THE GEOENGINEERING ELEPHANT IN THE ROOM

A COALITION OF RESEARCHERS AND LEGAL ADVOCATES ANNOUNCES A MAJOR PUBLIC WEBINAR ON

WHAT IS HAPPENING IN AMERICA'S SKIES

SPECIAL PUBLIC WEBINAR
MONDAY, MAY 4, 2026

5:00 PM
PACIFIC

FREE & OPEN
TO THE PUBLIC

WHAT WE FOUND CHANGES THE CONVERSATION ENTIRELY.

We ask only that people come with an open mind.

WATCH THE WEBINAR LIVE
MAY 4, 5PM PT

- YOUTUBE.COM/@CLIMATEVIEWER
- RUMBLE.COM/CLIMATEVIEWER
- X.COM/CLIMATEVIEWER

CUTTING-EDGE SCIENCE
What's really in our atmosphere

FEDERAL LEGAL ACTION
The 180-day countdown to accountability

STATE-LEVEL IMPACT
What this means for efforts across the country

WHY THE FIGHT HAS NOT BEEN WORKING
And what has been missing

THE PATH FORWARD
A concrete, actionable path to clean and healthy skies

JOIN THE CONVERSATION. • UNDERSTAND THE EVIDENCE. • BE PART OF THE PATH FORWARD.

EPA Petition for Rulemaking

AVIATION AEROSOL EMISSIONS, AVIATION-INDUCED CLOUDINESS (AIC), AND THE ENDANGERMENT OF PUBLIC HEALTH AND WELFARE

MAY 4TH 2026.

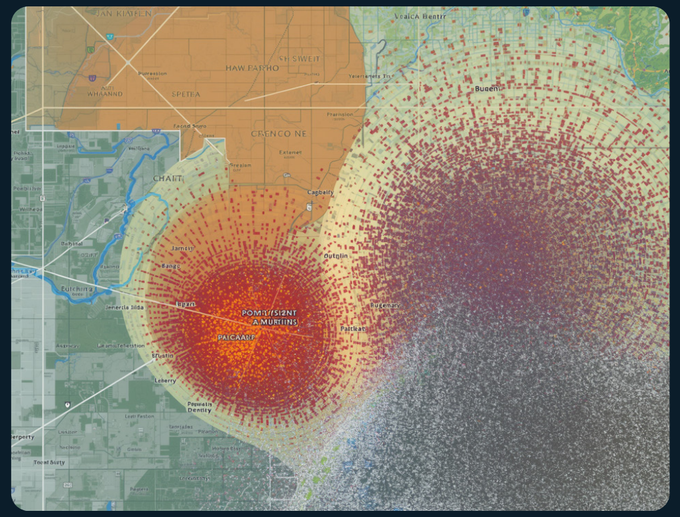
Presentation by Jim Lee

ClimateViewer News

connect.climateviewer.com

What We’re NOT Advocating

Less Flights



We are not asking for anything that would restrict movement or make flight too cost prohibitive. Freedom requires freedom of movement and choice.

SAF (biofuels)

As of 2024, Sustainable Aviation Fuel (SAF) makes up less than 0.3%–0.53% of the total global aviation fuel supply. Electric engines will be available before SAF can meet global demand.

UN/WEF Agendas

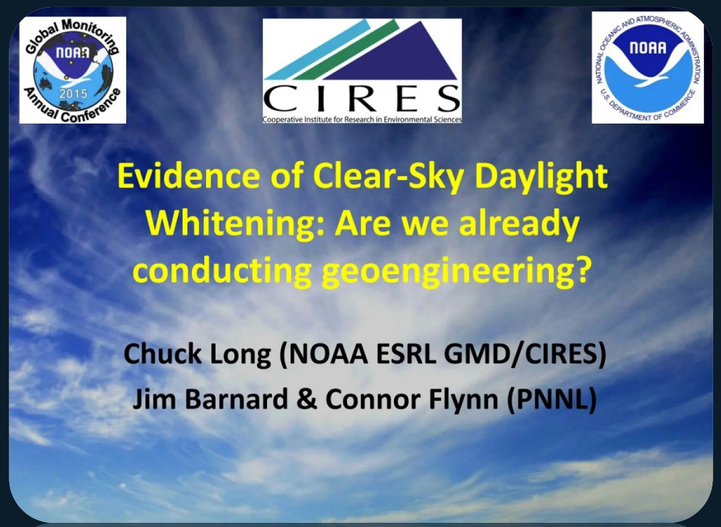
We are not advocating changes based on any economic or climate goals that align with any global organizations or institutions.

What We ARE Advocating

End Fake Clouds

The airline industry must stop making Aviation-Induced Cloudiness (AIC) and Contrail-Induced Cirrus (CIC) clouds. They can and they should.

End Sky Whitening



Jet exhaust emissions are creating ice haze and are effectively acting as Stratospheric Aerosol Inject (SAI).

Pollution Verification

We must have sensors that can tell us WHAT is in the air we breathe and the rain falling from the sky. We want ultrafine particles counted and named!

EPA ENDANGERMENT FINDING

AVIATION POLLUTION THREATENS OUR HEALTH, OUR CLIMATE, AND OUR FUTURE.
It's time for the EPA to act.

WHAT WE ARE ASKING THE EPA:

Under 42 U.S.C. § 7571(a)(2)(A), issue a formal finding that **Aviation-induced Cloudiness (AIC), Sulfur Oxides (SOx), Black Carbon (BC, also known as soot), Metallic Aerosols, and Ultrafine Particles (UFP)** from aviation may reasonably be anticipated to endanger public health or welfare.

Protect Public Health. Protect Our Future.

AVIATION-INDUCED CLOUDINESS (AIC)

Persistent contrail cirrus and induced clouds trap heat in the atmosphere, warming the planet and disrupting the climate.

SO_x SULFUR OXIDES (SO_x)

Form sulfate particles and acid compounds that harm respiratory health, degrade air quality, and contribute to haze and ecosystem damage.

BLACK CARBON (BC, also known as soot)

A potent climate forcer and air pollutant that penetrates deep into the lungs and bloodstream, increasing risks of asthma, heart disease, and premature death.

METALLIC AEROSOLS

Emitted from aircraft wear and combustion; these metals can accumulate in the body and environment, posing long-term health and ecological risks.

ULTRAFINE PARTICLES (UFP)

Tiny particles that can reach deep into the lungs and enter the bloodstream, linked to serious cardiovascular and respiratory effects.

DEFINITION OF REGULATED AIR POLLUTION

Define aircraft-related air pollution under Section 231 to include both **primary emissions and their reasonably foreseeable atmospheric transformations**, including but not limited to particulate matter, sulfur compounds, black carbon, and **Aviation-Induced Cloudiness (AIC)**, where such effects result from emissions released into the ambient air.

CLEANER SKIES. HEALTHIER PEOPLE. A SAFER CLIMATE. | THE EPA HAS THE AUTHORITY. NOW IS THE TIME TO ACT.

CLEANER SKIES. MORE SUNSHINE. SMARTER AVIATION.

Science-based standards and monitoring to reduce aviation's atmospheric impact.

1. REDUCE JET FUEL SULFUR EMISSIONS

Establish standards under 42 U.S.C. § 7571(b) to limit sulfur content in aviation turbine fuel to

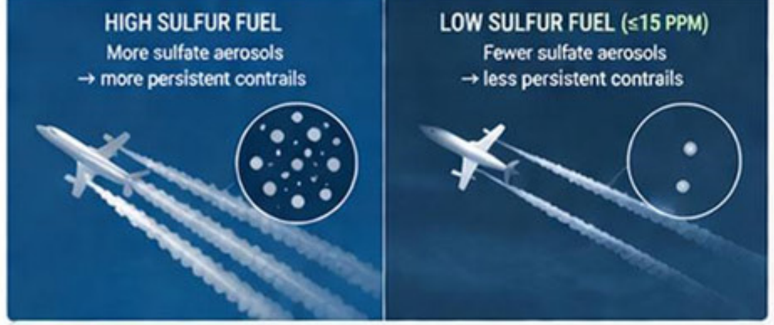
15 PARTS PER MILLION (PPM)

within a reasonable compliance period.

Reduction of fuel sulfur content has been shown to reduce contrail persistence and associated atmospheric effects.

≤15 PPM SULFUR

WHY FUEL SULFUR MATTERS



Cleaner fuel. Fewer persistent contrails. More Sunshine!

2. MANDATORY CONTRAIL AVOIDANCE

Pursuant to 42 U.S.C. § 7571, and in coordination with applicable authorities under 42 U.S.C. § 7572 and 49 U.S.C. § 44714, promulgate standards or requirements to reduce the formation of persistent contrails and AIC associated with aircraft emissions, including through measures addressing emissions characteristics, fuel composition, and operational conditions that contribute to their formation — such measures to include:

- Binding Ice-Supersaturated Regions (ISSR) and persistent-contrail-forming region diversion
- Requirements, including coordination with the FAA as necessary, for the installation of onboard humidity sensors on commercial aircraft to enable real-time ISSR detection and avoidance
- A narrowly tailored safety exemption
- Limitations on operational practices that intentionally promote contrail formation for atmospheric or radiative effects — consistent with aviation safety requirements

Current satellite-based ISSR prediction carries a 50–80% error rate compared to in-situ measurements, rendering voluntary avoidance protocols without onboard sensing operationally unreliable.

3. NATIONAL AEROSOL REGISTRY

Pursuant to CAA §§ 103 and 114 establish a phased national monitoring and public data registry to characterize aviation-related particulate emissions.

PHASE 1 (0–1 YEAR)

Monitoring at major hub airports:

- **ATL** Hartsfield–Jackson Atlanta International Airport
- **LAX** Los Angeles International Airport
- **ORD** O'Hare International Airport
- **DFW** Dallas/Fort Worth International Airport
- **DEN** Denver International Airport

PHASE 2 (1–3 YEARS)

Expand monitoring to the top 25 U.S. airports by traffic volume.

PHASE 3 (3+ YEARS)

Implement a nationwide GIS-based public dashboard integrating emissions data, including:

- Particle Number (PN) concentration
- Fushimi's nanostructure
- Supporting meteorological and operational data

INITIAL PN BASELINE AUDIT

An initial PN baseline audit shall be completed within 180 days.

180 DAYS

AUTHORITY & PURPOSE

These actions under the Clean Air Act and Federal Aviation laws will reduce aviation's contribution to persistent contrails, aviation-induced cloudiness (AIC), and associated climate impacts while advancing transparency, accountability, and public health protection.

MORE BLUE SKIES

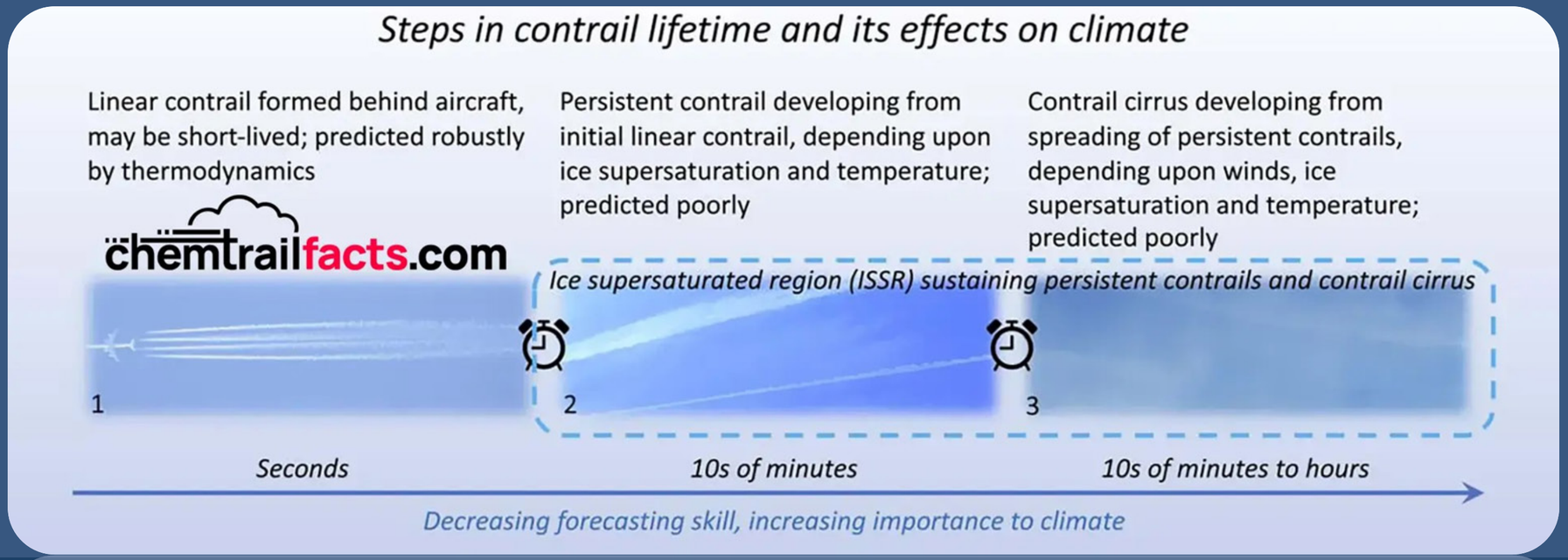
PROTECT PUBLIC HEALTH

DRIVE TRANSPARENCY

Why This Approach?

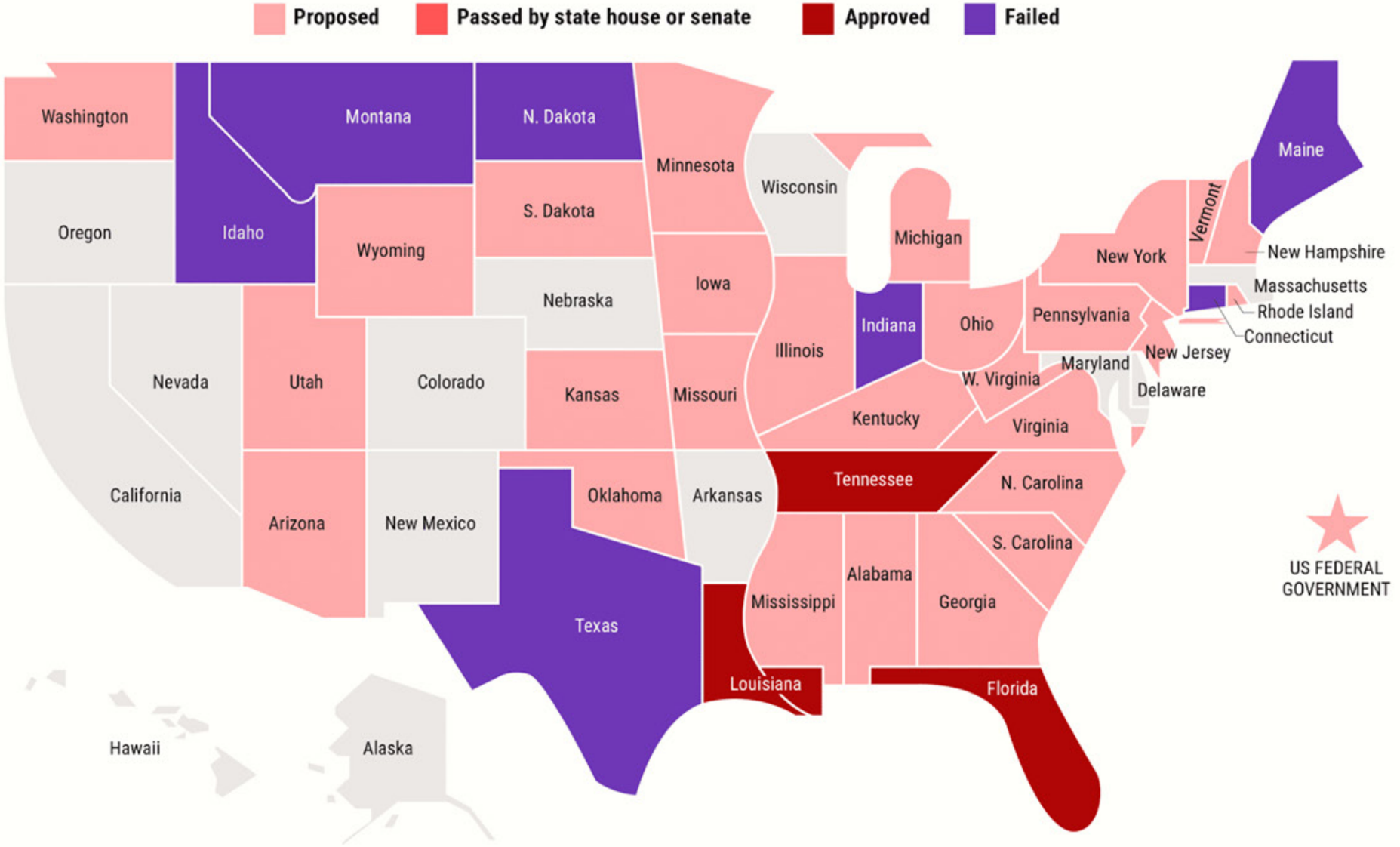
State bans on weather modification and geoengineering cannot fix this!

Despite Tennessee, Florida, and Louisiana banning geoengineering and weather modification, planes continue to stripe the sky on a daily basis. Proponents and constituents are angry. State laws can't change physics and many well meaning people didn't understand the problem.



Proposals to ban solar geoengineering in the US

Thirty-seven US states have proposed banning solar geoengineering since 2023.



Note: As of 13 February 2026

Source: SRM360.org

SRM360

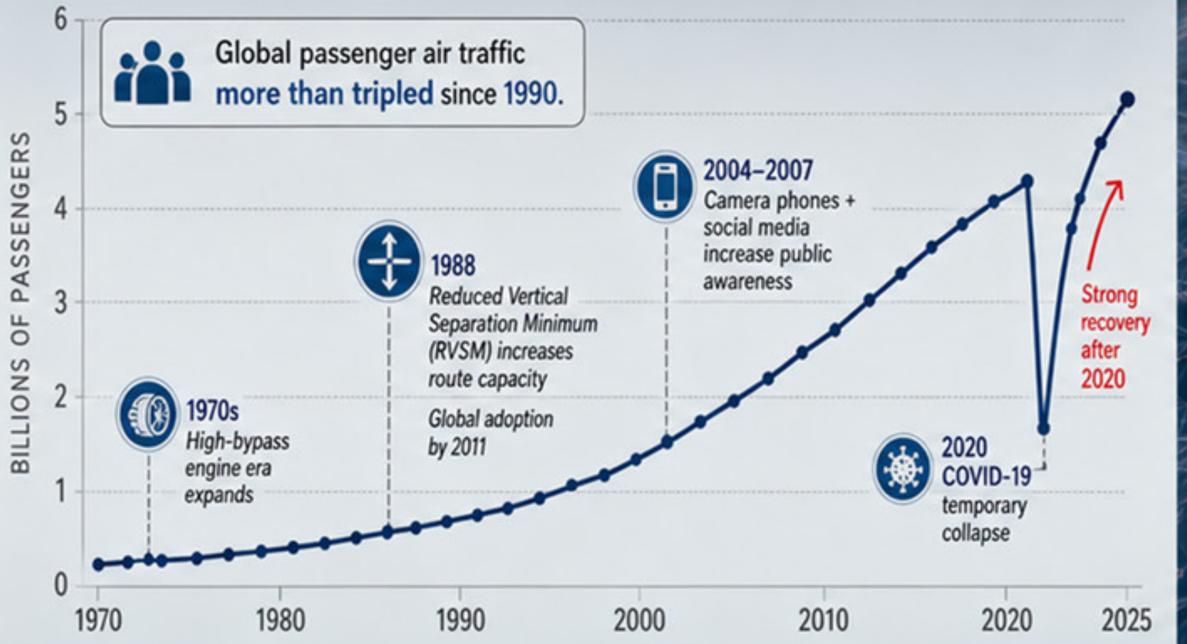
If the Windy app says contrails are visible in your area, you can also use ADS-B Exchange to find out what flights they are.

THE EXPANSION OF AVIATION-INDUCED CLOUDINESS

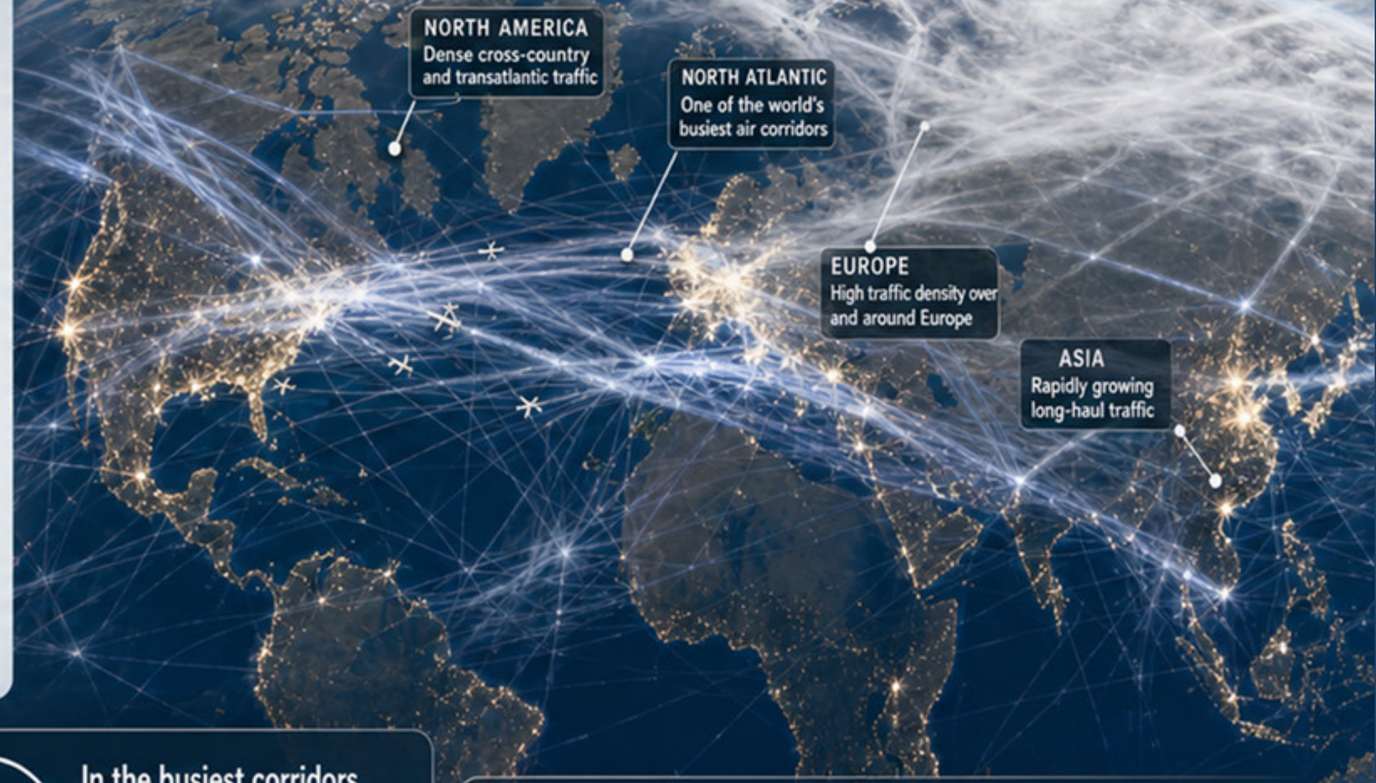
As flights multiplied, persistent contrails and aviation-induced cirrus expanded across the world's busiest air corridors.

GLOBAL PASSENGER AIR TRAFFIC

Total passengers per year (billions)



Source: ICAO Air Passenger Market Analysis (2025) and historical data.



1990–2025: Air traffic more than tripled

High-cloud frequency in major flight corridors increased about 1%–3% per decade

~10%

In the busiest corridors, aviation-induced cirrus can now affect up to ~10% of total sky area

North America, Europe, and the North Atlantic show the clearest concentration of aviation-induced cirrus due to persistent traffic through ice-supersaturated regions (ISSR).

Lee Zeldin
@epaleezeldin

Make Sunsets is a startup that is geoengineering by injecting sulfur dioxide into the sky and then selling “cooling credits.” This company is polluting the air we breathe. I’ve instructed my team that we need to quickly get to the bottom of this and take immediate action.

OFFICE OF AIR AND RADIATION
WASHINGTON, D.C. 20460

April 14, 2025

Mr. Luke Iseman
Mr. Andrew Song
Make Sunsets
514 Americas Way # 18412
Box Elder, South Dakota 57719

Dear Mr. Iseman and Mr. Song:

The United States Environmental Protection Agency (“EPA”) is evaluating whether Make Sunsets is subject to the Clean Air Act (“Act”) by adversely impacting air quality.

Section 114(a) of the Act, 42 U.S.C. § 7414(a) in relevant part states that for the purpose of carrying out any provision of the Act:

> *The Administrator may require any person who owns or operates any emission source, who manufactures emission control equipment or process equipment, who the Administrator believes may have information necessary for the purposes set forth in this subsection, or who is subject to any requirement of this chapter . . . on a one-time, periodic or continuous basis to . . . provide such [] information as the Administrator may reasonably require.*

Within thirty (30) days of receipt of this information request letter, Make Sunsets must provide the information requested in the enclosures to this letter. Please provide responses in electronic format by email to: Erika Sasser (sasser.erika@epa.gov)

Be aware that if Make Sunsets does not provide the information requested in a timely manner, the EPA may order it to comply and may assess monetary penalties under Section 113 of the Act, 42 U.S.C. § 7413. Federal law establishes criminal penalties for providing false information to the EPA. This letter is not subject to Office of Management and Budget review pursuant to the Paperwork Reduction Act, 44 U.S.C. Chapter 35.

You may assert a business confidentiality claim covering part or all of the information requested in the manner described by 40 C.F.R. § 2.203(b). Information covered by such a claim will be disclosed by the

es of information, such as emission data, are not properly the su
n accompanies the information when the EPA receives it, the EP
e to the public without further notice to you.

tions regarding this letter, please contact Erika Sasser (sasser.eri

Sincerely,

Abigale Tardif

Abigale Tardif
Principal Deputy Assistant Admin
Office of Air and Radiation

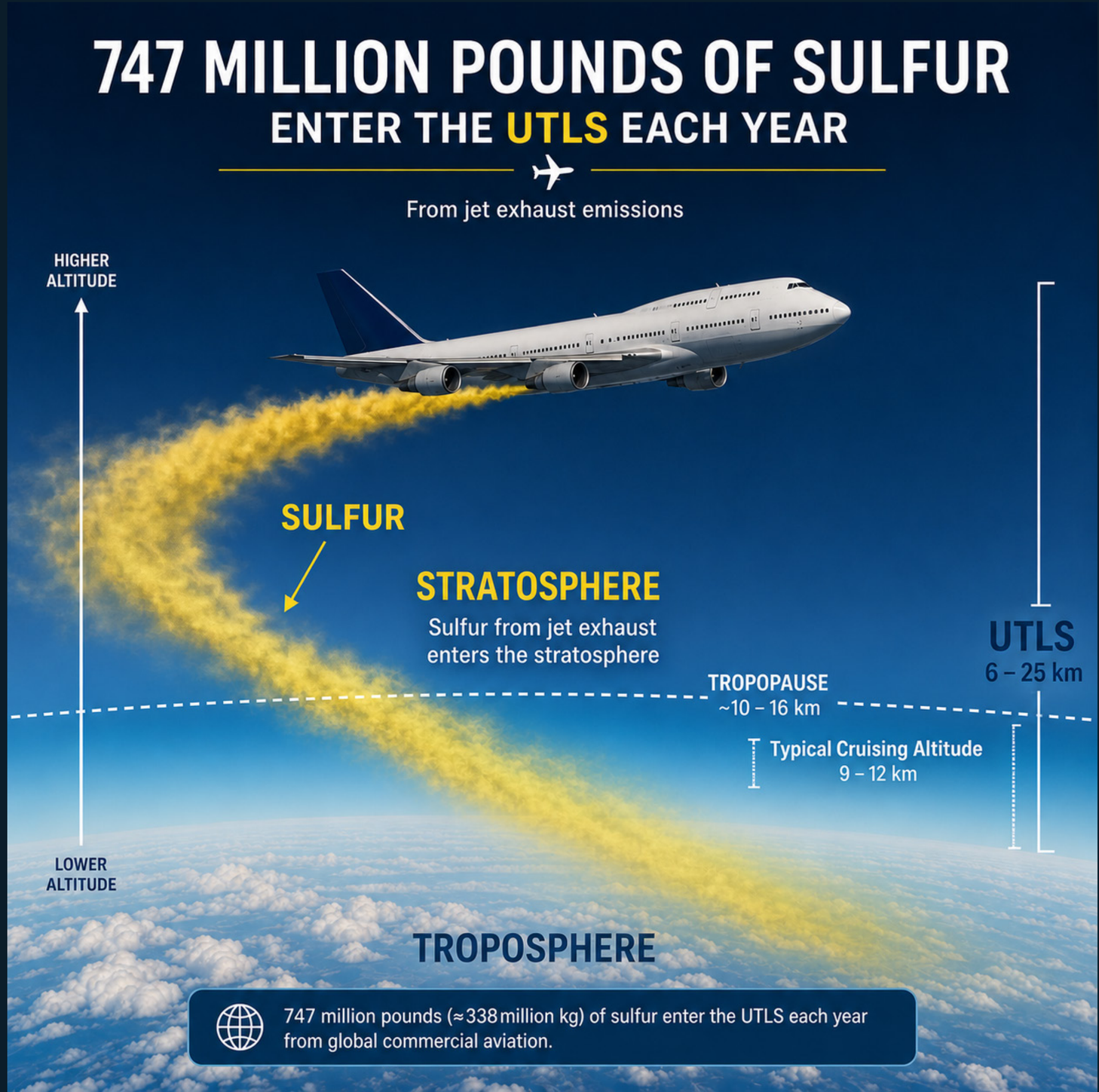
Rate proposed Community Notes →

3:22 PM · Apr 15, 2025 · **2.5M** Views

747 million pounds

Annual sulfur emissions from aviation

Commercial aviation produces 747 million pounds of sulfur dioxide each year in the upper troposphere and lower stratosphere, yet this pollution remains largely unregulated, while a mere 220-pound geoengineering weather balloon faces scrutiny.



David Keith: Geoengineering Guru

“You can’t write legislation that says you can’t put sulfur in the stratosphere since every commercial flight does that.”

SOURCE: Reuters. Insight: How two weather balloons led Mexico to ban solar geoengineering

YES WE CAN!

“This is a really important moral point. So if I made a decision, or if there was a collective decision to do a geoengineering program, and you put say, the kind of program I think makes more sense, you put about a million tons of sulfur per year (in the stratosphere), you might end up killing many tens of thousands of people a year as a direct result of that decision.”

https://youtu.be/fSCHLwJHwVM?t=4217

The Bifurcated Stratosphere

NASA's ATom mission found the Northern Hemisphere stratosphere chemically distinct from the Southern Hemisphere, with commercial aviation as the likely anthropogenic cause.

10,000 airports shown

67,663 flight paths

More than **80%** of annual flights occur in the Northern Hemisphere

SO_x NO_x H_2O BC Metals

NORTHERN HEMISPHERE

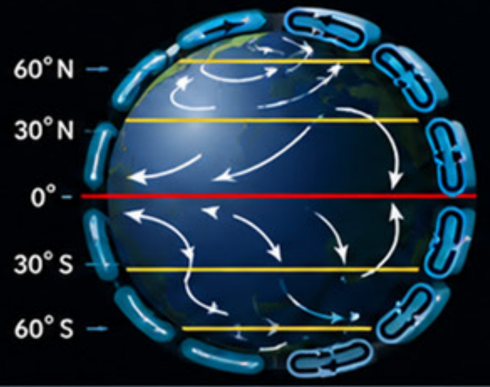
HAZIER. MORE POLLUTED.
CHEMICALLY ALTERED.

EQUATOR

SOUTHERN HEMISPHERE

CLEANER. CLEARER.
LESS IMPACTED.

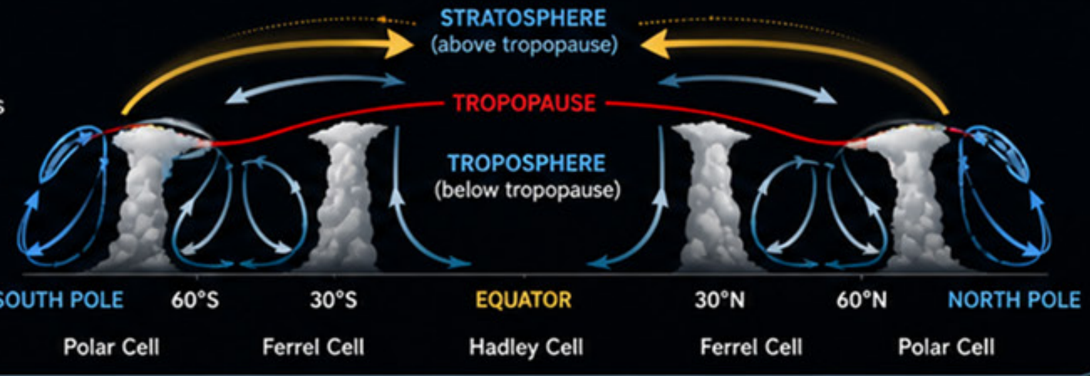
> "We also observe elevated SO_2 ... in the NH lowermost stratosphere (LMS).



The Brewer-Dobson Circulation

This large-scale atmospheric circulation transports air upward in the tropics and poleward in the stratosphere, then downward in the extratropics.

It helps isolate the Northern Hemisphere lowermost stratosphere, allowing pollutants from aviation to accumulate.



AVIATION POLLUTION REACHES THE STRATOSPHERE

Aircraft emissions can inject black carbon (soot) and sulfur dioxide aerosols high into the atmosphere, affecting the ozone layer.

STRATOSPHERE
(12 – 50 km)

TROPOPAUSE
(~12 km)

TROPOSPHERE
(0 – 12 km)

HIGH IN THE STRATOSPHERE

HAZY STRATOSPHERE
Aviation emissions contribute to a layer of haze high above the clouds.

ALTITUDE RANGE
8–12 km
(stratosphere)

10,000
BLACK CARBON PARTICLES
PER CUBIC CENTIMETER

> "This is the first time that any group in the world has shown that black carbon from aircraft can go to the stratosphere and affect the ozone layer."
>
> – IISc & ISRO

IISc Indian Institute of Science | ISRO

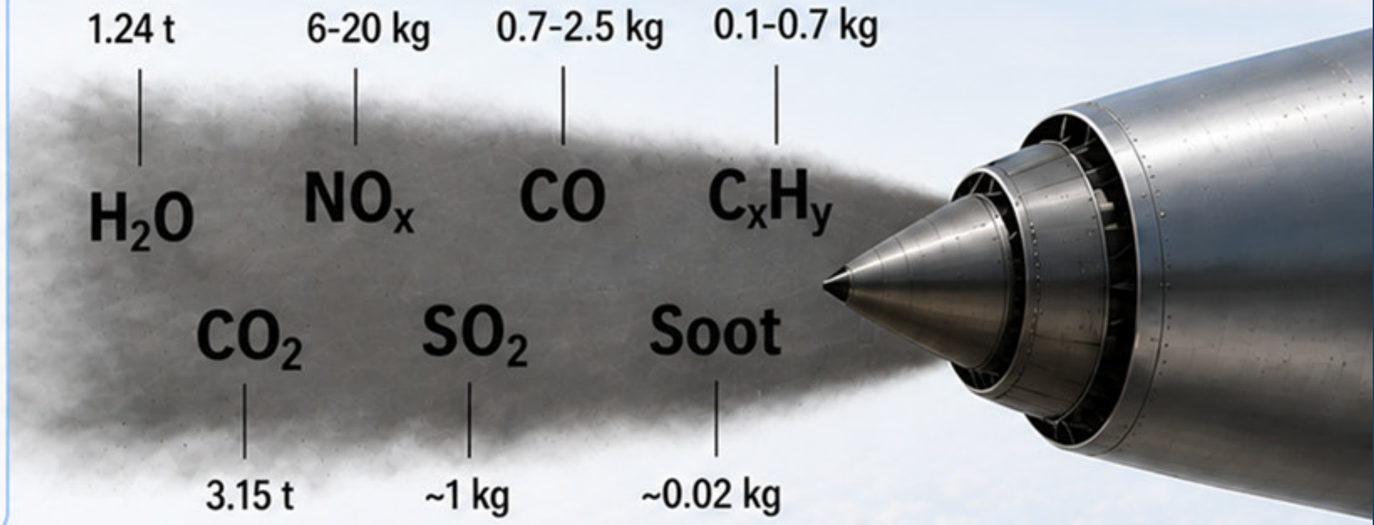
Source: Indian Institute of Science (IISc) & Indian Space Research Organisation (ISRO)

The nvPM Inventory

EMISSIONS PER TONNE OF KEROSENE BURNED

NvPM refers to solid particles emitted from combustion processes — most notably aircraft engines — that remain in a solid state and do not vaporize when heated to a temperature of 350°C.

Primarily composed of carbonaceous soot and trace metal aerosols, these particles are measured directly at the engine exhaust nozzle and are crucial in aircraft emission certification standards.



The Global Aviation Emissions Inventory (GAIA) Based on Automatic Dependent Surveillance–Broadcast (ADS-B) documents

21.4 Gg nvPM

47,179,000 lbs

280 Septillion (2.8×10^{26} particles) annually.

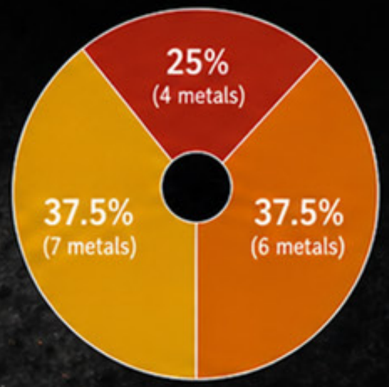
Source: Teoh, R., Engberg, Z., Shapiro, M., Dray, L., & Stettler, M. E. (2024). The high-resolution Global Aviation emissions Inventory based on ADS-B (GAIA) for 2019–2021. *Atmospheric Chemistry and Physics*, 24(1), 725-744. https://doi.org/10.5194/acp-24-725-2024.

METALLIC FINGERPRINTS

Metals detected in jet exhaust and stratospheric aerosols

Research in the Proceedings of the National Academy of Sciences (PNAS) shows metallic particles (Al, Cu) embedded in ~10% of stratospheric aerosols. PNAS attributes these stratospheric metallic aerosols to supersonic aircraft; however, Abegglen et al. confirmed 15 metal species in aircraft exhaust in 2016, and Government et al. confirmed that stratospheric accumulation of aviation soot is more likely the cause of metallic aerosol accumulation in 2017.

Metals detected in exhaust plume



- **> 10%** — Sodium, Iron, Calcium, Chromium
- **1%–10%** — Silicon, Aluminum, Cobalt, Copper, Molybdenum, Magnesium
- **< 1%** — Vanadium, Manganese, Nickel, Barium, Titanium, Lead, Zirconium

SOURCES OF METALS IN JET EXHAUST

Jet Fuel

Engine Oil/Lubricants

Engine Erosion

> *The detected metallic compounds were all internally mixed with the soot particles. The most abundant metals in the exhaust were Chromium (Cr), Iron (Fe), Molybdenum (Mo), Sodium (Na), Calcium (Ca), and Aluminum (Al), Vanadium (V), Barium (Ba), Cobalt (Co), Copper (Cu), Nickel (Ni), Lead (Pb), Magnesium (Mg), Manganese (Mn), Silicon (Si), Titanium (Ti) and Zirconium (Zr) were also detected.*

Abegglen, Manuel, et al. "Chemical characterization of freshly emitted particulate matter from aircraft exhaust using single particle mass spectrometry." Atmospheric Environment 134 (2016): 181-197.

Metals found in jet exhaust

> 10% | 1%–10% | < 1%

1 H																	2 He
3 Li	4 Be											5 B	6 C	7 N	8 O	9 F	10 Ne
11 Na	12 Mg											13 Al	14 Si	15 P	16 S	17 Cl	18 Ar
19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn	25 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr
37 Rb	39 Sr	39 Y	42 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe
55 Cs	56 Ba	57–71 —	72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt	79 Au	80 Hg	81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn

Weather Modification by Commercial Aviation

ALTITUDE (approx.)

40,000 ft (12 km) — UPPER TROPOSPHERE

30,000 ft (9 km)

20,000 ft (6 km) — MID TROPOSPHERE

10,000 ft (3 km)

Surface LAYER

AIC / cirrus homomutatus
Aviation-Induced Cloud

> *"It appears likely that inadvertent cloud seeding by jet aircraft may be of the same order of magnitude as that attained in commercial cloud seeding operations."*
> — Wallace Murcray, 1970

Suppression and Redistribution of Rainfall (Over-Seeding)

nvPM · BC · metallic aerosols · INPs · CCN

Moisture Sink
Moisture trapped in upper troposphere

Weak / Delayed Precipitation
Blocked or greatly reduced

- Artificial ice crystals compete for moisture
- Crystals remain too small to sediment
- Disrupts Wegener–Bergeron–Findeisen process
- Suppresses light regional rainfall
- Redistributes moisture downwind

Suppressed Light Rainfall
or delayed precipitation

Moisture Redistributed Downwind

Rainfall Occurs Farther Downwind
in another region

Source Region – Rain Suppressed

Downwind Region – Rain Enhanced / Delayed

Enhancement and Streamers (Seeder–Feeder Mechanism)

Soot / Black Carbon · Metallic Aerosols · INPs · CCN

Seeder Layer
Upper seeded AIC (Cirrus homomutatus)

Precipitation Streamers
Ice falls from seeder layer into feeder cloud

Feeder Cloud
Moisture-rich Altostratus / Stratiform Cloud

Intense, Localized Precipitation
Enhanced rainfall bands and anomalies

- Dense ice masses form in mature AIC
- Upper seeded cloud acts as a seeder layer
- Falling ice penetrates feeder clouds below
- Accelerates droplet coalescence and secondary ice formation
- Triggers concentrated precipitation anomalies

RAIN RATE (relative)
Low · Moderate · High · Extreme

Altered Rainfall Geometry – Intense & Localized

Persistent contrails evolving into cirrus homomutatus can mechanically alter the timing, spatial distribution, and volume of regional surface precipitation.

Solar Dimming & Accidental Geoengineering

> “I’m talking about a sub-visual contrail-generated haze of ice, which we do not classify as a cloud but gives the blue sky more of a whitish tint.”

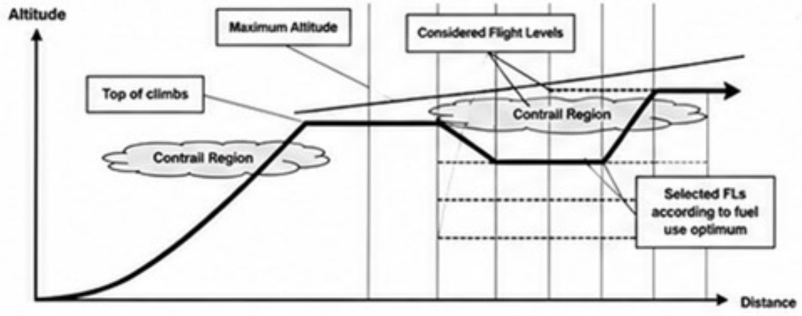
> “We might be actually conducting some unintentional geoengineering here.”
>
> *— Dr. Charles Long, NOAA scientist, 2015*

CONTRAIL AVOIDANCE AS GEOENGINEERING

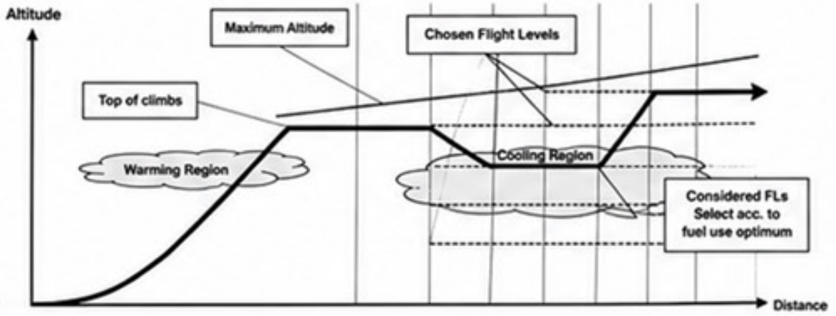
Managing the climate by managing clouds—at the push of a button.

Government agencies, international groups, and the aviation industry are not just studying contrails—they intend to operationally manage them to control Earth's energy balance.

Avoiding warming contrails



Creating cooling contrails



CONTEXT

Despite the outrage expressed by **37 states** with pending legislation, the FAA, NASA, NOAA, and ICAO are only concerned with avoiding contrail formation in **2% of flights** that they claim may lead to "warming contrails" that form cirrus clouds.

The mechanism being pursued is operational: by predicting ISSR where persistent contrails form, flight paths can be adjusted to avoid them — or, conversely, routed through them deliberately to produce "cooling contrails" during daylight hours when their reffective effect exceeds their heat-trapping effect.

Google's AI contrail forecasting tool, already integrated into **American Airlines'** flight planning software, is the operational implementation of exactly this approach.

EPA and FAA have been telling concerned citizens that contrails are harmless water vapor for over two decades. Meanwhile, government agencies, international groups, and the aviation industry attempt to control the warming effect of contrail cirrus with zero regard for the public's clear demands: **stop clouding our skies and blocking the sun.**

Deliberately routing flights into or out of contrail-forming regions to create "cooling" or avoid "warming"

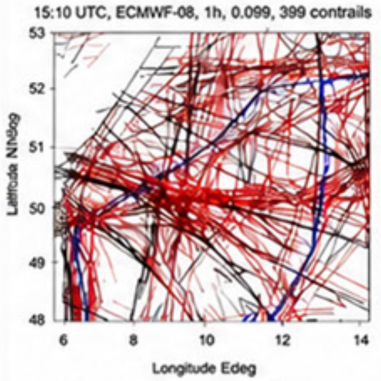
Contrail Cirrus Simulation and Prediction (CoCiP)

Input: Aircraft (BADA)

Movements
(ATM data, DFS, Eurocontrol)

Meteorology
(NWP results, ECMWF, DWD)

Contrail Cirrus Prediction Tool



- From regional to global
- Comparable to observations

Output:

Contrail,
life cycle,
cover, radiation

Cirrus Simulation
(insitu, Lidar, Satellite)

Sensitivity studies

Prediction Climate impact

IMPACT STATEMENT: We are not requesting that some planes avoid making contrails that might "trap heat." Petitioners request that EPA establish **mandatory contrail avoidance** that reduces or eliminates AIC and persistent contrails **regardless** of perceived thermal impacts. The CAA provides no exception for pollutants with perceived "beneficial" effects. EPA must act to reduce aviation-induced cloudiness consistent with the Clean Air Act.

QUOTES / EVIDENCE

ICAO (2010)

Dr. Ulrich Schumann addressed the ICAO Colloquium on Aviation and Climate Change, where the operational objective was explicitly framed as:

"less warming, MORE cooling contrails; predictable for operational planning."

— Statement that aviation operations have the goal of modifying atmospheric conditions at a structural level.

FAA ACCRI (2017)

Dr. Rangasayi Halthore, head of the FAA's Aviation Climate Change Research Initiative (ACCRI), documented agency-level awareness that contrail formation could be operationally managed, stating:

"we would like to have MORE CIC [Contrail-Induced Cirrus] during day and none during night."

— Framing treats aviation cloudiness as a controllable variable — not an incidental byproduct.

Royal Aeronautical Society (2021)

The "Greener by Design" Contrail Avoidance Group documented industry-level discussions of deliberately routing flights into ISSRs to form "cooling contrails." The group explicitly noted:

"half the group foresaw political reluctance to consider deliberately forming contrails on the grounds that it could be considered geoengineering."

The group concluded that "the option that offers the quickest and the biggest impact is **direct contrail management.**"

Breakthrough Energy, Google AI, and American Airlines (2025)

Breakthrough Energy has a stated goal that **"Adjusting 5% of flights could avoid up to 80% of contrail warming."**

Their model for predicting ISSR locations and the "climate impact" of AIC is based on Dr. Ulrich Schumann's Contrail Cirrus Prediction Tool. Breakthrough Energy and Google AI have now partnered and are using Schumann's CoCiP model, which they have integrated with American Airlines' flight planning software to run contrail avoidance trials.

VISIBILITY IMPAIRMENT UNDER THE CLEAN AIR ACT

Visibility is a protected welfare value — yet aviation-induced cloudiness affects skies nationwide.

Class I Area: Protected Visibility

Everywhere Else: Visibility Degraded

CAA § 302(h): Welfare includes visibility.

Aviation-induced cloudiness affects visibility, weather, and climate.

CAA § 302(g) — Aircraft engine emissions are air pollutants.

CAA § 169A — Congress set a national goal to prevent anthropogenic visibility impairment in Class I areas.

Regulatory gap — EPA protects park visibility, while the same physics affects skies across the entire USA.

★ CLEAN AIR. CLEAR SKIES. PROTECT VISIBILITY EVERYWHERE. ★

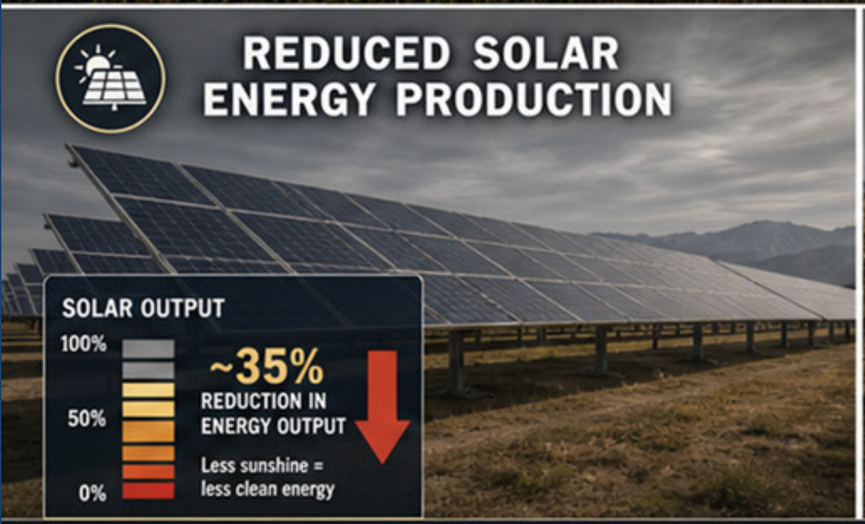
THE SUNSHINE ECONOMY

WHEN THE SUN DISAPPEARS, SO DOES OUR PROSPERITY.

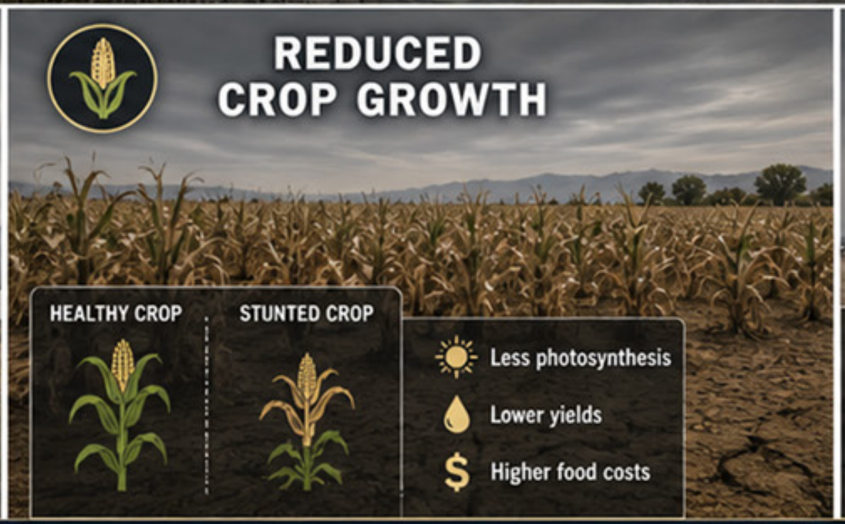
"As you know, our entire economy is dependent upon tourist trade, which is predicated on our bright sunshine and warm climate. Recently our sky has resembled a mob of exuberant sky riders performing an aerial circus. The 'contrails' are not disappearing but are breaking down into a haze and creating a cloud-like appearance in the sky. With the unlimited expanse of barren, uninhabited land in the west, does such activity have to be centered over a resort area, which is offering the visitor cloudless skies and unlimited sunshine?"

~ Jimmy Cooper, Manager, Palm Springs Chamber of Commerce (1958)

REDUCED SOLAR ENERGY PRODUCTION



REDUCED CROP GROWTH



TOURISM & BEACH LEISURE AFFECTED

SUNSHINE IS A PRECIOUS RESOURCE. PROTECT OUR SKY. PROTECT OUR FUTURE.

GROUND LEVEL: LOCALIZED ACUTE TOXICITY ZONES

> Over **5 million** people, including **360,000+** children under five, reside near airports where piston-engine aircraft operate and that counts only leaded-fuel airports. The population near major jet airports is vastly larger: **40 million Americans** live near major airports, disproportionately lower-income and minority communities.

TOXIC EXPOSURES AT GROUND LEVEL

ULTRAFINE PARTICLES (UFPs)

Significant increase in UFP concentrations extendin up to 16 km downwind of airports. (Hudás et al., 2014, 2016)

Increased acute systemic inflammation in individuals following exposure to airport-related UFPs. (Vosseghi et al., 2019)

POLYCYCLIC AROMATIC HYDROCARBONS (PAHS)

Aviation exhaust includes carcinogenic PAHs, such as naphthalene.

No binding occupational exposure limits currently exist for aviation workers.

METALLIC NANOPARTICLES

Aviation exhaust contains metallic nanoparticles.

No binding occupational exposure limits currently exist for aviation workers.

SULFUR DIOXIDE (SO_2)

Epidemiological evidence indicates the deadly established safe threshold for SO_2 exposure.

These exposures fall within the scope of air pollution that may reasonably be anticipated to endanger public health under **Section 231** of the CAA.

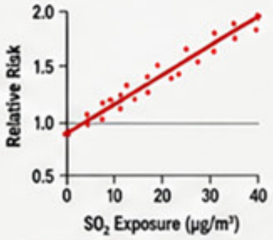
These ground-level exposures represent the localized manifestation of a broader atmospheric emissions system originating from aviation activity.

OVERWHELMING EVIDENCE OF HARM

74,300
PREMATURE DEATHS PER YEAR

due to aviation-attributable $PM_{2.5}$ and ozone exposure.

NO SAFE THRESHOLD FOR SO_2



A 67-study meta-analysis. confirmed linear, threshold-free. SO_2 dose-response.

A 3 µg/m³ study found mortality associations with SO_2 below current WHO guideline levels.

NO SAFE THRESHOLD EXISTS

ACTIONS CAN SAVE LIVES

1,020
U.S. DEATHS PREVENTED ANNUALLY

A transition to 15 ppm sulfur fuel alone is estimated to prevent 1,020 U.S. deaths annually.

REDUCED SUN EXPOSURE COMPOUNDS HARMS

Pediatric Vitamin D levels measured at **12.4 ng/mL** (deficient) compared to **26.1 ng/mL** in controls.

CHILDREN BEAR A DISPROPORTIONATE BURDEN—A FACT RECOGNIZED IN MULTIPLE LEGAL AUTHORITIES MAXIMIZING HEIGHTENED PROTECTION.

EMISSIONS KILL FAR MORE THAN CRASHES

AIRPLANE CRASHES

KILLED ABOUT
1,000
PEOPLE ANNUALLY
(IN 2010)

VS.

PLANE EMISSIONS

KILL ABOUT
10,000
PEOPLE EACH YEAR
(IN 2010)

"Aircraft emissions impact human health through degradation of air quality. The majority of previous analyses of air quality impacts from aviation have considered only Landing and Takeoff (LTO) emissions. We show that aircraft cruise emissions impact human health over a hemispheric scale and provide the first estimate of premature mortalities attributable to aircraft emissions globally. We estimate ~8000 premature mortalities per year are attributable to particulate matter emissions globally. Premature mortalities due to ozone and other emissions, including from aircraft NO_x emissions, are substantially higher." (Dedoussi et al., 2021)

THE BOTTOM LINE

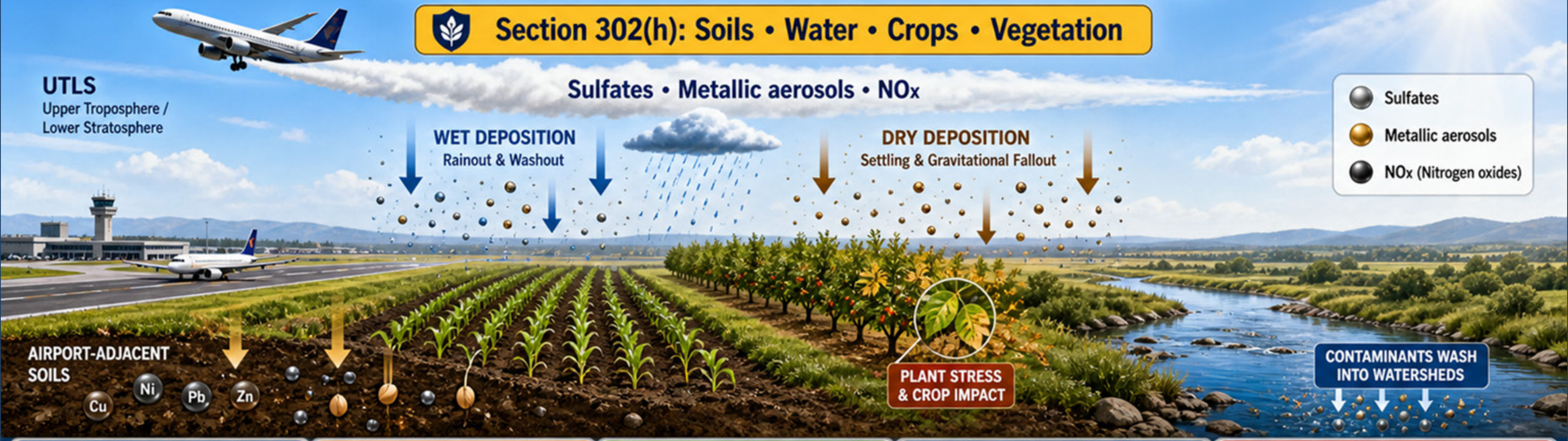
Aviation pollution creates localized acute toxicity zones at ground level, causing preventable disease and death—especially in children and overburdened communities.

NO SAFE THRESHOLD. NO DE MINMIS DEFENSE.
AVIATION POLLUTION IS A PUBLIC HEALTH EMERGENCY.

SOIL, WATER, AND CROPS

How aviation emissions deposit onto agricultural land and watersheds

Section 302(h): Soils • Water • Crops • Vegetation



1 Documented deposition pathway

Aviation emissions injected into the UTLS do not remain airborne permanently. Through wet and dry deposition, sulfates, metallic aerosols, and nitrogen oxides settle onto agricultural soils and into watersheds across the United States.

2 Airport soils are contaminated

Cu, Ni, Pb, and Zn measured at

1.34–3× background

33.7% germination inhibition

3 Cropland already at risk

2025 Science study: **14–17%** of global cropland exceeds toxic metal thresholds

Up to **1.4 billion** people affected globally

Key metals: Cd, Pb, Cr, Cu, Ni

4 Aviation-linked metals

Peer-reviewed research has documented copper, nickel, zinc, chromium, lead, and other metals in aviation exhaust, with soil and sediment deposition correlating with air traffic volume.

Cu Ni Zn Cr Pb

5 Critical regulatory gap

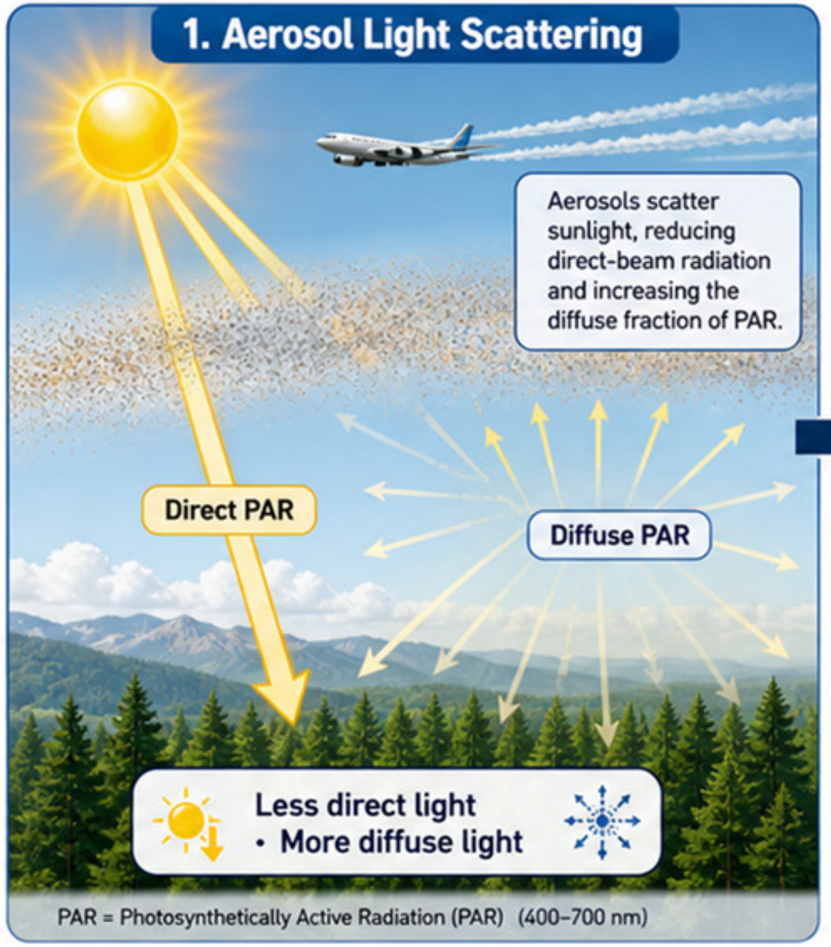
- ✕ No comprehensive U.S. monitoring program tracks heavy metal deposition in soils surrounding airports or along flight corridors.
- ✕ No coordinated federal effort quantifies Cu, Ni, Zn, and Cr deposition from aviation emissions.

Beyond chemical deposition, aviation emissions also **alter sunlight** and the **radiative environment**, affecting plant function and ecosystem dynamics.

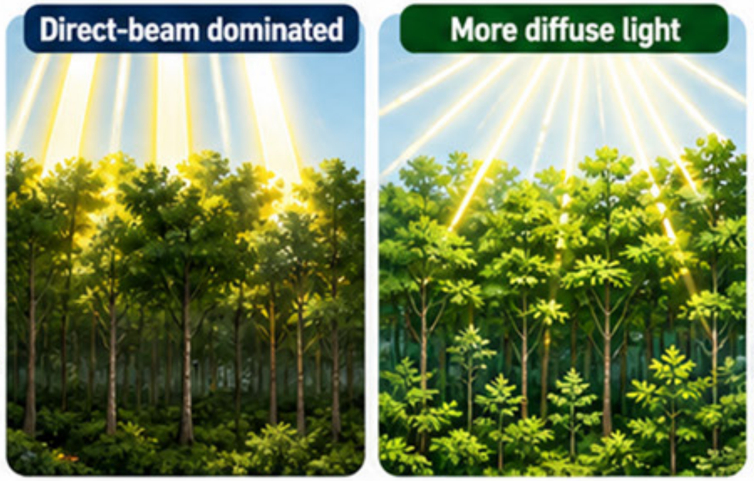
THE WILDFIRE PARADOX

How aerosol-scattered light can boost canopy growth yet raise fire danger

1. Aerosol Light Scattering



2. Forest Response



- Whole-canopy photosynthesis often increases
- Greater leaf area / biomass can accumulate
- Diffuse-light fertilization is well documented in forest and ecosystem studies.

3. Why Fire Risk Can Increase

A Denser canopy / more biomass → More available fuel load

B Altered energy balance and hydrology → Potentially lower moisture availability / weaker evaporation and water cycling

More fuel + drier vegetation = higher wildfire risk

Live fuel moisture strongly influences ignition and fire spread.

What the literature supports

- Aerosols increase diffuse light by scattering incoming sunlight.
- Diffuse light often improves canopy light-use efficiency and photosynthesis.
- Aerosols can alter evapotranspiration and moisture conditions, but the direction and magnitude vary by ecosystem and aerosol loading.
- Wildfire risk increases when fuel loads are high and live fuel moisture is low.

Evidence status: The diffuse-light effect is strongly supported. The evapotranspiration and wildfire pathway is a synthesis of multiple studies and is context-dependent rather than a single universal law.

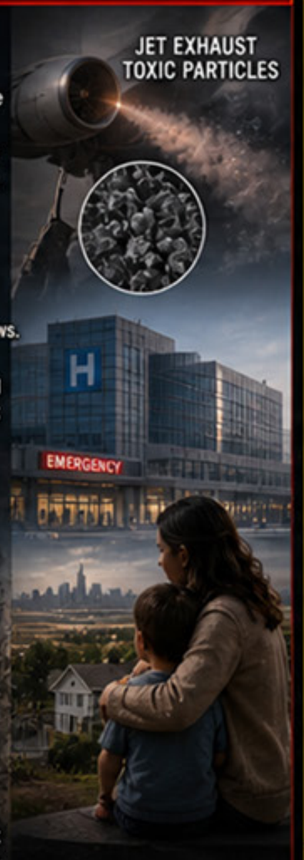
Selected references | Gu et al., 2002, *J. Geophys. Res.*; Mercado et al., 2009, *Nature*; Zhou et al., 2021, *Curr. Opin. Environ. Sci. Health*; Wang et al., 2022, *Agric. For. Meteorol.*; Yebra et al., 2013, *Remote Sens. Environ.*

THE TRIPARTITE ENDANGERMENT

Final Summary for EPA Petition for Rulemaking

1. PUBLIC HEALTH: A DOCUMENTED KILL CHAIN

- **~74,300 premature deaths** per year worldwide are attributable to aviation-emitted particulate matter and ozone, according to a 2024 high-resolution GEOS-Chem assessment (21,200 PM2.5-attributable + 53,100 ozone-attributable mortalities in 2015).
- **US domestic aviation emissions account for 37%** of all aviation-attributable PM2.5 exposure occurring within the United States — confirming a domestic health crisis within EPA's jurisdiction.
- **No safe threshold exists:** PM2.5 dose-response studies across 67 countries and 600+ cities show health damage at all observed concentrations; EPA has acknowledged this principle in its NAAQS reviews.
- **Near airports,** ultrafine particle concentrations are catastrophically elevated: LAX research documented a **100–900%** increase extending 18 km downwind; at 10 km downwind, concentrations increased **4-fold** over background.
- These **UFPs** are sub-40 nm, can cross cellular membranes by nonphagocytic mechanisms, and penetrate indoors — exposing residents even inside their homes.
- **Over 5 million people,** including **360,000+** children under five, live near piston-aircraft airports; **40 million Americans** live near major airports, disproportionately lower-income and minority communities.
- **Fuel transition** is a proven life-saving intervention; the literature supports preventing on the order of 1,000 U.S. deaths per year.
- **EPA cannot claim ignorance:** its 2022 nvPM rulemaking acknowledged that exposure to ambient PM is associated with a broad range of health effects.



74,300 DEATHS/YEAR
Worldwide attributable to aviation PM & ozone

40 MILLION AMERICANS
Live near major airports, disproportionately burdened

100–900% UFP INCREASE
Extending 18 km downwind at LAX; 4× at 10 km

2. ECONOMIC WELFARE: EXPLICIT § 302(h) HARMS

- **Crops, soils, and property** — including concentrated solar power (CSP) — are directly damaged. Aviation **emissions** degrade air quality across continental scales.
- US domestic aviation emissions contribute **37%** of all aviation-attributable PM2.5 exposure within the United States, meaning the welfare harms are overwhelmingly domestic in origin and squarely within EPA's jurisdiction.
- Tourism and property values are suppressed: communities near airports face documented declines in quality of life, property values, and economic activity linked to noise and air quality degradation — harms Section 302(h) explicitly enumerates.
- Soil contamination near airports is measurable and persistent: airport-adjacent soils show heavy metal and PAH concentrations at **1.34–3×** background levels, impairing agricultural productivity and triggering remediation obligations.
- Hospitalization costs are quantifiable: one standard deviation increase in airport-attributable air pollution at California's 12 largest airports generates about **$1 million per day** in respiratory and cardiovascular hospitalization costs for the 6 million people living within 10 km.
- These are not speculative harms: crops, soils, property, economic values, personal comfort, and wellbeing all appear in Section 302(h)'s enumerated welfare effects.

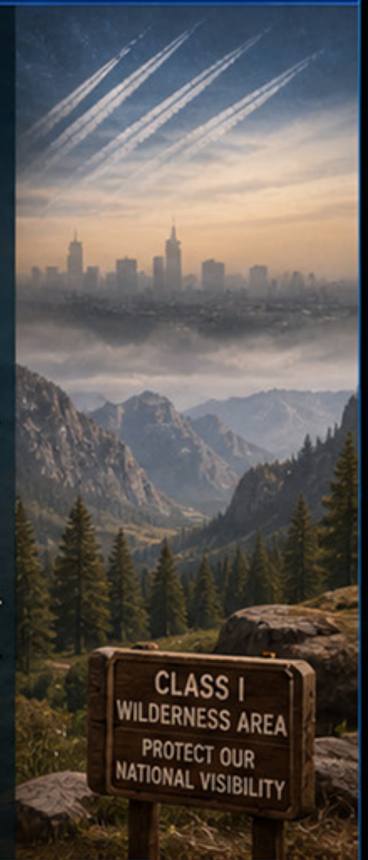
$1 MILLION/DAY
Respiratory & cardiovascular hospitalization costs (CA's 12 largest airports; 6M people within 10 km)

1.34–3× BACKGROUND
Heavy metals & PAHs in airport-adjacent soils

EXPLICIT § 302(h) HARMS
Crops, soils, property, economic values, personal comfort, and wellbeing

3. VISIBILITY: THE ARBITRARY EXEMPTION

- Aviation emissions degrade visibility at continental scale — implicating both CAA § 302(h)'s welfare mandate and the independent national visibility goal established by **§ 169A.**
- Sulfate, nitrate, and organic aerosols from aviation contribute to regional haze through the same light-scattering physics EPA regulates under the Regional Haze Rule for Class I wilderness areas.
- The physics are identical; the exemption is not. EPA requires states to demonstrate "reasonable progress" toward natural visibility conditions in parks and wilderness areas — yet exempts aviation-origin PM from this same framework.
- Contrails and contrail cirrus are visible proof of aviation's atmospheric footprint. These persistent ice clouds, formed from aviation water vapor and soot, are themselves a form of visibility impairment.
- EPA cannot regulate the same pollutant from power plants and vehicles but exempt it from aircraft. The CAA does not authorize selective blindness. If sulfate aerosols impair visibility when emitted from a smokestack, they impair visibility when emitted from a turbine engine at 36,000 feet.



THE PHYSICS ARE IDENTICAL; THE EXEMPTION IS NOT

CONTRAILS ARE VISIBLE PROOF
Of aviation's atmospheric footprint and visibility harm

EPA IS NOT BEING ASKED TO STRETCH THE STATUTE — THE STATUTE WAS WRITTEN FOR EXACTLY THIS.

The Clean Air Act's Mandate is Clear. The Science is Overwhelming. The Harms are Real. The Time for Action is Now. **PROTECT HEALTH. PROTECT WELFARE. PROTECT VISIBILITY.**

SAVE OUR SKIES

OUR TEAM

Reinette Senum

Reinette Senum is the President and Founder of GenSeven and SaveOurSkies.org, a researcher and investigator, and a former mayor of Nevada City, CA, whose work bridges environmental science, public policy, and community advocacy.

genseven.org

GenSeven

James Franklin Lee Jr.

James Franklin Lee Jr. of ClimateViewer News, LLC: a researcher and data analyst with over a decade of documented investigation into atmospheric emissions and their impacts on public health. Jim has been sounding this alarm since 2015, when he testified before the EPA and warned the agency about exactly what this petition now proves. The agency did not act. This petition forces the answer he never recieved.

climateviewer.com

ClimateViewer News
Tracking The Climate Changers

Leslie Manookian

Leslie Manookian, President and Founder of the Health Freedom Defense Fund: a nationally recognized legal advocacy organization with an established record of federal litigation in defense of public health rights and informed consent. Leslie and her team bring the legal firepower that makes this petition not just compelling, but unassailable.

healthfreedomdefense.org

HEALTH FREEDOM DEFENSE FUND

Michael Hogan

Michael Hogan of Missouri Clean Skies: representing the grassroots, state-level advocacy for atmospheric transparency and environmental accountability that has been building momentum across the country. Michael speaks directly to what 37 states of legislative effort has been working toward, and what this federal petition now makes possible.

mocleanskies.org

MO CLEAN SKIES

Leah Wilson, J.D., Executive Director
Valerie Ferrell, J.D., Policy Director

Stand for Health Freedom is a national health freedom advocacy organization that has empowered over 1 million individuals to directly contact elected officials and key decision-makers, generating more than 7.7 million civic actions and 173 policy wins through its specialized engagement portal to preserve and promote fundamental American rights, including the right to clean air, clean water, and a transparent regulatory system.

standforhealthfreedom.com

STAND FOR HEALTH FREEDOM

Sayer Ji

Sayer Ji is the Chairman and Founder of Global Wellness Forum is a 501(c)(3) nonprofit organization dedicated to advancing health, transparency, and individual sovereignty through research, public education, and policy reform. Working alongside its affiiliated advocacy organization, Global Wellness Action (GWA), a 501(c)(4) social welfare organization, GWF brings together experts across science, medicine, law, and public policy to address critical issues impacting human and environmental health. Together, the organizations support evidence-based solutions, legislative engagement, and public awareness to promote accountability and protect the foundations of public well-being.

GlobalWellnessForum.org

GLOBAL WELLNESS FORUM

Future Generations

A call for clean skies