

Who Bears the Burden of Climate Inaction?

Clausing, Knittel and Wolfram

Discussion by Wolfram Schlenker

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Brookings - September 26, 2025

Motivation

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 - ▶ Is it already **affecting the US today**?
 - ▶ Are there **differences across groups / regions**?

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 - ▶ Traditionally, EPA only measures domestic benefits and cost
 - ▶ Wildfire smoke, a significant component, crosses borders
 - ▶ Contributes to the debate on political support for climate legislation
 - ▶ Recent work that highlights that experiencing a changing climate influences attitudes
 - ▶ E.g., Bombardini, Finan, Longuet-Marx, Naidu, and Trebbi (WP, 2025)

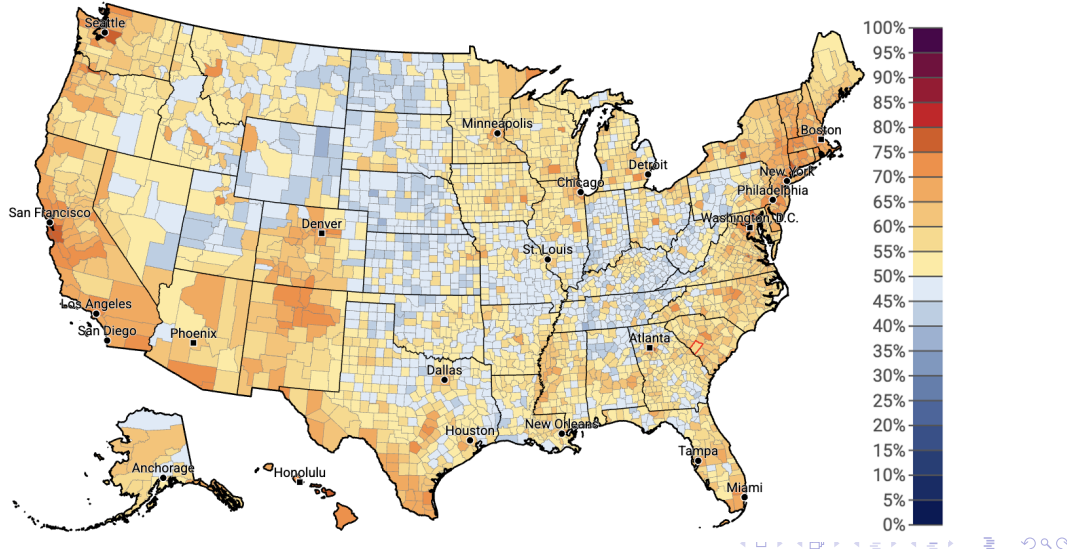
Motivation

Dechezleprêtre et al (AER, 2025) - Question: "Climate Change Is an Important Problem"



Motivation

Yale Program on Climate Change Communication. Q: "Worried about Global Warming"



Four Discussion Points

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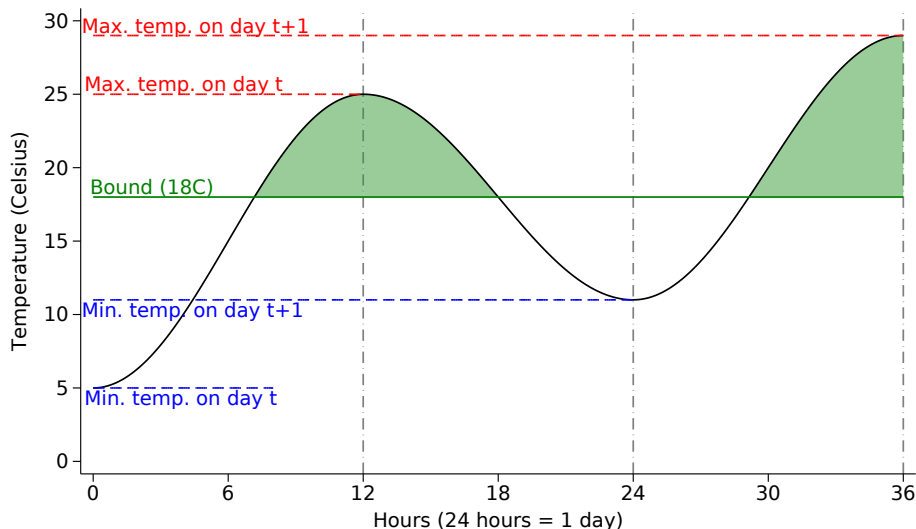
1. Trends in climatic variables have been very heterogenous
 - ▶ Minimum temperature has increased more than maximum temperature
 - ▶ Midwest has even seen a decrease in maximum summertime temperature
2. Sector-specific comments
 - ▶ Flood / hurricane damage: US is an outlier
 - ▶ Wildfire smoke: $PM_{2.5}$ from wildfires more toxic
 - ▶ Mortality from heat: mitigating the effect through forecasts and cooling centers
3. Two other sectors not covered that might be significant
 - ▶ House prices (forward-looking) - large present value changes due to changes in flood risk
 - ▶ Amenity value of climate
4. Trends versus cycles
 - ▶ 2020-2024 (last five years) saw strong La Nina

Discussion Point 1

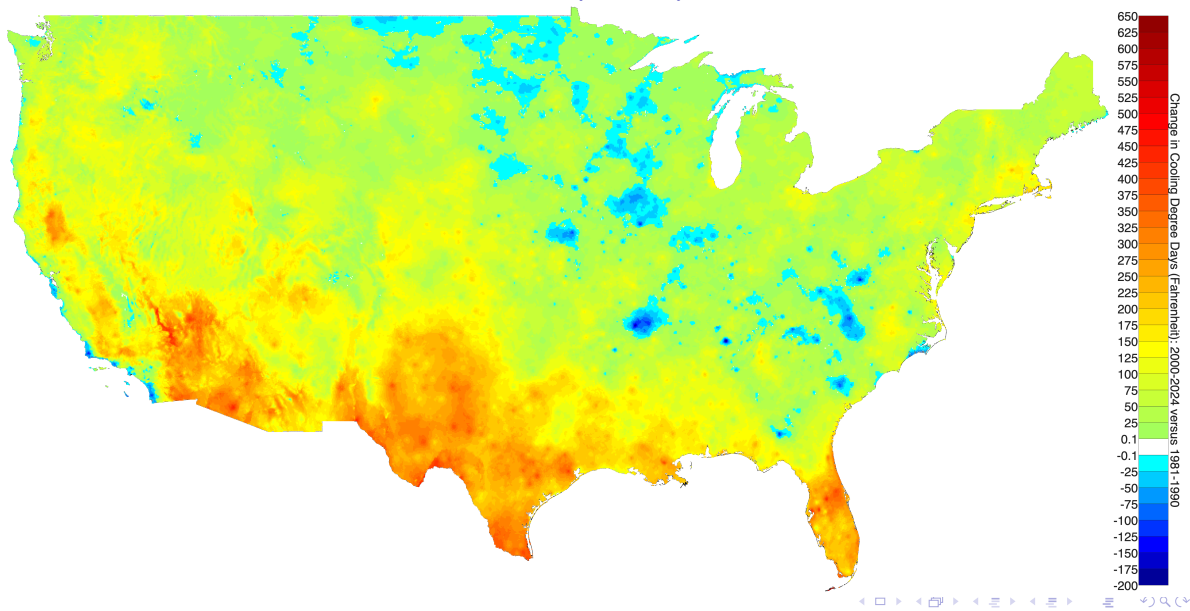
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Concept of Degree Days

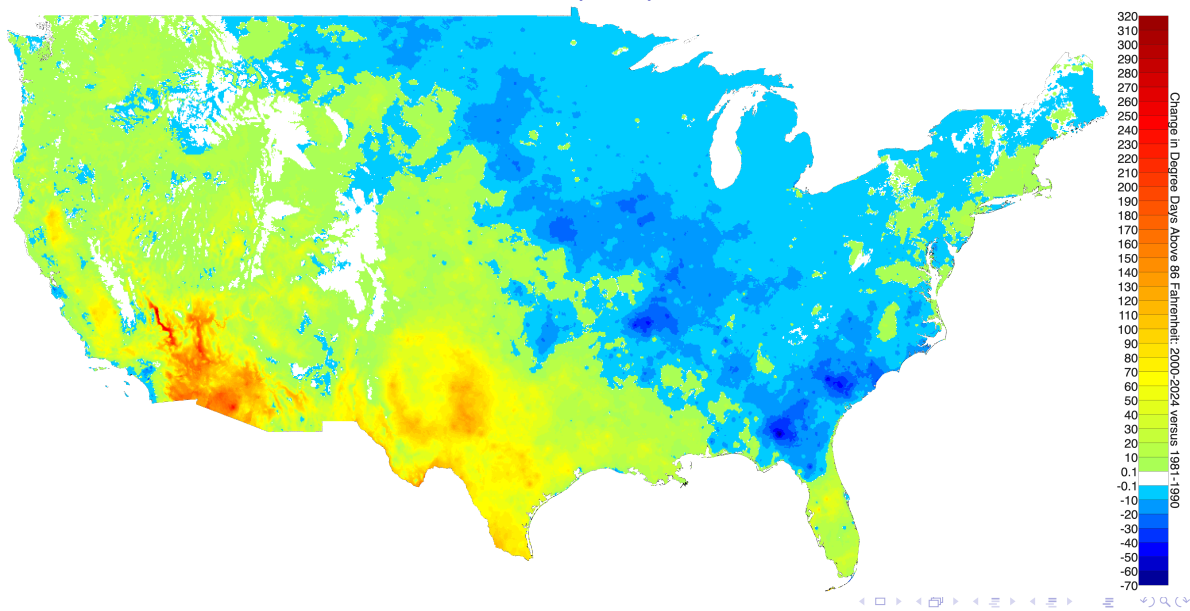
Measures how long and by how much temperatures exceed / fall below threshold



Change in Degree Days Above 65F (18.3C): 2020-2024 vs 1981-1990



Change in Degree Days Above 86F (30C): 2020-2024 vs 1981-1990



Reasons for Decline in Summertime Maximum Temperature Debated

[nature](#) > [nature climate change](#) > [articles](#) > article

Article | Published: 12 October 2015

Cooling of US Midwest summer temperature extremes from cropland intensification

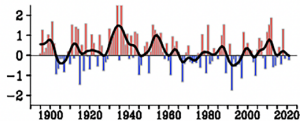
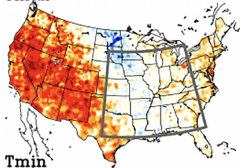
[Nathaniel D. Mueller](#) , [Ethan E. Butler](#), [Karen A. McKinnon](#), [Andrew Rhines](#), [Martin Tingley](#), [N. Michele Holbrook](#) & [Peter Huybers](#)

[Nature Climate Change](#) **6**, 317–322 (2016) | [Cite this article](#)

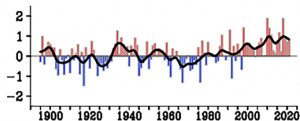
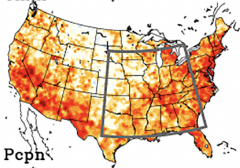
- ▶ Mueller et al. (NCC, 2016)
 - ▶ ag: increased planting density
 - ▶ plants transpire (corn sweat)

Reasons for Decline in Summertime Maximum Temperature Debated

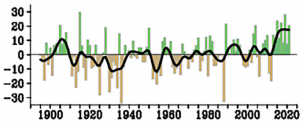
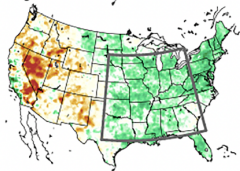
a) T_{max}



b) T_{min}

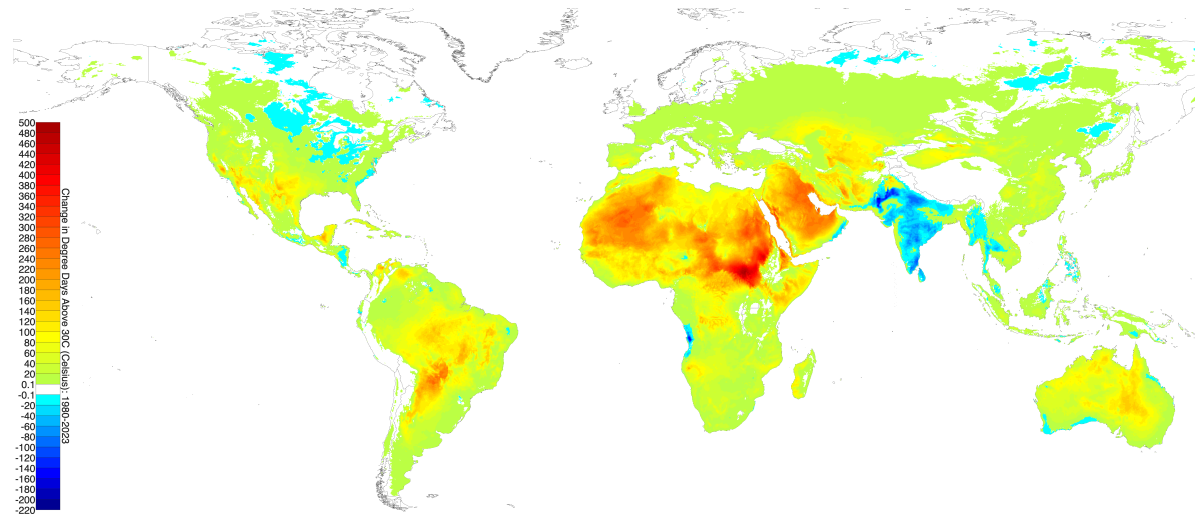


c) Pcpn

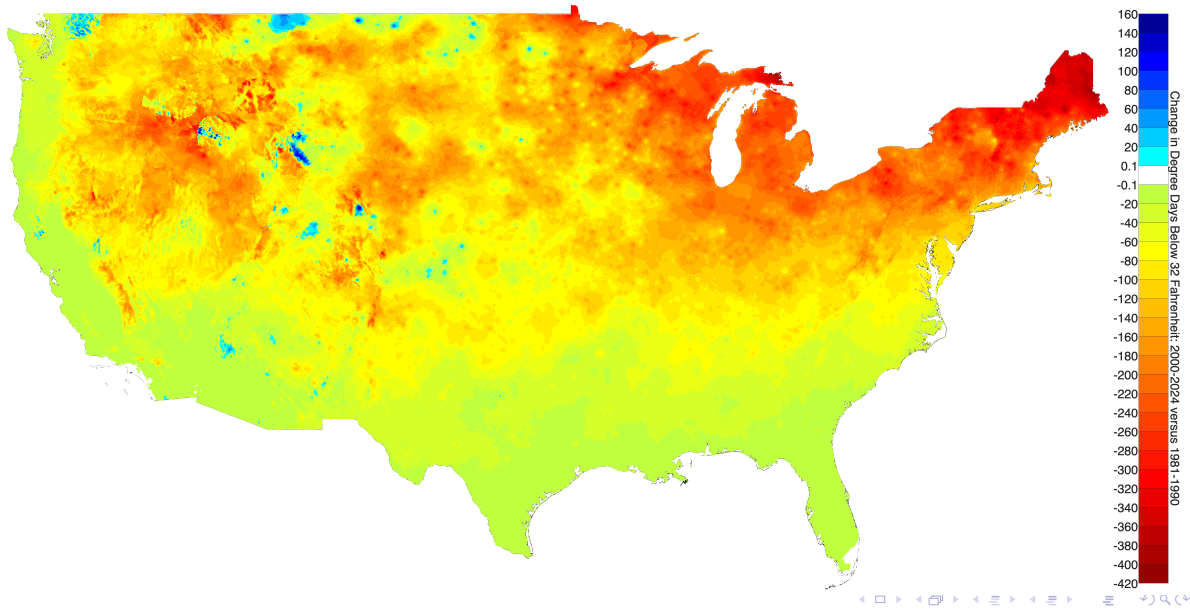


- ▶ Mueller et al. (NCC, 2016)
 - ▶ ag: increased planting density
 - ▶ plants transpire (corn sweat)
- ▶ Eischeid et al. (Journal of Climate, 2023)
 - ▶ Summer cooling
 - ▶ increased precipitation

Trends Across World in Degree Days Above 86F (30C): 1980-2024



Change in Degree Days Below 32F (0C): 2020-2024 vs 1981-1990

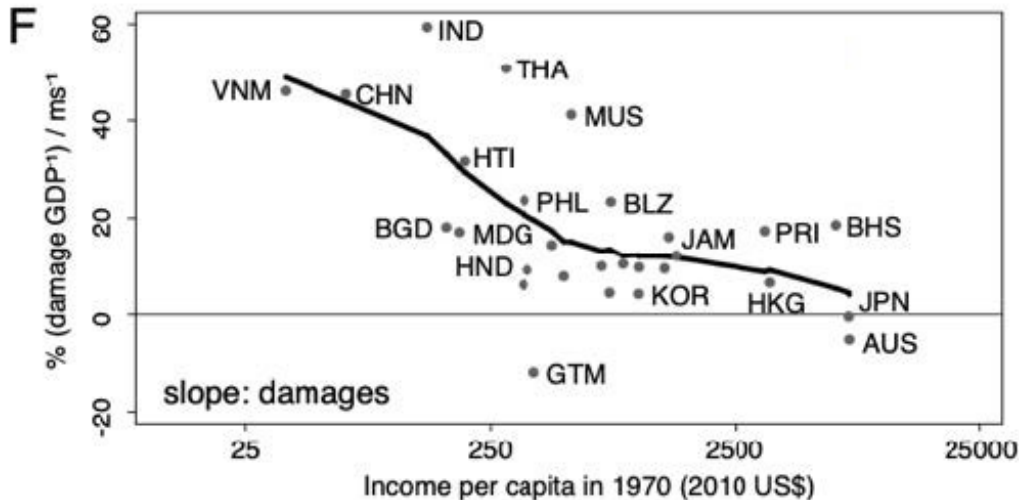


Discussion Point 2

- ▶ Sector-specific comments
 - ▶ Flood / hurricane damage: US is an outlier
 - ▶ Wildfire smoke: $\text{PM}_{2.5}$ from wildfires more toxic
 - ▶ Mortality from heat: mitigating the effect through forecasts and cooling centers

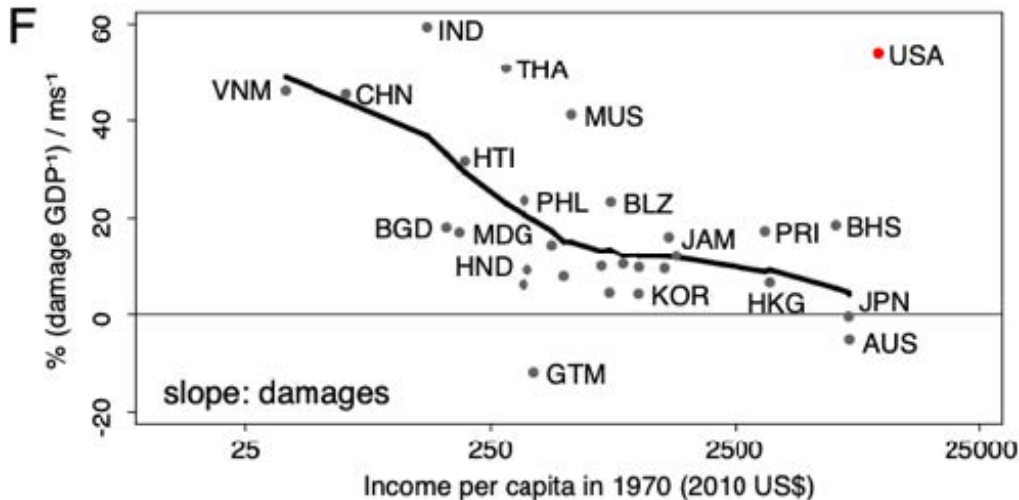
Hurricane Damages

Hsiang (2011): Sensitivity of Hurricane Damages to Wind Speed by Income of Country



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Flood Damages



- ▶ Tokyo's caverns
 - ▶ flooding from cyclones

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 - ▶ drainage into Lake Zurich
 - ▶ tunnel
 - ▶ cost of tunnel
 - ▶ 175 million
 - ▶ property damage avoided
 - ▶ 8 billion

Trends in PM_{2.5} Air Pollution

Forest Vulnerability: Early – Late Deficit

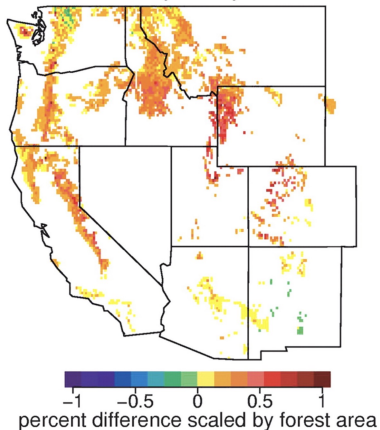
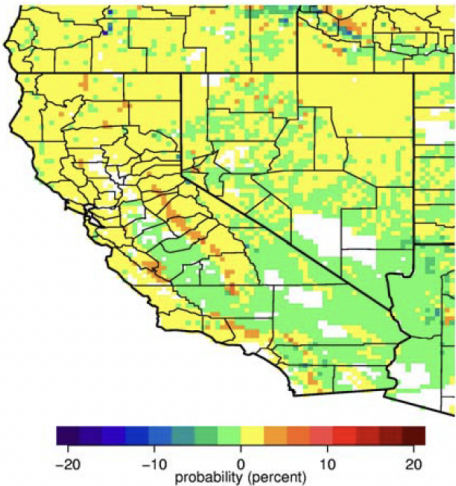


Fig. 4. Index of forest vulnerability to changes in the timing of spring: the percentage difference in cumulative moisture deficit from October to August at each grid point in early versus late snowmelt years, scaled by the forest-type vegetation fraction at each grid point, for 1970 to 1999 (26). See fig. S3 for a map of forest vulnerability for 1970 to 2003 over a smaller spatial domain. See Fig. 1B for a definition of early, mid-, and late snowmelt years.

- ▶ Wildfire risk
 - ▶ Westerling et al. (Science, 2006)
 - ▶ more wild fires since 1980
 - ▶ climate main driver, not land use
 - ▶ drier summer conditions (rain rather than snow)

Trends in PM_{2.5} Air Pollution

A2 GFDL 2005-34 minus 1961-90

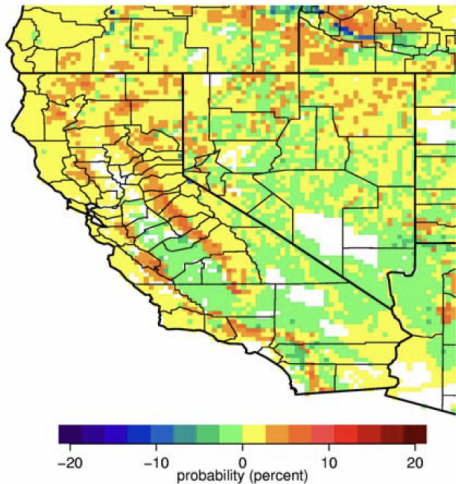


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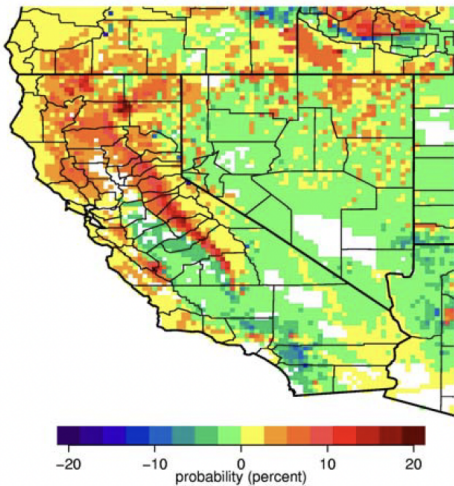
A2 GFDL 2035–64 minus 1961–90



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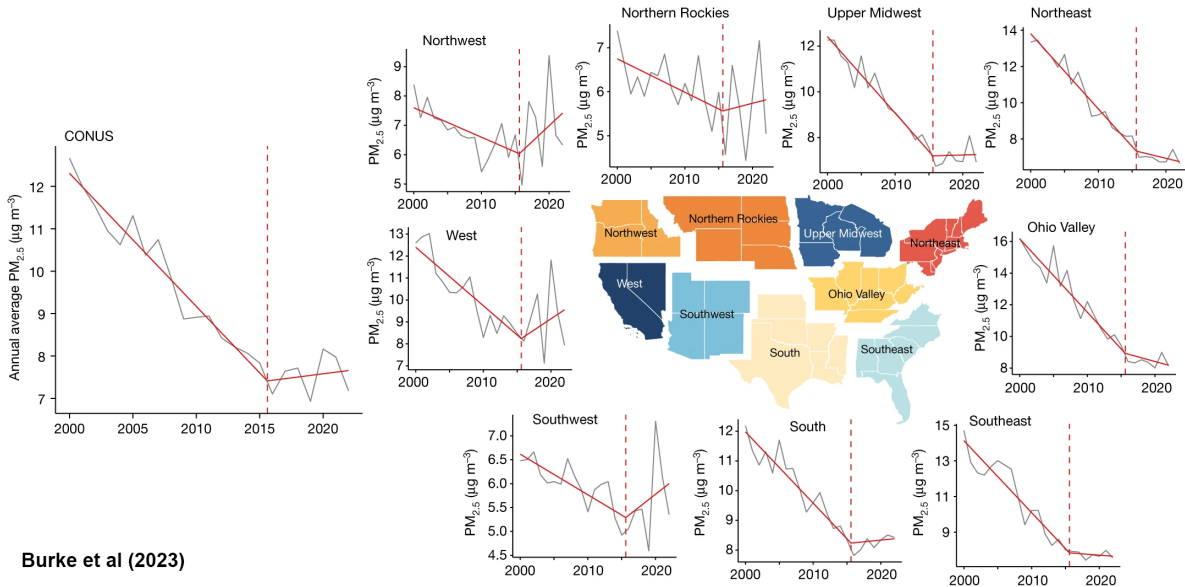
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Trends in PM_{2.5} Air Pollution



Burke et al (2023)

Health Effects from Wildfire Smoke

nature

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Article | Published: 18 September 2025

Wildfire smoke exposure and mortality burden in the US under climate change

[Minghao Qiu](#) , [Jessica Li](#), [Carlos F. Gould](#), [Renzhi Jing](#), [Makoto Kelp](#), [Marissa L. Childs](#), [Jeff Wen](#),
[Yuanyu Xie](#), [Meiyun Lin](#), [Mathew V. Kiang](#), [Sam Heft-Neal](#), [Noah S. Diffenbaugh](#) & [Marshall Burke](#) 

[Nature \(2025\)](#) | [Cite this article](#)

3626 Accesses | 1047 Altmetric | Metrics

- ▶ Qiu et al. (Nature, 2025)
 - ▶ 71,420 excess deaths by 2050
 - ▶ Cost exceeds all other sectors combined

Health Effects from Wildfire Smoke

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Article | Open access | Published: 05 March 2021

Wildfire smoke impacts respiratory health more than fine particles from other sources: observational evidence from Southern California

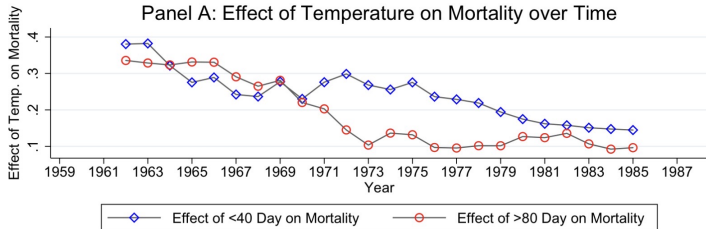
Rosana Aguilera , Thomas Corringham, Alexander Gershunov & Tarik Benmarhnia

Nature Communications **12**, Article number: 1493 (2021) | [Cite this article](#)

- ▶ Qiu et al. (Nature, 2025)
 - ▶ 71,420 excess deaths by 2050
 - ▶ Cost exceeds all other sectors combined
- ▶ Dose-response function for $PM_{2.5}$
 - ▶ $PM_{2.5}$: particles less than $2.5 \mu m$
 - ▶ Catch-all for small particles
 - ▶ Not a homogenous chemical substance
 - ▶ $PM_{2.5}$ from wildfires more harmful
 - ▶ High temperature in fire (oxidation)
 - ▶ Uncontrolled combustion
 - ▶ Paper uses dose-response for overall $PM_{2.5}$
 - ▶ Your estimates might be lower bound

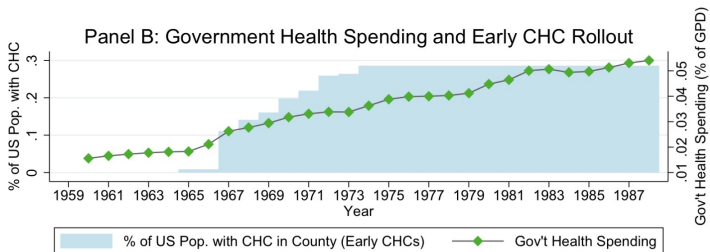
Temperature-Induced Mortality

Panel A: Effect of Temperature on Mortality over Time

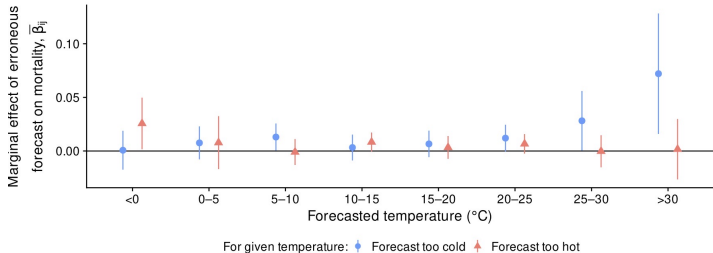
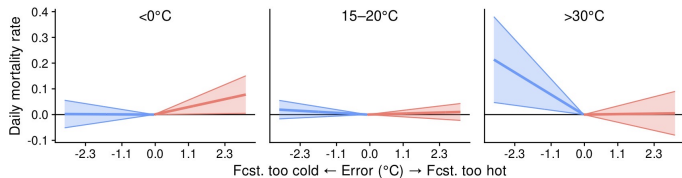


- Mullins and White (JEEM, 2020)
 - Community Health Centers
 - mitigates effect of temperature

Panel B: Government Health Spending and Early CHC Rollout



Temperature-Induced Mortality



- ▶ Mullins and White (JEEM, 2020)
 - ▶ Community Health Centers
 - ▶ mitigates effect of temperature
- ▶ Shrader, et al. (WP, 2023)
 - ▶ temperature forecast
 - ▶ under-predicting heat
 - ▶ casuses mortality
 - ▶ correctly predicted heat
 - ▶ no mortality

Discussion Point 3

- ▶ Two other sectors not covered that might be significant
 - ▶ House prices (forward-looking) - large present value changes due to changes in flood risk
 - ▶ Amenity value of climate

Other Sectors

The New York Times

Spike in Florida Condo Supply Is Creating a Buyers' Market

Inspections mandated after a 2021 building collapse have led to expensive repair costs, forcing many to list their units.

Share full article



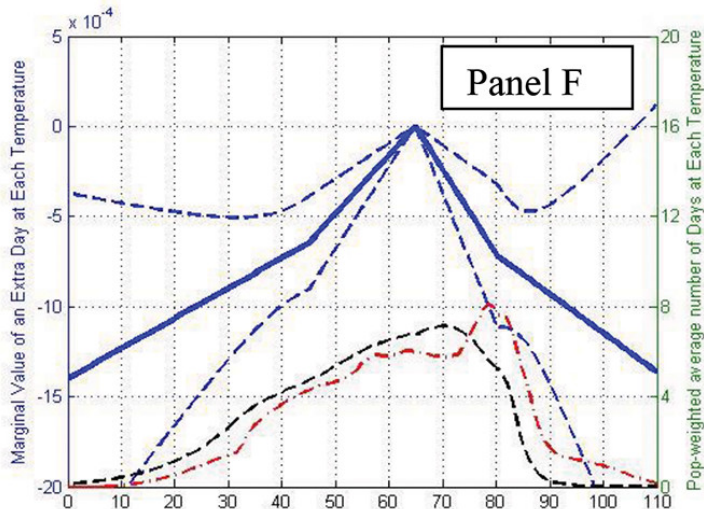
326



Condo buildings line Collins Avenue in Surfside, Fla., near the site of the 2021 Champlain South Towers collapse. Scott McIntyre for The New York Times

- ▶ Fairweather et al. (WP, 2024)
 - ▶ Experiment with Redfin
 - ▶ Randomly disclosed flood risk
 - ▶ Price spread (close-listed)
 - ▶ Affected by share of users exposed to information
- ▶ High-risk properties
 - ▶ Flood risk (first st. foun.)
 - ▶ \$85,000 decline

Other Sectors



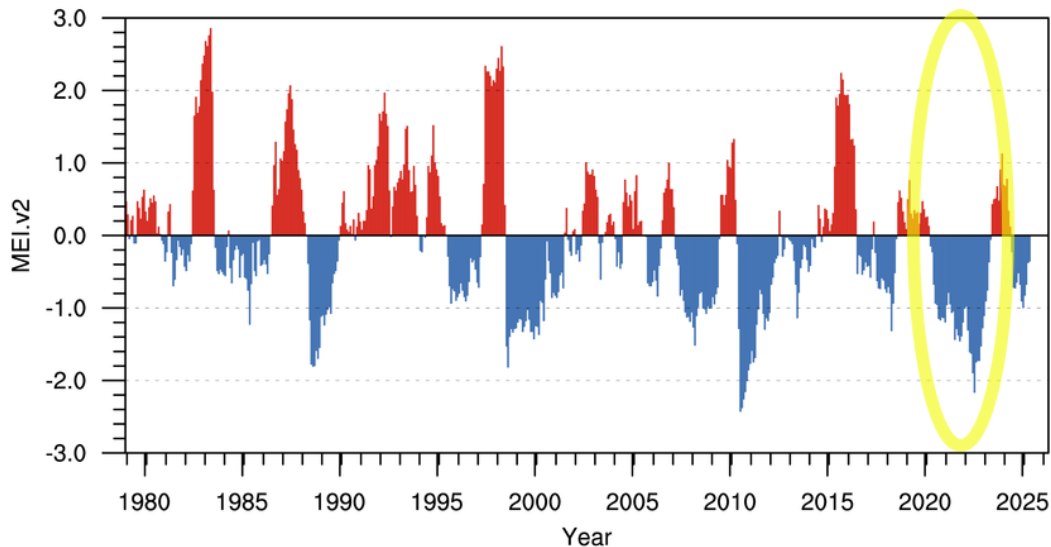
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 - ▶ \$85,000 decline
- ▶ Albouy et al. (2016)
 - ▶ Amenity value of climate
 - ▶ People dislike extremes
 - ▶ Benefit from observed trends
 - ▶ Less heat
 - ▶ Less cold

Discussion Point 4

- ▶ Trends versus cycles
 - ▶ 2020-2024 (last five years) saw strong La Nina

2020-2024 Strong La Nina Condition

Multivariate ENSO Index Version 2 using JRA3Q



Weather over Corn-Growing Area: 2012 Was Very Hot

