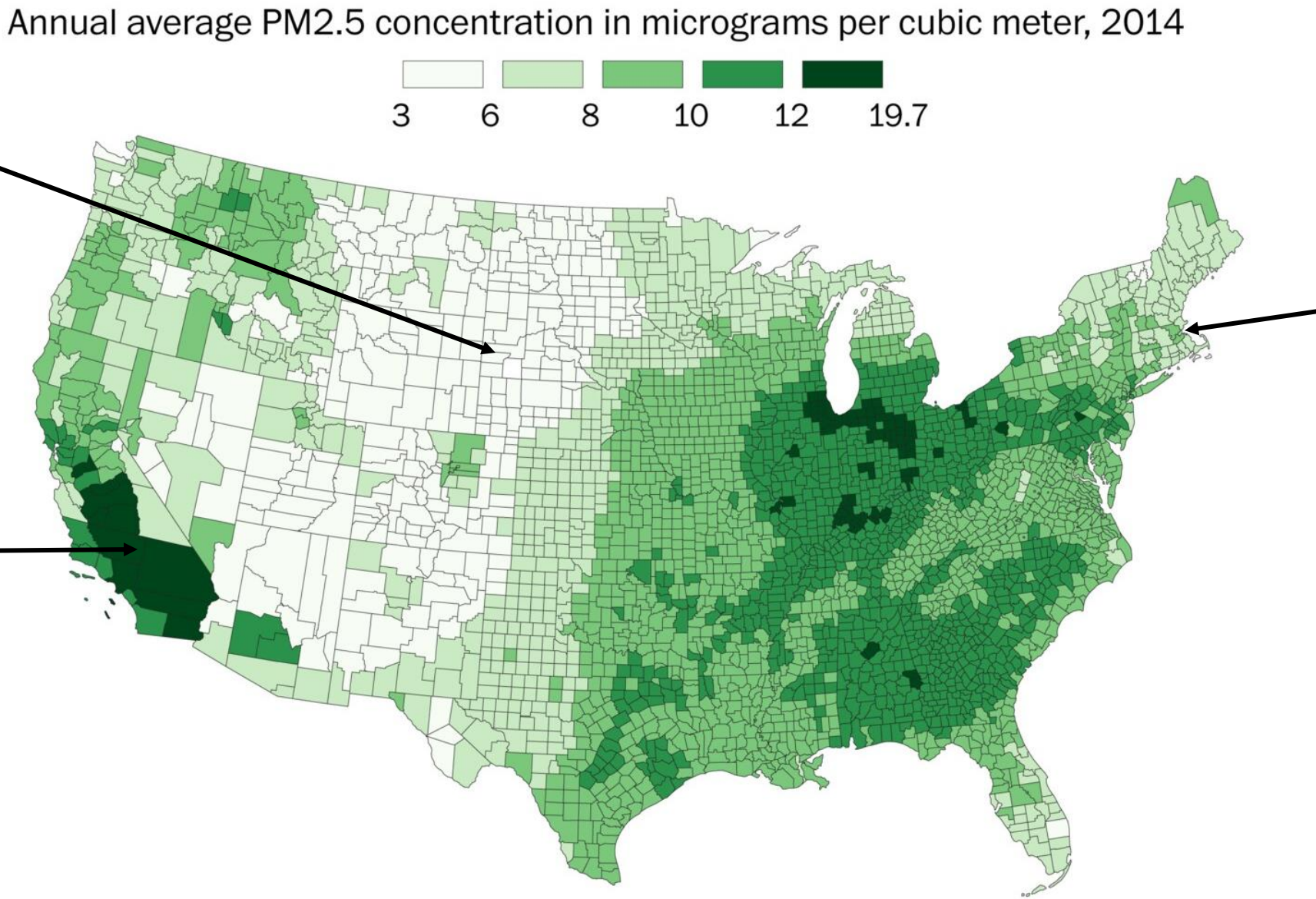
Le nuove sfide della qualità dell'aria negli Stati Uniti: Incendi, Clima, Salute

Paolo Giani
MIT Earth, Atmospheric and Planetary Sciences
8 Ottobre 2026

In media, la qualità dell'aria negli Stati Uniti è relativamente buona

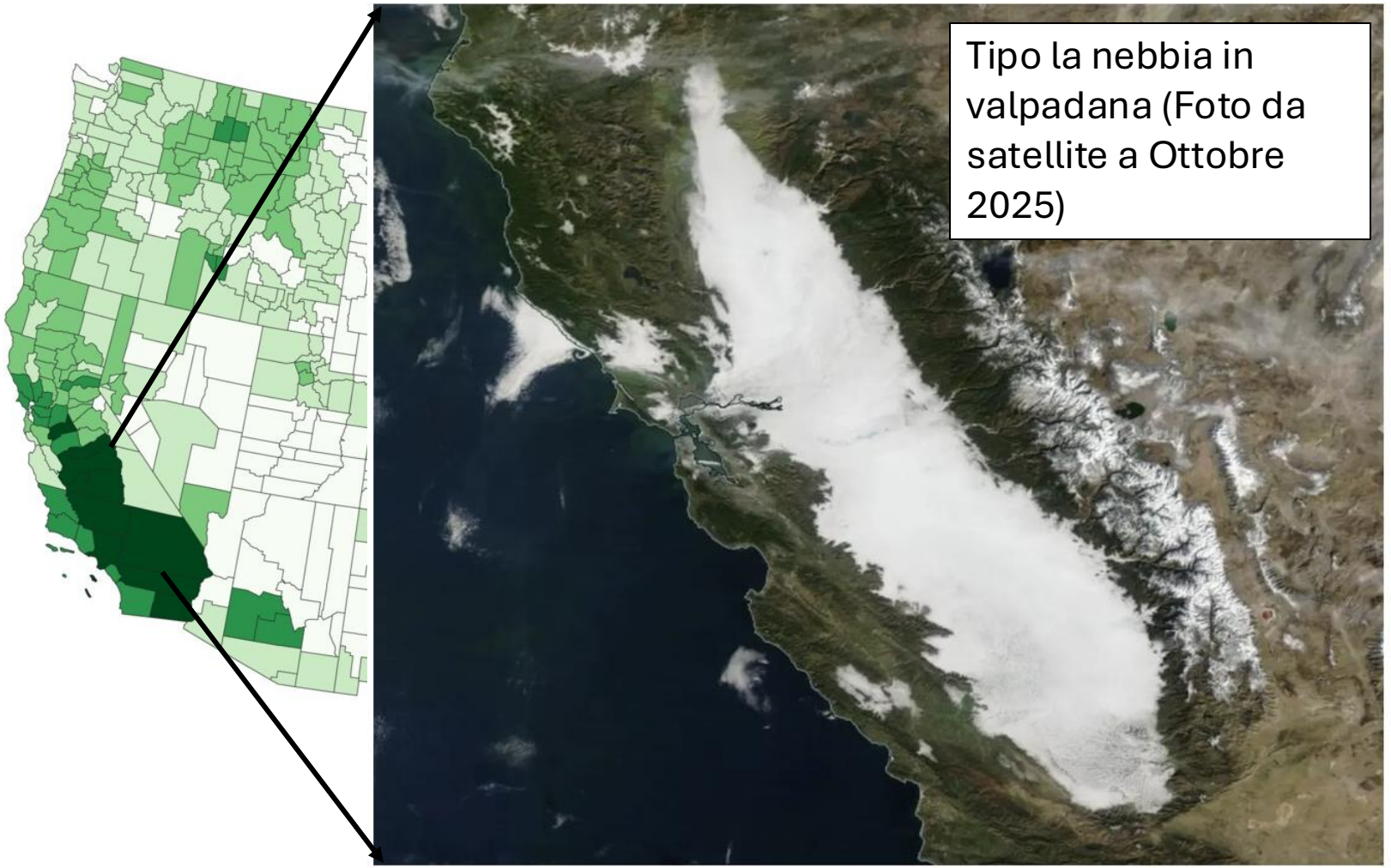


Non molta gente vive nel centro della nazione

Boston, da dove vi parlo (~8 ug/m3 media annuale pm2.5)

Central Valley, un po' la Pianura Padana d'oltreoceano (~15 ug/m3 media annuale pm2.5)

Annual average PM2.5 concentration in micrograms per cubic meter, 2014



Tipo la nebbia in valpadana (Foto da satellite a Ottobre 2025)

California's Central Valley lies beneath Tule fog on Saturday. (NASA EOSDIS)

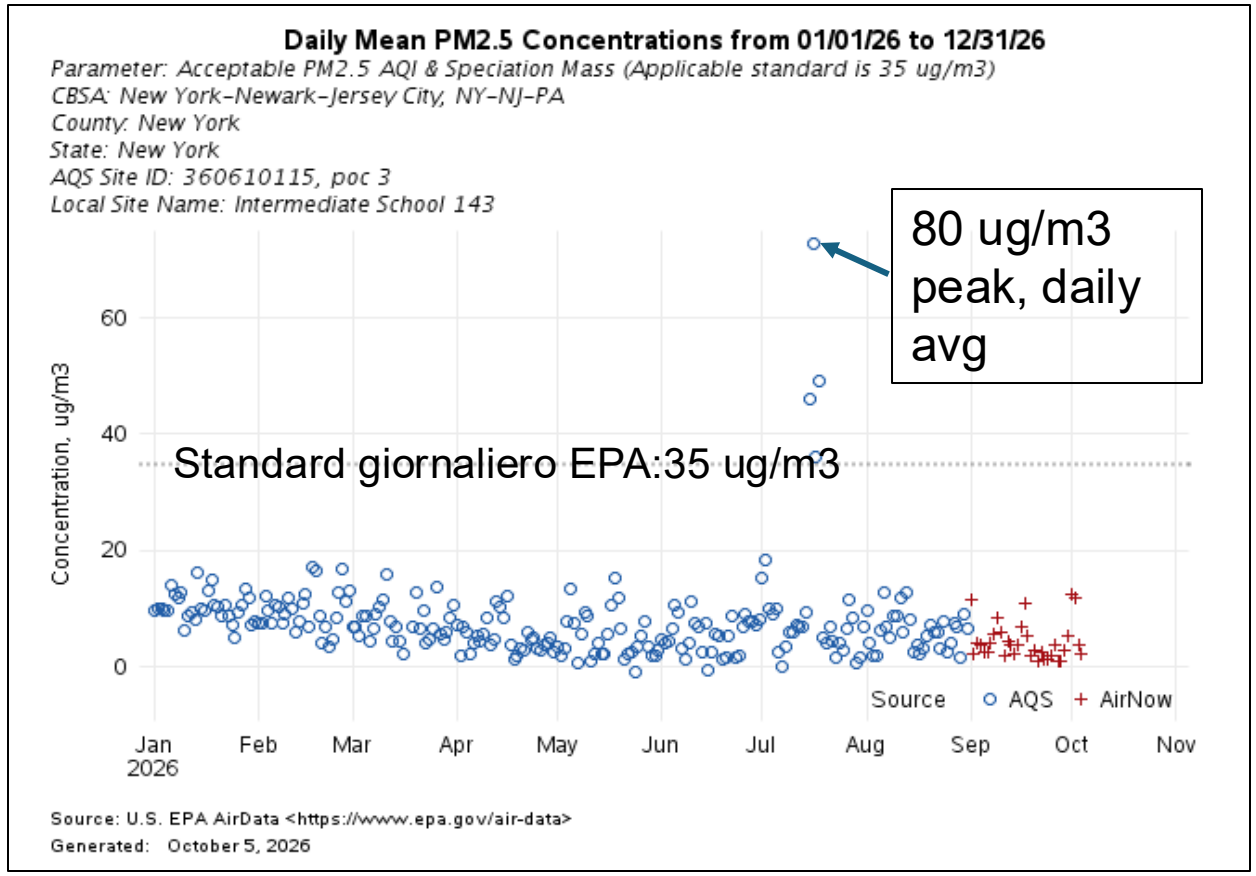
Central Valley, un po' la Pianura Padana d'oltreoceano (~15 ug/m3 media annuale pm2.5)

Source: CDC

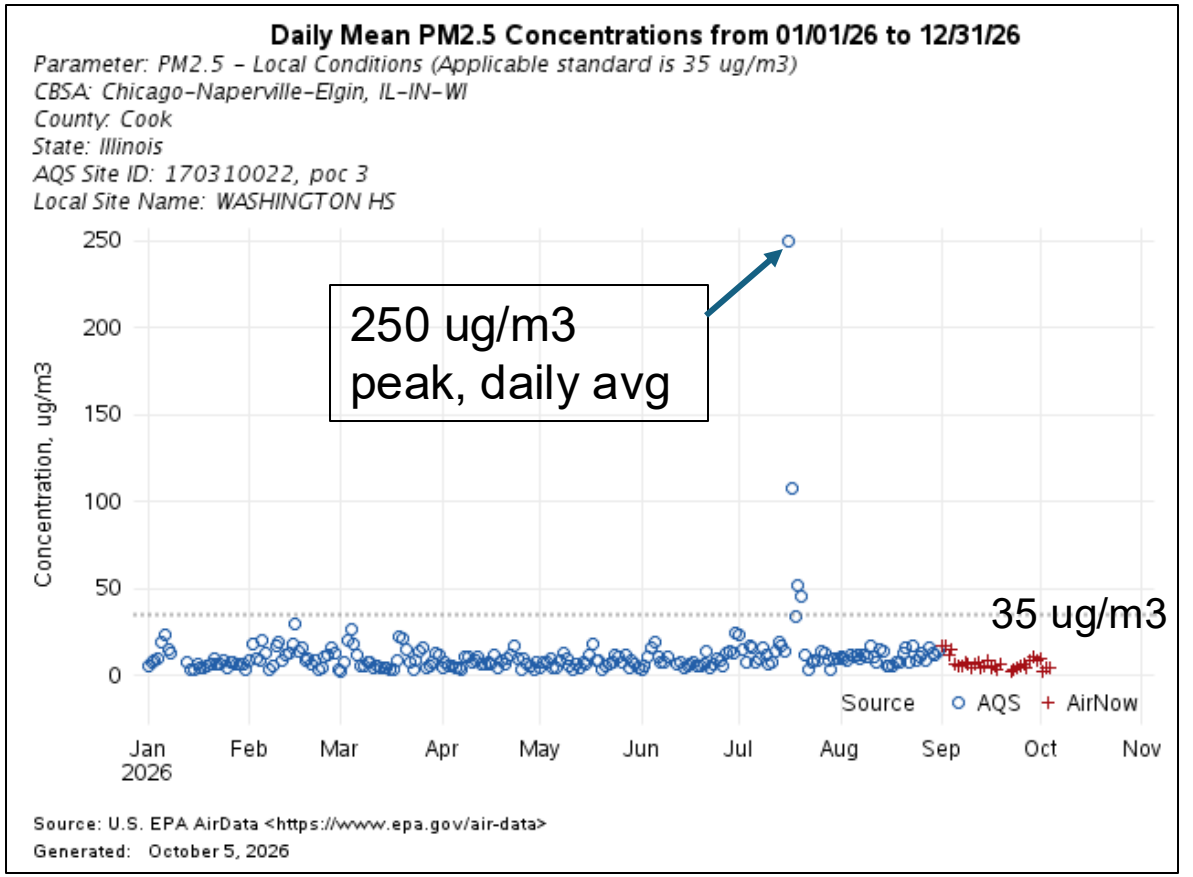
WAPO.ST/WONKBLOG

Livelli bassi di particolato non significano che la qualità dell'aria è sempre buona

New York City, NY, 2026



Chicago, IL, 2026



Che e' successo a Luglio?



CBS News Chicago

Che e' successo a Luglio?



CBS News Chicago



Reuters

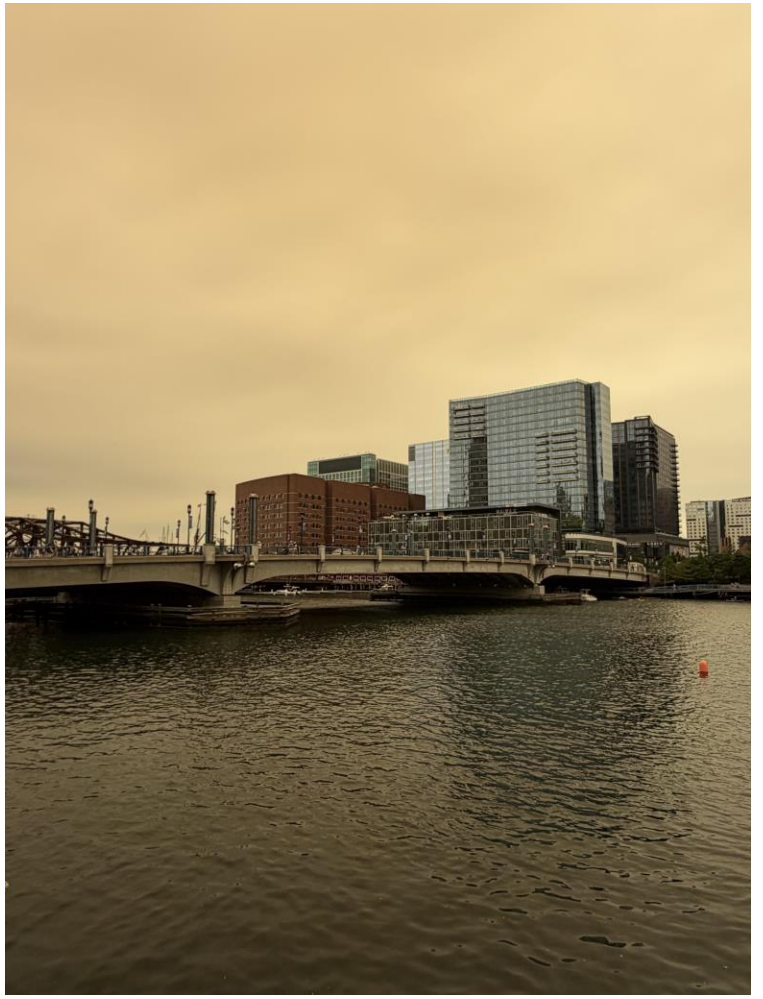
Che e' successo a Luglio?



CBS News Chicago



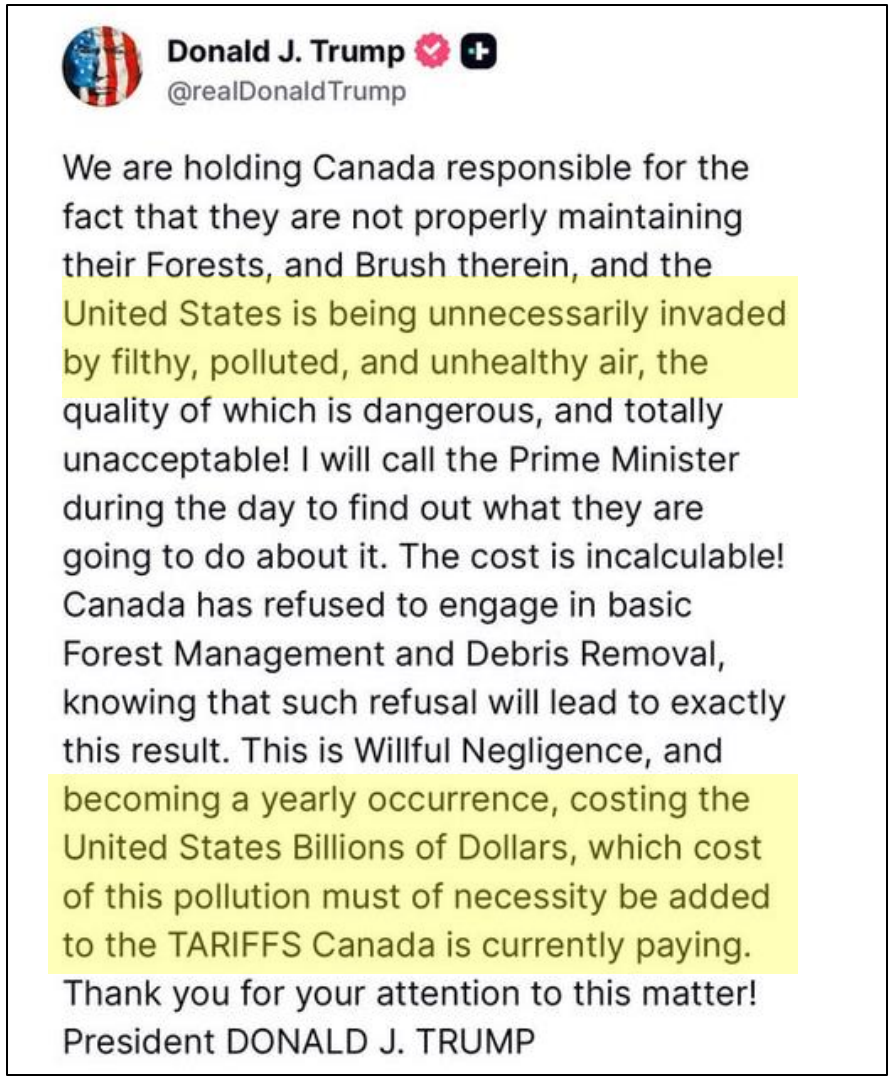
Reuters



Boston (Luglio 2026), praticamente fuori dal mio ufficio


Wildfire Smoke Intensity
no smoke
moderate
dense
0
0.1
0.25
0.4
0.5
estimated from Brown Carbon Aerosol Optical Depth
NASA
GMAO
GEOS-CAM Replay
14 Jul 2026 00:00 GMT

La rilevanza di questi eventi nell'opinione pubblica

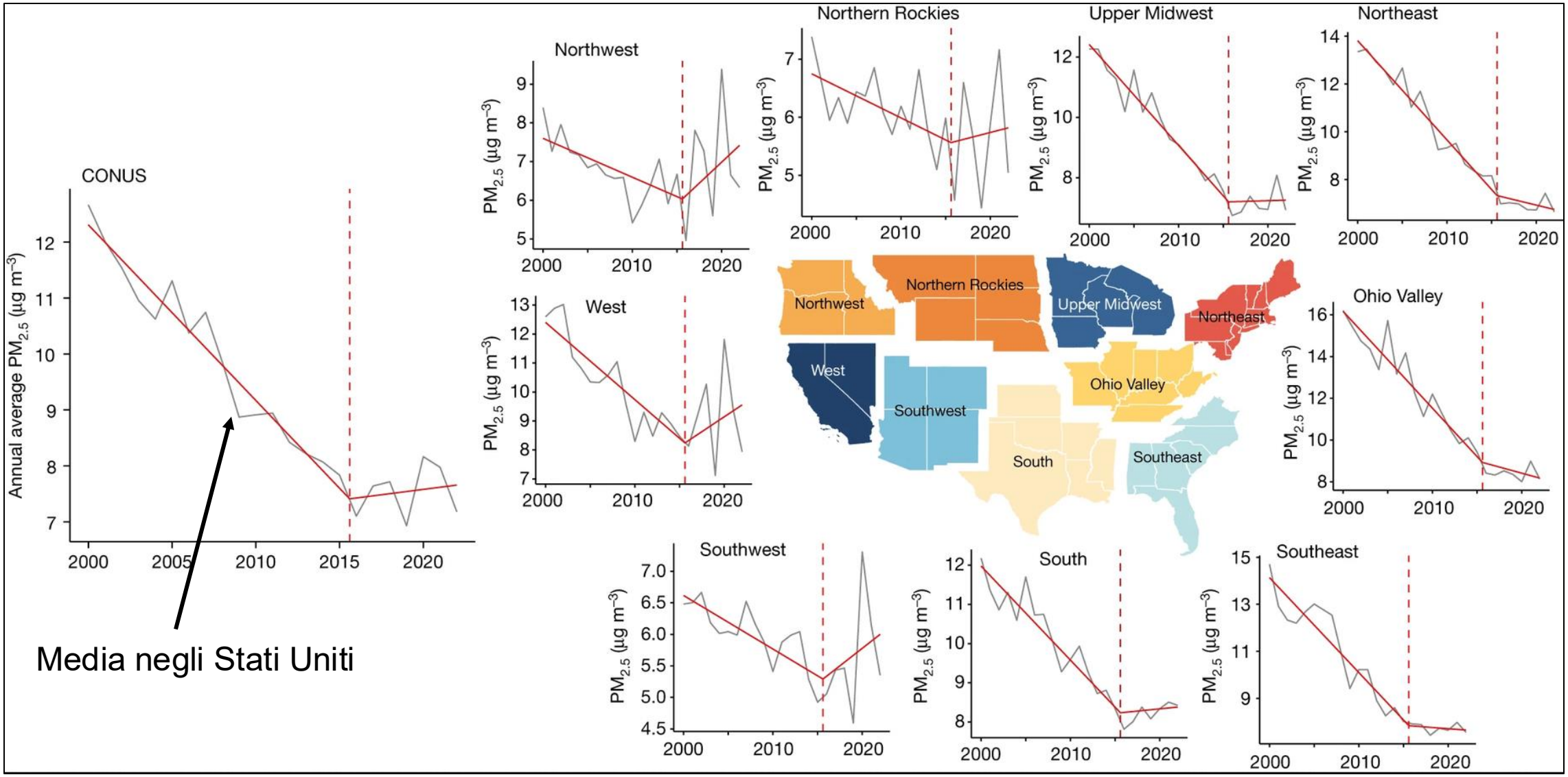


Twitter/X



New York Times

Abbiamo risolto il problema dell'inquinamento da particolato?



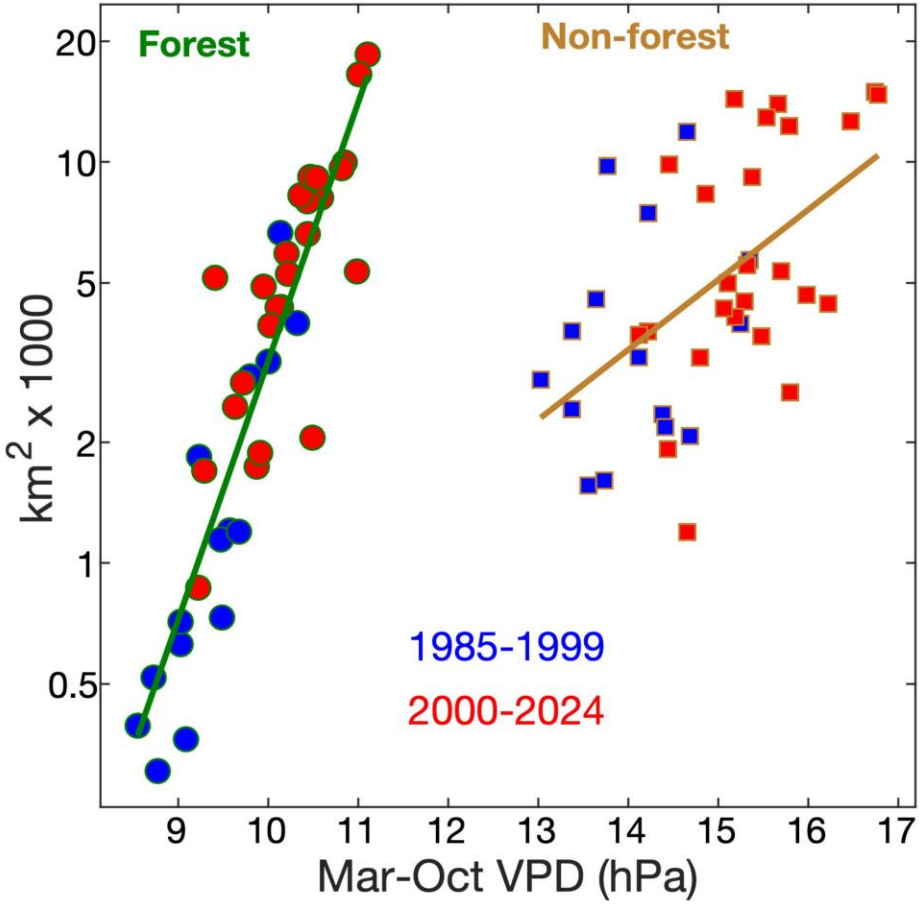
Media negli Stati Uniti

Burke et al., 2023, Nature

Quali sono le direzioni di ricerca e cosa puo' fare l'ingegnere ambientale?

1) Perche' gli incendi sono piu' grandi negli ultimi anni?

Ci sono varie ragioni, dall'aumento di combustibile fino ai cambiamenti climatici



Williams et al., 2020, Global Change Biology

nature communications

Article

https://doi.org/10.1038/s41467-024-46702-0

Fire suppression makes wildfires more severe and accentuates impacts of climate change and fuel accumulation

Received: 14 June 2023

Accepted: 7 March 2024

Published online: 25 March 2024

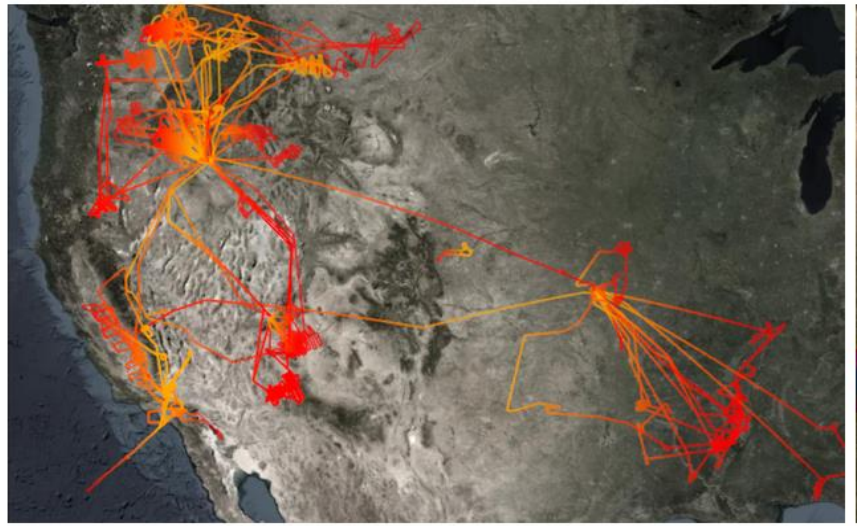
Check for updates

Mark R. Kreider[1], Philip E. Higuera[2], Sean A. Parks[3], William L. Rice[4], Nadia White[5] & Andrew J. Larson[1,6]

Fire suppression is the primary management response to wildfires in many areas globally. By removing less-extreme wildfires, this approach ensures that remaining wildfires burn under more extreme conditions. Here, we term this the "suppression bias" and use a simulation model to highlight how this bias fundamentally impacts wildfire activity, independent of fuel accumulation and climate change. We illustrate how attempting to suppress all wildfires necessarily means that fires will burn with more severe and less diverse ecological impacts, with burned area increasing at faster rates than expected from fuel accumulation or climate change. Over a human lifespan, the modeled impacts of the suppression bias exceed those from fuel accumulation or climate change alone, suggesting that suppression may exert a significant and underappreciated influence on patterns of fire globally. Managing wildfires to safely burn under low and moderate conditions is thus a critical tool to address the growing wildfire crisis.

Kreider et al., 2024, Nat Comm

2) Come cambia il fumo mentre viaggia nell'atmosfera?



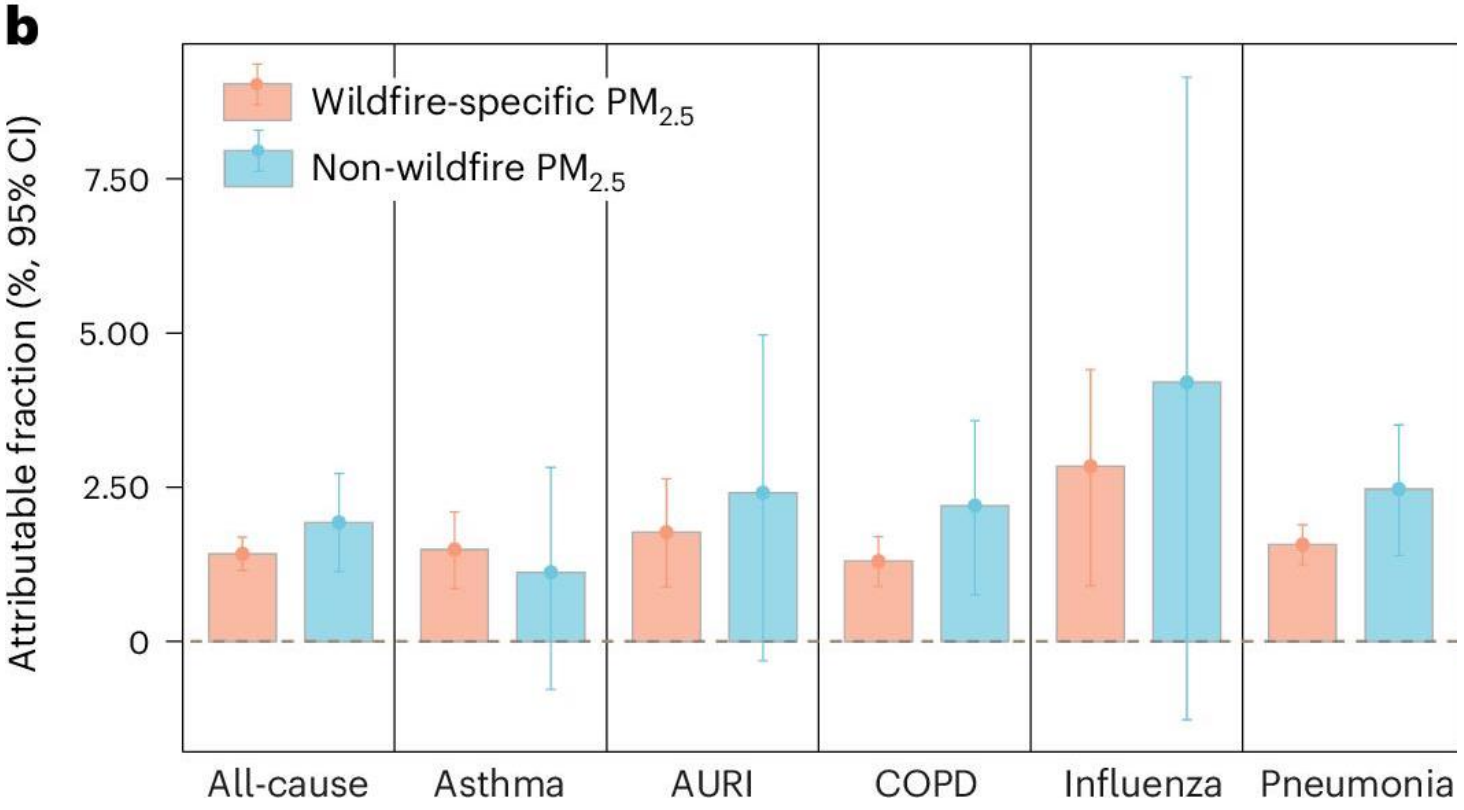


FIREX-AQ: Campagna di misura di composizione chimica del fumo con aerei di ricerca (Estate 2019)

La composizione chimica del fumo alla sorgente e' molto diversa da quella centinaia/migliaia di km a valle

3) Quali sono le implicazioni sulla salute di questi eventi?

C'e' evidenza che il pm2.5 da fumo non ha gli stessi effetti sulla salute che il pm2.5 urbano



Aguillera et al., 2021, Nat Comm

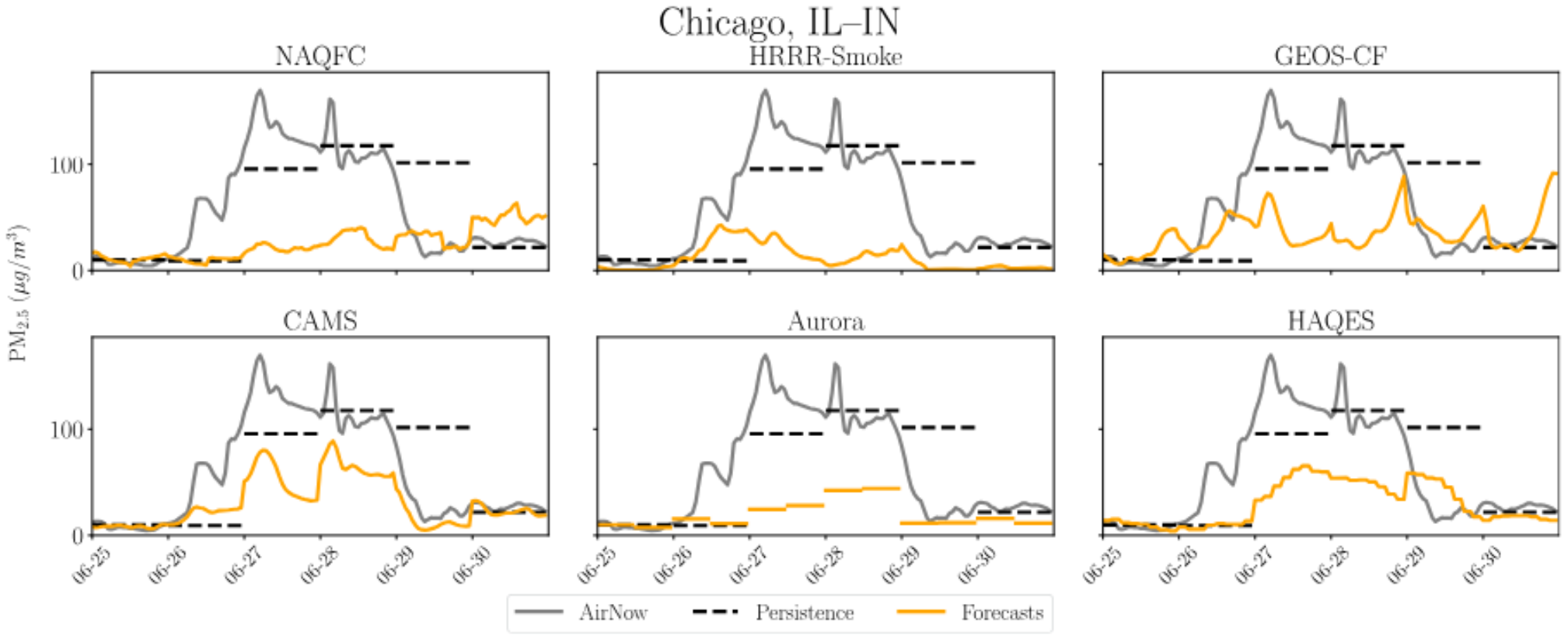


Participants at the AMS 2026 Wildfire Smoke and Health Workshop. [Photo credit: Alan Sealls]

Workshop a DC in Estate su "Wildfires & Public Heatlh", organizzato da AMS

4) E' possibile prevedere in anticipo questi eventi?

I modelli di previsione fanno fatica a riprodurre questi eventi estremi



Berlinghieri et al., 2026 (Bulletin of American Meteorological Society)


Wildfire Smoke Intensity
no smoke
moderate
dense
0
0.1
0.25
0.4
0.5
estimated from Brown Carbon Aerosol Optical Depth
NASA
GMAO
GEOS-CAM Replay
01 Jul 2026 00:00 UTC