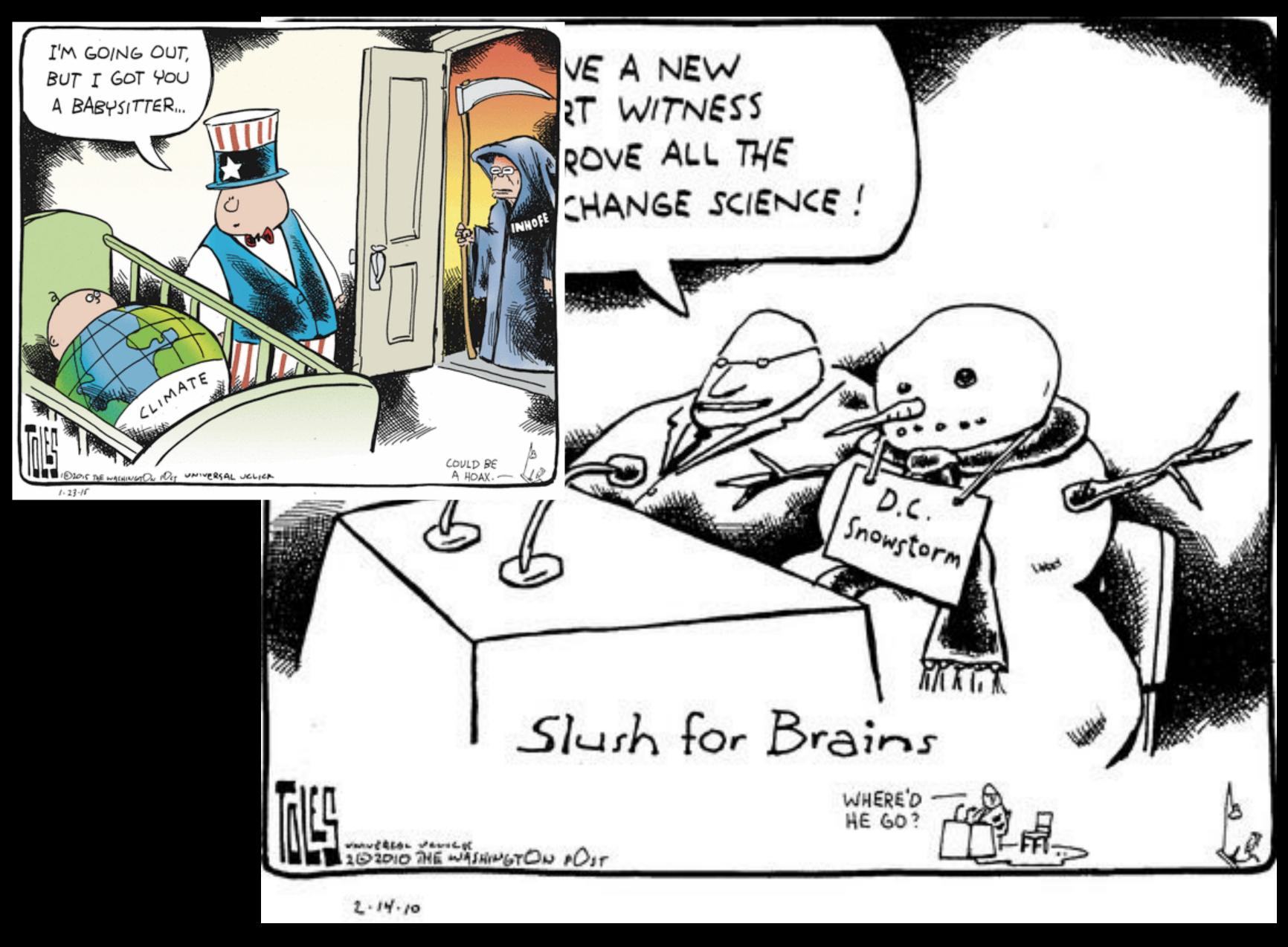
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Annual J-D 2014-2016

L-OTI(° C) Anomaly vs 1951-1980







"It's natural!"

A14 | Wednesday, May 23, 2028

OPINION

REVIEW & OUTLOOK

When Carter Page Met Stefan Halper

much the Fill asked to side up

2016, Some questions follow: who asked Mr. Halperto htep mbs on the Trump officials. Justice and the FBI. The inserts guto the cred-

the matter of the Federal Barreau of Investigation's on July II. Mr. Page confirms he met Mr. Helper dain that it dia't open an official countaria for the first time at the symposium.

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M ultiple means sources have now con-firmed that American academic Ste-ian halper is the "top secret" infor the Fin and academic ste-top infor The event was titled '2015's Race to Change

the World," and headlined the dueling perspectives of former Speretary of State Madeleine Aibright and former GOP Congnessman Vin Weber, Accord-

ing to the program, Mr. Halper ideked off the opening session

dam that it didn't optic an official countarian ielligence prote into Tractip-Russia collusing attai July 31, 2016. The accovers might elso about this mission, or if political shoer ing for the Chaton comparing sock as Flesce diseffician 1998 to 2004. As such the communication about this integers of the factors where the second As played a role One faystery scatters for Halper's internet. White contraction doubter doubter doubter contractopress the fays the state that the state to a fair of the state to a Overanstery concerns Mr. Halver's informe then used Thanp adde came from Tak level food These reported on Findly that Mr. Bober's con-text wait There calificate approach over after the Add Alexandro of the prote Heatory notes the Add Alexandro of the Alexandro of the Add Alexandro of the Alexandro o

A Right To Try Arrives

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to Trismo cumpation officials in A timeline that contradicts claims by Concession in which the

THE WALL STREET JOURNAL.

LETTERS TO THE EDITOR

Water's Rising Because It's Getting Warmer

ing The Sea is Rising, but Not Because of Climate Change" (op-ed, May 16).

No, ice is not accumulating on Earth-it is melting. No, Antarctica nesth, destabilizing the ice sheet. And no, legitunate scientific conclusions are not reached in op-ed pieces, but through careful peer-reviewed research.

That research shows that see levets are rising and human caused cliunte change is the cause. Don't take our word for it; help yourself to the mountain of scientific literature showing as much. When water warms, it expands. When ice warms, it melts. To depy these facts is not just to deny climate change. It is to Just to usely communications deny basic physics. New York City experienced an ad-

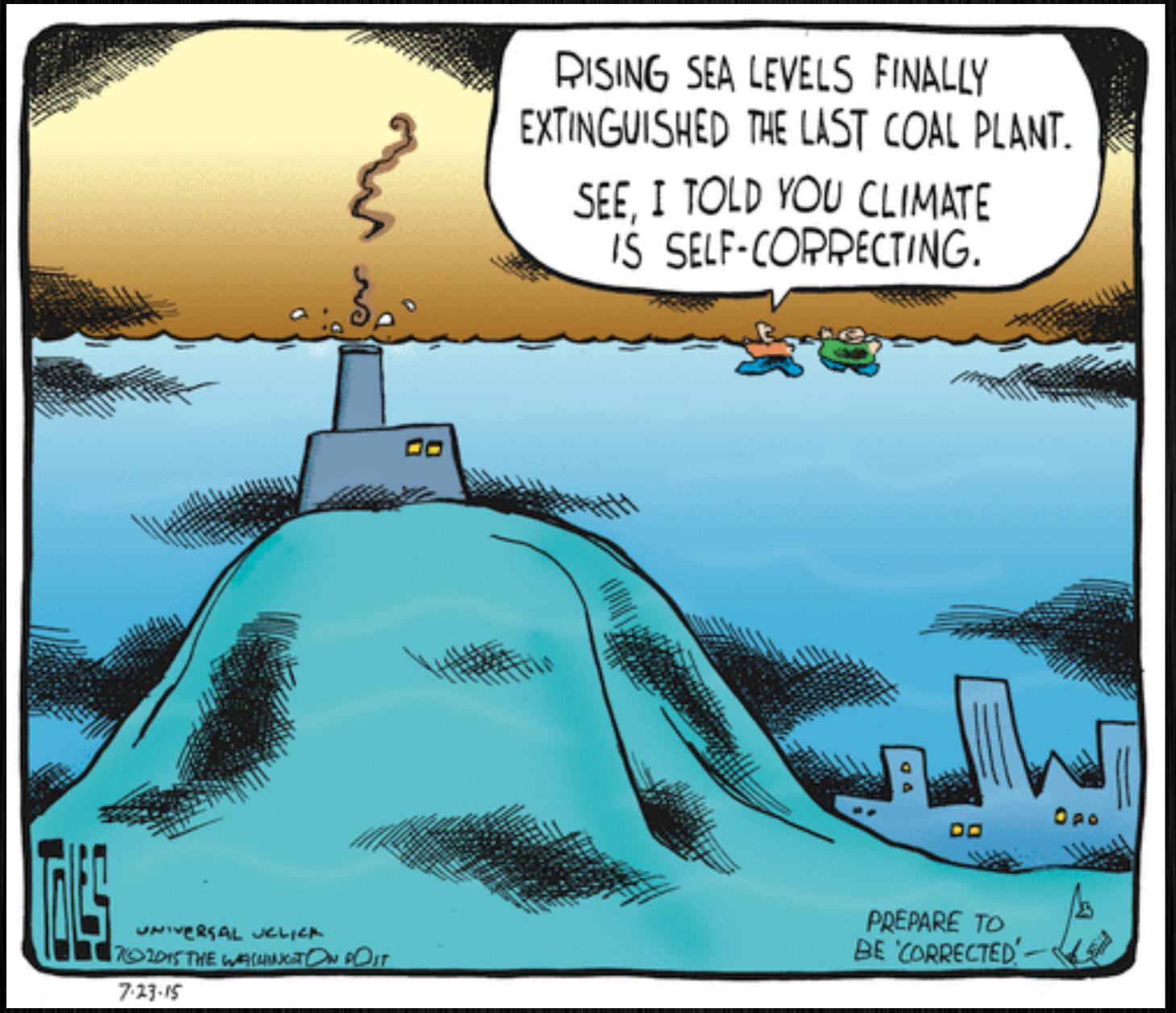
dhional 25 square miles of flooding from the epproximately one foot of sen-level rise that has occurred due sen-level rise that has occurred due to human-cansed warming. Without A unich as eight feet by the end of the nost of Wall Street Asser Pare 4

Would the Journal run the op-ed Sea-level rise has brought more fre-"Objects Are Failing, but Not Because quent flooding to dozens of coastal of Gravity"? That's pretty similar to communities, including Atlantic City, elimate contrarian Fred Singer say- N.J. and Charleston, S.G., where the number of floods has quadrupled since 1970. The pace of sea-level rise has recently doubled.

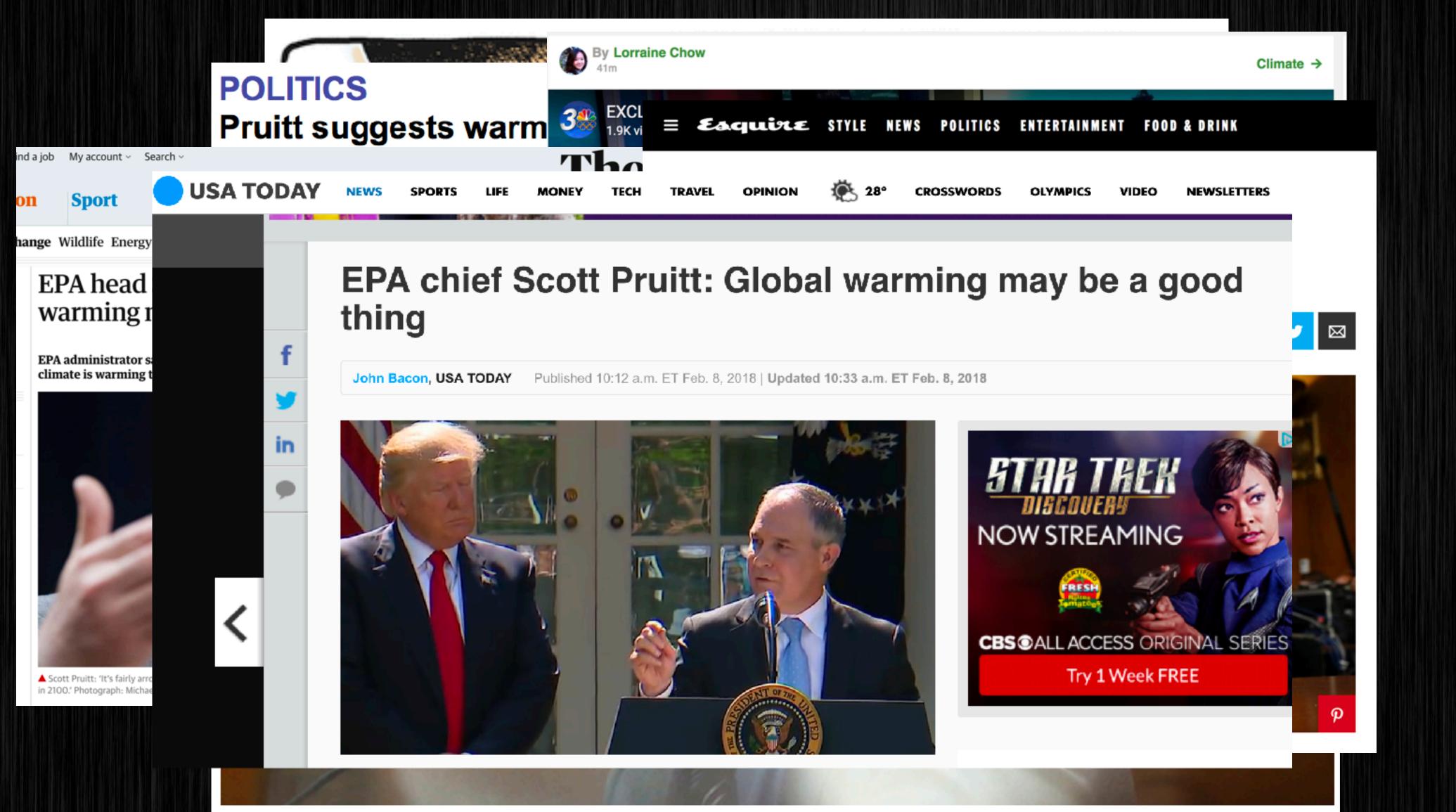
Mr. Singer acknowledges there's isart too cold for melting-warming in fact rising at an accelerating "good data showing sea levels are rate," yet makes the unscientific claim that this is disconnected from rising global-warming emissions and temperatures. The risks are clear. Sea-level rise projections for 2100 range from one foot to more than eight feet-far greater than the six inches Mr. Singer claims. Swiftly reducing our globalwarming emissions would give us the best chance to minimize sea-Jevel rise, but our current emissions trajectory makes achieving the range's low end more unlikely

Union of Concerned Scientists

NASA disagrees with Prof. Singer. Oakland, Calif. A Feb. 13 paper notes: "Rising concentrations of greenhouse gases in And Street And And A Durrow This, warner water expands of two ways ocean has contributed about half Earth's atmosphere increase the temperature of air and water, which causes sea level to rise in two ways. Prote Anosata L. Durrow this thermal expansion of the Gamesuite Fiz. the 2.8 inches (7 centimeters) of the Poor Micrae: E. Many global mean seatewal rise with of Gamesville Fiz the 2.8 inches (7 centimeters) of Four Monari E Man global mean sea level rise we've University Park Pa und melting land ice flows into the







EPA Administrator Scott Pruitt said yesterday that humans benefit from warmer temperatures. He's pictured in the Senate last week. Pablo Martinez Monsivais/Associated Press

"It's a GOOD thing!"

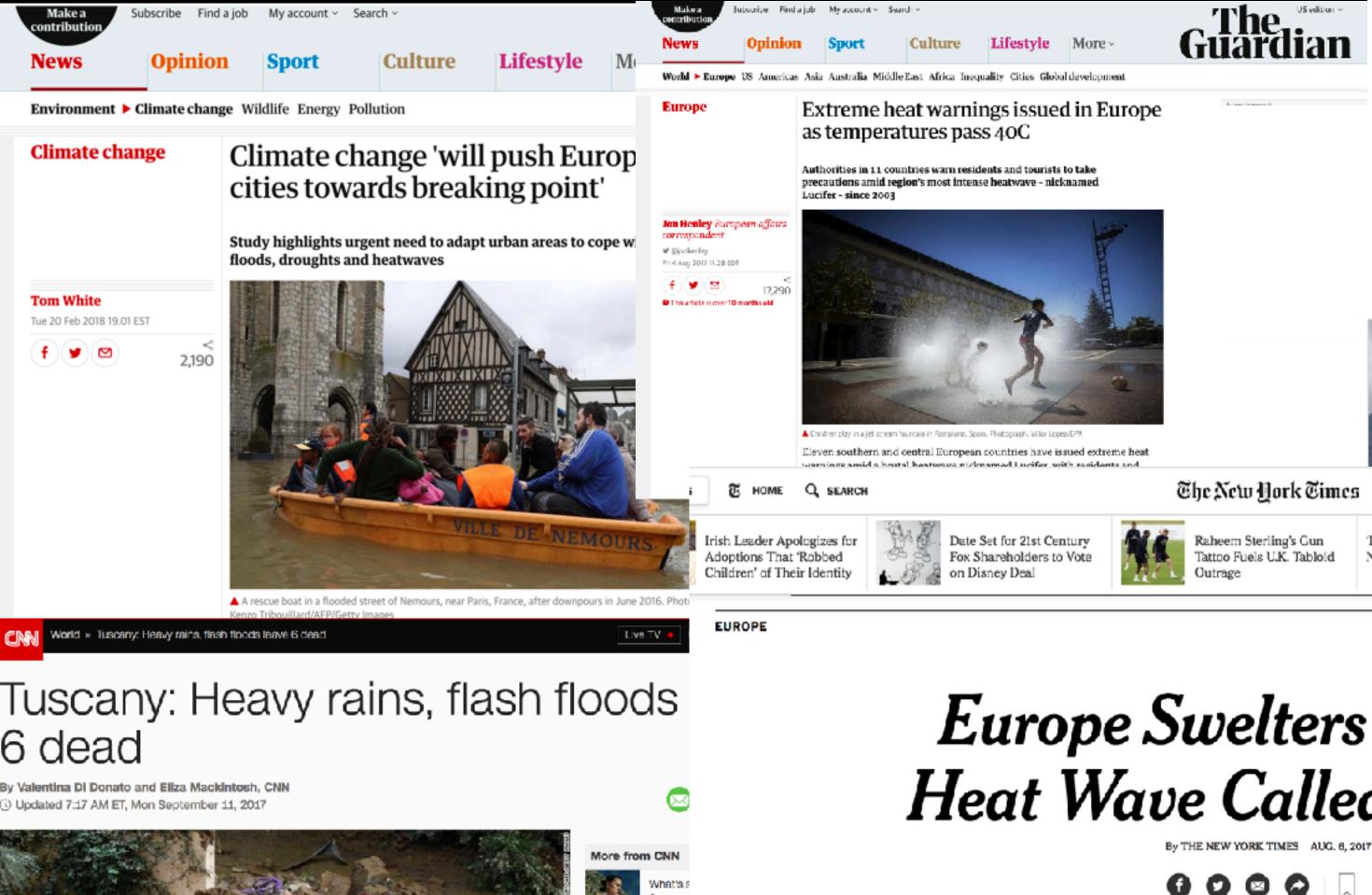


HAPPENING NOW SEARCH FOR SURVIVORS AFTER DEADLY 110545ES AT LEAST 17 KILLED AMID WIDESPREAD DEVASTATION

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100







nan plies wrecked furniture outside his home in the Livorno area, flooded after heavy rain, on September 10, 2017.

Rome (CNN) — At least six people have been killed and two are still missing after heavy rainstorms triggered severe flooding in Italy's Tuscany region over the weekend.

Four members of one family trapped in their basement apartment died in the city of Livorno, which has taken on the brunt of the flooding.

mazon





'Lucifer' heat wave holds Italy, eastern Europe in fiery grip

SARAJEVO/BELGRADE (Reuters) - Swathes of southern and eastern Europe sweltered in

has fanned forest fires, triggered weather warning alerts and damaged crops.

temperatures above 40 degrees Celsius (104°F) on Friday in a heat wave nicknamed "Lucifer" that

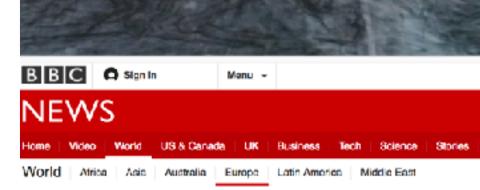
Maja Zuvela, Aleksandar Vasovic

4 MIN READ

'Dead' Russian Journalist Appears at News Conference in Ukraine

PAID PO Why Berli Europe's

Europe Swelters Under a Heat Wave Called 'Lucifer'





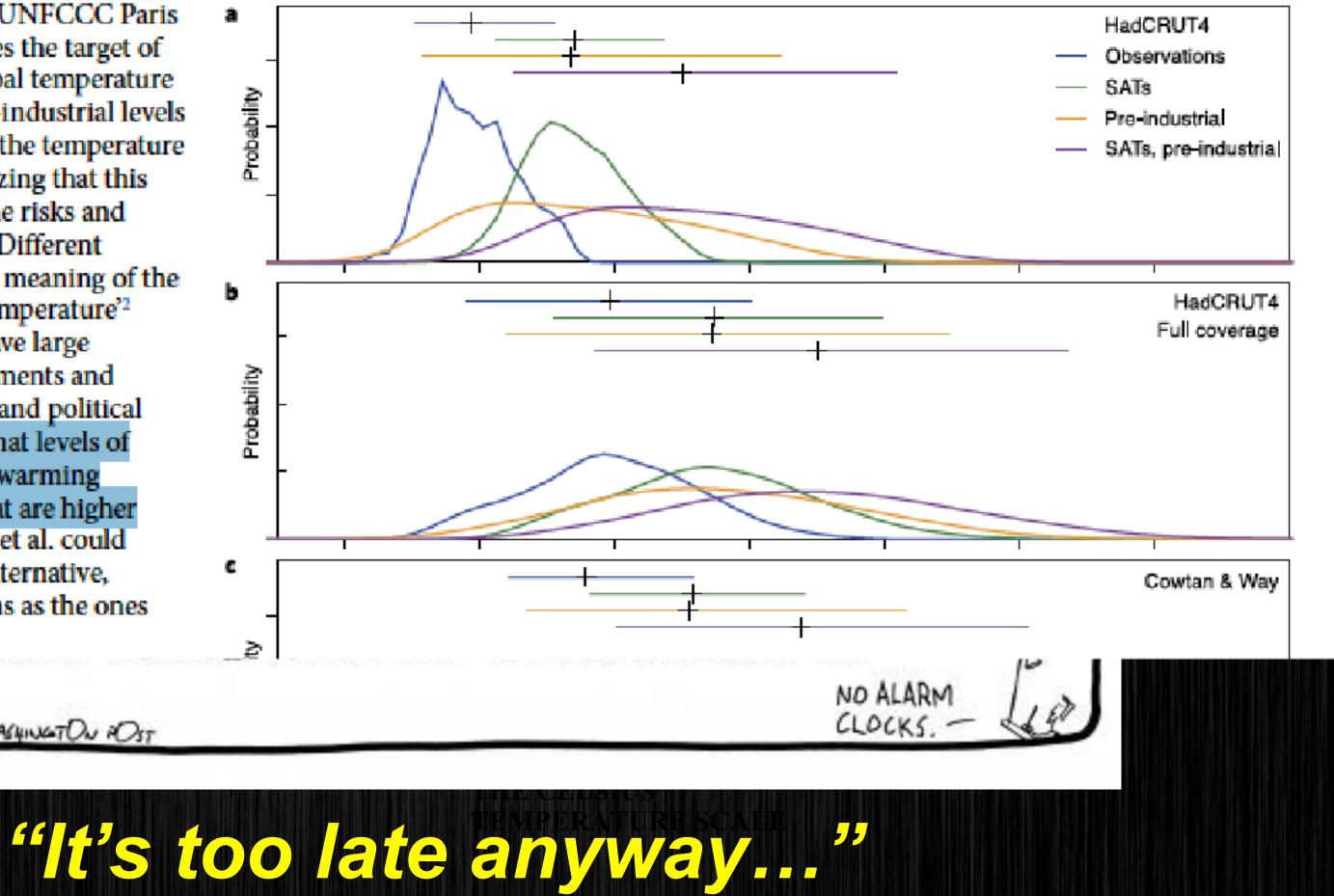
Italy drought: Rome forced to cut water pressure at night



NATURE GEOSCIENCE | www.nature.com/naturegeoscience

Interpretations of the Paris climate target

To the Editor — In the 2015 UNFCCC Paris Agreement, article 2 expresses the target of "Holding the increase in global temperature to well below 2 °C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5 °C ... recognizing that this would significantly reduce the risks and impacts of climate change"1. Different interpretations of the precise meaning of the phrases 'increase in global temperature'2 and 'pre-industrial'3 could have large effects on mitigation requirements and corresponding social, policy and political responses. Here we suggest that levels of current global mean surface warming since pre-industrial times that are higher than those derived by Millar et al. could have been calculated using alternative, but equally valid, assumptions as the ones made by those authors.



20 2014 THE WASHINGTON POST

correspondence

Chapter 5. The War on Climate Science



Chapter 6. Hypocrisy—thy name is Climate Change Denial





EDITORIALS University of Virginia should fight the Va. attorney general's inquiry The Washington Post

VIRGINIA A decided to m climate scien should coope

ATTORNEY GENERAL KEN

EDITORIALS

U-Va. should fight Cuccinelli's faulty investigation of Michael Mann The Washington Post

Friday, May 7, 2010

WE KNEW Virginia Attorney General Ken Cuccinelli II (R) had declared war on reality. Now he has declared war on the freedom of academic inquiry as well. We

Thursday, May 13, 2010

EDITORIALS

U-Va. admirably resists Mr. Cuccinelli's fishing expedition The Washington Post Saturday, May 29, 2010

The Washington Post

AII MARK

AFTER WEEKS of consideration, the University of Virginia has decided to fight Virginia Att

EDITORIALS

A judge puts a damper on Mr. Cuccinelli's U-Va. witch hunt

Tuesday, August 31, 2010

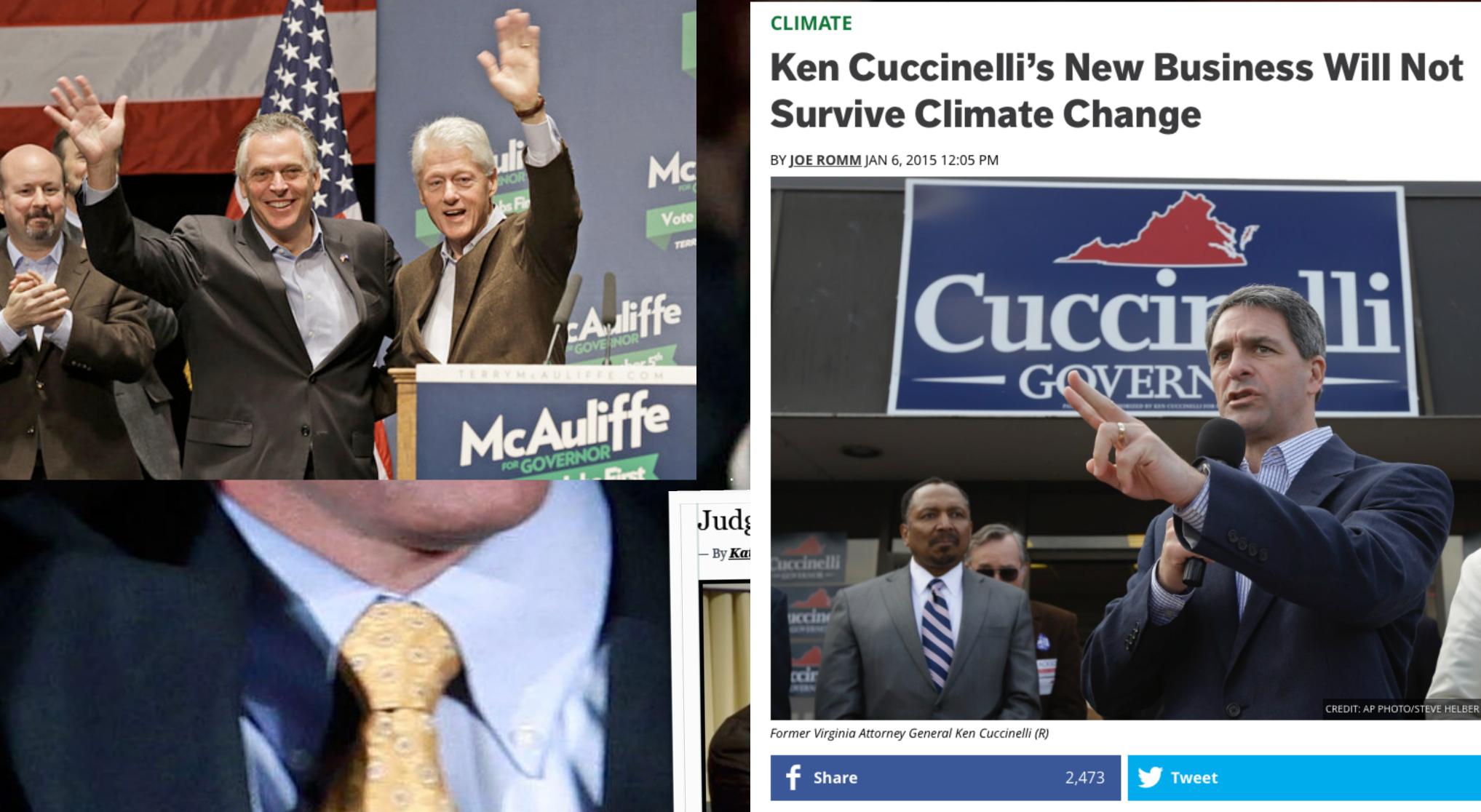
EARLY TIHS YEAR, climate-change skeptics went on the attack, pointing to two molehills of scandal that they claimed were towering peaks of scientific malfeasance. One was "Climategate," in which skeptics used highly selective excerpts of stolen e-mails in an effort to discredit some well-known scientists. The other was the identification of errors in the last assessment of the Intergovernmental Panel on Climate Change (IPCC) -the canon of the international consensus on global warming -- particularly a dubious prediction that Himalayan glaciers would disappear by 2035.



ATTORNEY GENERAL KEN CUCCINELLI, VIRGINIA







ATTORNEY GENERAL

– Phote /photos/l

What's the next step for a science-denying former politician? Launch a new business venture that will be utterly destroyed by human-caused climate in the coming decades. And if you wanted to pick a business venture that would be the most vulnerable to climate change, you could hardly do better then Ken Cuccinelli's new oyster farm on super-low-lying Tangier Island, Virginia. climate scientist.

Chapter 7. Geoengineering, or "What could possibly go wrong?"

Energy and Environment

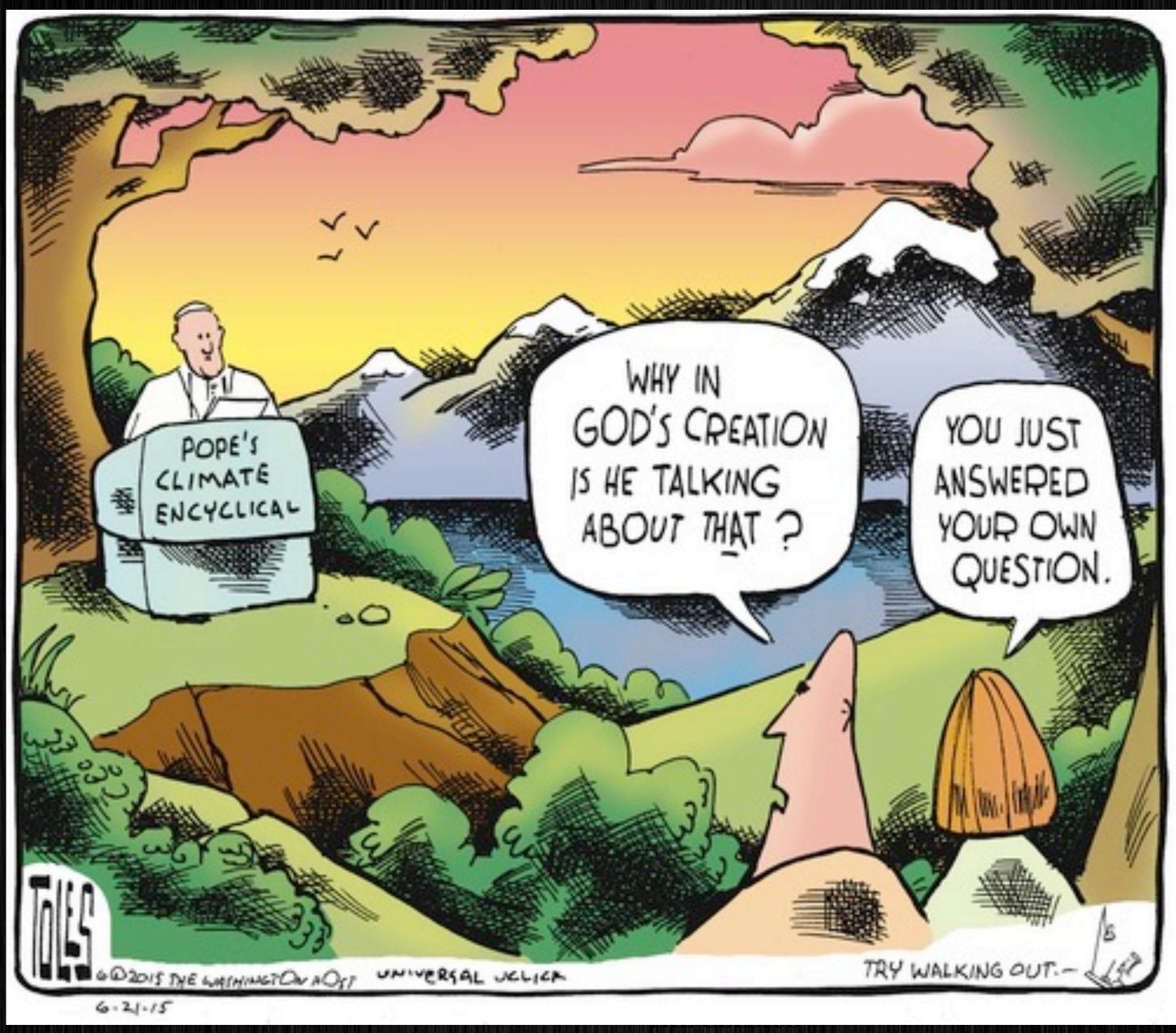
Rex Tillerson's view of climate change: It's just an 'engineering problem'

By Chris Mooney December 13 at 4:45 PM 🔽



Rex Tillerson, ExxonMobil chairman and chief executive, during the 2015 Oil and Money conference in central London. (Ben Stansall/AFP/Getty Images)

Chapter 8. A Path Forward

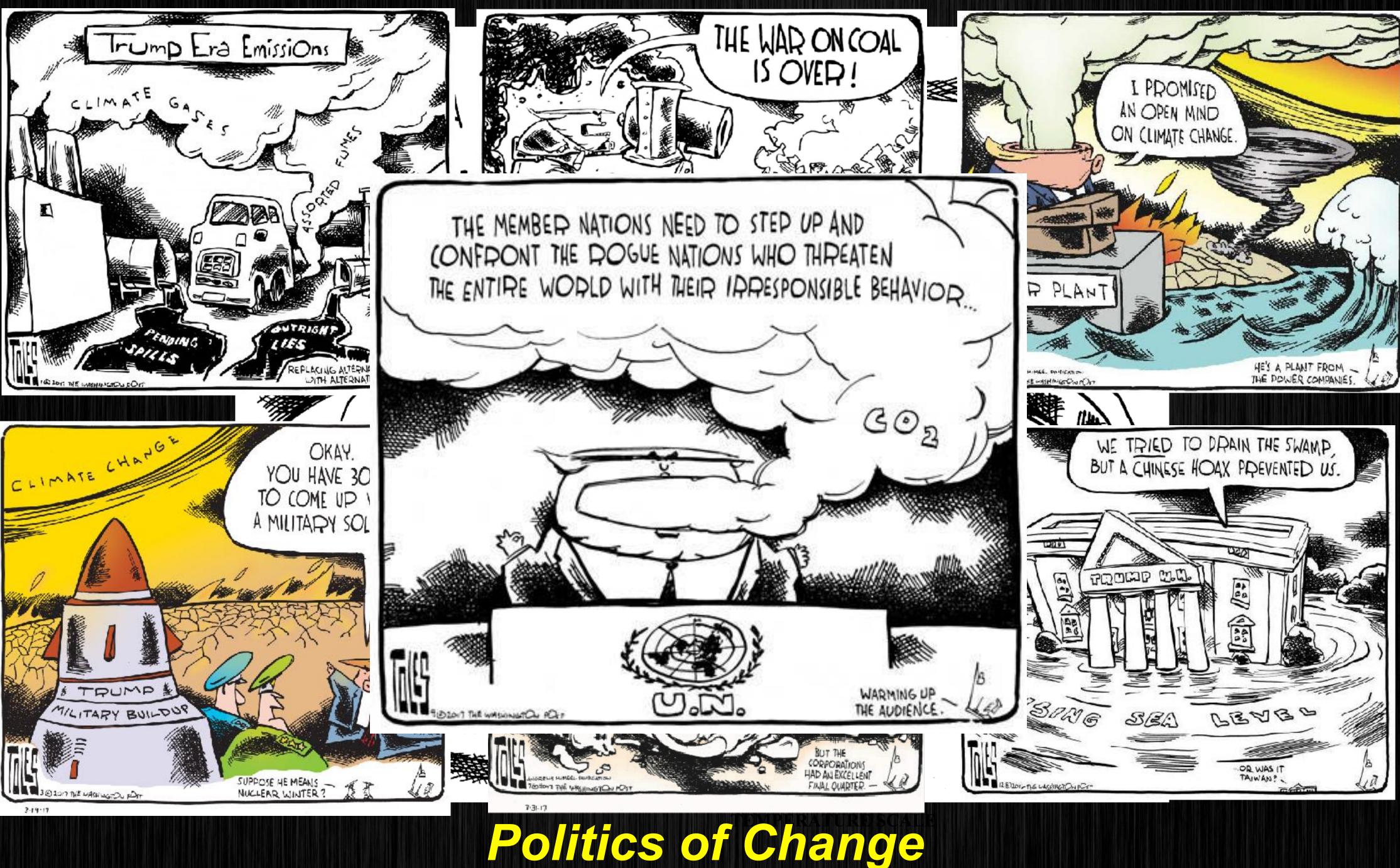


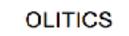




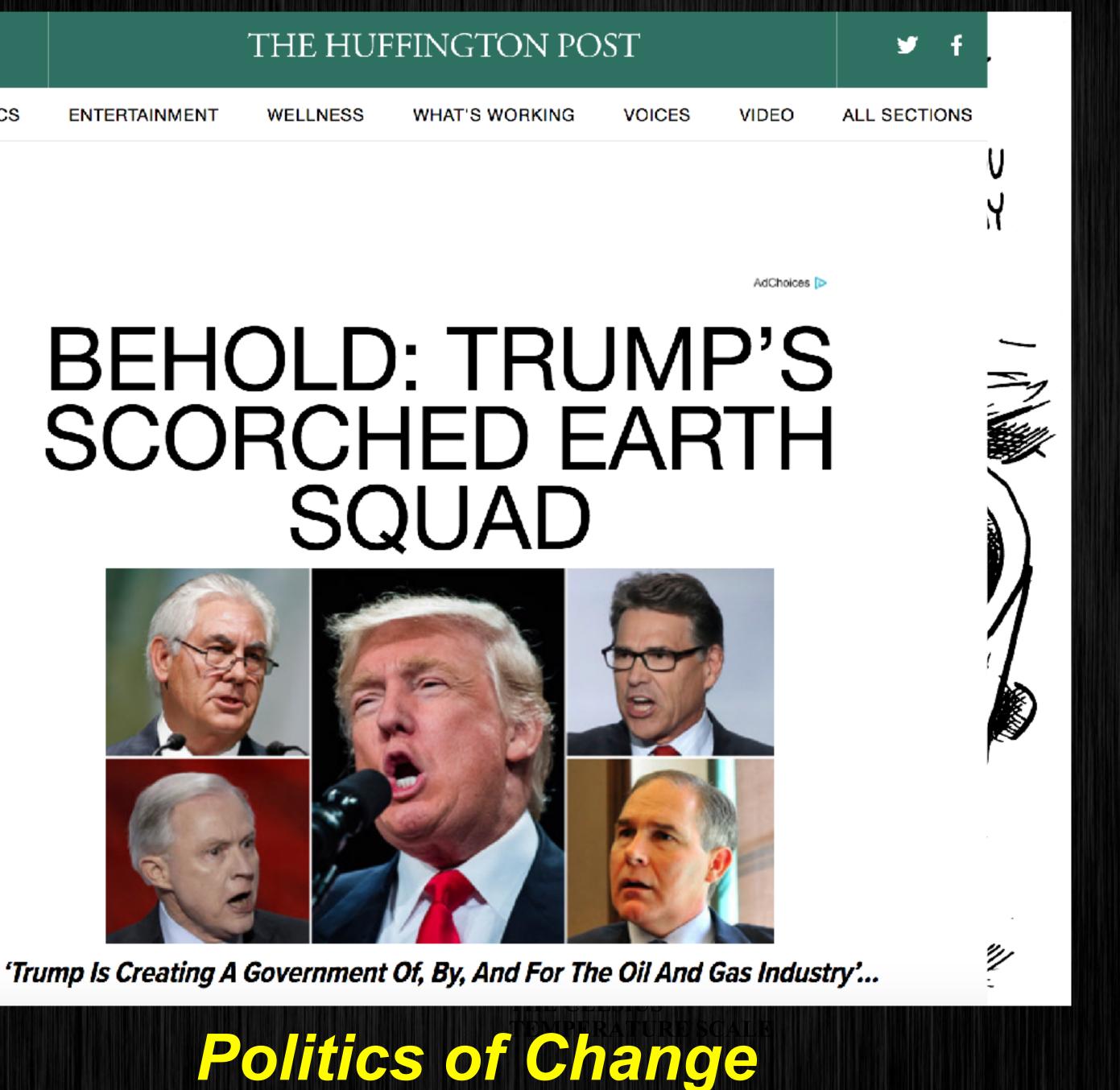
Global Cooperation









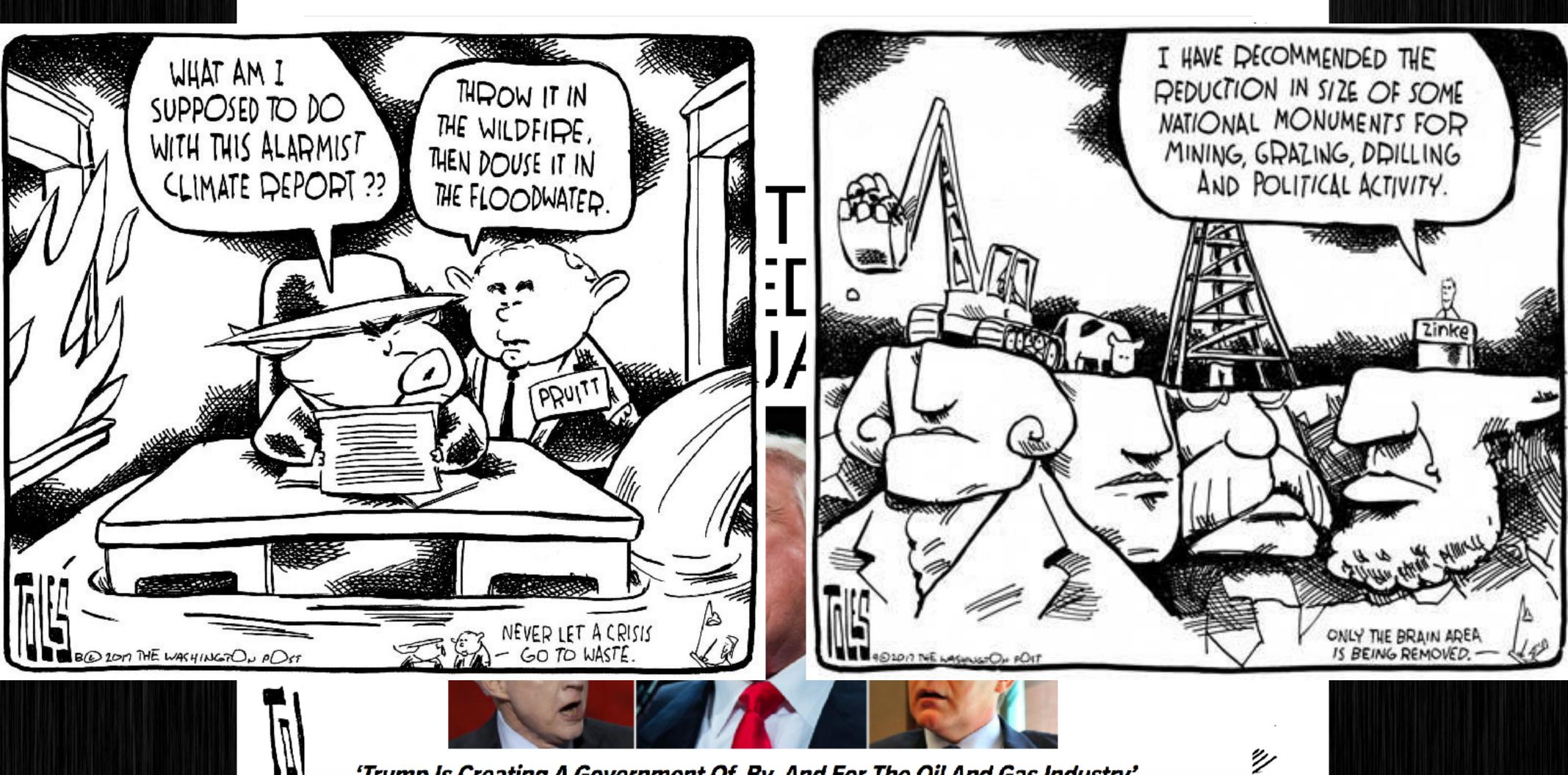


THE HUFFINGTON POST

WELLNESS

OLITICS

ENTERTAINMENT



'Trump Is Creating A Government Of, By, And For The Oil And Gas Industry'...

WHAT'S WORKING VOICES

VIDEO

ALL SECTIONS



THE HUFFINGTON POST

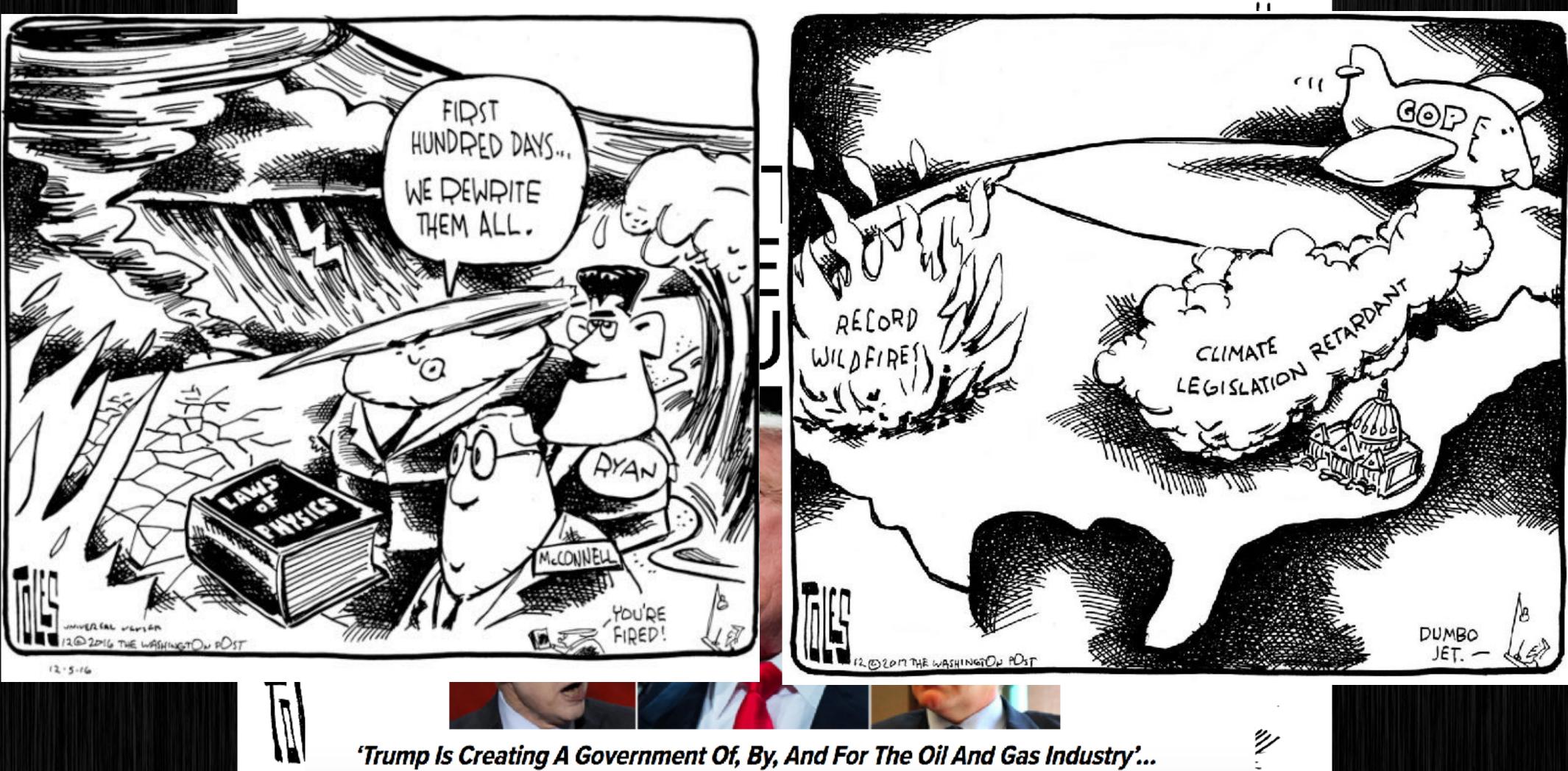
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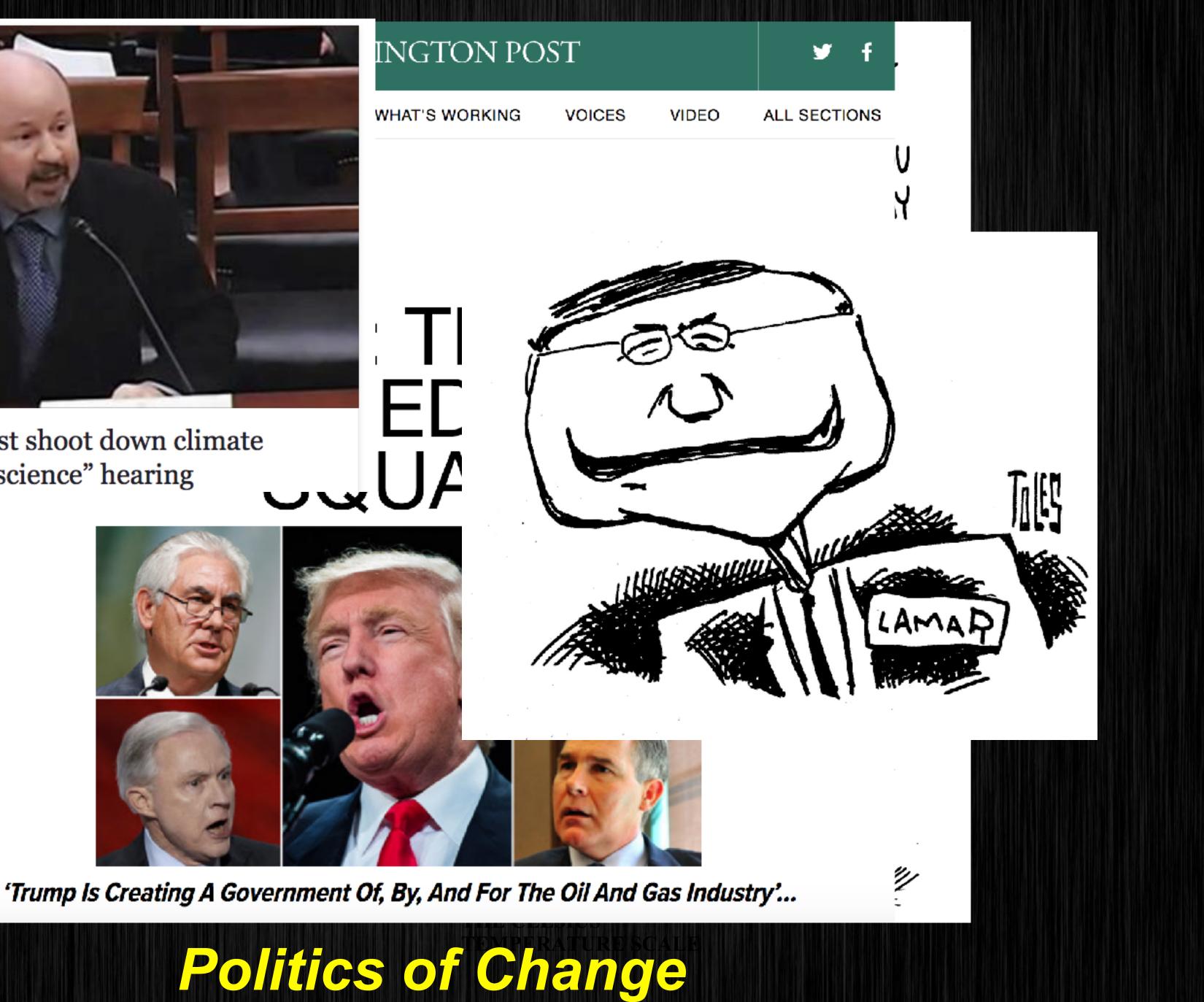


Politics of Change



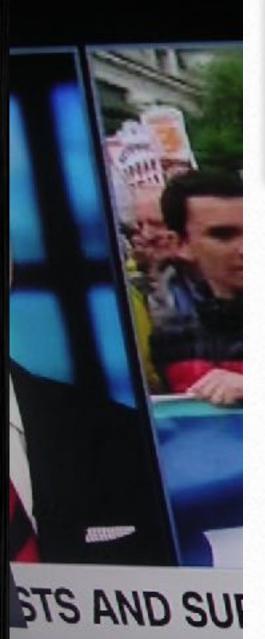
Watch real climate scientist shoot down climate "skeptic" at GOP's sham "science" hearing





Gov. McAuliffe: Virginia will join U.S. climate alliance

Erin Patterson, WVEC 1:07 PM. EDT June 06, 2017





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RICHMOND, Va. (AP/WVEC) - Virginia Gov. Terry McAuliffe is joining a coalition of 11 other governors who say they are committed to meeting the goals of the Paris Climate Agreement.

McAuliffe said on Monday that Virginia is joining the U.S. Climate Alliance, despite President Donald Trump's decision to

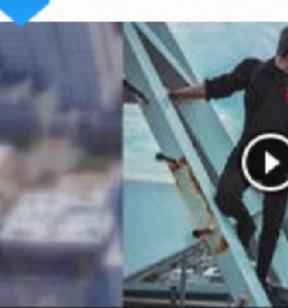
withdraw the federal government.

His statement:

"As the first state in the Trump era to take executive action to limit carbon emissions and create clean energy jobs, Virginia is proud to join the Climate Alliance. President Trump's announcement to withdraw the United States from the Paris Climate Agreement does not speak for the states and cities that are committed to fighting climate change and paving the way for a new energy economy. If the federal government insists on abdicating leadership on this issue, it will be up to the American people to step forward -- and in Virginia we are doing just that."



TRENDIN

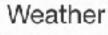


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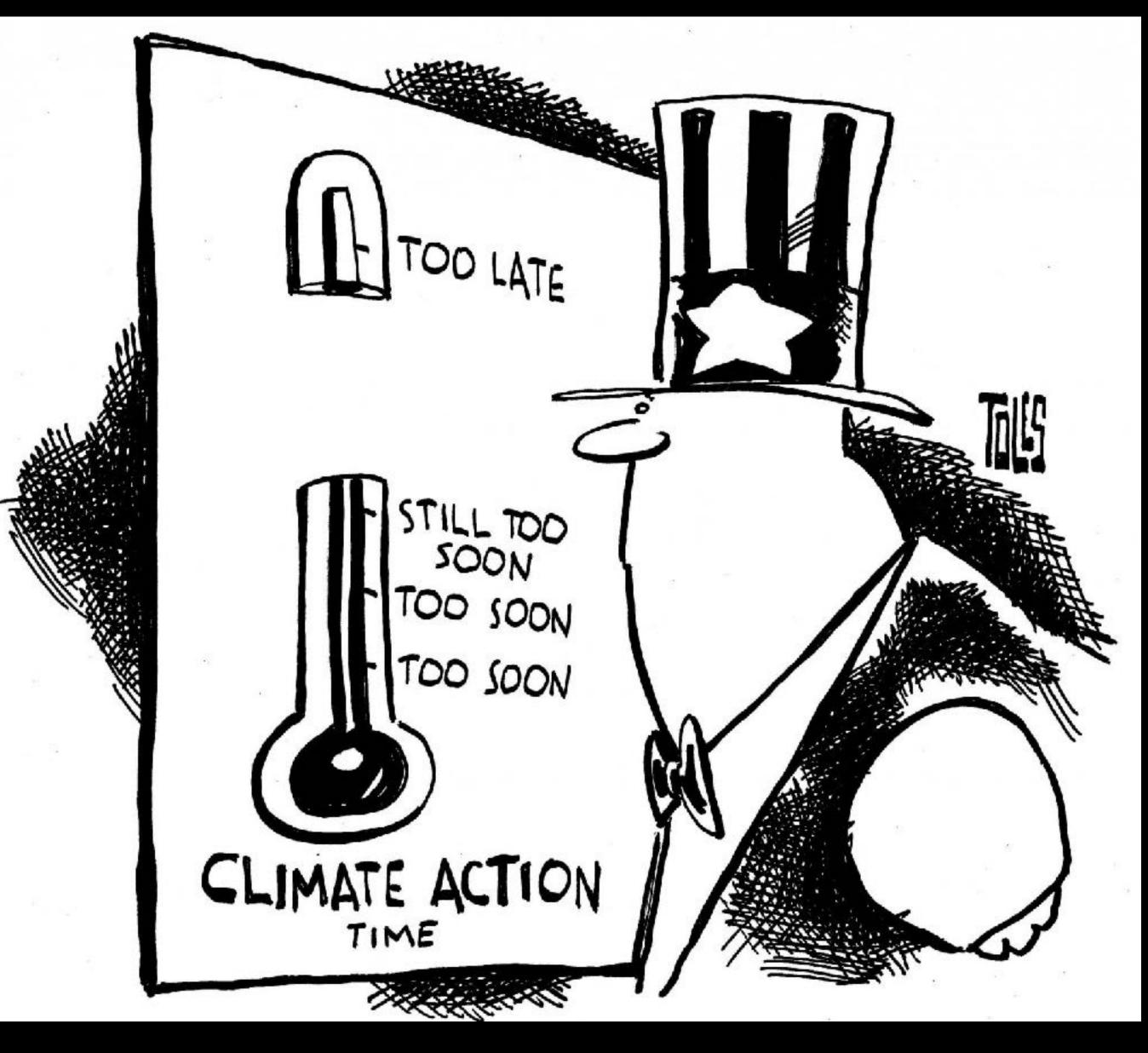


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The Dangers of Defeatism



Earth In the Balance

