Independent Meteorological Engagement Effort

Extreme Weather Outreach

Weather Conspiracies and Misconceptions

Chief Meteorologist Ms. Sunny Wescott
Critical Infrastructure and Emergency Response Operations

Weather as a Weapon 101: Correlation vs Causation

Online Review: Government interest in weather control is longstanding, dating from at least 1891. It reached a peak in the early 1970s before being banned by the Environmental Modification Treaty, which forbade "widespread, long-lasting or severe" weather weapons for "hostile purposes." 78 countries have joined since 1977.

Numerous weaponized concepts were explored over the years—artificial lightning, volcanoes, and earthquakes that could level enemy cities, and atmospheric modifications that could cause cancer or starve agricultural production, among other things. But most applied research has been directed at rainmaking and hurricane control.

- When Hurricane King approached the Florida coast in October 1947, the United States initiated Project Cirrus, for which US aircraft dumped 130 pounds of crushed ice into the storm in hopes of moderating windspeed.
- Hurricane victims threatened to sue in response, forcing the United States to continue hurricane control research in Project STORMFURY (1962-1983) "on the down low." These efforts were later discontinued due to a lack of results.

Disinformation campaigns are most successful when they can attach themselves to a kernel of truth.

- Research by Dan Silverman shows that disinformation is especially likely to take hold when audiences are spatially removed from events, which is the case for most people who receive hurricane news.
- It is vital that policymakers increase public awareness about the limits, context, and actual potential of weather control technologies.

In the news recently, a new target: Our weather radar stations!

A militarized conspiracy theorist group believes radars are 'weather weapons' and is trying to destroy them

By Andrew Freedman, CNN

Published 5:58 PM EDT, Mon May 5, 2025

Anthony Wahl/The Janesville Gazette/AP/File

A Doppler radar tower located outside the National Weather Service office in Sullivan, Wisconsin.

(CNN) — National Weather Service offices around the country are on guard after recent threats to agency infrastructure — specifically Doppler weather radars — from a violent militia-style group, emails from the National Oceanic and Atmospheric Administration's security office show.

The group Veterans on Patrol, which the Southern Poverty Law Center defines as an anti-government militia organization, views the NWS' network of Doppler radars as "weather weapons," according

"This group is advocating for anyone and everyone to join them in conducting penetration drills on NEXRAD sites to identify weaknesses which can be used to ultimately destroy the sites," the email stated, using an acronym for the weather radar network.

"The group referred to the NEXRAD system towers as 'weather weapons,' and claimed there were no laws preventing American citizens from destroying the 'weapons,'" the email states.

US weather forecasting is more crippled than previously known as hurricane season nears

It's unclear what the group believes the radars are doing. The NEXRAD, or "next generation radar," network has been in place since the 1990s and detects precipitation in the atmosphere. It can also help pinpoint tornadoes and severe thunderstorms, prompting timely, life-saving warnings. The system is also used by the Federal Aviation Administration and the US Air Force.

Among other actions, NOAA's security office advises that the NWS implement a buddy system when working at remote sites and be alert for suspicious activity.

"Do not engage with anyone suspicious; instead, notify local law enforcement," Monday's email

Addressing Weather Modification

NOAA does not modify the weather, nor does it fund, participate in or oversee cloud seeding or any other weather modification activities. NOAA's objective is to better understand and predict Earth's systems, from the bottom of the seafloor to the surface of the sun.

- *The Weather Modification Reporting Act of 1972 (15 Code of Federal Regulations § 908) requires anyone who intends to engage in weather modification activities within the United States, including cloud seeding, to provide a report to the Administrator of NOAA at least 10 days prior to undertaking the activity. Those reports are filed via email and may be found on the NOAA Central Library website.*
- Decades ago, between 1962 and 1982, NOAA provided support for research into whether hurricane intensity could be modified, known as Project STORMFURY.
    - The research was not successful in modifying hurricanes and STORMFURY was discontinued.
- Efforts to seed are done by state water agencies or private sector entities operating with a permit or through pre-established methods.

Solar geoengineering, a theoretical practice which would modify the atmosphere to shade Earth's surface by reflecting sunlight back into space, **is not taking place at scale** anywhere in the world.

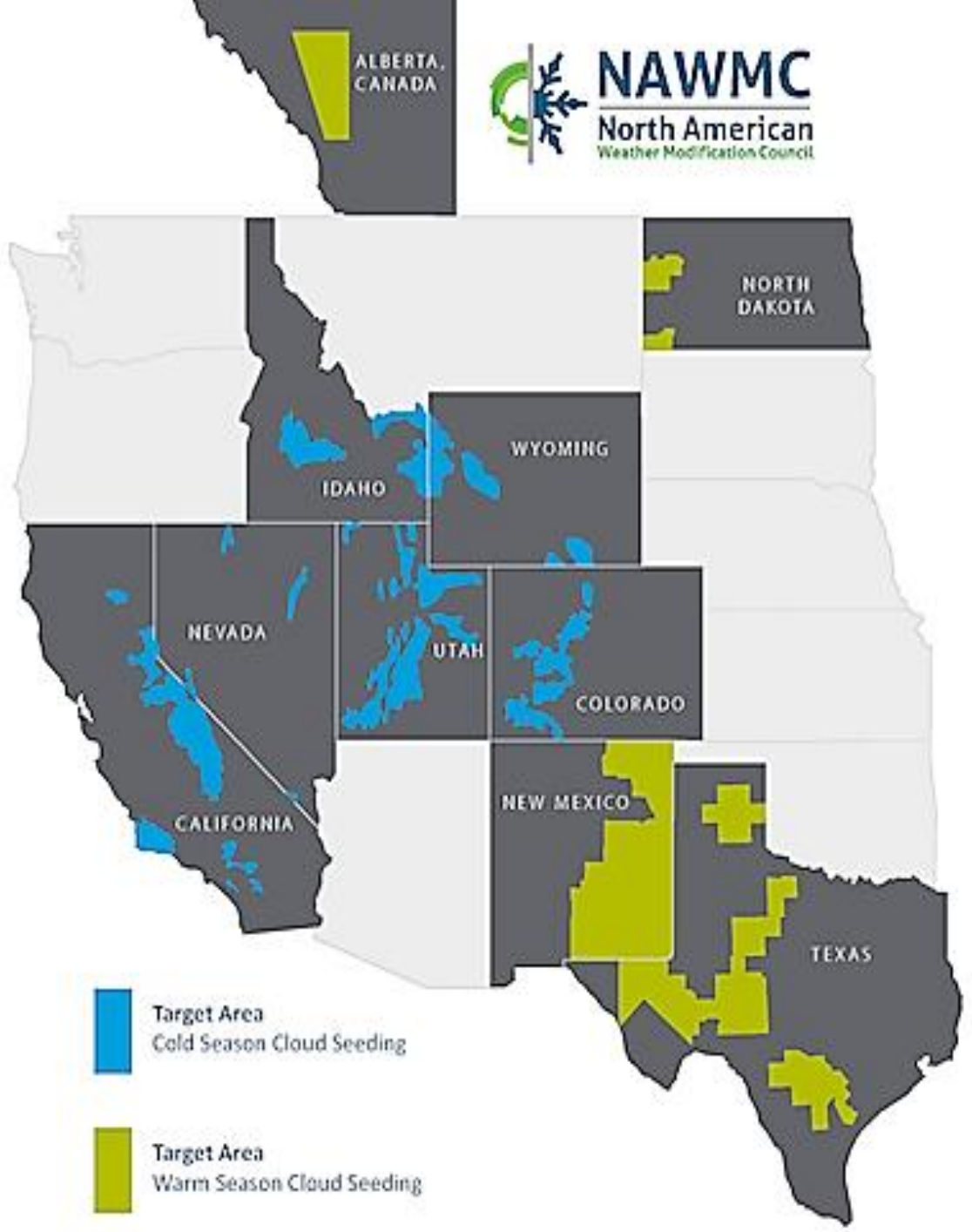
- SCOPEX, offsite link run out of Harvard University, was a scientific research project to study the behavior of small amounts of aerosols in the stratosphere to advance the understanding of solar geoengineering. The proposed scientific research project ended in March 2024 before field experiments were conducted.

HAARP offsite link is a small National Science Foundation-funded facility in Gakona, Alaska, that conducts research on the ionosphere, 30 to 600 miles above the Earth's surface.

- **HAARP** (High-frequency Active Auroral Research Program) **is not capable of influencing local weather at Earth's surface**, let alone tropical cyclones thousands of miles away. The HAARP system is basically a large radio transmitter.

No technology exists that can create, destroy, modify, strengthen or steer hurricanes in any way, shape or form.

- Conspiracy theories will continue to spread internationally as weather events worsen.



Chem Trails (Contrails)

Chemtrails refers to the theory that governments or other parties are engaged in a secret program to add toxic chemicals to the atmosphere from aircraft in a way that forms visible plumes in the sky, somewhat like contrails caused by passing aircraft.

- “If you think that aircraft contrails “look different” or are “behaving strangely” consider that regular aircraft condensation trails (contrails) are sometimes long-lasting and the way they look can change suddenly along a flight path as aircraft fly through regions with different temperature and humidity.” (Harvard University)

The idea began in 1996 from an Air Force research paper titled: Weather as a Force Multiplier: Owning the weather in 2025 (https://apps.dtic.mil/sti/citations/ADA333462).

- The EPA stated the paper does not reflect military policy.
- The paper discusses the speculation of weather modifications in 1839 through the President’s advisory committee on weather control in 1957 and the legal consequences potentially arising from alterations.
- In 1977 the UN General Assembly adopted a resolution to prohibit the use of environmental modification techniques – ENMOD.
    - The document merely discusses ideals in speculation.

In the case of chemtrails, the alleged chemicals typically mentioned include barium, aluminum, human plasma, spreading the COVID-19 infection, or involuntary vaccines.

- If the air is supersaturated with respect to ice formation, the water vapor in the exhaust contrails turns immediately into ice particles, which can then become persistent and be claimed as evidence of ‘chemtrails’.

Contrail conditions in terms of temperature and humidity should exist at (typically) 25-30,000 ft. Supersaturation and a temperature near the dew point are also required. There are often small amounts of alto cirrus cloud present, and these conditions might indicate an approaching warm front. These trails dissipate within a couple hours as the ice sublimates.

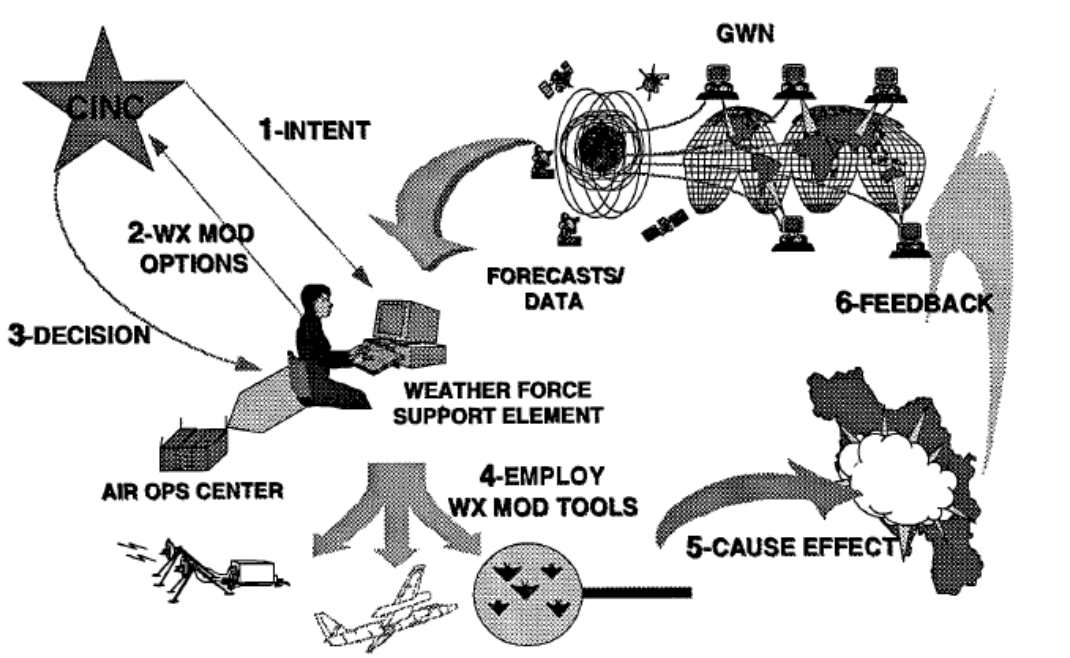
Chemtrail theories are not only a U.S.-based phenomena—almost 17% of respondents in an international survey noted a belief in the existence of a "secret large scale atmospheric program" to be at least partly true.

One scientist noted that in one remote location, the levels of barium in the atmosphere were unusually high relative to the levels of barium in the soil.

No claims were made that the reason for those elevated levels had to be a large-scale chemical operation, but since that scientist was not convinced of a clear reason for the barium to be higher in the atmosphere there, they left the possibility open.

It is possible climate change is causing contrails to persist for longer periods than they used to.

For about 28 years, American’s have postulated that Chem Trails could be mind control, sterilization, or even sexual modification



Source: Microsoft Clipart Gallery © 1995 with courtesy from Microsoft.

Figure 3-2. The Military System for Weather-Modification Operations.

Aircraft vapour trails - there's nothing sinister about them

HAARP – High Altitude Weather Control

The High-frequency Active Auroral Research Program, or HAARP, is a scientific endeavor aimed at studying the properties and behavior of the ionosphere.

- It was devised as a research instrument in the early 1990s to study the ionosphere and how it is affected by solar waves from the sun, which can impact on comms and electrical systems.
- "Radio waves in the frequency ranges in which HAARP transmits are not absorbed in either the troposphere or the stratosphere—the two levels of the atmosphere that produce Earth's weather. Since there is no interaction, there is no way to control the weather.“
- The HAARP system is "basically a large radio transmitter" that produces radio waves that "interact with electrical charges and currents and do not significantly interact with the troposphere.“ HAARP’s radio waves are 100 times weaker than those from mobile phones.

Operation of the research facility was transferred from the United States Air Force to the University of Alaska Fairbanks on Aug. 11, 2015. UAF has been responsible for operations and maintenance of the remote research station, originally developed at a cost of about $290 million

- HAARP is the world's most capable high-power, high-frequency transmitter for study of the ionosphere. (https://haarp.gi.alaska.edu/)
- "The ionosphere stretches ~50 to 400 miles above Earth's surface, right at the edge of space. Along with the neutral upper atmosphere, the ionosphere forms the boundary between Earth's lower atmosphere and the vacuum of space." (NASA)

A study done for the military: using the antenna array to heat a part of the ionosphere, which in turn acted as a low-frequency antenna that could send an ocean-penetrating signal to a submarine.

In 2017 The Los Alamos researchers used HAARP to generate irregularities in the ionosphere to test satellite-to-ground communications under conditions like solar storms.

- Large solar storms can disrupt communications and sometimes take out power grids.

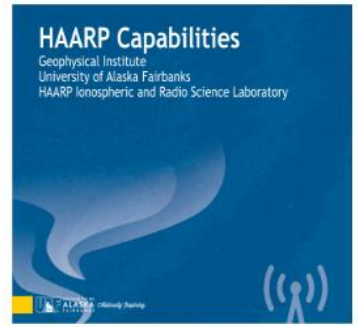
Photographers with equipment sensitive enough to capture the natural aurora can photograph the airglow created by HAARP.

Recent News: January 2024, Laura Loomer, a conservative political activist and MAGA Republican, alleged that the "deep state" was "using HAARP to rig the Iowa Caucus," adding that the snowstorm "looks like weather manipulation to me." Her post on X (formerly Twitter) has since been viewed 2.4 million times.

Reports

Opportunities for High-Power, High-Frequency Transmitters to Advance Ionospheric/Thermospheric Research: Report of a Workshop. Washington, DC: The National Academies Press. https://doi.org/10.17226/18620.

United States Arctic Research Commission, Report on the Goals and Objectives for Arctic Research, 2019-2020. Download



HAARP Capabilities brief, 2021.
Download

The 33-acre HAARP antenna array near Gakona, Alaska. Photo courtesy of Todd Paris of UAF.

Atmosphere Changes Impacts Drone and Satellite Ability

Since the 1980s, the Earth's stratosphere has contracted by approximately 400 meters.

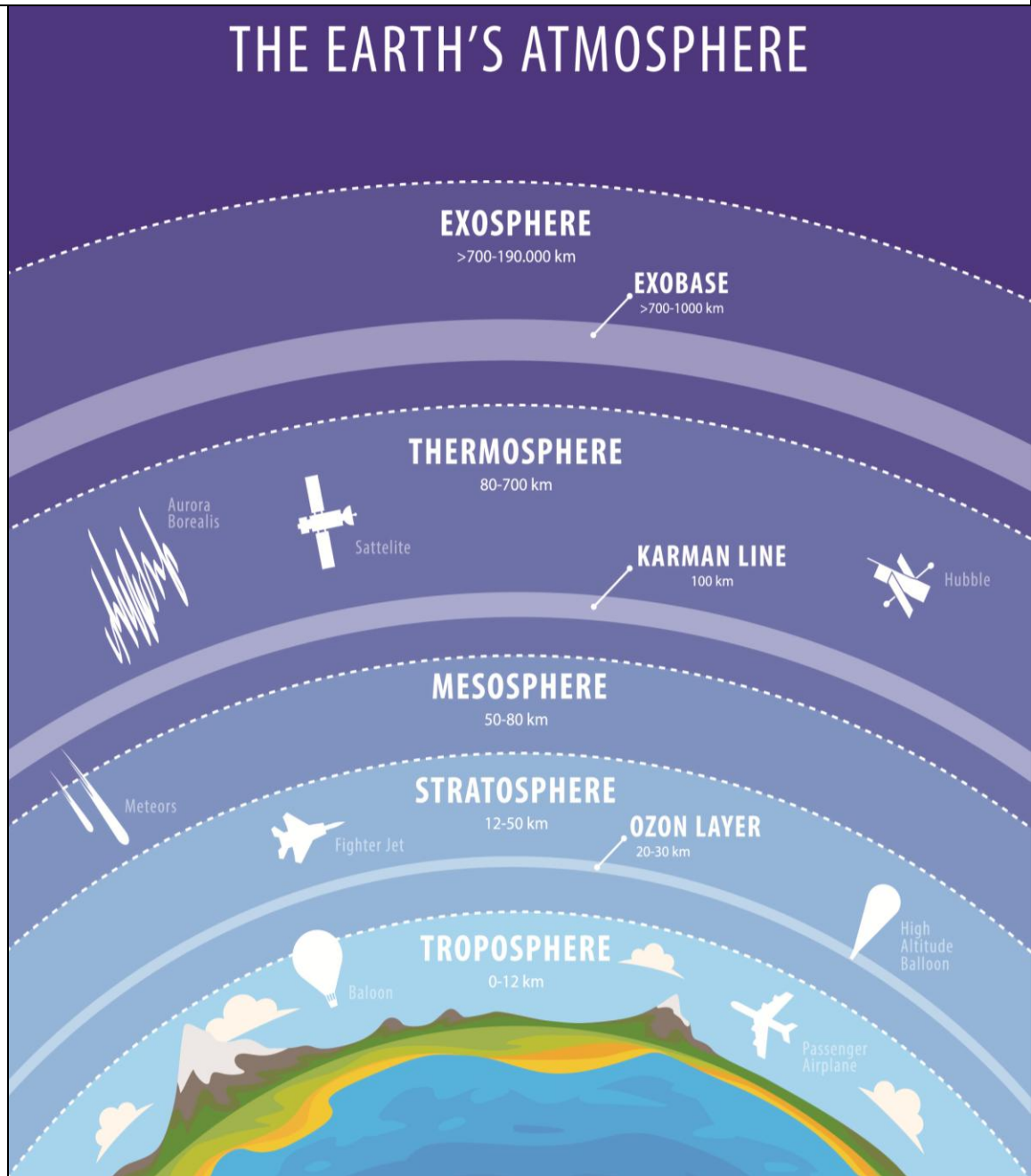
- If current emission trends continue, the stratosphere is projected to lose nearly 4% of its vertical extension by 2080 compared to 1980 levels.
- This contraction can impact satellite operations, GPS navigation, and radio communications, as the stratosphere plays a role in signal propagation and atmospheric density at certain altitudes.

Drones - Changes in the tropopause height can impact drone flying at higher elevations.

- **Atmospheric Stability and Weather**: The tropopause marks the boundary between the troposphere and stratosphere, where weather conditions change significantly. Variations in its height can affect wind patterns, turbulence, and temperature gradients at higher altitudes, impacting drone stability and control.
- **Flight Planning and Safety**: For drones flying near or above typical operational ceilings (which can be several thousand feet), unexpected tropopause height changes can lead to altered atmospheric pressure and temperature conditions, potentially affecting drone sensors and flight systems.
- **Communication and Signal Propagation**: Changes in atmospheric layers can influence radio signal transmission and GPS accuracy, which are critical for drone navigation and remote control at higher elevations.

Satellites - An increasing tropopause height can effectively shrink the stratosphere, and this can impact satellites, especially those in low Earth orbit. Here's why:

- **Stratosphere Thickness**: If the tropopause rises, the stratosphere (the layer above the troposphere) becomes thinner. This can influence atmospheric density profiles at the edge of space where satellites orbit.
- **Satellite Drag**: A thinner stratosphere means changes in the upper atmosphere's density. This can alter drag forces on low Earth orbit satellites, affecting their trajectories, altitude maintenance, and fuel consumption.
- **Orbital Decay**: Increased atmospheric density at certain altitudes due to shifts in atmospheric layers can accelerate orbital decay for satellites, requiring more frequent adjustments.
- **Space Weather Interaction**: Changes in atmospheric layers can influence how the Earth's atmosphere interacts with solar radiation and geomagnetic activity, indirectly impacting satellite operations and satellite impairment may impede space weather alerts for coronal events.



Why Look to Space for Surface Weather

Why study the Ionosphere and Mesosphere?

Sprite lightning is a large-scale electrical discharge that occurs high above a thunderstorm, triggered by a powerful positive cloud-to-ground lightning strike.

- The lightning creates strong electric fields that accelerate electrons to high energies, which then collide with nitrogen molecules in the upper atmosphere (the mesosphere), causing them to emit light, resulting in the characteristic reddish-orange glow of a sprite.
- Since 1989 Sprites have been observed in North America, Africa, Australia, and South and Central America. The space shuttle astronauts have also observed Sprites over both land and oceans, and temperate and tropical regions. Thus, Sprites seemingly can occur over any region as long as strong thunderstorms are present.

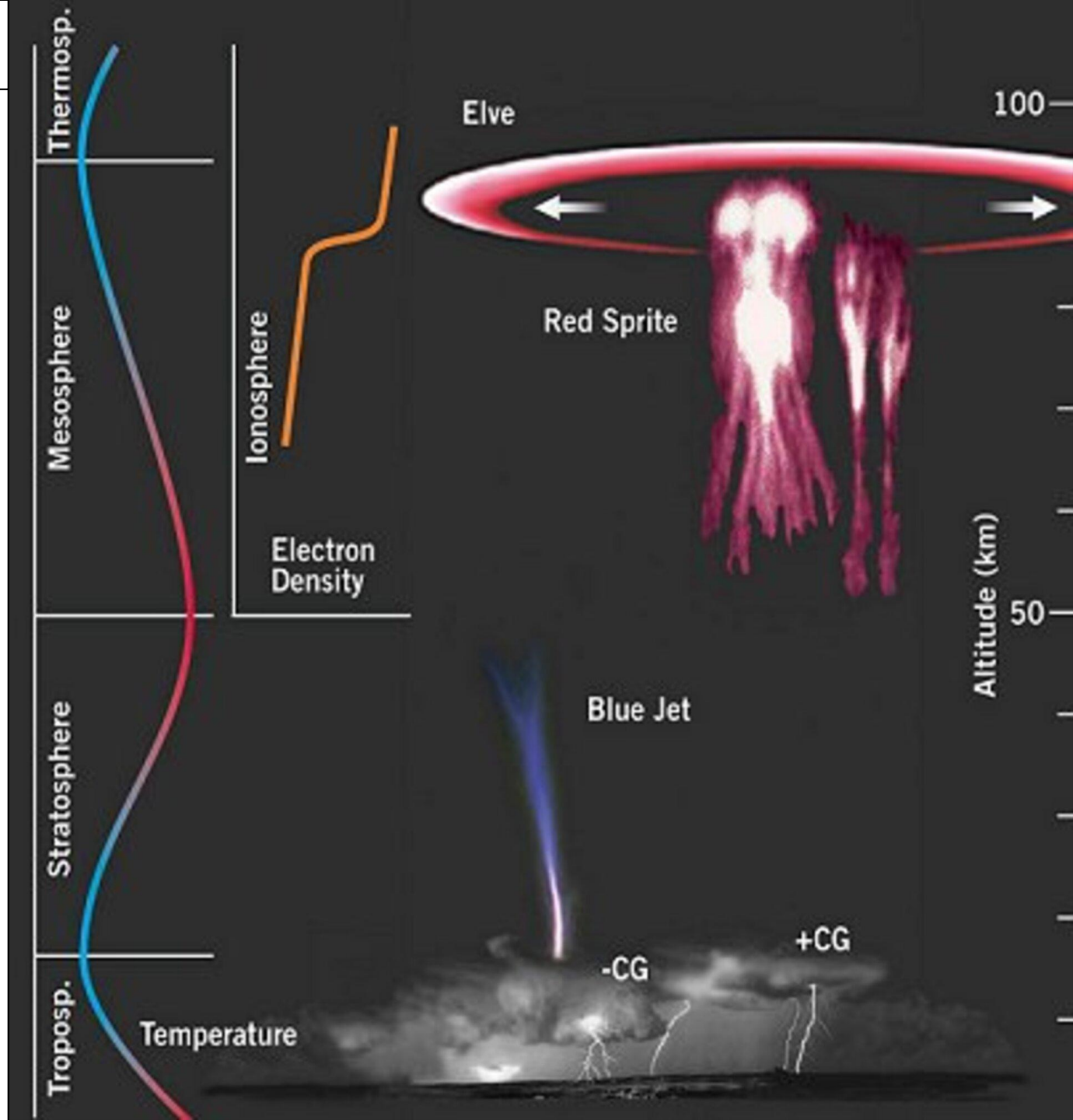
The intense lightning strike that triggers a sprite produces an electromagnetic pulse (EMP), but the sprite itself is not the EMP. The EMP is responsible for a different, though related, phenomenon known as an ELVE.

- Since sprites occur at least 5ms after the positive CG and the EMP lasts about 1ms after the positive CG, the EMP model seems to better explain another related phenomena known as Elves which occur 0.35ms after the positive CG.

Storms, particularly powerful ones like thunderstorms and hurricanes, can generate atmospheric gravity waves when their updrafts displace air into stably stratified layers of the atmosphere.

- These waves, also known as buoyancy or density waves, appear as ripple-like patterns in the atmosphere, often seen as concentric bands in satellite images.
- Gravity waves can extend hundreds of miles into the upper atmosphere and can impact space weather, making them important for global and space weather forecasting.

Studying Gravity Waves is left to NASA's Atmospheric Waves Experiment which is mounted on the outside of the International Space Station scanning to find the ripples in the airglow of the Earth's Mesosphere. The most recent use case of these images came with Hurricane Helene where visuals were made public.



Surface and Space Lasers

Malicious accusations: The conspiracy theory of lasers from equipment in space sent to earth causing heating and subsequently responsible for ignition of vegetation triggering intentional wildfires has recently spread.

- In 2018 accusations spread through social media that the California wildfires were started by “space solar generators” with funding provided by the wealthy.

Overview: Light needs some sort of atmospheric material to pass through so the photons of light can refract off the material and become visible.

- NASA has developed a new laser beam pointing technology for use in space optical communications with application to the Artemis Program for CubeSats in low-Lunar Orbit.
- These capabilities make it possible to model laser beam propagation over long space communication distances.
- Space lasers can also assist in global altimeter layouts.

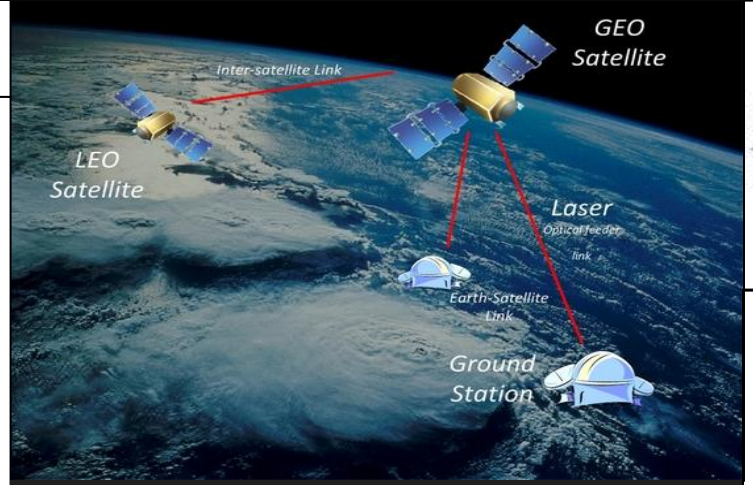
Actual laser use: Fog dispersal on airport runways by warming fog to evaporation/dissipation rates.

- In 1982 this was communicated as a potential use.

A lidar uses the phenomenon of light scattering and the Doppler Effect to acquire data on wind.

- A lidar works by emitting a short, but powerful, pulses of light from a laser through the atmosphere and then collects light that is backscattered from particles of gas and dust and droplets of water in the atmosphere.

If West Virginia University research pays off, debris that litters the planet’s orbit and poses a threat to spacecraft and satellites could get nudged off potential collision courses by a coordinated network of space lasers.

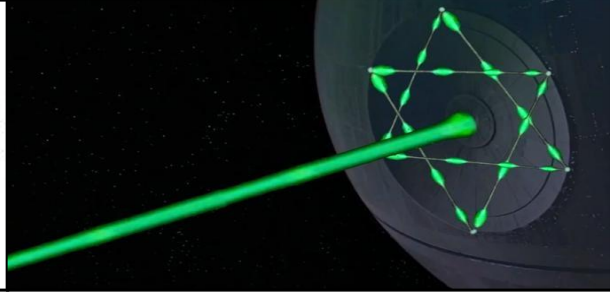


Government Accountability Office (GAO) (.gov)
https://www.gao.gov › products

Space-Based Lasers | U.S. GAO

GAO presented an overview of the Department of Defense's (DOD) Space-Based Laser Program. **Space lasers** are one of several laser concepts that may some...

Warning: this site is flagged as being dangerous.



NASA uses advanced lidar (Light Detection and Ranging) technology, which uses lasers, to measure wind speed/ direction, and aerosol concentrations. This data improves accuracy of weather forecasting.

Laser altimeters on satellites send pulses of light to Earth, helping scientists monitor critical climate factors such as melting ice, sea level changes, and deforestation.

Current attempts to trigger lightning in storm clouds have yet to yield a successful emission. Lasers currently do not produce enough energy.

Marjorie Taylor Greene
November 17, 2018 ·

As there are now over 70 people confirmed dead and over 1,000 missing, the fires in CA are a horrific tragedy. I'm praying for all involved!
I'm posting this in speculation because there are too many coincidences to ignore, and just putting it out there from some research I've done stemming from my curiosity over PG&E stocks, which tanked all week then rallied Thursday night after CA official announced they would not let PG&E fail. I find it very interesting that Roger Kimmel on the board of directors of PG&E is also Vice Chairman of Rothschild Inc, international investment banking firm. I also find interesting the long history of financial contributions that PG&E has made to Jerry Brown over the years and millions spent in lobbying. What a coincidence it must be that Gov Brown signed a bill in Sept 2018, protecting PG&E and allowing PG&E to pass off its cost of fire responsibility to its customers in rate hikes, and through bonds. It also must be just a coincidence that the fires are burning in the same projected areas that the $77 billion Dollar High Speed Rail Project is to be built, which also happens to be Gov Brown's pet project. And what are the odds that Feinstein's husband, Richard Blum is the contractor to the rail project! Geez with that much money, we could build 3 US southern border walls. Then oddly there are all these people who have said they saw what looked like lasers or blue beams of light causing the fires, and pictures and videos. I don't know anything about that but I do find it really curious PG&E's partnership with Solaren on space solar generators starting in 2009. They announced the launch into space in March 2018, and maybe even put them up before that. Space solar generators collect the suns energy and then beam it back to Earth to a transmitter to convert to electricity. The idea is clean energy to replace coal and oil. If they are beaming the suns energy back to Earth, I'm sure they wouldn't ever miss a transmitter receiving station right??!! I mean mistakes are never made when anything new is invented. What would that look like anyway? A laser beam or light beam coming down to Earth I guess. Could that cause a fire? Hmmm, I don't know. I hope not! That wouldn't look so good for PG&E, Rothschild Inc, Solaren or Jerry Brown who sure does seem fond of PG&E. Good thing for Solaren that Michael Peevey is on their board since he is former President of California Public Utilities Commission, California's most powerful energy regulatory agency. Great connections right there!
Also I will say whoever was able to buy that PG&E stock at the bottom before that announcement was made when stocks rallied sure did well on their investment. I wonder how you get privy to that kind of info? You must have to know somebody right? Seems like there's a lot of connected people in this crowd. And with these space solar generators, I really hope they have very good aim beaming the suns power down to Earth...
But what do I know? I just like to read a lot

Lightning Modifications, Plasma, and ‘Weaponization’

Background: Most lightning starts inside a thunderstorm and travels through the cloud, staying within the cloud or traveling through the open air and eventually to ground.

- There are roughly 5 to 10 times as many flashes that remain in the cloud as there are flashes which travel to the ground, but individual storms may have more or fewer flashes reaching ground (NOAA).
- Artificially initiated lightning is associated with things like very tall structures, rockets and towers. Triggered lightning starts at the “ground,” which in this case may mean the top of a tower, and travels upward into the cloud, while “natural” lightning starts in the cloud and travels to ground.

Lightning as a weapon: Essentially this would be categorized as a taser.

- A guided lightning system, in part creating a ladder for lightning pulses to follow to strike a particular item or location, were tested by the CIA as early as 1967. This “ladder” could be a very thin wire spooled from aircraft.

DARPA later experimented with triggered lightning and took research much further with their Project Nimbus, operating the only dedicated outdoor lightning research center in the US although the funding ended in 2017 and the projects interest died.

- Lightning is considered less effective than lasers and other weapons, and more costly.

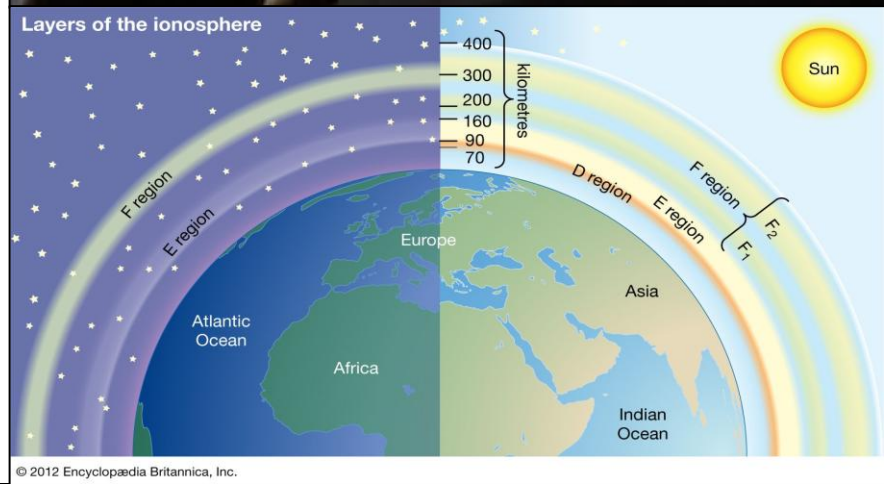
Actual uses: Significant efforts have been dedicated to control lightning with lasers to protect sensitive sites like rocket launching pads and airports.

- Laser Lightning Rod provides 720 mJ, < 1 picosecond pulses at 1 kHz repetition rate, i.e., TW-class peak power and kW average power and was transported in 2021 to the top of Säntis Mountain in Switzerland (one of the highest lightning occurrence locations in Europe).
- The laser will be aimed to the top of this tower to extend its height by the length of the filaments, realizing a "laser lightning rod".
- The second part of the presentation focuses on the recent use of high-power laser filaments to dissipate fog and clouds.

The US Army was featured in some news articles in 2012 for their use of a Laser-Induced Plasma Channel (LIPC) as a weapon which conducts electricity through pulses.

- A target, an enemy vehicle or even some types of unexploded ordnance, would be a better conductor than the ground it sits on.

Currently, energy weapons require too much power, generate too much heat, are too fragile, and involve the use of highly toxic chemicals. Strong low-pressure centers can create pressure waves that ripple up into the ionosphere.



2025 Drone Tests: Lightning Guiding Rods

On December 13, 2024, during the approach of a thundercloud, the electric field strength observed by the field mill increased. At that moment, a drone equipped with a conductive wire was flown to an altitude of 300 meters.

- The drone was then electrically connected to the ground via a switch installed on the ground (Figure 2). As a result, a large current was observed flowing through the wire, accompanied by a significant change in the surrounding electric field strength.
- Just before the lightning strike, it was confirmed that a voltage of over 2000 volts had developed between the wire and the ground. This rapid increase in local electric field strength triggered a lightning strike directed at the drone. This marks the first successful case in the world of triggering lightning using a drone.
- During the strike, a loud cracking sound was heard, a flash was observed at the winch, and partial melting occurred in the drone's lightning protection cage.

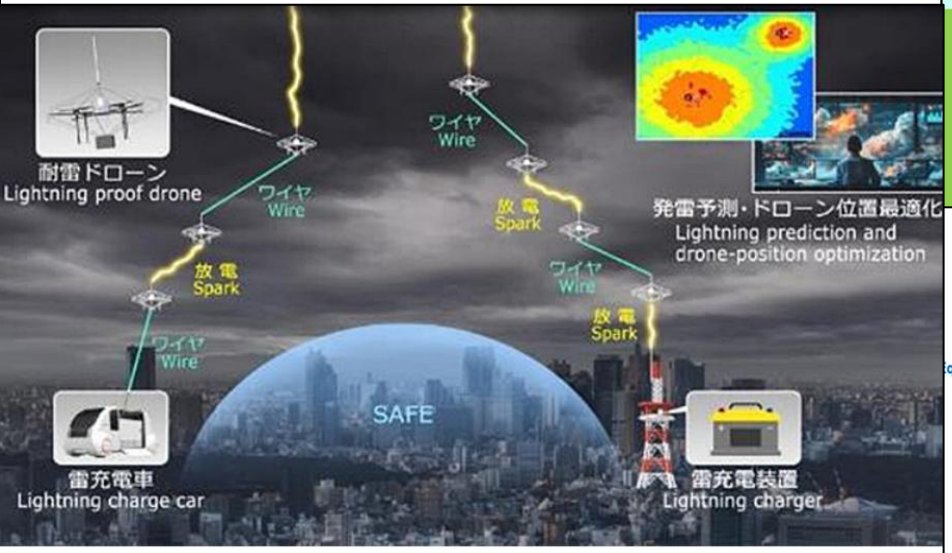
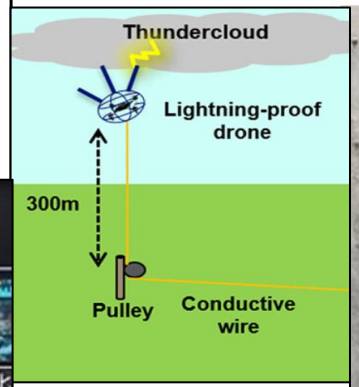


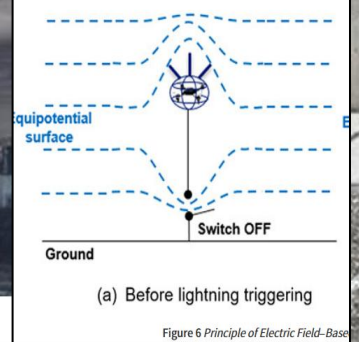
Figure 7 *NTT's Vision: Protecting Cities from Lightning and Harnessing Its Energy Using Drones*

TOKYO - April 18, 2025 - NTT Corporation (Headquarters: Chiyoda, Tokyo; President and CEO: Akira Shimada; hereinafter "NTT") has become the first in the world to successfully trigger and guide lightning using a drone. This experiment also demonstrated, under natural lightning conditions, the effectiveness of both the drone's lightning protection technology and the electric field-based lightning triggering method. These results are expected to contribute to further research on the still-mysterious mechanisms of lightning and to help reduce lightning-related damage to cities and people.

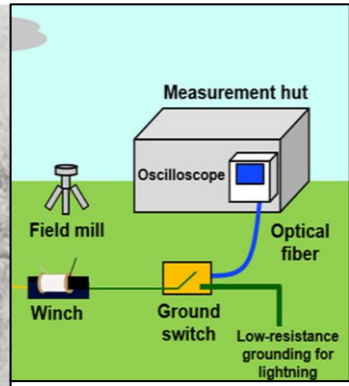
Overview and Key Findings of the Experiment

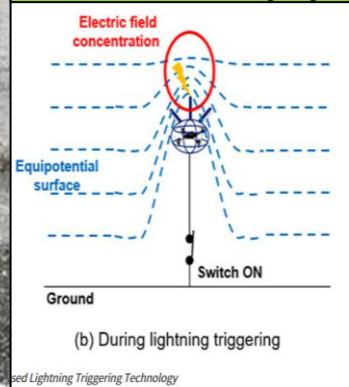
From December 2024 to January 2025, a lightning-triggering experiment using drones was conducted at an elevation of 900 meters in a mountainous area of Hamada City, Shimane Prefecture. In this experiment, a device called a field mill[3] was used to monitor the electric field at ground level. When the electric field strength increased due to the approach of a thundercloud, a drone equipped with a custom-designed lightning protection cage was launched to attempt lightning triggering (Figure 1).





(a) Before lightning triggering





(b) During lightning triggering

Figure 6 *Principle of Electric Field–Base* ... *sed Lightning Triggering Technology*

False Fog: World War II Applications

Historic Use: To hide from possible attacks, the Tirpitz would linger in Norway's fjords, moving from one fjord to another. The Nazis also released a chemical fog of chlorosulfuric acid for camouflage.

- Part of the Nazis' defense was to release chlorosulfuric acid into the air, which attracts moisture and can create a smoke screen.
- The substance is known to be corrosive, and the group of soldiers responsible for producing this smoke had to wear special protection suits and the result was that tree rings around the ship for the year it was hidden nearby were not present.
    - 60% of the trees didn't produce a ring in 1945, and some of the trees didn't grow for several years after the war.
    - According to new research, smoke damage caused a period of stunted growth in pine and birch trees at Kåfjord, located in the northern tip of Norway.

Titanium tetrachloride, a smoke-generating catalyst used during World War II, has acute and chronic effects ranging from corneal damage to chronic bronchitis.

- Unburned hydrocarbons have been proven to be carcinogenic.

In 2014, the Navy experimented with next-generation obscurant systems at sea in an exercise dubbed *Pandarra Fog*.

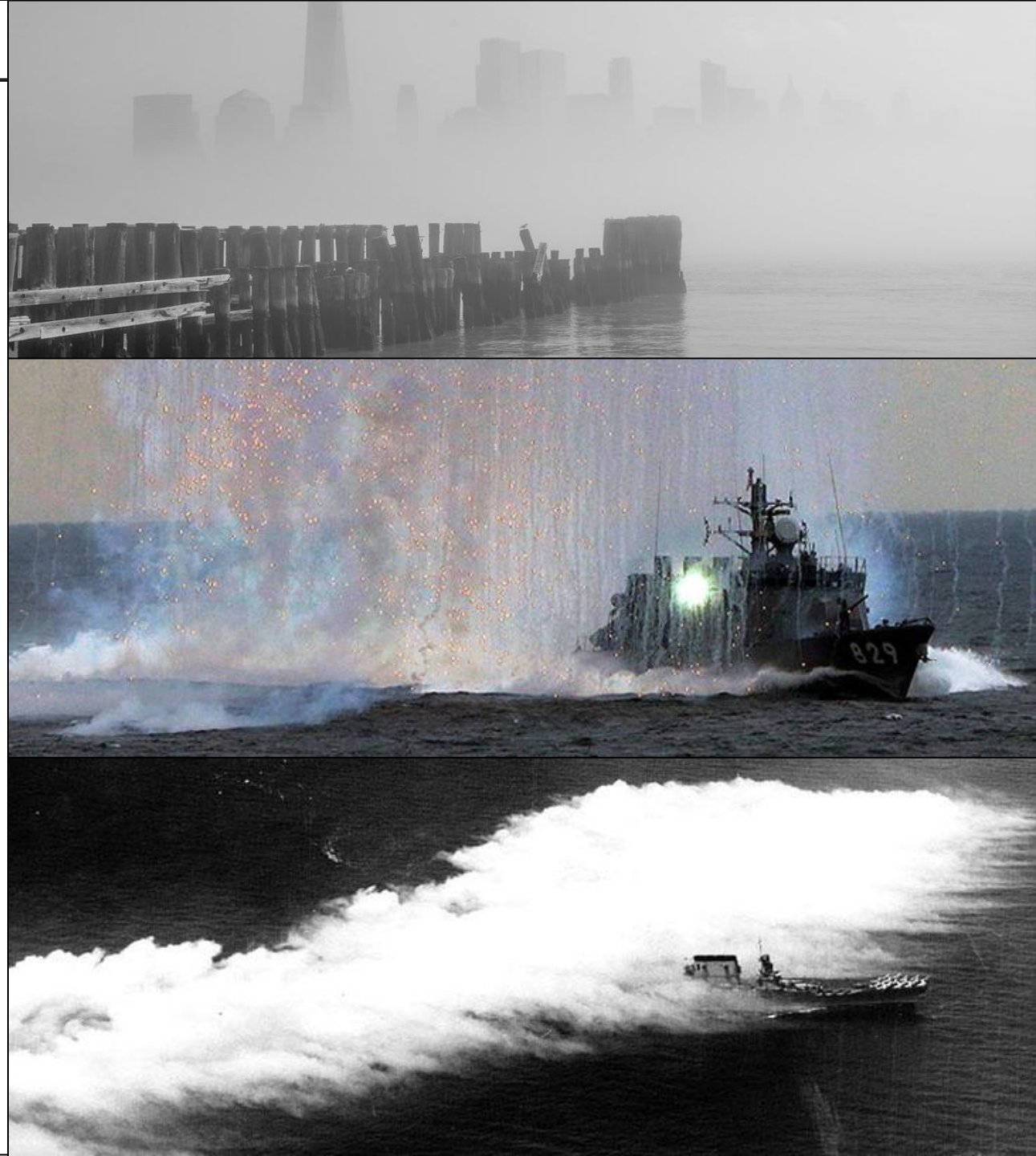
- Surface ships generated clouds filled "with carbon-fiber particles that could make it more difficult for antiship missiles to detect ships as well as hit them.

In 2019, the Journal of Materiomics published an article stating that aluminum/hydrogen treated titanium dioxide nanoparticles had a broad range of microwave absorption properties including in the S, C, X, and Ku frequency bands.

Modern Use: Some obscurants have been shown to weaken the transmission of parts of the electromagnetic spectrum other than visible and infrared radiation.

- Today, advances in technology make it possible to create chemical smokescreens that have radar-absorption properties.

Some cities in Russia have attempted to use fake smog to hide cities for military exercises as recently as 2016 such as Severomorsk which has a population of 50,000 and was the largest attempt ever held during an exercise.



Super Fog and Soil Bacteria

Soil bacteria are a diverse group of microorganisms essential for soil health and ecosystem function.

- These bacteria have roles in nutrient cycling, decomposing organic matter, improving soil structure, and even influencing plant growth.
- Common bacterial genera found in soil include Bacillus, Arthrobacter, Pseudomonas, and Actinomycetes.

Serratia marcescens bacteria was discovered in 1819 in Italy. This bacteria may be found in environments like dirt and the subgingival biofilm of teeth as well as any moist location, animal feces, and surface waters.

In September 1950, the U.S. Navy conducted a secret experiment to release balloons full of S. Marcescens over the San Francisco Bay area in a test called "Operation Sea Spray."

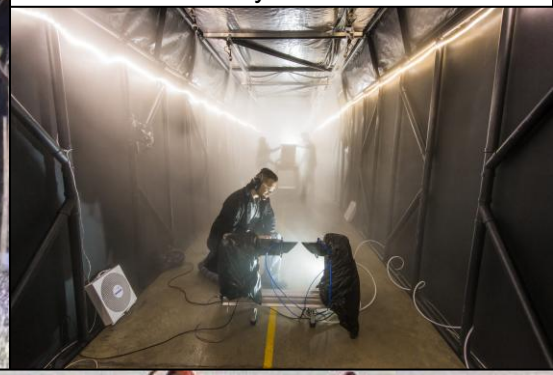
Open-air testing continued through the 1960s, with the Special Operations Division operatives simulating even more audacious assaults.

- In 1965 they spread bacteria throughout Washington's National Airport; a year later, agents dropped light bulbs filled with organisms onto the tracks in New York's subway system. "I think it spread pretty good," participant Wally Pannier later said, "because you had a natural aerosol developed every few minutes from every train that went past."
- President Nixon's 1969 termination of the United States offensive biological weapons program brought an end to the open-air testing, but the American public did not learn of this testing until 1977.

There have also been reports since January that samples of the fog have been tested in an unnamed laboratory and found to contain high levels of the bacteria Serratia Marcescens. No link is ever provided.

A 2001 study found that inhalation of moist, humid fog can induce coughing in people and potentially bronchoconstriction in patients with asthma.

In 2015, Sandia National Labs began testing their fog chamber to improve security cameras.



Worsening Fog Events and Gamma Flashes

Theory: fog is worse because of the byproduct of terrestrial gamma flashes.

- A terrestrial gamma-ray flash (TGF), also known as dark lightning, is a burst of gamma rays produced in Earth's atmosphere.
- New studies shows that just one of these terrestrial gamma ray flashes, or TGFs, can equal the radiation dosage of about 400 chest x-rays.
- Terrestrial gamma-ray flashes pose a challenge to current theories of lightning, especially with the discovery of the clear signatures of antimatter produced in lightning.

Early hypotheses of this pointed to lightning generating high electric fields and driving relativistic runaway electron avalanche at altitudes well above the cloud where the thin atmosphere allows gamma rays to easily escape into space, like the way sprites are generated.

- Subsequent evidence, however, has suggested instead that TGFs may be produced by driving relativistic electron avalanches within or just above high thunderclouds.

The Atmosphere-Space Interactions Monitor (ASIM), an experiment dedicated to study TGFs, was launched to the International Space Station on 2 April 2018 and was mounted on the Columbus External Payload Facility on 13 April 2018

How does fog form: Cold air, dry at the surface while rain is falling through it evaporates and causes the dew point to rise. This saturation forms fog.

- Radiation fog occurs in air with a high dew point. This condition ensures radiation cooling lowers the air temperature to the dew point.
- Steam fog forms when cold air moves over warm water.

When cool air mixes with the warm moist air over the water, the moist air cools until its humidity reaches 100% and fog forms. Fog can form ahead of or behind frontal boundaries across the continent regardless of most topography.

Super fog forms when a mixture of smoke and moisture released from damp smoldering organic material such as brush, leaves and trees, mixes with cooler, nearly saturated air.

Visibility is lowered to less than 10 feet and has been the cause of several large, multi-vehicle pileups.

(1) Advection fog. Advection fog forms due to moist air moving over a colder surface, and the resulting cooling of the near-surface air to below its dew-point temperature. Advection fog occurs over both water (e.g., steam fog) and land.

(2) Radiation fog (ground or valley fog).
Radiational cooling produces this type of fog. Under stable nighttime conditions, long-wave radiation is emitted by the ground; this cools the ground, which causes a temperature inversion. In turn, moist air near the ground cools to its dew point. Depending upon ground moisture content, moisture may evaporate into the air, raising the dew point of this stable layer, accelerating radiation fog formation.

(3) Upslope fog (Cheyenne fog). This type occurs when sloping terrain lifts air, cooling it adiabatically to its dew point and saturation. Upslope fog may be viewed as either a stratus cloud or fog, depending on the point of reference of the observer. Upslope fog generally forms at the higher elevations and builds downward into valleys. This fog can maintain itself at higher wind speeds because of increased lift and adiabatic cooling. Upslope winds more than 10 to 12 knots usually result in stratus rather than fog. The east slope of the Rocky Mountains is a prime location for this type of fog.

(4) Steam fog (arctic sea smoke). In northern latitudes, steam fog forms when water vapor is added to air that is much colder, then condenses into fog. It is commonly seen as wisps of vapor emanating from the surface of water. This fog is most common in middle latitudes near lakes and rivers during autumn and early winter, when waters are still warm and colder air masses prevail. A strong inversion confines the upward mixing to a relatively shallow layer within which the fog collects and assumes a uniform density. Under these conditions, the visibility is often 3/16 mile (300 meters) or less.

(5) Frontal fog. Associated with frontal zones and frontal passages, this type of fog can be divided into three types: warm-front pre-frontal fog; cold front post-frontal fog; and frontal-passage fog. Pre and post-frontal fog are caused by rain falling into cold stable air thus raising the dew point. Frontal passage fog can occur in a number of situations: when warm and cold air masses, each near saturation, are mixed by very light winds in the frontal zone; when relatively warm air is suddenly cooled over moist ground with the passage of a well marked precipitation cold front; and in low-latitude summer, where evaporation of frontal-passage rain water cools the surface and overlying air and adds sufficient moisture to form fog.

(6) Ice fog. Ice fog is composed of ice crystals instead of water droplets and forms in extremely cold, arctic air (–29°C (–20°F) and colder). Ice fog of significant density is found near human habitation, in extremely cold air, and where burning of hydrocarbon fuels adds large quantities of water vapor to the air. Steam vents, motor vehicle exhausts, and jet exhausts are major sources of water vapor that produce ice fog. A strong low level inversion contributes to ice fog formation by trapping and concentrating the moisture in a shallow layer.

Energy Weapons and the Environment

Directed energy weapons (DEWs): use energy fired at the speed of light. These weapons can produce force that ranges from deterrent, to damaging, to destructive. Many countries, including the US, are researching their use.

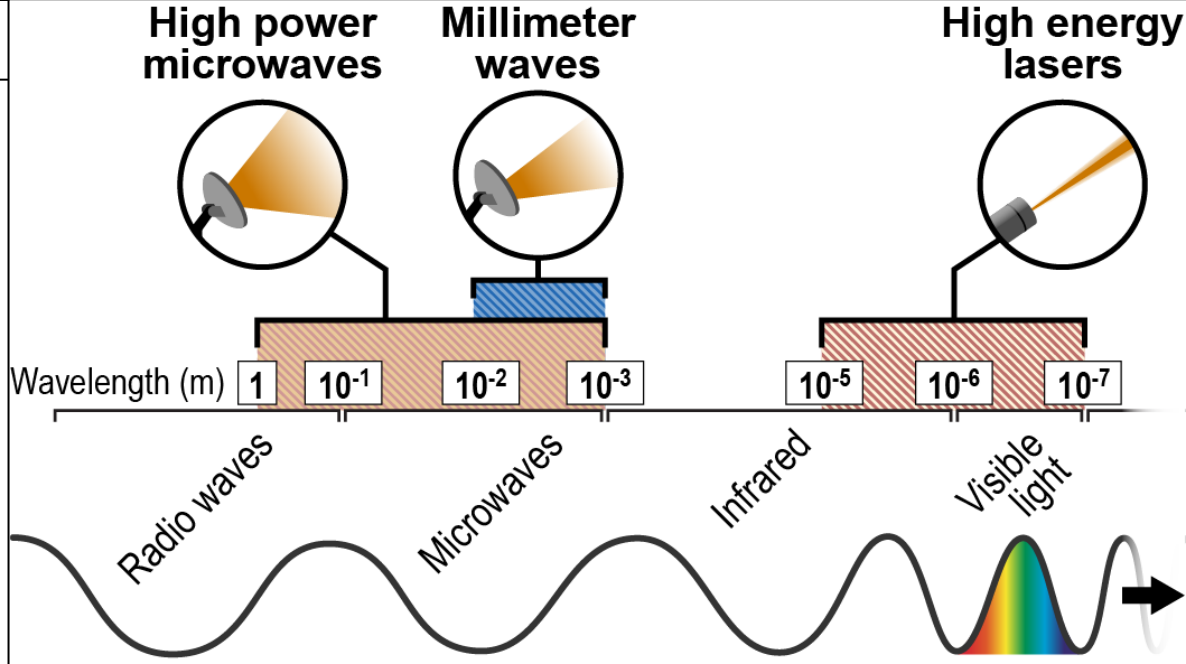
- Because they use energy instead of bullets or missiles, directed energy weapons could be less expensive per shot and have virtually unlimited firing power.
- However, the long-term health effects of these weapons are unclear. They also generally have a shorter range than conventional weapons, and weather conditions, such as fog, humidity, and storms conditions, can make certain directed energy weapons less effective.

DEWs are generally less effective the farther they are from the target, and atmospheric conditions and cooling requirements can limit their effectiveness.

The conspiracy for weather propagated during the Hawaii Wildfires of 2023 in which social media surged with claims that a laser beam had been directed into the area, explaining that the wealthy homes were left unmarred by the burns and thereby a targeted event. The videos of the light event were later attributed to a transformer blowing and lens flare effects.

Public Belief: Low-power lasers are already being used on people for crowd control, protest suppression and deterring pirates. (Active Denial System and Sonic Weapons/ squawk boxes)

- Scientific literature shows that a DEW is suspected to be the cause of the “Havana syndrome” reported by US diplomatic personnel in Cuba.
    - The first known cases of Havana syndrome were reported in Cuba in late 2016, when CIA officers stationed at the U.S. Embassy in Havana reported feeling intense fatigue, nausea and pressure in their heads.
    - Brain scans later showed tissue damage and volume loss like those found in persistent concussion syndrome.
- Potential effects of DEWs like burning skin, eye damage or radiation sickness may raise concerns under international humanitarian law, which prohibits inflicting superfluous injury or unnecessary suffering to combatants.
    - More than 30 countries have DEWs and investment is increasing rapidly. The USA alone has more than doubled its spending on DEW research since 2017.
- Some DEW lasers are fueled by a toxic cocktail of environmentally-damaging chemicals which require special handling. As a result, electrically powered systems are now preferred.



Source: GAO. | GAO-23-106717

Source: Department of Defense/Air Force Research Laboratory Keith Lewis.

Weather and the Entertainment Industry

Weather as the Main Character:

Twister (1996): This film follows storm chasers in Oklahoma as they attempt to deploy a tornado research device during a severe outbreak

The Perfect Storm (2000): Based on a true story, this film recounts the harrowing tale of a fishing boat caught in a ferocious hurricane in 1991.

The Day After Tomorrow (2004): A series of catastrophic climatic events, triggered by global warming, plunge the Northern Hemisphere into a new Ice Age.

2012 (2009): With the warnings of an American scientist, world leaders begin secret preparations for the survival of select members of society.

Sharknado (2013): A waterspout lifts sharks out of the water and flings them around Los Angeles, leading to a chaotic battle for survival.

Into the Storm (2014): A found-footage meteorological disaster movie that follows storm chasers in Oklahoma as they film a series of tornado outbreaks.

Geostorm (2017): A satellite designer tries to save the world from a storm of epic proportions caused by malfunctioning climate-controlling satellites.

Twisters (2024): Storm chasers attempt to solve the atmospheric phenomena of tornado outbreaks and unveil corruption in private sector aid.

Others: The Day the Earth Caught Fire, The Core, The Wave, Earthquake, Mega Fault, San Andres, and Deep Impact / most Asteroid films.

Conspiracy Theory Driven:

Moonfall (2022): The moon's orbit shifts causing significant weather pattern disruptions on earth and the imminent demise of humanity, leaving two astronauts and a conspiracy theorist to discover the moon is a false structure controlled by AI.

Moon Megastructure and Secret Moon Base

Background: The Moon is rotating at the same rate that it revolves around Earth (called synchronous rotation), so the same hemisphere faces Earth all the time. Some people call the far side – the hemisphere we never see from Earth – the "dark side" but that's misleading.

- As the Moon orbits Earth, different parts are in sunlight or darkness at different times. The changing illumination is why, from our perspective, the Moon goes through phases (NASA).

The leading theory of the Moon's origin is that a Mars-sized body collided with Earth about 4.5 billion years ago.

- The resulting debris from both Earth and the impactor accumulated to form our natural satellite 239,000 miles (384,000 kilometers) away.
    - The newly formed Moon was in a molten state, but within about 100 million years, most of the global "magma ocean" had crystallized, with less-dense rocks floating upward and eventually forming the lunar crust.

China's Chang'e-4 mission touched down near the south pole on the lunar far side on January 3, 2019, the first spacecraft ever to land intact on this largely unexplored region of the moon.

- The mantle material was discovered using the Visible and Near Infrared Spectrometer on Yutu-2, which can ascertain the chemical composition of rocks by studying their reflected light. Both olivine and pyroxene are believed to be among the first minerals that froze out from the moon's magma ocean as it cooled, falling to its solid base deeper in the mantle.
- The spacecraft has enabled scientists to visualize the layer cake of structures that comprise the upper 1,000 feet (300 meters) of the moon's surface in finer detail than ever before.

The Dark side of the moon 'hides a secret lunar base built by earth's superpower'.

- Some claim the Nazi's managed to colonize and set up a base on the moon, while others insist the US is the one who has a huge complex on the far side.

New data suggest the top 130 feet of the lunar surface are made up of multiple layers of dust, soil, and broken rocks.

- Moonfall suggests the moon is a megastructure controlled by AI and powered by small starts. The moon in the film is believed to act as an ark of seeds for Earth.

NASA states only the first few hundred meters of the Moon's surface is scant in iron and titanium oxides, but below the surface, there's a steady increase to a rich and unexpected bonanza.

Developing Our Moon into a Test Habitat

The U.S. Army and Air Force did plan for lunar bases in the 1950s, primarily due to Cold War tensions and technological optimism, but these ambitious projects like Project Horizon were too expensive and later superseded by the **1967 Outer Space Treaty, which forbids military installations on the Moon and other celestial bodies.**

- The astronomical cost of building a lunar base led President Dwight D. Eisenhower to reject Project Horizon in 1959.
- NASA is working on the Artemis program, which aims to establish a long-term human presence on the Moon with initiatives like the Artemis Base Camp, but these are for scientific and peaceful exploration, not military purposes.

Developing the Moon into a human habitat involves utilizing lunar resources for construction through technologies like 3D printing with local regolith, establishing power systems (e.g., nuclear, solar), creating pressurized living spaces like NASA's Artemis Base Camp, and building infrastructure like mobile homes and rovers.

- The Foundation Habitat will not launch for a decade or more. It is still in the early stages of development, and NASA is continually refining its design in order to maximize the comfort and productivity of the crew.
    - However, the general characteristics of the habitat have remained somewhat constant since 2021.

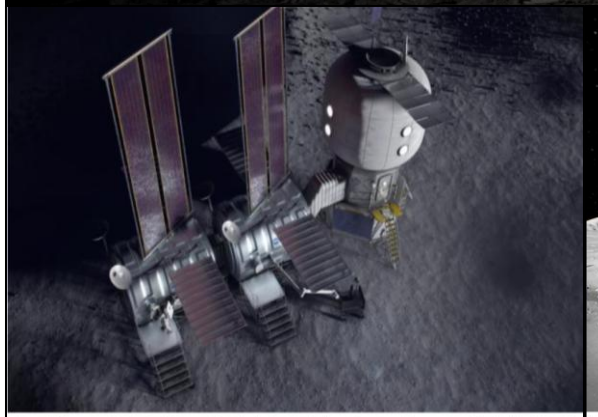
NASA is fast-tracking plans to land a 100-kilowatt nuclear reactor on the Moon by 2030 as part of its Fission Surface Power program, aiming to support a permanent human presence and future Mars missions.

- This accelerated effort is partly a response to China and Russia's announced plans to develop their own lunar microreactors, intensifying a new space race for lunar dominance and resource access.

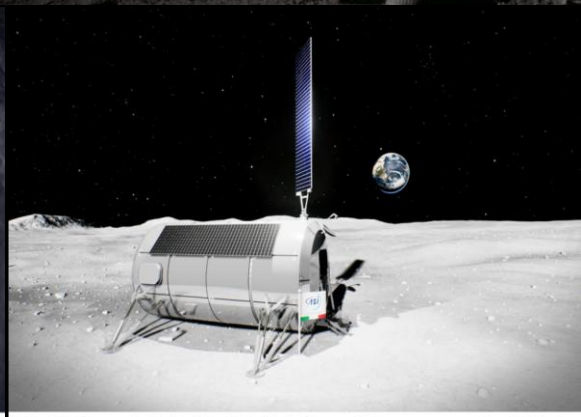
Changing the weight of the moon to place enough material to truly colonize the moon would result in changes to the tidal heights for all bodies of water across Earth and could result in changes to the circadian rhythm for all living creatures and vegetation stressors.

- Changing the rotational rate or proximity of the moon could trigger water cycle impacts outside of sustainability on Earth.

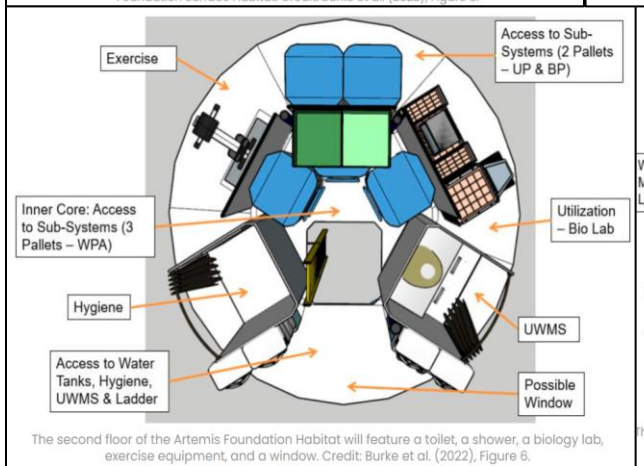
The moon creates two bulges of water on opposite sides of Earth resulting in daily rise/fall tides.



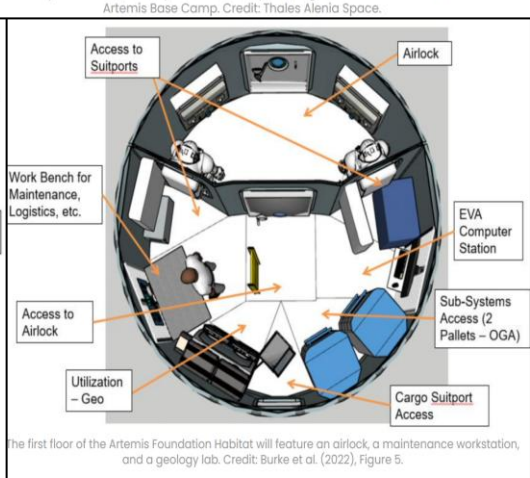
An artist's concept depicts two notional, dedicated laboratory modules connected to the Artemis Foundation Surface Habitat. Credit: Burke et al. (2022), Figure 8.



Italy's Multi-Purpose Habitat, built by Thales Alenia Space, might become a second module for the Artemis Base Camp. Credit: Thales Alenia Space.



The second floor of the Artemis Foundation Habitat will feature a toilet, a shower, a biology lab, exercise equipment, and a window. Credit: Burke et al. (2022), Figure 6.



The first floor of the Artemis Foundation Habitat will feature an airlock, a maintenance workstation, and a geology lab. Credit: Burke et al. (2022), Figure 5.

Entertainment Industry and Federal Support

In Hollywood weather disaster films, there is often an insinuation that the federal government struggles or is inadequate in fully managing or preventing catastrophic weather events.

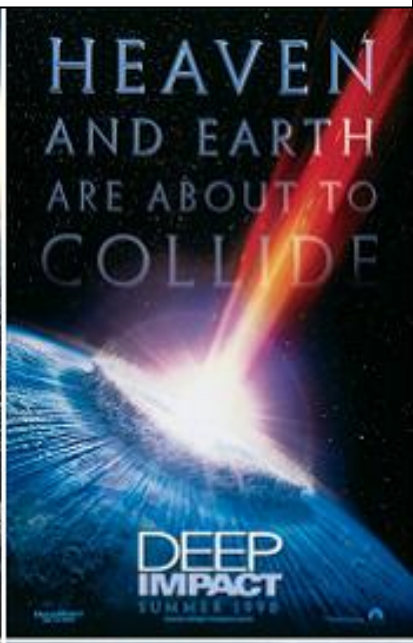
- A 2023 survey found that 59% of respondents believe TV and movies do not accurately portray the government, and 52% feel the same about civil servants. In films, government is often shown as both good and inefficient.
- Examples like "Twister" and "The Day After Tomorrow" show government agencies working but also facing enormous challenges, often pushing the storyline toward individual or small team efforts overcoming great odds.

Portraying small teams as more effective aligns with storytelling goals of engagement, clarity, and emotional impact, rather than reflecting real-world crisis management.

In disaster movies, governments are often portrayed as making mistakes that contribute to the crisis or complicate the response. The top things government is shown doing wrong include:

- Delayed Response: Hesitating or slow to act in the face of imminent disaster, costing precious time.
- Bureaucratic Red Tape: Overly complex procedures and hierarchy hinder quick decision-making and effective action.
- Poor Communication: Failing to inform the public or issuing confusing, contradictory messages.
- Denial or Underestimation: Ignoring or downplaying the severity of the disaster until it becomes unmanageable.
- Lack of Coordination: Different agencies failing to work together smoothly, leading to fragmented efforts.
- Inadequate Preparedness: Being under-equipped or under-trained to handle the specific disaster scenario.
- Overreliance on Protocols: Sticking rigidly to rules that don't fit the emergency, preventing flexible, creative problem-solving.

These portrayals drive drama but often oversimplify real government challenges and capabilities for storytelling impact.



Social Media Manipulation: Extreme Weather Windows of Opportunity

Social media manipulation is the deliberate actions taken to influence public opinion, spread misinformation, or deceive users on social media platforms.

- **Heightened Emotions**: Crises increase public anxiety and fear, making people more susceptible to misinformation and emotionally charged content.
- **Information Gaps**: Rapidly evolving situations often create gaps or delays in verified information, which manipulators exploit by spreading rumors or false news.
- **Amplified Reach**: Social media algorithms may amplify sensational or alarming content, increasing the spread of manipulation during weather emergencies.
- **Impersonation and Fake Accounts**: Fake accounts may pose as official sources to spread misleading instructions or false updates.
- **Agenda-Driven Messaging**: Groups or actors may use extreme weather events to push political, economic, or social agendas under the guise of crisis information. Astroturfing: Creating fake grassroots movements or impressions of widespread support or opposition.

This also applies to using platforms as leaders in the US to instill distrust in emergency responders such as the FEMA attacks in North Carolina in 2024 Hurricane Helene efforts and stating the 'other side' (often referencing liberals) are using a weather machine which are echoed by home-grown terrorists.

CHINA

Chinese state-backed actors have engaged in social media manipulation during extreme weather events. These activities often involve spreading disinformation to influence public perception and sow discord.

- **Maui Wildfires (2023):** Chinese-linked accounts disseminated conspiracy theories suggesting that the U.S. military used experimental weapons to cause the wildfires. This disinformation campaign utilized AI-generated images and was highly coordinated across multiple platforms.
- **Hurricane Misinformation (2024):** During hurricane events, there were signs that Chinese and Russian actors amplified misinformation to undermine public trust in US institutions and disrupt emergency response efforts. This included spreading false claims about the storms and the government's response.

RUSSIA

- **Hurricane Florence** (2018): Russian-linked accounts spread false narratives about the U.S. government's preparedness and response, amplifying criticisms and sowing distrust.
- **California Wildfires** (2018-2020): Russian disinformation networks circulated conspiracy theories blaming government agencies for intentionally causing wildfires, aiming to erode public trust.
- **European Floods** (various years): Russian actors used flooding events to spread misleading information about relief efforts and government competence, often tying messages to broader political aims.

Secret Ice City and Bases in Antarctica

Ice Base: A German expedition to Antarctica from the 17th of December 1938 to the 12th of April 1939 on the ship MS Schwabenland had the purpose of claiming an area now known as Dronning Maud Land mainly to protect the German whaling industry.

- This area however had been previously explored by Norway and was formally claimed by the Norwegians in January 1939 after the Germans had set sail.
- he land surveyed was claimed by Germany in August 1939 as "Neuschwabenland" named from the ship.
- The outbreak of war prevented two further planned expeditions and the possible building of a base, though most probably to the other side of Antarctica in the Pacific sector away from the Norwegian claim, the claim was abandoned in 1945.
    - Two years later in 1947, Szabo published a book "Hitler is Alive" where he claimed these two U-boats had taken fleeing senior Nazis to Antarctica as part of a submarine convoy, the commander of U-977 in particular.
    - Szabo claimed a Nazi Antarctic base called "New Berchetesgaden" had been built in 1938-39, this idea has been taken up by several authors over the years.

Sub-Ice City: Antarctic researchers said radar mapping technology shows no city exists under the surface of Antarctica.

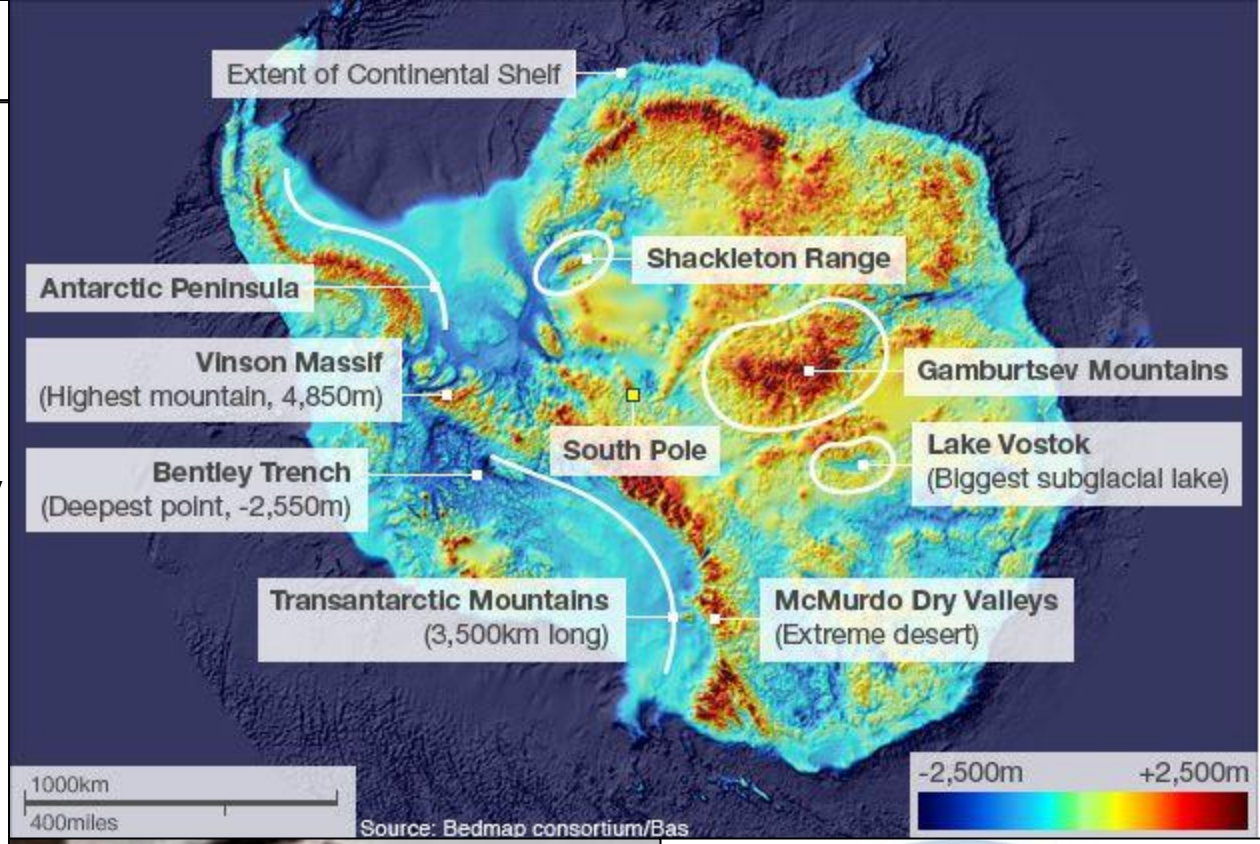
- Scientists have been using radio echo sounding techniques to map the terrain underneath Antarctica for the last 60 years (Scientific Committee on Antarctic Research)

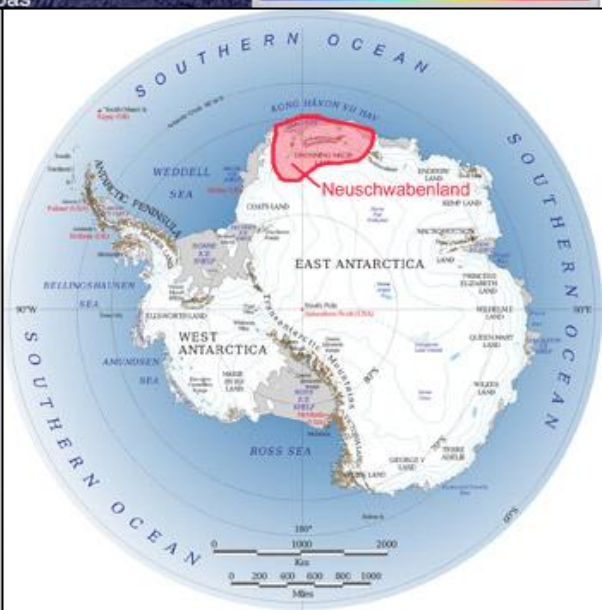
Above-Ice City: Recent social media identified a google map point in Antarctica which they claim shows a hidden city only discoverable when the 'veil thins'. In truth is a geotag fail.

- A screenshot of the video through a Google reverse image search, which revealed it's a college campus in Jabalpur, India — about 7,354 miles from Antarctica.
- Despite trees and shrubs being unable to grow in Antarctica, the continent is home to two types of plants — the Antarctic hair grass and Antarctic pearlwort.

Recent News: Scientists discovered a vast, hidden landscape of hills and valleys carved by ancient rivers that has been "frozen in time" under the Antarctic ice for millions of years.

- This landscape, which is bigger than Belgium, has remained untouched for potentially more than 34 million years, but human-driven global warming could threaten to expose it





Man-Made Aerosol Injections – Cloud Albedo Modification – Volcanic Effect Mimicking

The Belief: Oceans, especially the deep oceans, absorb and lose heat more slowly than the atmosphere, so an intervention that cools the air would not be able to cool the deep ocean on the same timescale

The Concept: Stratospheric aerosol injection is a geoengineering concept based on the idea that adding particles to the stratosphere could help cool the surface of the planet by reflecting sunlight back into space.

Application Process: Spreading dust/salt in the upper atmosphere to suspend and block sunlight or brightening clouds to reflect heat absorption.

Misconceptions Applied: The volcanic activity historically which produced far reaching plumes of smokes/ash and yielded lower temperatures following eruption can be repeated in a meaningful manner to reduce the heat content the atmosphere is absorbing from solar radiation.

- Some scientists use the contrails as an example of an artificial cloud system capable of re-emitting sunlight before it reaches the surface, causing a cooling effect over the oceans and in some rural areas. Similarly, volcanic activity yielding cooling does not provide a clear means to mimic effects.
- "When volcanoes release sulfur dioxide into the atmosphere, it reacts with water vapor to form sulphate aerosols, which then reflect sunlight and lower global temperatures. One such eruption happened in 1991 when Mount Pinatubo eruption injected 20 million tons of sulfur dioxide into the stratosphere and temporarily cooled the Earth by 0.5C for over a year."

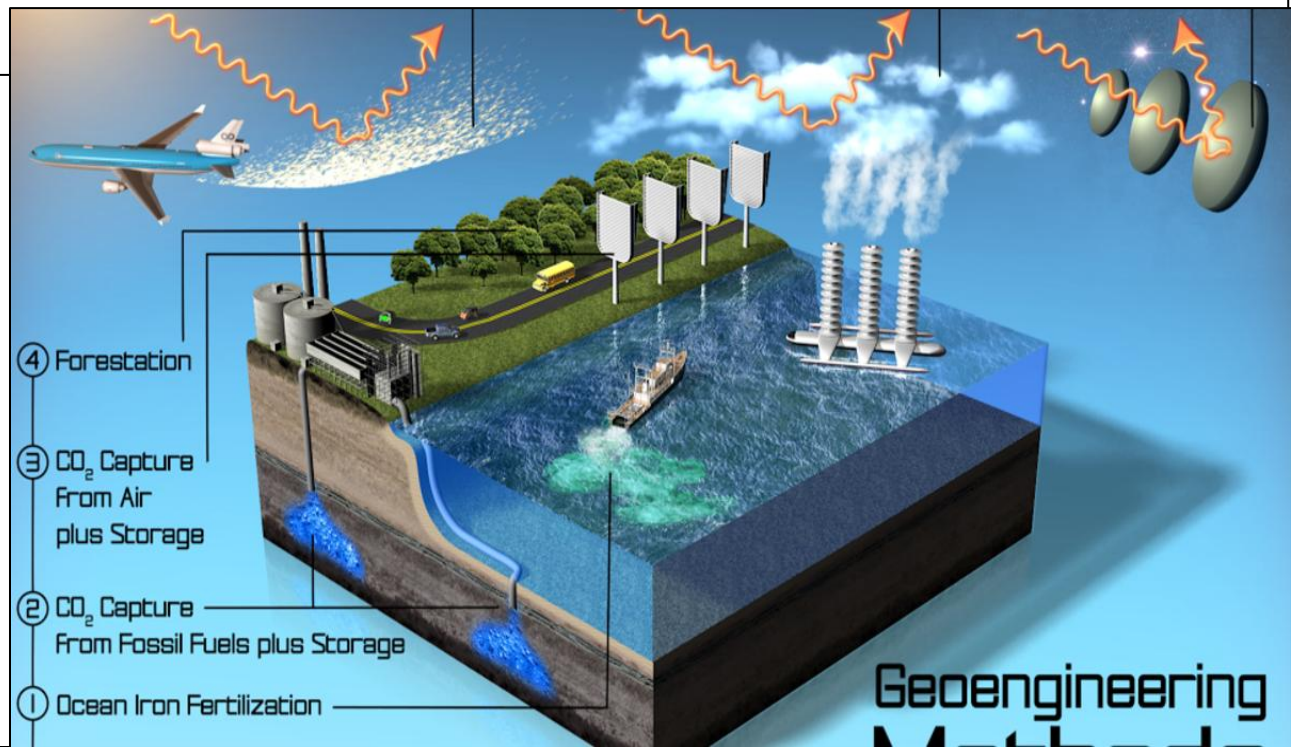
NOAA Data: Marine cloud brightening (MCB) is one of two primary solar radiation modification methods being proposed to offset the worst effects of global warming while decarbonization advances.

- MCB proposals involve the injection of salt spray into shallow marine clouds to brighten them, increasing their reflection of sunlight and reducing the amount of heat absorbed by the water below.

Air Pollution Differences: Air polluted by fossil fuels leads to the premature death of around 8 million people globally each year. Tiny particles emitted during fossil fuel combustion can be inhaled, and they can cause asthma, respiratory infections, lung cancer, and heart disease.

- Soot as a darker material yields hotter/higher temperatures (wildfires).

A cloud that is already bright, with a high drop concentration, is much more difficult to brighten than a wispy cloud with a low drop concentration (NOAA).



Magnetic Field Impacts – Geomagnetic Activity Changes Weather Systems

There are three north poles on Earth: true north, geomagnetic north, and magnetic north.

- True north is a fixed position on the globe that points directly towards the geographic North Pole.
- Geomagnetic north is not a fixed point—it represents the northern axis of Earth's magnetosphere and shifts from time to time.
- Magnetic north corresponds to magnetic field lines and is what your compass locates.

Conspiracy: A prior Air Force employee suggested magnetic pole reversals were responsible for the extinction of several ancient civilizations.

Society: January to April 2023, the media watchdog group, Media Matters identified seven viral clips from the January episode discussing the conspiracy theory, which has garnered millions of views on TikTok.

Studies: A 2021 study connects the Laschamps excursion (41,500 years ago) to climate upheaval, extinction events, and even changes to human behavior. The scientists hypothesized that during a time when Earth's magnetic field was weaker than normal, increased solar and cosmic radiation was able to penetrate Earth's atmosphere, altering ozone levels and driving global climate shifts and extinctions.

During a pole reversal, Earth's magnetic north and south poles swap locations. This happens on average every 300,000 years.

- In Earth's geologic history, pole reversals are relatively common, reversing 183 times in the last 83 million years.

In 2023 some scientists stated that over the past 200 years, Earth's magnetic field has weakened by about 9%, which could indicate that another pole reversal is coming.

- NASA states: paleomagnetic studies show the field is about as strong as it's been in the past 100,000 years and is twice as intense as its million-year average.
    - While some scientists estimate the field's strength might completely decay in about 1,300 years, the current weakening could stop at any time.
        - Plant and animal fossils from the period of the last major pole reversal don't show any big changes. Deep ocean sediment samples indicate glacial activity was stable. Ice core data also does not currently support this speculation.

Changes and shifts in Earth's magnetic field polarity don't impact weather and climate for a fundamental reason: air isn't ferrous (iron). There's no known physical mechanism capable of connecting weather conditions at Earth's surface with electromagnetic currents in space.

- **Solar storms and their electromagnetic interactions only impact Earth's ionosphere,** which extends from the lowest edge of the mesosphere (about 31 miles or 50 kilometers above Earth's surface) to space, around 600 miles (965 kilometers) above the surface.
- They have no recorded impact on Earth's troposphere or lower stratosphere, where Earth's surface weather, and thereby its climate, originate.

Pulling Water From Air

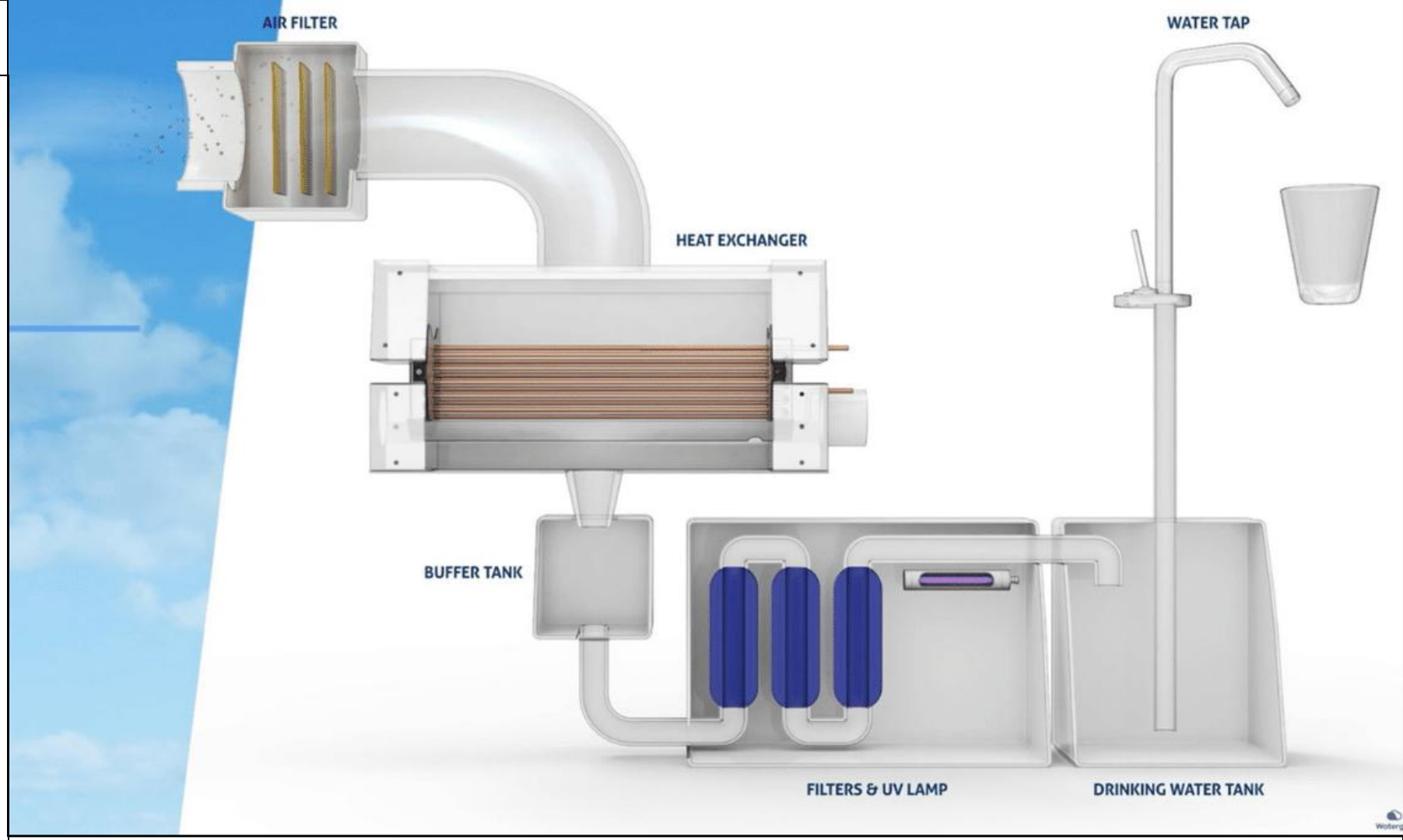
An **atmospheric water generator** (**AWG**), is a device that extracts water from humid ambient air, producing potable water.

- Water vapor in the air can be extracted either by condensation - cooling the air below its dew point, exposing the air to desiccants, using membranes that only pass water vapor, collecting fog, or pressurizing the air.
- AWGs are useful where potable water is difficult to obtain, because water is always present in ambient air.
- AWG may require significant energy inputs, or operate passively, relying on natural temperature differences.

A panel costing about $2,000-$3,000 could produce 4-5 liters per day and last about 15 years in ideal areas.

Concerns exist that if multiple fields of these devices were implemented in dry climates, that storms which may have produced rain downstream may end up being reduced

This could yield the need for atmospheric modification compact agreements for countries sharing mountain ranges or upstream humidity contributors.



There may be significant maintenance costs associated with owning an AWG due to the complexity of their components and the need for regular filter changes.

The energy cost of atmospheric water generation is 200 Wh per kg to 1000 Wh per kg. This is about 100 times greater than the energy needed for reverse osmosis.

AWGs become more effective as relative humidity and air temperature increase. As a rule of thumb, cooling condensation AWGs do not work efficiently when the ambient temperature falls below 18.3 °C (65 °F) or the relative humidity drops below 30%.

Cloud Seeding

What it is: Cloud seeding is the deliberate introduction of various substances into clouds in a region which act as condensation nuclei or ice nuclei to induce precipitation. Introduction of a substance, such as silver iodide, that has a crystalline structure like that of ice will induce freezing (to yield snow).

- Cloud seeding is not a viable substitute for water conservation and yields are only recorded locally.
- There is no way to tell if the weather system would have produced rainfall if silver iodide would not have been sprayed into the cloud.

How long in use: In the US cloud seeding began in the 1940s and has persisted in various forms since then.

- The initial seeding techniques used dry ice.

Locations: **52 countries have a cloud seeding program**. Various seeding programs have been operating since 2018 for states along the Colorado River Basin until 2026.

Cost: Cloud seeding costs $3,000 per operation with hundreds of operations performed annually per region.

- The upper Colorado River Basin spends about $1.5 million annually on cloud seeding in CO-WY-UT.

Result: Cloud seeding is widely criticized for having no empirical evidence of effective rainfall production.

- The National Research Council stated in 2003 that there was no convincing scientific proof of these weather modification methods.
    - In 2015 the USBR stated the same concerns.

The global cloud seeding market size is expected to reach 250 million dollars by 2030, almost double the 2021 costs.

In 1947, Project Cirrus (GE and the U.S. military) made history as scientists' first attempt to modify a hurricane. On Oct. 13, the operation dumped nearly 200 pounds of dry ice into a cyclone that was churning off the coast of Florida.

- Testing continued through the 1970s but did not yield substantial amounts and it was concluded this was not effective.

In the early 1960s, the Bureau of Reclamation funded a series of cloud seeding experiments known as Project Skywater, aimed at boosting water resources in the Western states.

- The project reported mixed results.

Operation Popeye aimed to generate enough rainfall to disrupt enemy supply routes in Vietnam.

- In 1977, an international treaty banned the use of weather modification for military purposes.

The SNOWIE project, short for "Seeded and Natural Orographic Wintertime Clouds", was claimed to provide the first set of 'proof' that the seeding worked.

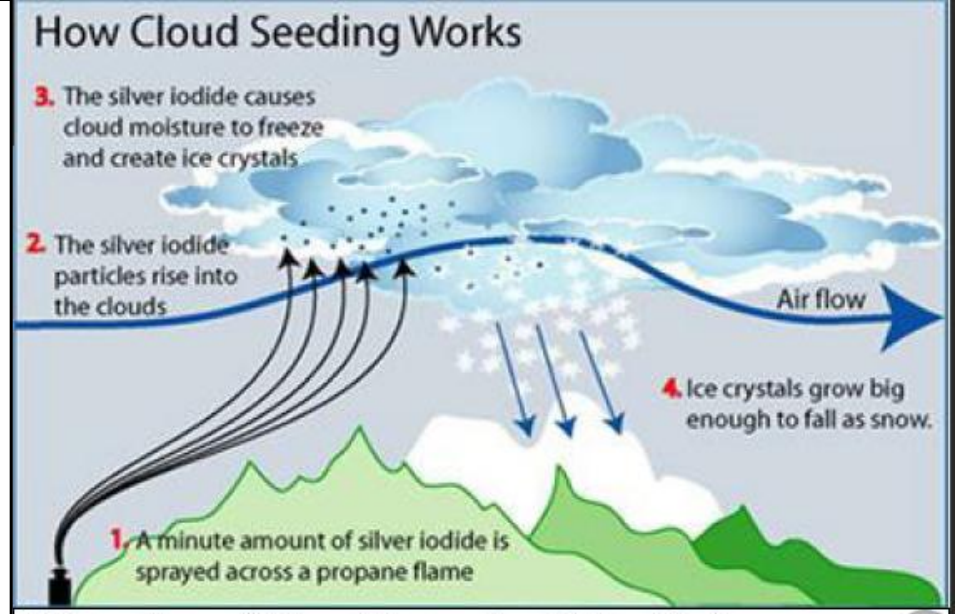
- This yielded a paper from the scientists performing the experiment here.

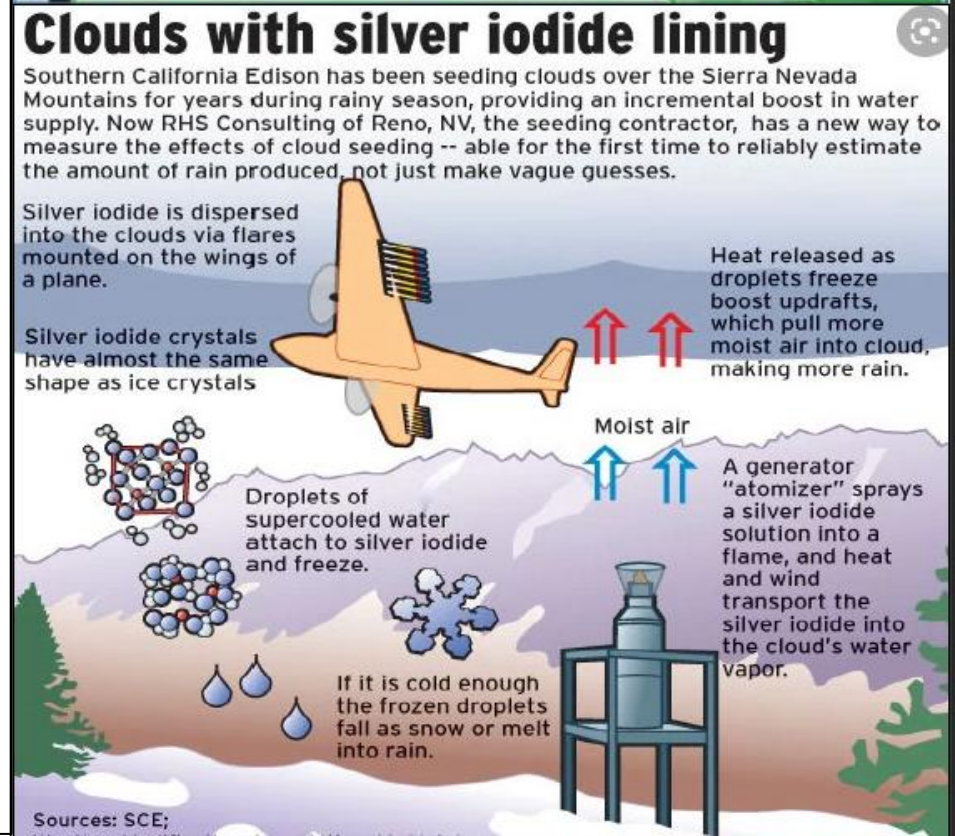
The UAE has begun research on drones producing electric charges within clouds for rain.

- A grant was provided for $1.5 million over three years to test out the model.

China's program expanded to 5.5m sq km in 2020 and continues in semi-unabated rates.

Mexico expanded cloud seeding use in 2023 despite stating minimal to no evidence of use.





Research on Cloud Seeding

The claim: Cloud seeding allows water managers to boost the amount of snow that falls from certain storms.

- Cloud seeding can increase a storm's snowfall by up to 15% and associated stream flows up to 5%.
- This added snow could equal up to 80,000 acre-feet of water annually once it melts, which is about enough water to serve about 160,000 households on average per year.

In the 1960s, cloud seeding research focused on improving winter snowpack and precipitation, primarily in the Western US, and explored methods like using silver iodide.

- Experiments during this period, like the Whitetop experiment, aimed to assess the effectiveness of seeding, but some early results showed negative effects in certain areas.
- Researchers, like those at the Desert Research Institute (DRI), focused on increasing snowpack in mountainous regions.
- A US military project in the 1960s investigated using cloud seeding to modify hurricanes: https://www.aoml.noaa.gov/hrd/hrd_sub/sfury.html

From the 1960s onward Project Skywater by USGS was part of a national attempt to collect atmospheric data by testing cloud seeding locally.

- https://www.usbr.gov/history/ProjectHistories/Project_Skywater_D1[1].pdf

Skywater's side projects: Skywater's San Angelo Cumulus Project near San Antonio, Texas, developed use of hygroscopic seeding to increase precipitation in warm climates. In Illinois the state water survey teamed up with Skywater to develop technology on frontal and squall-line storms.

- Skywater also worked with the governors of Arizona, Texas, and Oklahoma and with the President's Office of Emergency Preparedness for drought-relief cloud seeding operations.
- The largest summer seeding program was the High Plains Cooperative Program, a research-driven field program designed to develop rainmaking technology for use on the high plains.
- Reclamation established three field sites near Miles City, Montana, Colby-Goodland, Kansas, and Big Spring-Snyder, Texas, where testing began in May 1975.
- The program used some ground generators, like the CRBPP, and airplanes to seed the cumulus clouds with silver iodide and urea-ammonium nitrate. Many believe the progress by the industry in modification systems is still far off from being capable.

Reportedly, in 1965 there were 79 weather modification projects operated in the United States and other countries of the western hemisphere— 60 for rainmaking, the others for fog dispersal and hail reduction.

In fiscal 1971 there were eight agencies working on research and development of cloud seeding shared only about $10 million.

- A common method was to release dirt, sulfuric acid, or salt that latched onto condensation nuclei in the atmosphere.
- August Veraart of Holland triumphantly proclaimed that the dry ice he dispersed into the clouds caused it to rain
- At the same time a duo from Scandinavia and Germany experimented with freezing vapor on ice crystals in clouds and claimed that "at comparatively slight expense, it will, in time, be possible to bring about rain artificially.
- Most well known remains Irving Langmuir, Vincent Schaefer, and Bernard Vonnegut of the General Electric Laboratories in Schenectady, New York, in 1946.
    - Form ice crystals in his home ice box—dry ice—which is solid carbon dioxide. In November 1946, he confirmed, in a four-mile-long stratus cloud,—what he tested in his ice box—that ice crystals formed when clouds were cooled.
    - Not long thereafter, the younger Vonnegut found that silver iodide could be used to seed clouds to produce rain and snow

The Advisory Committee on Weather Control, created by Congress in 1953, reported at the end of 1957 that the program of rainmaking required more basic information and practical experimentation.

In 1964 a report of the National Academy of Sciences produced by a panel of experts from the scientific community and government agencies gave a grim diagnosis of the changing of weather.

- The report critiqued "present efforts which emphasize the a posteriori evaluation of largely uncontrolled experiments," and instead proposed "patient investigation of atmospheric processes coupled with exploration of the technological applications."
- It predicted that even after a very costly and lengthy period of study and testing, not everything could possibly be known about the atmosphere.

The Whitetop experiment concerning cloud seeding was conducted in southern Missouri and northern Arkansas during 1960–64.

- In general, the early analysis showed the rainfall in the treated areas on days with seeding to be significantly less than the rain in corresponding areas on days without seeding. (This study states seeding effect is not significant at <5%)

Wyoming Cloud Seeding Efforts

Wyoming cloud seeding statements: This technology has been in use since the 1940s in dozens of countries around the world.

- In North America, cloud seeding programs are conducted in California, Colorado, Idaho, Kansas, Nevada, North Dakota, Texas, Utah and Wyoming, as well as Alberta, Canada.
- Cloud seeding is also conducted through major programs in the countries of Australia, Chile, China, France, Greece, India, Israel, Saudi Arabia, and Spain.
- https://wwdc.state.wy.us/weathermod/weathermod.html

Wyoming has cloud seeded for about two decades in the Wind River Range and Sierra Madres, and more recently the Medicine Bow Range.

- Water managers across the Colorado River Basin consider it a "tool in the toolbox" for drought mitigation.
  - Cloud seeding costs Wyoming about $320,000 annually.
- This year, 14 other states had similar legislation, according to Louisville Public Media reporting. Tennessee fully banned the practice in 2024.
- The state stripped its funding and will only continue ground-based operations – no more seeding from planes, which included the Medicine Bow Range.

"Chemtrail" conspiracy theorists generally believe the government is spraying chemicals in the sky to control people's minds and hurt their health. It's been debunked.

- However, the idea surfaced in much of the anti-cloud seeding legislation across the country this year.

State House Dumps Wyoming Cloud Seeding Program

Citing a lack of evidence that it works, the Wyoming House slashed all funding for the state's cloud-seeding program on Monday.

Leo Wolfson
February 10, 2025 • 6 min read

As for health and environmental impacts? The main ingredient used for cloud seeding, and not found in your typical aircraft exhaust, is silver iodide. French said people sometimes confuse it with silver, which is toxic. But when bonded with iodide, research shows it's pretty harmless, even more so in the small amounts used for cloud seeding – a few grams. In fact, silver iodide is used as an antiseptic in medicine and for sterilizing drinking water.

The program in Wyoming saw $2 million approved in 2025 which supported the program through 2026.

International Seeding Trends

Australia also began seeding int the 1940-1950s: Methods include ground-based generators (like at Snowy Hydro) and aircraft-based releases (like in Tasmania) of seeding agents.

- A study (Williams and Denholm, 2009) concerned with a winter cloud seeding program in Australia confirmed findings from Utah's initial studies in the early 2000s.

Mexico: cloud seeing since 1950s, across at least 62 municipalities.

- Extreme drought and heat overwhelmed key crop regions in 2023 resulting in an increase in cloud seeding operations in 2024.

China: cloud seeding since 1940s, extreme heat events have risen notably over the past decade resulting in manufacturing showdowns and power outages along with significant evaporative losses.

- Limitations: during major drought in 2022 several regions on the Yangtze have launched weather modification programs, but with cloud cover too thin, operations in some drought-ravaged parts of the river's basin have remained on standby. Drone use began in 2024.
    - Other modification threats: It is believed that the Three Gorges Dam in China has caused a very slight slowdown in Earth's rotation due to the massive amount of water stored in the reservoir, affecting the Earth's moment of inertia.

Dubai: the Emirati Weather Center is using drones to 'zap' the air into submission. These drones are designed to target certain clouds and use electrical discharges via concentrated lasers to forcibly pool water droplets in the air, thus triggering desired rainfall.

Japan: May 2025 - a new drone triggered a lightning strike as is being advertised as a "flying lightning rod". Tokyo introduced artificial rain generators in 1965. Drought is still expanding across the country.

Thailand: advocates use of rainmaking to alleviate air pollution issues through absorbing PM2.5 dust and particles especially in Bangkok.

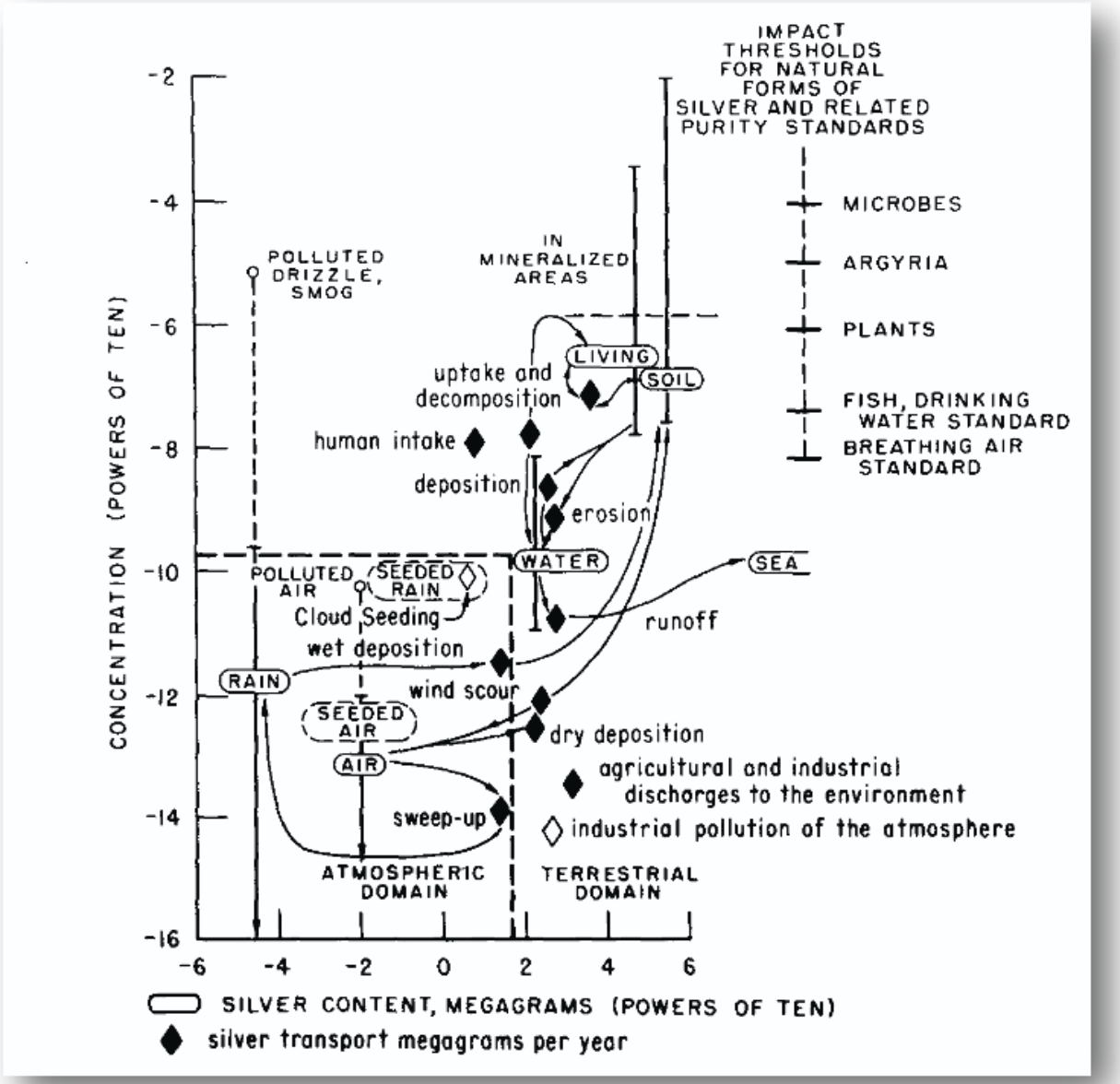


Figure 1 Generalized Approximate Content and Concentration of Silver in Environmental Compartments from the Contiguous United States, Pathways of Exchange between Compartments, and Impact Threshold Concentrations

Seeding Requirements

Due to the abnormal shifts in weather pattern stability and increases in the water cycle intensity, cloud seeding will face significant issues in coming decades as ideal conditions are unlikely.

- 50% cloud cover in target area
- Significant cloud depth
- Wind direction and <60kts
- Mid-latitude cloud temp -10C to -12C
- Supercooled Liquid Water presence
- Minimal flood/avalanche risk
- Adequate weather model forecast

How might atmospheric rivers change?

Our climate modeling shows that extreme atmospheric rivers will get wetter. By the 2070s, if emissions of heat-trapping gases keep increasing at a rapid rate, our simulations show an increase of **24% on average** over Central California. Some places see greater increases. Some (like the Western Sierra) are very wet to begin with, so even a smaller percentage increase makes a big difference.

More Rain, More Quickly

Atmospheric rivers can bring a lot of rain in a short time. Our future projections show a **25–45% increase** in hourly rainfall rates, indicating that flash flood risk may rise too.

Wetter, Wilder Times

INTENSIFYING EXTREME PRECIPITATION EVENTS INCREASE FLOOD POTENTIAL IN CALIFORNIA

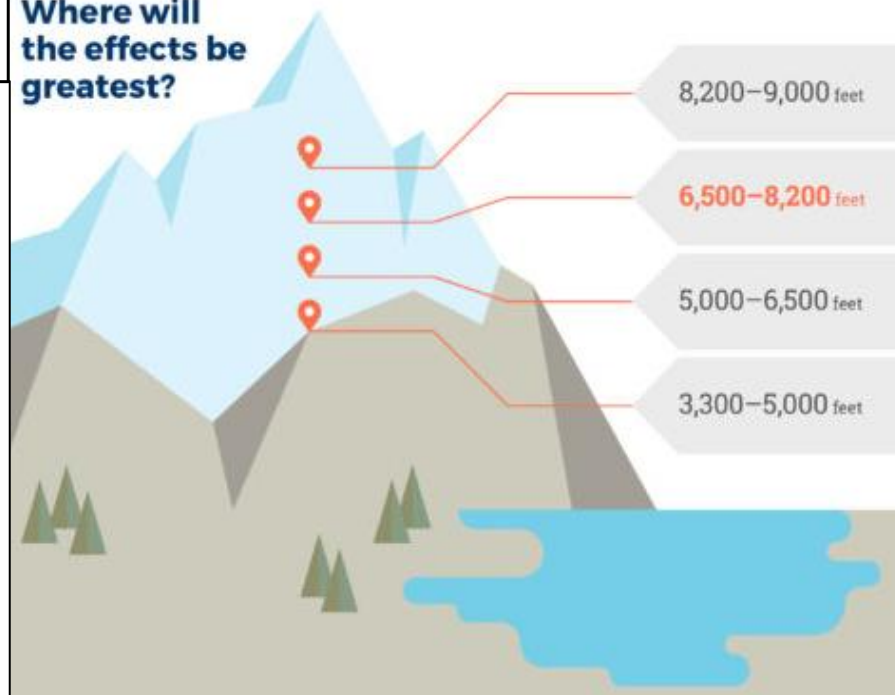
What is the potential for severe floods in California's Sierra Nevada under climate change? To find out, the UCLA Center for Climate Science used sophisticated climate modeling to investigate the impacts of future extreme storms. We assessed how much warmer these storms get, how much rain and snow falls, how much water flows over mountain surfaces—and what all this means for our water future.

Could future extreme storms increase flooding?

Using a scenario of rapidly increasing emissions of heat-trapping gases, we compared the most extreme precipitation events of 2071–2080 with those of 1996–2005. In the future, total precipitation during extreme events substantially increases. Meanwhile, it's warmer, so more precipitation falls as rain instead of snow. The one-two punch of more precipitation and a shift from snow to rain greatly increases the flow of water into mountain streams. The numbers at right reflect the average changes over the Sierra Nevada—but as shown below, different elevation levels are affected very differently.

↑25% Overall Precipitation Increase + ↑3-6°F Overall Temperature Increase → ↓30% Average Snow Loss + ↑50% Average Runoff Increase

Where will the effects be greatest?



	CHANGE IN SNOW (PER EVENT)	CHANGE IN SURFACE RUNOFF (PER EVENT)
8,200–9,000 feet	-18%	+515%
6,500–8,200 feet	-52%	+265%
5,000–6,500 feet	-61%	+82%
3,300–5,000 feet	-67%	+34%

Impact: Flood Risk

When the heavy snow events of the past become heavy rain events in the future, and they're even bigger than before, downstream communities face a greater risk of flooding.

Impact: Water Supply Loss

Water managers will need to reserve more space in reservoirs to catch increased flows and mitigate flood risk downstream. That reduces space to store water for later use.

UCLA Institute of the Environment & Sustainability · UCLA Center for Climate Science

X Huang, S Stevenson, and A Hall, 2020: Future warming and intensification of precipitation extremes: A 'double whammy' leading to increasing flood risk in California. *Geophysical Research Letters*. DOI: 10.1029/2020GL088679

 Learn more: www.joes.ucla.edu/climate

Extremists Using Weather Events

Veterans on Patrol (VOP) is a far-right, anti-government militia group founded in 2015 by Michael Meyer.

- The Southern Poverty Law Center has designated VOP as an anti-government militia group. In 2025, the group gained national attention for threatening to attack weather radar installations operated by NOAA.
- VOP's stated reason belief that the radar systems are being used by the military to manipulate weather patterns and harm Americans (Texas/North Carolina).
- VOP has also falsely claimed that Hurricane Helene was a "weather weapon" directed at Americans.
- The group's founder has publicly stated their intent to "take as many NexRads offline as possible" once their "attack simulations" are complete

Patriot Front was founded in 2017 by Thomas Rousseau, a Texas resident, and has its base in the state.

- Texas has experienced a significant amount of the group's activity, which includes distributing racist propaganda, holding demonstrations, and targeting specific communities.
- Recently Patriot Front has appeared in disaster shelters in North Carolina following Helene and in Texas following the July 2025 flooding claiming to have aid to distribute while soliciting membership.

Key risks of extremists exploiting disaster shelters:

Recruitment and Radicalization: Extremist groups may use shelters to identify vulnerable individuals seeking help, trying to recruit or radicalize them by exploiting their emotional and physical needs.
Propaganda and Messaging: Shelters can become venues for spreading extremist ideologies, misinformation, or propaganda under the guise of relief and support.
Underground Networks: Extremists might use shelters to establish clandestine communication or logistical networks, facilitating coordination and movement.
Targeted Influence: Some extremists could aim to influence community dynamics or encourage division by exploiting social tensions during crises.
Security Threats: Shelters could be targeted or infiltrated to stage attacks or pose security risks to residents and responders.

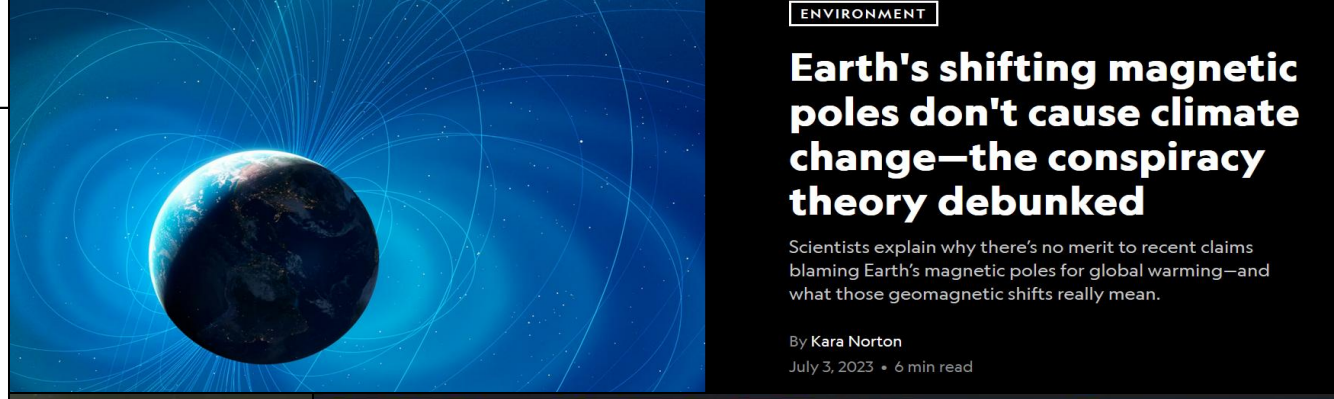
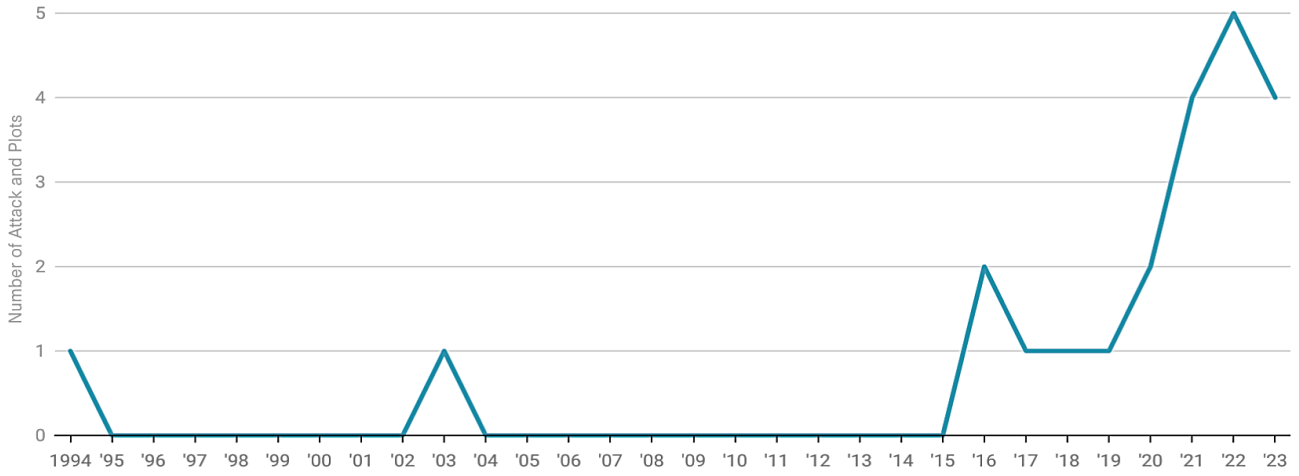


Figure 6: Domestic Terrorist Attacks and Plots Against Government Targets Motivated by Partisan Political Beliefs, 1994–2023



Source: Data compiled by CSIS Warfare, Irregular Threats, and Terrorism Program.

CSIS | WARFARE, IRREGULAR THREATS, AND TERRORISM PROGRAM

Radar Weather Machine

The Belief: Some believe that radar beams cause the storm rather than just detecting it. Some may notice that storms appear on radar after it's turned on or after seeing radar imagery, mistakenly linking radar operation with storm creation.

- Lack of Understanding of Meteorology: Without a scientific explanation, people might form their own explanations to make sense of severe weather events.
- Radar screens sometimes show bright and dynamic colors that could be misinterpreted as "creating" storm phenomena rather than just visualizing them, often with the 'noise' of surrounding infrastructure, pollution, insects, bats, etc. adding to the confusion and correlations.

The Concept: Many new social media accounts have emerged showing radar identifying natural storm movement away from the site, or lines in the noise, leading to the belief that the storms are manufactured. Veterans on Patrol states that military personnel are using radar to intentionally craft storms within the US to kill citizens.

Misconceptions Applied: When attempting to provide information on the radar systems, the loudest voice often gets the most attention resulting in a disbelief among those eager for an explanation for the increasing destructive nature of these storms.

- Abnormally high temperatures have been attributed to worsening paranoia rates.

Truth: Weather radar, like the NEXRAD system, is a tool for observing and analyzing weather patterns, not for manipulating or creating them. While radar can detect precipitation and wind, it doesn't have the capability to influence or change the weather itself.

- Weather radar emits radio waves and analyzes how they bounce back (reflect) from precipitation and other particles.
- Without the radar systems, both the state-wide systems and the ASOS/Mesonets, alerting for severe storms would be nearly impossible in a timely, honed manner.

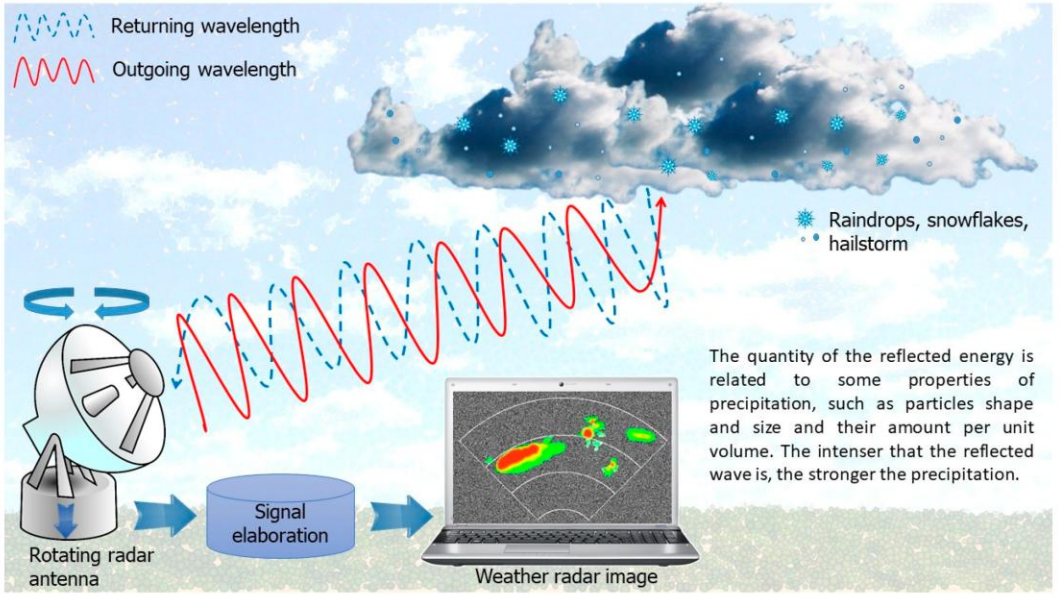
Marjorie Taylor Greene proposing weather modification ban after Texas flooding

By Joyce Lupiani | Published July 7, 2025 1:29pm EDT

- **CLAIM:** The government is creating, strengthening and/or steering hurricanes into specific communities.
- **FACT:** No technology exists that can create, destroy, modify, strengthen or steer hurricanes in any way, shape or form. All hurricanes, including Helene and Milton, are natural phenomena that form on their own due to aligning conditions of the ocean and atmosphere.

- **CLAIM:** NOAA is conducting solar geoengineering.
- **FACT:** NOAA is not conducting solar geoengineering. NOAA studies the stratosphere and marine boundary layer with instruments on balloons and aircraft to help fill important gaps in our knowledge and inform decisions about the potential risks and benefits of solar geoengineering.

- **CLAIM:** NOAA is involved with projects like HAARP and SCOPEX that modify weather.
- **FACT:** NOAA is not associated with these projects, neither of which can modify the weather.



Extremist Implications

According to a PwC study, 75% of firms in the U.S. experience a major supply chain disruption annually (PwC, 2015). Hurricanes, wildfires, and other major events can cause severe disruption.

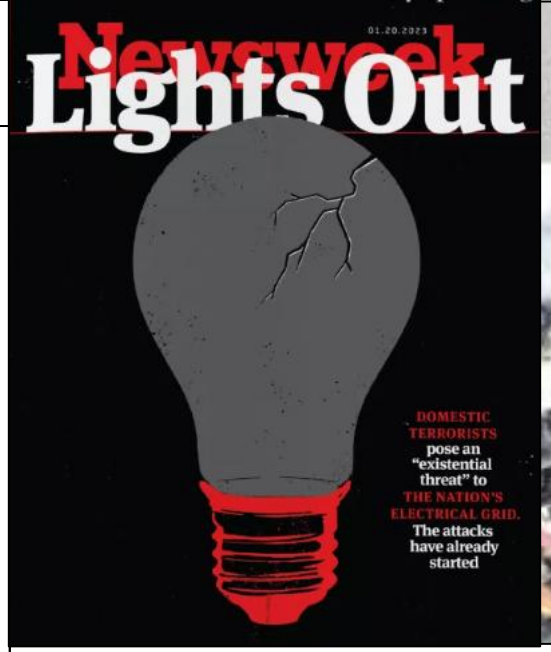
- Extremists seeking to increase power outage frequency aspire to use the cover of chaos from sudden outages to instigate race-war violence.
    - Plans like those of the extremists are unlikely to work because disaster solidarity tends to involve forming a united front against outsiders e.g. “Hurricane BBQ Parties”
    - A study from Penn State advocated “There’s a fair amount of evidence that there’s an early period after a disaster when people are fairly cooperative”.

Utilizing heatwaves for grids overwhelming is one potential threat from amplified outages to cause chaos, the other is using material fail points.

- Electronic equipment such as EV motorcycles, scoots, and bicycles can explode in extreme heat and can be easily placed in high-traffic areas.

First responders facing greater call volume and need from those facing medical risk and increased unrest in heatwaves or panic in floods may leave fewer personnel available for enforcement.

- Crimes of opportunity during the initial surge of the extreme weather event are not uncommon in most countries, however as events increase this threat expands across multiple regions and may be focused on material goods, survival needs, or resiliency supplies.
- Generator theft from stores and from critical sites can cause insurance issues as claims rise. GPS monitoring equipment is still difficult to retrieve initially post-disaster due to the persisting power and telecommunication outages across the area.



One white supremacist Telegram channel included calls for attacks against substations, railways and commercial sites such as grocery stores and Amazon distribution centers.
A short video appeared to show two men shooting a "water plant" with rifles.

- *The same channel celebrated the Moore County attacks as an act of "magnificent sabotage" and "beautiful escalation" in an anti-LGBTQ culture war.*
- *Others called for large-scale attacks on New York City, Washington, D.C. and other cities.*

A user on 4Chan, who self-identified as "the current Chancellor of the 4th Reich," called on like-minded individuals to attack substations in any area of the country that was "not majority white."

Exploding e-scooters kill four as heatwave damages batteries

There have been near daily reports of electric scooters catching fire across India amid record-breaking temperatures

E-Scooters: Bomb Risks

Threats: A growing concern is the availability of materials already assembled being used for destruction during amplifying weather events such as heatwaves.

- Lithium-ion batteries in larger devices like e-bikes and scooters are volatile during major heatwaves as internal cooling systems are often missing and the equipment is recommended to be left in the external hazardous weather conditions.
- Many of these devices have been in operation for nearly a decade in the US and for over two decades in other countries resulting in wear-and-tear from general use and material fails.

From 2019 to 2022, there's been a more than 1,000% increase in injuries from fires that started with an e-bike or e-scooter, and there's been a more than 600% increase in the fires themselves.

- In December 2022, the federal government's Consumer Product Safety Commission sent a letter to more than 2,000 manufacturers, imploring them to meet safety standards and urging them to review their product line immediately.
- Burn surgeons who treat these often life-changing injuries are calling for hazard labels to increase public awareness, while predicting cases will increase as the number of e-bikes and e-scooters in the UK – currently around 550,000 – continues to rise.
    - The London Fire Brigade, however, has said 143 fires were caused by e-bikes and 36 by e-scooters in London in 2023, causing three deaths and 60 injuries.

Personal Mobility Devices (PMDs) use lithium-ion batteries, which are cheaper to make and more powerful than older types of rechargeable batteries but contain flammable chemicals.

- The other danger from PMD batteries is when the charger terminals are touched – particularly by children. In a fraction of a second, their temperature can rise above 400C, causing burns.

Dockless bikeshare and e-scooter systems expanded coverage, first appearing in the US in 2017 whereas areas like India have had them in use since the early 2000s.

- As of June 30, 2024, there are 60 dockless bikeshare systems and 194 e-scooter systems (not counting systems limited to college / employer sites).
- There is an open-access interactive map showing all the major cities were e-scooters/bikes have been adopted and are in use today.

Damage to a property caused by an e-scooter, in West Hampstead, north-west London earlier this week

India's transport ministry has ordered a government investigation into the deadly fires while three manufacturers have recalled over 6,600 scooters over safety fears Credit: India Times

Urgent warning over 'an epidemic' of patients as young as THREE with horrific burns from exploding e-scooters

By ANDY BEAVEN
PUBLISHED: 20:34 EDT, 8 February 2025 | **UPDATED:** 20:57 EDT, 8 February 2025

Nuclear ExWx Report

In response to nuclear arsenals, a series of major scientific studies conducted in the 1980s issued warnings about the potential for a "nuclear winter" scenario - the possibility that a large-scale nuclear exchange could inject massive amounts of soot and particulates into the upper atmosphere that would block incoming solar radiation and cause major ecosystem and societal disruptions.

In the decades since that concept emerged, profound military, political, and technological changes have reshaped the nuclear landscape, while scientific advances have deepened the understanding of, and ability to model, Earth system processes.

It is in this context that the U.S. Congress asked for this report to re-examine the potential environmental, social, and economic effects that could unfold over the weeks to decades after a nuclear war.

The effects of any given nuclear exchange would depend on key processes and interactions along a causal pathway with six stages: weapon employment scenarios and effects; fire dynamics and emissions; plume rise, fate, and transport; physical Earth system impacts; ecosystem impacts; and socioeconomic impacts.

- Impacts of radioactive fallout were not included in the assessment.

Potential Environmental Effects of Nuclear War identifies major uncertainties and data gaps at each stage of the causal pathway that currently limit researchers' ability to understand and model the effects of a nuclear war.

This report recommends that relevant U.S. agencies coordinate the development of and support for a suite of model intercomparison projects to organize and assess models to reduce uncertainties in projections of the climatic and environment effects of nuclear war.

Climate impact models, including partial and general equilibrium economic models, primarily focus on gradual changes over extended time horizons. Sudden shocks introduce immediate and complex disruptions, that these models cannot capture. To better inform policy and decision making, significant improvements in modeling approaches are needed.

Airbursts with heights of burst that minimize fallout or optimize blast effects have fireballs with limited or no surface interactions, resulting in little mixing between particles in the cap and those lofted from the surface. This phenomenon was observed in the Hiroshima and Nagasaki nuclear ("mushroom") clouds (see Figure 2-3). The cloud cap contains small particles, with diameters in the range of 0.01 to 20 μm, formed by the vaporized and resolidified bomb components, while condensed water causes the white color. The darker stem contains material with diameters ranging from sub-micron to millimeters lofted from the surface by the buoyant nuclear cloud. The observed air gap between the cap and stem illustrates the limited mixing between these two types of particles. In contrast, for a detonation near the surface, mixing between the debris particles from the weapon and particles entrained from the surface occurs quickly, and these particles are incorporated throughout the vertical extent of the debris cloud. Surface detonations are also capable of lofting significantly more entrained material mass into the atmosphere.

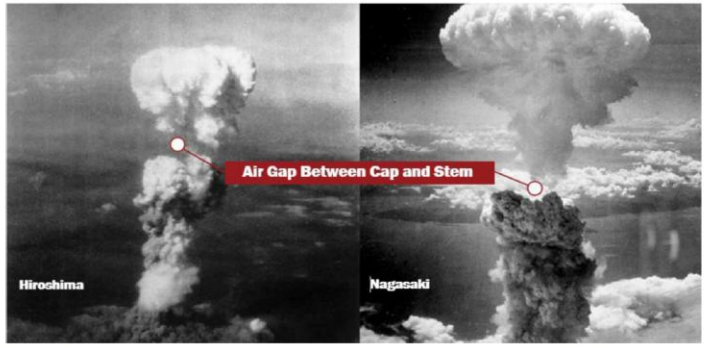


FIGURE 2-3 Nuclear cloud after detonations in Hiroshima and Nagasaki. In these photos the white cap is comprises of bomb debris and condensed water, while the dark stem is entrained material from the surface (condensed water is also present in the stem).
SOURCE: FEMA, 2022.


NATIONAL ACADEMIES Sciences Engineering Medicine

NATIONAL ACADEMIES PRESS Washington, DC

This PDF is available at https://nap.nationalacademies.org/27515

Potential Environmental Effects of Nuclear War (2025)

DETAILS

234 pages | 8.5 X 11 | PAPERBACK

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CONTRIBUTORS

Committee on Independent Study on Potential Environmental Effects of Nuclear War; Board on Atmospheric Sciences and Climate; Nuclear and Radiation Studies Board; Division on Earth and Life Studies; National Academies of Sciences, Engineering, and Medicine

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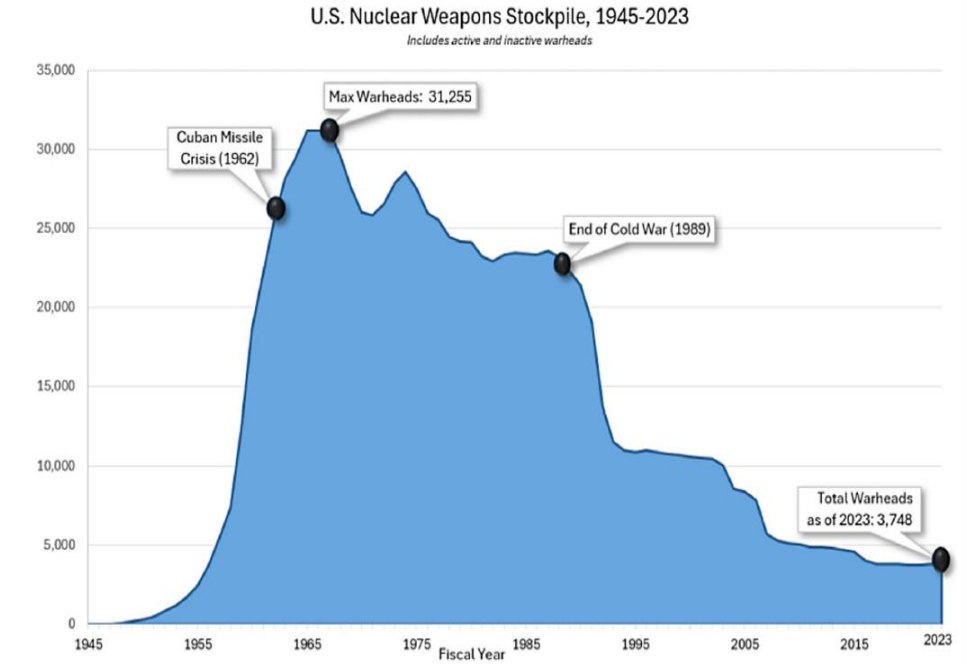
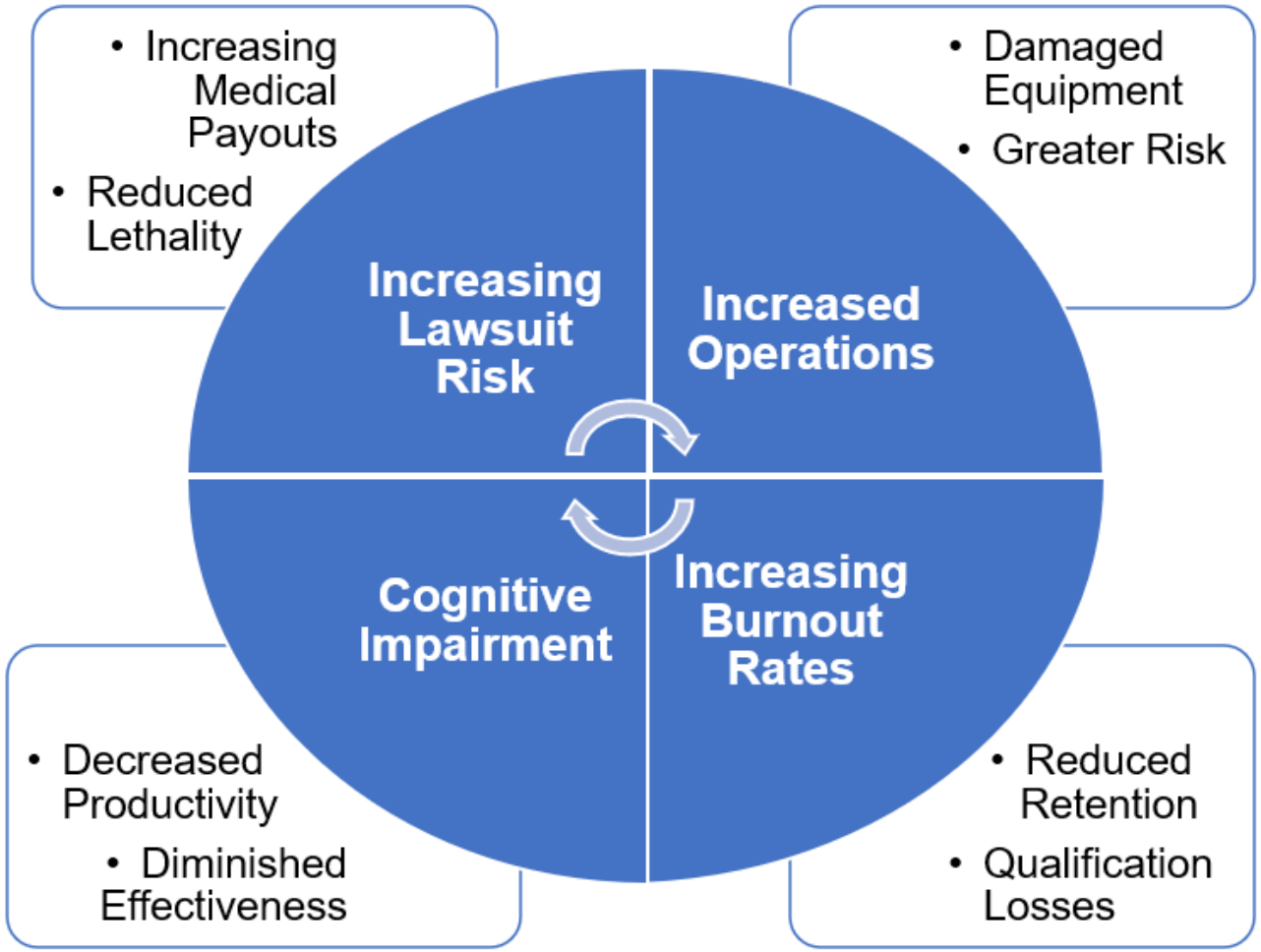
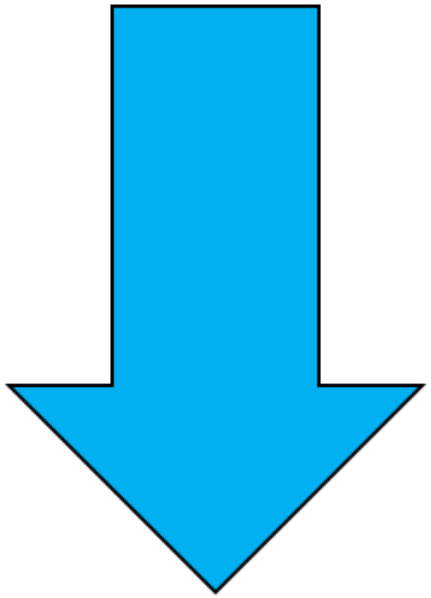


FIGURE 2-1 Historical U.S. Nuclear Weapons Stockpile.
SOURCE: DOS (2024).

Higher Highs → Lower Lows

Variations outside of the normal for barometric centers present growing operational risks to emergency managers as many struggle to understand the impacts from this invisible threat and are thereby caught off-guard by the symptoms degrading their work performance and destabilizing societal norms.



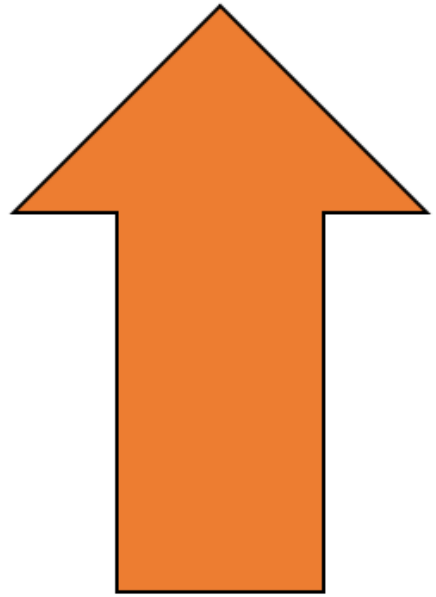


High Pressure Impacts

- Aggression
- Property Damage
- Workplace / Domestic Violence
- Membrane Rupture
- Rising Blood Pressure
- Poor Air Quality
- Heatwaves – Heatstroke
- Paranoia
- Poor Sleep

Low Pressure Impacts

- Suicidal Ideation
- Depression
- Lethargy
- Sinus Issues
- Muscular Pain
- Joint Aches
- Barometric Migraines
- Manic Events
- Digestive Issues



High-Pressures and Humans

Hot weather increases body temperature, which in turn increases heart rate and blood pressure. Increased blood pressure and heart rate can lead to discomfort, which can be attributed to the correlation between high heat and increased anger and violence.

- A recent study in India found that a 1C increase in annual mean temperature was associated with a 4.5% increase in intimate partner violence. Other studies noted the increase in sexual violence and heightened workplace violence during heat events.

When the barometric pressure is high, more pressure is pushed against our body, limiting tissue expansion, increasing blood pressure with an increased possibility of heart attacks.

- A 10-millibar decrease <1016 millibar and a 10-millibar increase >1016 mbar were associated with a 12% increase and an 11% increase in myocardial infarction and coronary death events.

Studies have focused on temperatures more than the high-pressure centers enabling persisting heat events over regions for longer periods.

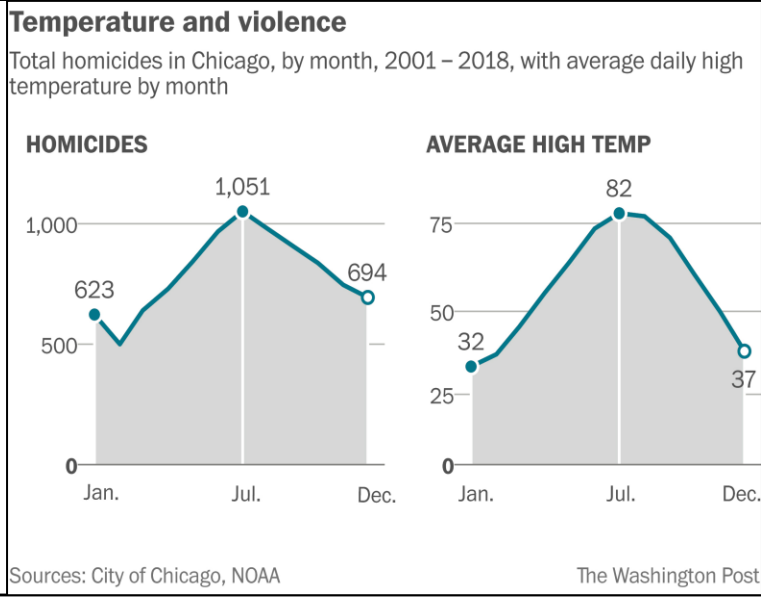
- A 2019 study from Stanford University found weather instability contributed to between 3% to 20% of conflicts over the last century with the potential influence set to increase substantially due to warming temperatures.
- Research from Mexico took 16 years' worth of daily crime records and found an increase in temperature of 1C correlated with an increase across all types of crime by 1.3%.
- There were about a third more accusations of crime per population on days hotter than 32C than on days cooler than 10C.

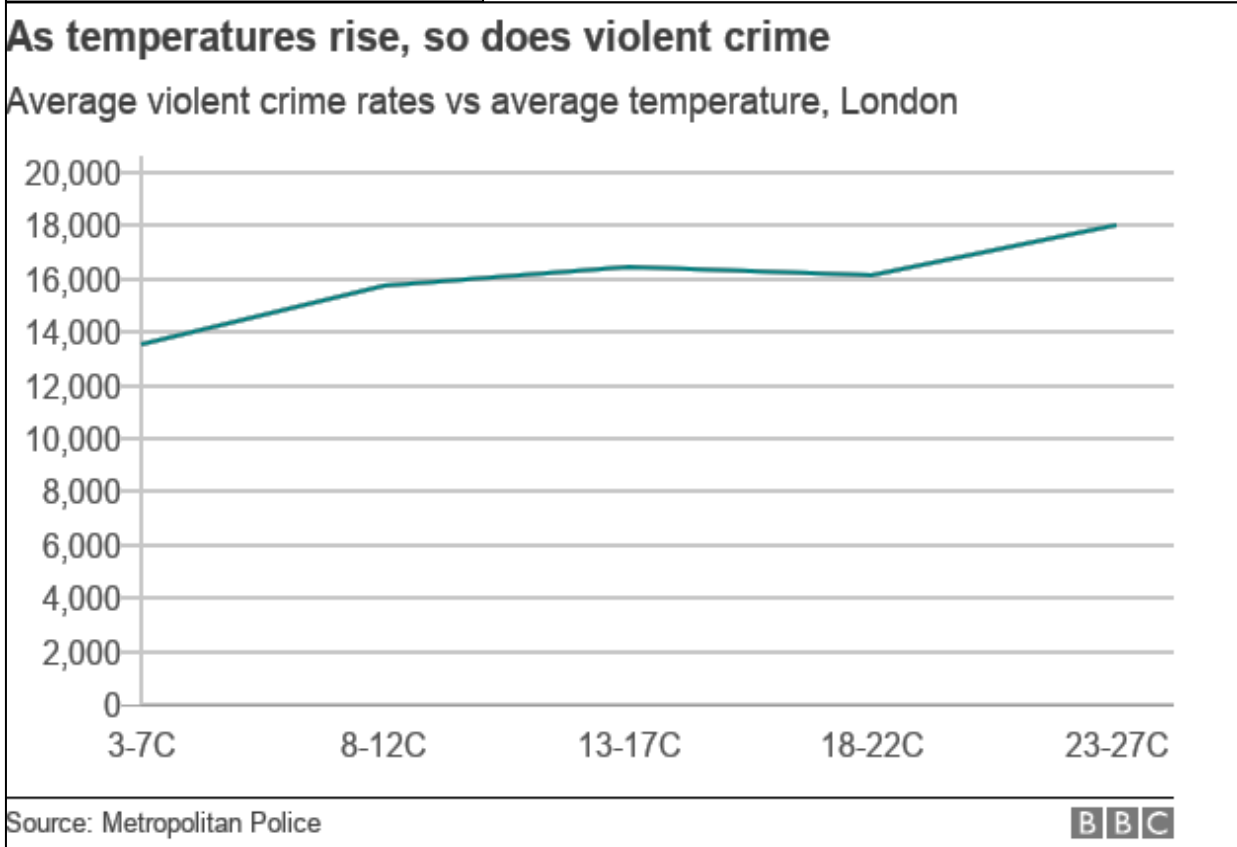
A study of Los Angeles, CA: Overall crime increases by 2.2% and violent crime by 5.7% on days with maximum temperatures above 85F (29.4C).

A 2019 study on terrorist attacks found that not only were terrorist attacks more common on hotter days, but also that the number of fatalities per attack were higher.

Even if the world's countries managed to keep "global temperature rise this century well below 2C above preindustrial levels," global terrorist attacks would increase by 14% solely due to hotter days.

Total terrorism fatalities would rise by 24% to include the increase in populations being outside more and larger events.





According to a 2018 study published in *Nature Climate Change*, a 1.8°F (1°C) increase in average temperature in the U.S. and Mexico correlates to a 1% increase in suicides. Poor quality sleep may be one of the driving factors.

- Heat also plays a role in perceiving an aggressive tone or transgression when interacting with others. Violence in prisons also increases during extreme heat with days ranging over 27C increasing the probability of violence by 18%.

Twitter sees hate tweets and online aggression increase during heatwaves, along with phrasing that researchers have linked to anxiety and depression.

Analysis showed that productivity started dropping when average daily maximum temperatures rose above 20° C. The researchers' calculations suggest that average annual output will decrease by 2.1% if average daily temperatures warm by 1 degree C over current conditions; annual gross domestic product, or the value of goods and services produced in a single year, would drop by 3%.

- Impacts to venue operations could be experienced in decreased staff productivity, more aggressive crowds, losses in supply chain, site damages, staff burnout, greater damage to operational capabilities, and delays/cancellations of performances/events.

Portland sees spike in gun violence as heat wave blankets metro area

Published: Jul. 8, 2024 at 1:21 AM EDT

A laboratory experiment found that participants demonstrated an increase in the joy of destruction when subject to increasing ambient temperatures.

As the temperature rose across Portland, so has violent crime, with six shootings since July 4. According to a local sociology professor, that is a predictable pattern.

According to the Mississippi Department of Public Safety, the violent crime rate in **Mississippi** increased by 2.4% in 2022 from the previous year.

- The most common violent crimes in Mississippi are aggravated assault, robbery and murder.

Research from Lancet Planetary Health states for every 5°C (9°F) increase in the average daily temperature, there was a 4.5% uptick in sex offenses in the following week across several major U.S. cities.

- On days when the temperature gauge exceeded 85°F (29.4°C), overall crime jumped by 2.2%, and violent offenses surged by 5.7%.

With each 5°C rise in temperature, **Chicago**'s homicide rates shot up by 9.5%, and **New York City** wasn't far behind with an 8.8% increase.

In 1988, during the periods warmest summer on record, the US reported record-breaking violence (1.56 million cases).

- This is a global phenomena and risk.

Extreme Weather and Unrest: Response Risk

Asthma: People may notice their asthma symptoms get worse on humid days when there is a lot of moisture in the air. This is especially true when exercising in humid conditions.

- Humidity can increase the levels of other substances in the air that irritate the bronchial tubes, such as pollen and pollution.
- After experiencing hot, humid air (49°C and 75–80% humidity) for 4 minutes, people with asthma had a 112% increase in airway resistance as opposed to the healthy group that only had a 22% increase in airway resistance.

Thunderstorm Induced Asthma: During the first 20-30 min of a thunderstorm, patients suffering from pollen allergies may inhale a high concentration of the allergenic material that is dispersed into the atmosphere, which in turn can induce asthmatic reactions, often severe.

Whether you're recovering from a minor scrape, a surgical incision, or a more significant injury, the amount of moisture in the air can determine how quickly and effectively your body repairs itself.

- Too much humidity can increase the risk of infection, while too little can slow the healing process, causing unnecessary pain and discomfort.

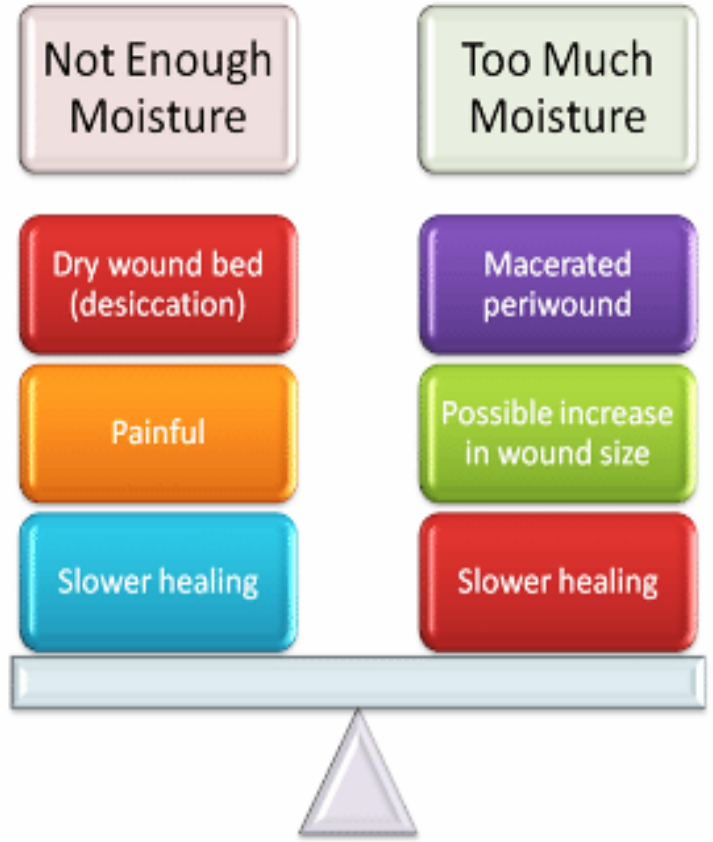
Diabetic Ulcers: High moisture levels can make it harder for these chronic wounds to heal, increasing the risk of infection and complications. Dehydration can worsen ulcers and can reduce the ability to properly judge the level of discomfort.

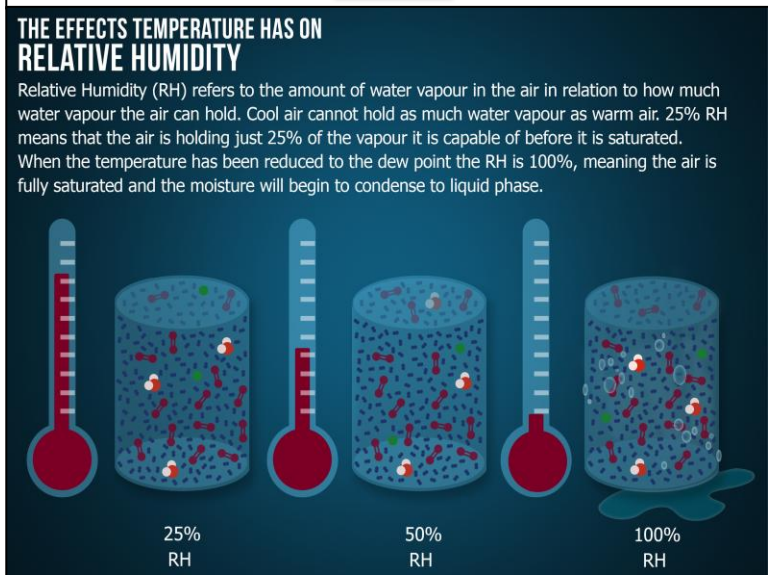
AED: Typically, the temperature range for normal AED operations is 32-122° F, since extreme temperatures can impact normal functions by draining the battery or altering the gel found in pads.

- High temperatures can negatively impact an AED's functionality and lifespan. Extreme heat can cause the internal circuitry to malfunction, potentially leading to device failure during a critical moment.
- Additionally, high temperatures can shorten the lifespan of the AED's battery and affect the gel on the electrode pads.

Emergency Vehicles: extreme heat or high humidity can impact safe temperatures of seabelt buckles, steering wheels, laptop systems, windshield mounted radar, rifle racks, camera systems, leather accessories, radio console, prisoner cages, in-vehicle fire extinguishers, road flares, etc.

- High temperatures can impact the accuracy and performance of police car radar (speed guns).
- Higher temperatures are linked to increased rates of tire blowouts, diminished battery ranges, radiator cracks, and in smart vehicles may result in touchscreen lifting and loss of access to critical applications due to extremes.
- Over prolonged exposure, fire extinguishers can explode due to excessive heat and pressure buildup.
- Road flares degrade in high temperatures or humidity and should not be left in temperatures >120F for long.





Weather and Weapons

Guns: *humidity and heat impact manufacturing, firing, and successful shots*.

- Higher humidity causes less dense air and a faster bullet trajectory, delivering a high impact on the target when you don't account for it.
- Lower humidity results in thicker air, slowing down your bullet's trajectory and delivering low impact on target when you don't account for it.
- As temperature increases, the muzzle velocity increases as the air density reduces, causing less bullet drag. This action flattens the bullet path, resulting in high hits if there's no compensation.
- A temperature increase of 5℃ can displace your bullet by as much as 8 inches between shots. Complete seasonal temperature changes, on the other hand, can result in far more drastic effects.
- *Humidity has a significant influence on the preservation of ammunition* and its components - ammunition bunkers must be kept dry and their relative humidity low.

Tasers: *humidity and heat can increase impact and degrade batteries.*

- High humidity or wet areas can damage sensitive electronics and batteries in stun guns and Tasers.
- Environmental conditions, such as humidity, can potentially change the chemical composition of the primer used to ignite the firing sequence in Taser cartridges, decreasing energetic output over time.
- Higher humidity means more moisture in the air, which can increase the electrical conductivity of both the air and skin.

Pepper Spray: *extreme temperatures, sunlight, and moisture accelerate degradation.*

- High humidity can affect pepper spray in two main ways: by impacting its effectiveness and by affecting its storage.
- While high humidity doesn't directly degrade the active ingredient (OC) in pepper spray, it can cause the canister to corrode or malfunction, and it can affect how the spray disperses and how it is cleaned up.

Tear Gas: In a heatwave, you're likely to sweat more, which means more moisture for the tear gas to interact with, potentially increasing the discomfort and pain.

- Heat can help the tear gas spread more easily, increasing the risk of exposure.

Humidity and Sirens: High humidity affects sound propagation by altering how sound waves travel through the air, specifically impacting higher frequencies. Increased humidity can lead to a decrease in sound absorption, allowing higher frequencies to travel further than they would in drier air.

Service Dogs and Police/Rescue Dogs face amplified risks in heatwaves as the temperature and humidity are often higher closer to the ground. Areas with thinner fur, like the nose, ears, belly, and around the eyes, are susceptible to sunburn.

An increase in ticks, mosquitoes, and fleas are also noted during high heat and humidity days, bringing threats of disease.

Avoid leaving your pepper spray or gel in a place where the temperature will drop below 32ºF or above 120ºF. Excessive heat or cold could cause the can to burst.

Meteorological Intelligence

Power outages can significantly impact physical bank locations by disrupting essential services like ATMs, payment processing, and security systems, potentially leading to temporary closures and hindering customer access to funds

According to a recent study, hackers are leveraging these weather trends to target energy systems when they are at their most critical.

The study, titled "*Operational and economy-wide impact of compound cyber-attacks and extreme weather events on power networks*", concluded that an attack carried out in the wake of a weather event increased the potential impact 3x more than a standalone cyberattack.

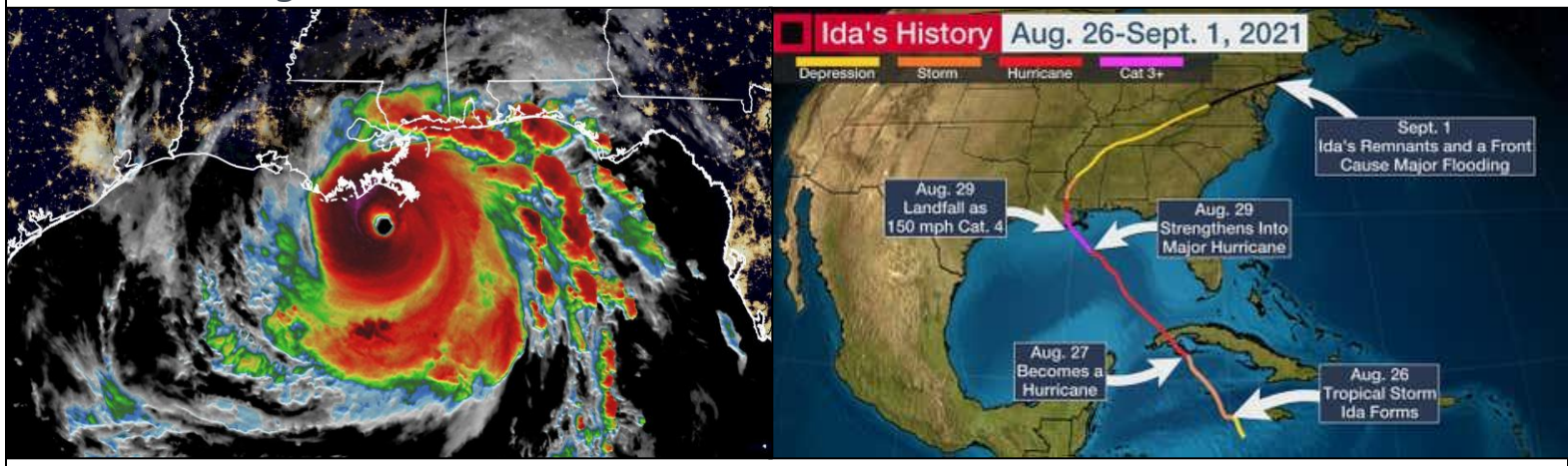
- Local economies could experience a 37% drop-in economic activity if faced with a compound threat.
- These events led to a 12% of energy demand going unmet and a daily GDP reduction up to 3.1%.

Example Event in Long Island:

- One conclusion listed a 9% increase in demand during a heatwave.
- A lone cyberattack could lead to 4% of demand going unmet.
    - Combined they could yield 12%, or nearly 200,000 customers.

HHS Office of Civil Rights states ransomware attacks on healthcare have surged by 264% over the last five years.

In 2021, Hurricane Ida in Louisiana left over one million people without power or internet. In the days following the storm, malicious actors launched a "malware attack" on the 24th Judicial District Court, disrupting its database and extending its storm-related closure.



Coupling a cyberattack with a major event like the Olympics has been well exercised in recent years preparing the industry for what occurred in 2024 with the Grand Palais, a venue hosting the Olympic events, when it was hit by a ransomware attack.

Other major cyber concerns during major events include ticket scams, misinformation aimed at generating mistrust or fear, and

- Researchers at threat intelligence provider QuoIntelligence found that fraudulent websites were selling fake tickets to the Olympics, mainly to Russians unable to buy legitimate tickets because of European sanctions imposed because of Russia's invasion of Ukraine. Organizers identified 77 fake ticket resale sites.
- Some reports circulated that Russian actors had been using AI-generated content to create fake news and images, aiming to discredit the International Olympic Committee and instill fear among attendees.
- The 2021 Tokyo Games saw over 450 million cyberattacks— 2.5 times more than during the London 2012 Games—while the 2018 Olympic Destroyer hack caused major problems just before that year's Opening Ceremony.

Using Weather as a Backdoor

IEEE 2025: Using weather as Camouflage for Backdoor Attacks

A testing group created design triggers by embedding variable adverse weather information to achieve visual camouflage, which can bypass certain defense methods to some extent.

The proposed camouflaged triggers have a global nature providing more efficient backdoor attack capabilities (model data manipulation).

- Experiments demonstrate that this method achieves attack success rates of 83.4% on the CIFAR-100 dataset and 44.8% on the ImageNet-100 dataset, surpassing existing state-of-the-art methods by 14.6% and 24.4%, respectively.
    - At the same time, this method exhibits better stealthiness.

In the US, cyberattacks have risen by 56% year-over-year in 2024.

- At an average cost of almost $4.9 million per data breach in 2024, 10% higher than in 2023, according to IBM and the Ponemon Institute, the financial risk associated with a cyberattack is growing.
- New reports highlight a surge in ransomware attacks, indicating a 149% increase year-over-year in the first five weeks of 2025.

A new report from the CISA ICS Advisory page covers the successful exploitation of a vulnerability allowing attackers access to sensitive information when users access the Luteon EV Chargers.

- CISA also provides a section for control systems security recommended practices on the ICS webpage on cisa.gov/ics.
- Several CISA products detailing cyber defense best practices are available for reading and download, including Improving Industrial Control Systems Cybersecurity with Defense-in-Depth Strategies.

Resiliency Options to Consider (Cyber)

Storm season can knock out primary data centers or cloud access. Make sure your data backup systems are current, tested, and geographically distributed.

- Offline or immutable backups can be your last line of defense in both weather and ransomware scenarios.
- Encrypt backups to ensure data security, even if physical drives are compromised.

When storms force teams to work remotely, ensure that home office setups are secure.

- Require VPNs for access
- Enforce multi-factor authentication (MFA)
- Restrict the use of personal devices for work purposes
- Mobile Hotspots: Provide employees with mobile hotspot devices as an emergency connectivity solution.

Run tabletop scenarios that simulate power loss, followed by a phishing attempt or data breach.

- This helps teams practice responding to overlapping threats.

Invest in mobile generators or backup power solutions (UPS) to keep essential systems online even during grid outages. Surge protectors too!

- Redundant Internet Connections: Use multiple internet service providers (ISPs) or failover solutions to ensure uninterrupted connectivity.

Train your team to recognize common post-disaster phishing tactics. During storms, attackers impersonate emergency alerts, HR communications, or even disaster relief organizations. Test your systems.

Exploiting Weather and EV Flaws

In 2019 a 19-year-old security researcher gained access to the digital car keys of more than 25 Tesla EVs scattered across the globe.

- From a remote location, the hacker ran programs that disabled the vehicles' security mode, unlocked their doors and opened their windows.

The 2022 Brokenwire attack: hackers wirelessly send signals to targeted electric vehicles. This causes electromagnetic interference and interrupts the connection between a public EV charging station and the vehicle.

- The charging station won't provide the vehicle with a charge until the attack ends.
- There are ransomware attacks possible that could lock out the owner from operating the vehicle until the fee is paid.
- Extreme temperatures can cause electric vehicles (EVs) to charge slower and potentially for a longer duration resulting in a greater window of cyber risk.

These scams and infiltrations are critical to keep in mind for government fleets, emergency vehicles, and key staff which could result in vehicle shutdown or erroneous exposure of microphone access, personal data, routes, contacts, and more.

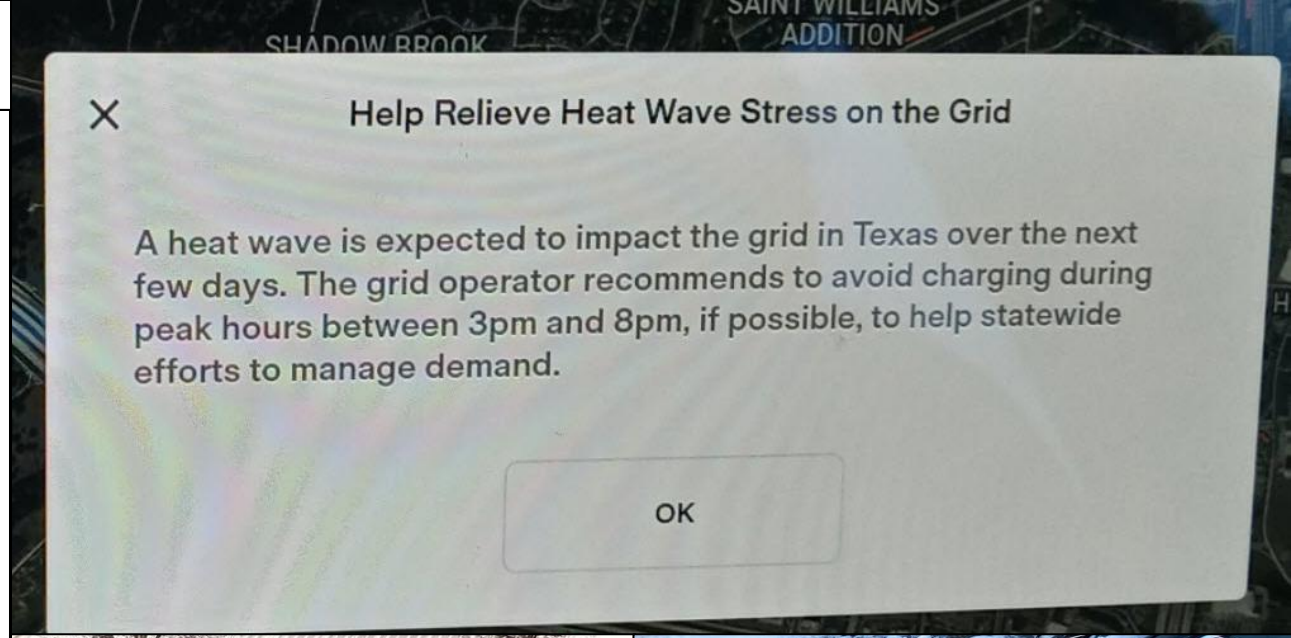
- Vehicles locking down for updates, forced or selected, can often be slower than anticipated during extreme temperatures.

Vehicles may also see their touch screens lifting due to extreme temperatures as heatwaves continue to intensify in longevity and intensity.

- Many electric vehicles do not have bypass physical systems installed where users can still access certain features or in some cases even turn on the vehicle without the main dashboard screen functioning.

Weatherproof QR codes can be used to share vital information like evacuation routes, emergency contacts, and safety guidelines, even when power and internet access are limited.

- **QRLjacking**: involves a cybercriminal spreading malware to an individual's devices after a fraudulent QR code directs the user to a malicious URL.
- **Device hacking**: Under certain circumstances, a malicious actor may be able to access a user's device if they scan a fraudulent QR code.



Weather Modification Risks

Weather modification could be seen as a weapon or trigger disputes between nations over unintended effects. Incomplete understanding of atmospheric systems may lead to ineffective or harmful interventions.

China has recently established its first Institute of Weather Modification at Chengdu University of Information Technology in Sichuan Province.

- This institute aims to cultivate high-level professionals to enhance the role of weather modification in addressing climate change, ensuring national food security, improving the environment, and promoting socioeconomic development.

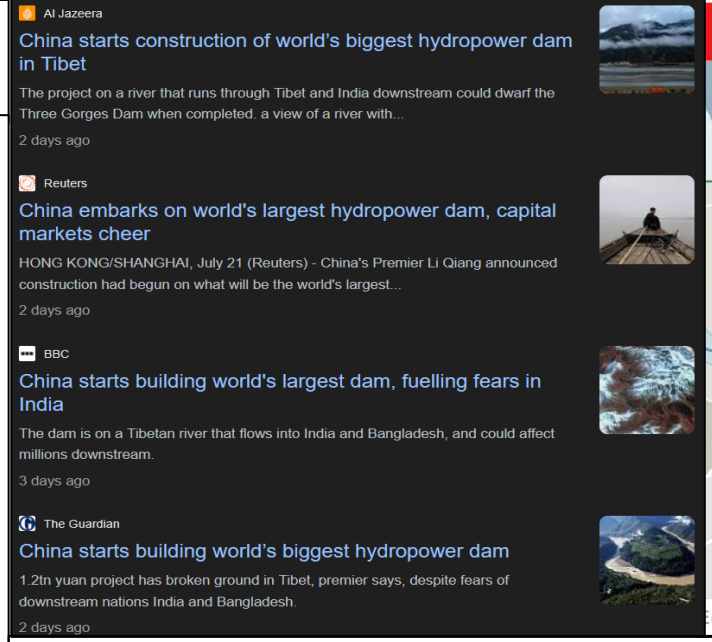
The institute offers a bachelor's degree program in meteorological technology and engineering, specializing in weather modification.

- Established in 2023 with an intake of 80 students, the program includes courses in meteorological physics, cloud precipitation physics, and meteorological big data with artificial intelligence.

China's Three Gorges Dam has shifted such a large amount of water it is being investigated for having triggered a shift in the tilt of the earth along with a project to reverse flow of the largest river system on the continent which can influence seismic activity via changes in water distribution and storage. Water plays a large role:

- **Load Changes**: Large volumes of water in reservoirs or river systems add weight to the Earth's crust, which can alter stress on faults and potentially trigger earthquakes, especially if the faults are already close to slipping.
- **Water Infiltration**: Increased water can seep into underground rock formations, changing pore pressure and lubricating fault lines, making it easier for them to move.
- **Reservoir-Induced Seismicity**: Filling or emptying reservoirs causes major changes in river water volume and often cause minor seismic activity, even during installation.

Moscow State University and the Russian Academy of Sciences have departments that research weather modification techniques.



The new dam will be situated in the lower reaches of the Yarlung Tsangpo, where a section drops 2,000 meters (6,562 feet) over a 50km (31 miles) stretch, creating immense hydropower potential.

- The dam is reportedly located in Medog, a remote county in the city of Nyingchi in the Tibet autonomous region.
- When completed, the project will overtake the Three Gorges Dam as the world's largest hydropower dam. It could generate three times more energy with five cascade hydropower stations – an estimated annual capacity of 300 billion kilowatt-hours (kWh) of electricity, more than Britain's total annual power output.

The Yarlung Tsangpo flows into India, becoming the Brahmaputra River, then into Bangladesh. Both South Asian nations raised concerns about downstream implications of water conflict, which affect millions depending on the river for agriculture, fisheries and daily consumption.

--- **The ENMOD Convention (1977):** The Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques *prohibits hostile use* of environmental modification—including atmospheric modification—*for warfare.*
--- **UN Framework:** The United Nations has discussions and frameworks on climate engineering and geoengineering, encouraging transparency and international cooperation.
--- **Convention on Biological Diversity (CBD):** Addresses potential impacts of geoengineering on biodiversity and calls for precaution in environmental interventions.
--- **Customary International Law**: Principles like sovereignty, no harm to other states, and peaceful use underpin atmospheric modification activities.

More Than 110 New Flights Cancelled in China as Severe Weather Disrupts Travel for Air China, China Eastern, Shanghai, Shenzhen Airlines, and More, Stranding Passengers

Published on September 16, 2025 By: Rana Pratap

UK weather: Scandinavian ice-dome to send temperatures plunging just days after 26C heat

TN Soybean farmers face 'desperate situation' amid inflation, weather extremes and tariffs

The University of Tennessee in August estimated total losses of nearly $110M for soybeans this year

BY: **CASSANDRA STEPHENSON** - SEPTEMBER 15, 2025 5:00 AM

A New Polar Vortex is Now Emerging over the North Pole and will bring Weather Impacts on Winter 2025/2026

By Andrej Flis

Published: 18/09/2025

Long range / seasonal forecast

A new Polar Vortex is now developing in the Stratosphere over the North Pole as pressure and temperatures are already dropping over the polar regions. With the recent oceanic and atmospheric anomalies having an impact on the Polar Vortex, there are signs emerging for a dynamic Winter 2025/2026.

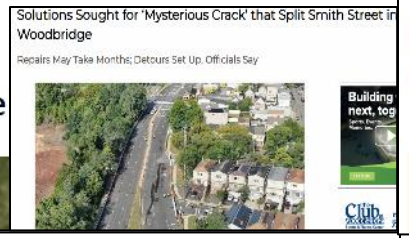
Water shutoffs happening earlier than usual for some Yakima Basin irrigators

BY: **QUESTEN INGHRAM** - SEPTEMBER 8, 2025 3:48 PM

Syria's worst drought in decades pushes millions to the brink

3 days ago

Samantha Granville



Drought is draining water supplies and driving up food costs where you'd least expect

From Mexico City to the Mekong Delta, increasingly severe droughts caused by climate change are laying waste to ecosystems and economies everywhere.

by **Ayurella Horn-Muller, Grist**

07/18/2025

SEPTEMBER 18, 2025 The GIST

Europe, Mediterranean coast saw record drought in August: EU data

edited by Andrew Zinin Editors' notes

WEATHER A FACTOR IN EARLY SOUTH AMERICAN PLANTING SEASON

September 18, 2025 By Jared White Filed Under: Ag Weather, Crops, News

Russian-occupied part of Zaporizhzhia Oblast sees lowest harvest since 2003

ANDRII MURAVSKYI — FRIDAY, 19 SEPTEMBER 2025, 16:36

Russia: Severe Drought Threatens 25% of Crops in Russia's Agricultural Heartland

- An ongoing drought in southern Russia's Krasnodar region has caused around 46 billion rubles ($572 million) in agricultural losses so far this summer
- Authorities have declared states of emergency in 30 districts — 21 in Rostov and nine in Krasnodar — as extreme weather devastates fields of wheat, barley, corn and sunflowers.

New Zealand: The Ashburton District Council in New Zealand is enlisting scientists to investigate the causes of algal blooms at Lake Hood. The council has reported that increasing water flow has not prevented blooms, and the scientists and university students will work to create a hydrodynamic model and test methods to slow algal growth.

- New Zealand Faces Worst Snow Drought in 10-years: Temple Basin ski area in New Zealand's Southern Alps has announced it will not open for the 2025 winter season.

Gaza: Nearly two years of war have crippled Gaza's water infrastructure, including wells, desalination plants and pipelines from Israel. Most facilities have been damaged, destroyed or rendered inoperable due to fuel shortages, lack of spare parts or unsafe locations.

- Before the war, the coastal enclave's more than 2 million residents got their water from a patchwork of sources. Some was piped in by Mekorot, Israel's national water utility. Some came from desalination plants. Some was pulled from high-saline wells, and some imported in bottles.

Iran: Lake Urmia, once the world's second-largest saltwater lake, has shrunk drastically, leaving salt-encrusted marshes and barren flats in its southern region. Its decline reflects deeper challenges facing Iran.

- A group of reformers called for Iran to suspend its uranium enrichment program and reach a deal with the US to ease sanctions on the country as it faces widespread power and water shortages.

Afghanistan: Kabul is running dry, withered by scarcer rainfalls and snow melts and drained by unregulated wells. It has become so dry that its six million people could be without water by 2030 — and are now fighting about it.

- Its water reserves are emptying nearly twice as quickly as they are getting replenished.
- Climate change has become the primary driver of displacement in Afghanistan, with nearly 400,000 people displaced and almost five million affected by droughts and floods this year, the International Organization for Migration reports.
- while its population has grown roughly sixfold over the past 25 years, no decent water management system has been put in place to bring water from other sources or to regulate underground extraction from greenhouses, factories and residential buildings that are mushrooming across the city.

Images captured by the ESA's Sentinel-2 satellites on in May 2020, left, and August 2025 show the declining water levels of Iran's Lake Urmia. **COPERNICUS**

Iraq has seen water levels along its two main rivers, the Tigris and the Euphrates, fall by more than a quarter and is grappling with its driest year since 1933, while water shortages in Hungary, Serbia, Syria, and Turkey, were reported, harming livestock, forcing farmers to abandon their land, and driving officials to impose restrictions on the use of water.

The Sea of Galilee, a critical water source in Israel, has dropped further due to last week's intense heatwave, reaching 212.595 meters (697.5 feet) below sea level as of Sunday, only 40.5 centimeters (16 inches) above the critical red line, noting the lake's capacity and limitations for water usage. Talhami warned of a sharp decline, predicting the level could hit the red line by late September.

International Weather Headlines: Impacts Expand Rapidly

Canada: As of Monday: Canada is at National Preparedness Level 5, indicating that there is full commitment of national resources and demand for interagency resources through the Canadian Interagency Forest Fire Center (CIFFC) is extreme. Since national availability of resources is limited, international resources are being mobilized.

- Manitoba and Saskatchewan are at Agency Preparedness Level (APL) 5, Alberta is at level 4, Ontario, and Parks Canada are at Level 3, and all other agencies at 2 or lower or not reporting APL today.

China: Hundreds of flights were cancelled or delayed in Guangzhou, the capital of Guangdong province. The flooded streets are threatening to worsen an outbreak of the mosquito-borne chikungunya virus in the province.

Hong Kong: on the 5th agencies reported +350mm (13.78 inches) of rain which marks the city's wettest August day since 1884

North Korea: 7 inches of rain fell in Jagang Province last week with risks of landslides elevating. Yopung students in the northern border province of Ryanggang were instructed to gather rocks daily to help build flood walls as the region

Iran: President Pezeshkian warned against excessive water consumption which is untenable for the country and could leave Tehran facing severe shortages by September.

- The Meteorological Organization recorded a 40% drop in rainfall over the last four months compared to a long-term average. 70% of Tehran residents consume more than the standard 130 liters a day.

India: A collapsing thunderstorm produced a "wall of water" resulting in +4 inches per hour in the foothills of the Himalayas where +50 people are missing and around 40 homes were washed away.

- The monsoon rains this year have also created significant damage in the neighboring state of Himachal Pradesh. Nearly 200 people have been killed over the past six weeks in monsoon-related disasters, according to official data, and 300 others have been injured and three dozen missing.

Russia: Russian coast hit by tornado and flooding with bridge collapsed (stranded +300 homes) and houses submerged. A state of emergency has been declared in the Tuapse region of Russia due to severe flooding. 25 houses in Defanovka, 9 houses and 25 adjacent territories in Moldavanovskoye, and 20 houses in Novomikhaylovskoye flooded.

France: A large fire burning over 16,000 hectares of forest and villages in southern France since Tuesday continues to spread prompting evacuations of +2,000 and is France's biggest wildfire in ~80 years.

Japan: marked its hottest day on record on Tuesday, with 41.8C (107F) registered in Isesaki city, Gunma prefecture. The country had also experienced its hottest-ever June and July this year.

South Korea: marked a record streak of 22 "tropical nights" in July where temperatures exceeded 25C.

Vietnam: Parts of Vietnam are also baking in unprecedented heat, with Hanoi recording its first-ever August day above 40C.

Pakistan: nearly 300 people, including more than 100 children, have died in rain-related incidents since June. The deluge has also destroyed hundreds of homes and buildings - at least a quarter of schools in the Punjab province have been partially or completely damaged.

Israel: Tomorrow Temperatures are expected to near 40°C (104°F) in Jerusalem and up to 49°C (120°F) in the east, prompting health warnings and a ban on bonfires.

Recent International Events

Turkey: Wildfires forced the evacuation of tens of thousands of people, while two people died in Italy following separate heat-related deaths.

- Overnight, on the first day of July, several places across the Iberian peninsula had topped 43C.
- Night-time temperatures recorded overnight into Tuesday hit 28C in Seville and 27C in Barcelona.
- In Turkey, rescuers earlier evacuated more than 50,000 people - mostly from the western province of Izmir - as firefighters continued to put out hundreds of wildfires that had broken out in recent days.

UK: End of June recorded 34.7C in St James's Park in London, making it the hottest day of the year so far.

- On Monday, the highest daily UK temperature was recorded at Heathrow Airport in London at 33.1C. Meanwhile, Wimbledon recorded a temperature of 32.9C, the tennis tournament's hottest opening day on record.

France: The top of the Eiffel Tower in Paris has been closed because of the intense European heatwave; while Climate Minister Agnès Pannier-Runacher called it an "unprecedented" situation.

- For first time in five years the Paris region has activated a red alert - the highest extreme heat warning - along with 15 other French regions.

Italy: In the Tuscany region has seen hospital admissions rise by 20%.

- Italians in 21 out of the 27 cities have been subjected to the highest heat alert and 13 regions, including Lombardy and Emilia, have been advised not to venture outside during the hottest periods of the day.

Germany: Temperatures over 38C lowered levels in the Rhine River, limiting the amount cargo ships can transport and raising freighting costs.

People look on near the Plage des Corbieres in Marseille, southern France on July 8, 2025, as smoke from a wildfire looms.
© Clement Mahoudeau, AFP

[1/5] A drone view shows burnt trees and destroyed houses in the aftermath of a wildfire in Seferihisar near Izmir, Turkey,

Summer 25 International Events

Canada Wildfires: by end of June, there were 2,672 fires which burned over 11.5 million acres, surpassing the national 25-year annual average. This figure is comparable to the record-breaking 2023 season

- In 2023, 93% of the fires in Canada were caused by lightning (Canadian Climate Institute). +40 of the fires from June 16-22 were from lightning strikes.

Russia: July 4, the water level in St. Petersburg has risen to the point where the dam needed to be closed to protect the city from a rare flood.

- A warning continues that the water level may rise further, reaching 190 cm. This is the first similar flood in July since 1865.
- Omsk region are suffering from a hurricane due to heavy rain and strong winds.

France: A blaze in southern France forced the closure of the Marseille airport, and weather agencies issued warnings for other parts of Europe where temperatures were expected to climb this week. Two weeks ago, Paris, France was flooding.

- **Spain**: Catalonia authorities ordered residents in 11 towns to remain in their homes as firefighters contained a fire burning ~6,000 acres since Monday.
- **Greece**: temperatures rose +40 Celsius (104 Fahrenheit) on Tuesday.

China: Possible flash flooding as the remnants of Typhoon Danas (Cat 1) passes through the region. Hong Kong at risk of mudslides and damaging wind gusts.

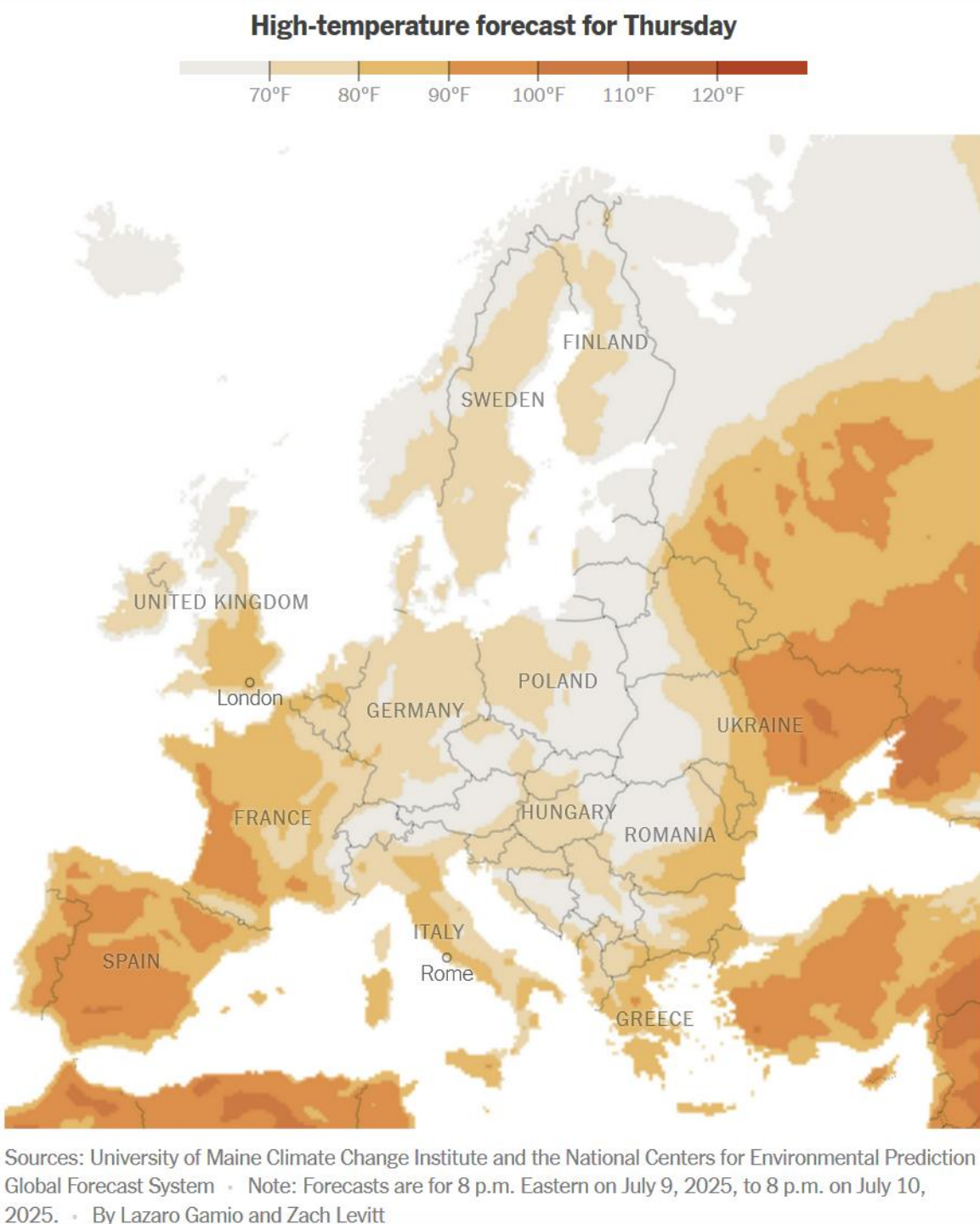
- Multiple tornadoes touched down last week and a month ago fires raged on.

Australia: Snowfall between 10cm-30cm are expected over the alpine regions, particularly in Victoria, with strong winds and rain affecting low-lying regions.

- New South Wales's coldest June in nearly 20 years, by minimum temperature, while Queensland had its coldest June minimums in over a decade.
- Similarly, South Africa is facing significant winter weather events this week.

North Korea: “Sweet Meat” a dog meat cooking contest in Pyongyang to elevate culinary standards for the red meat, a traditional red meat for summer seasons.

- Glavprodukt, a US company seized by Russia, will now supply China/NK.



Sources: University of Maine Climate Change Institute and the National Centers for Environmental Prediction Global Forecast System • Note: Forecasts are for 8 p.m. Eastern on July 9, 2025, to 8 p.m. on July 10, 2025. • By Lazaro Gamio and Zach Levitt

Summer 25 International Events

Pakistan: Accelerated glacial melt + monsoon rains trigger deadly floods in Pakistan and prompts additional arguments over India's waterway control.

- Record temperatures and seasonal downpours raise fears of a repeat of the devastating flooding in 2022
- Glaciers across northern Pakistan have been melting at an accelerated pace due to record-breaking summer temperatures, leading to deadly flash flooding and landslides.
- The floods and heavy monsoon rains have caused devastation across the country this summer, killing at least 72 people and injuring more than 130 since the rains began in late June.
- In the country's mountainous region of Gilgit-Baltistan, temperatures have risen as high as 48.5C (119.3F), which local officials described as unprecedented in a region that is more than 1,200 metres above sea level and famous for its snow-capped mountains. The previous record was 47 degrees, set in 1971.
- Pakistan, with a population of 240 million, is one of the world's most vulnerable countries to the effects of the climate crisis.

China (again)

A mountain river flooded by monsoon rains swept away the main bridge connecting Nepal with China on Tuesday, leaving 20 people missing, Nepali authorities said.

- The flooding on the Bhotekoshi River destroyed the Friendship Bridge at Rasuwagadi, which is 120 kilometers (75 miles) north of the capital, Kathmandu.
- Several houses and trucks that were parked at the border for customs inspections also were swept away.

While southern China is facing flooding, northeastern regions continue to suffer extreme heat.

- A subtropical high-pressure system has brought near-record temperatures to major cities like Shanghai, Wuhan, and Changsha.

People look at a raging river in Nepal *(AP)*

The Western Balkans are currently grappling with a severe drought and widespread water restrictions, triggered by a record-breaking heatwave.

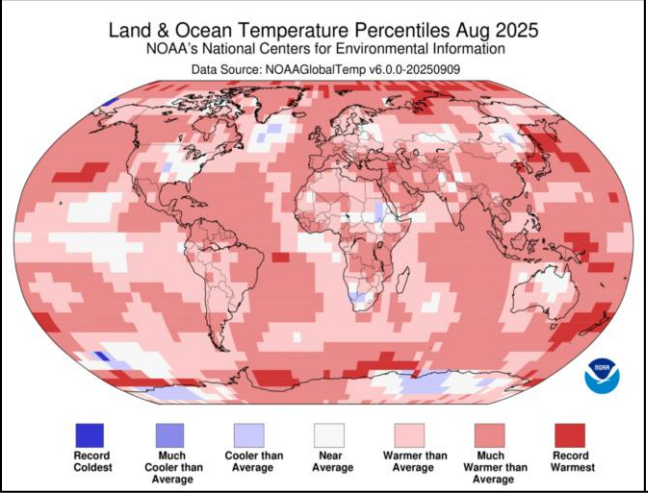
- Temperatures have soared, reaching up to 41°C (105.8°F) in some areas, leading to critically low river levels, agricultural distress, and significant impacts on daily life and power production across the region.
- Evaporative demand is a risk for rivers and lakes across Albania, Serbia, Kosovo, Bosnia, and North Macedonia.
- Albania is facing significant hydropower concerns.

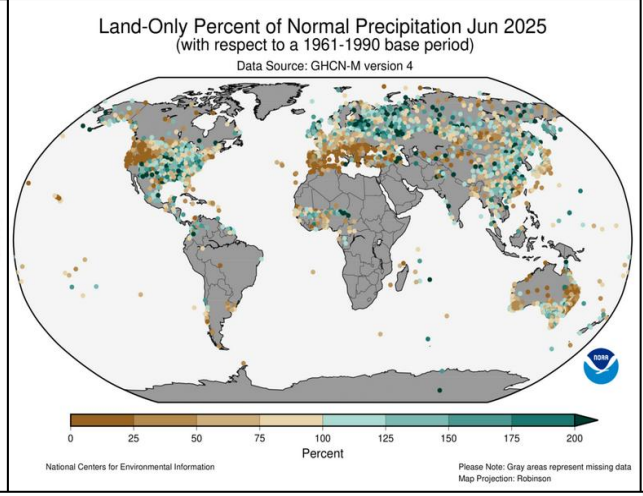
August 2025 was the third-warmest August globally since records began in 1850. The monthly temperature anomaly was +1.07°C (+1.93°F), ranking just below the warmest Augusts of 2023 and 2024 (+1.27°C / +2.29°F).

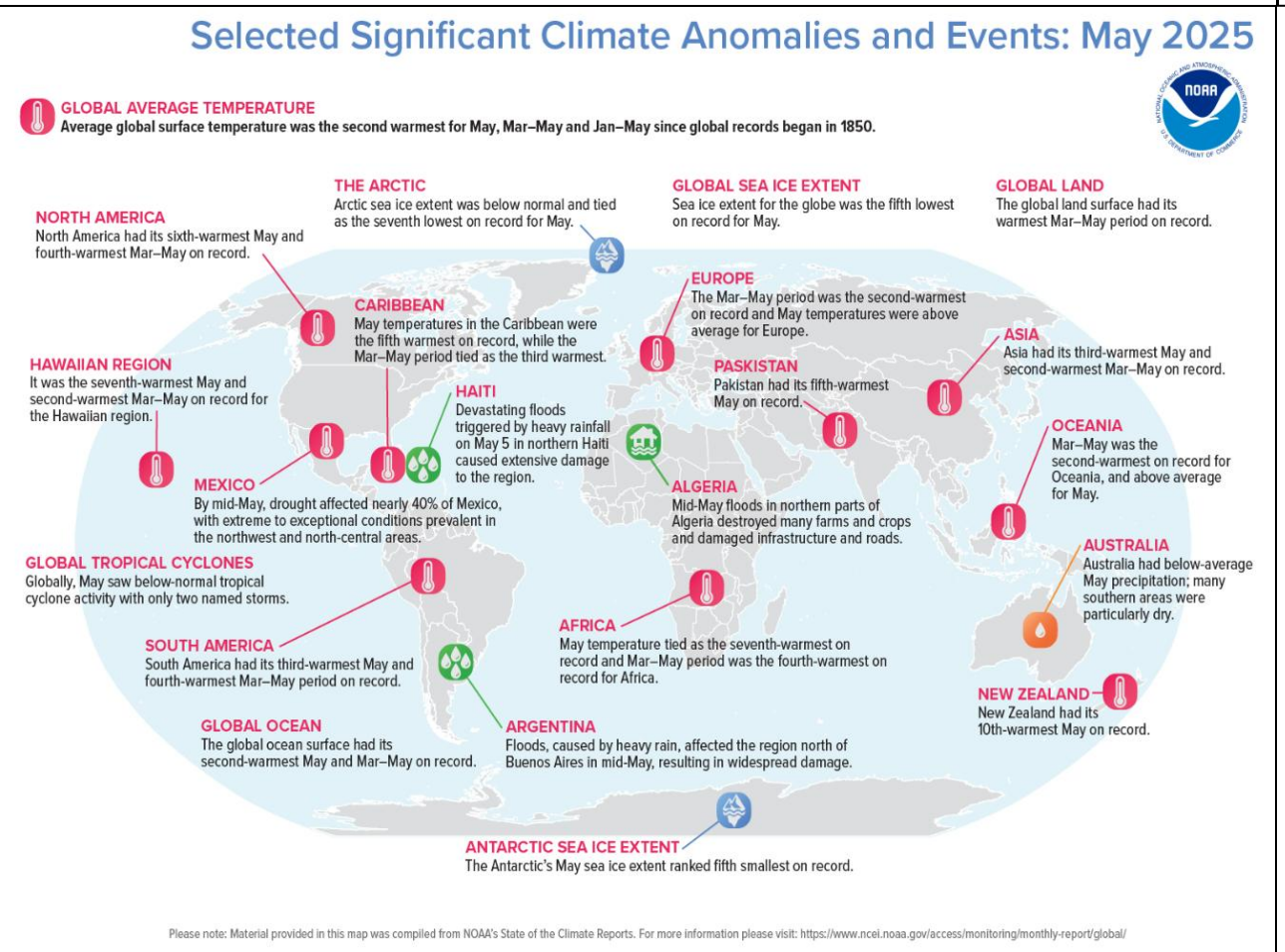
- August 2025 marks the 47th consecutive August with global temperatures at least nominally above average. The ten warmest Augusts have all occurred since 2015.

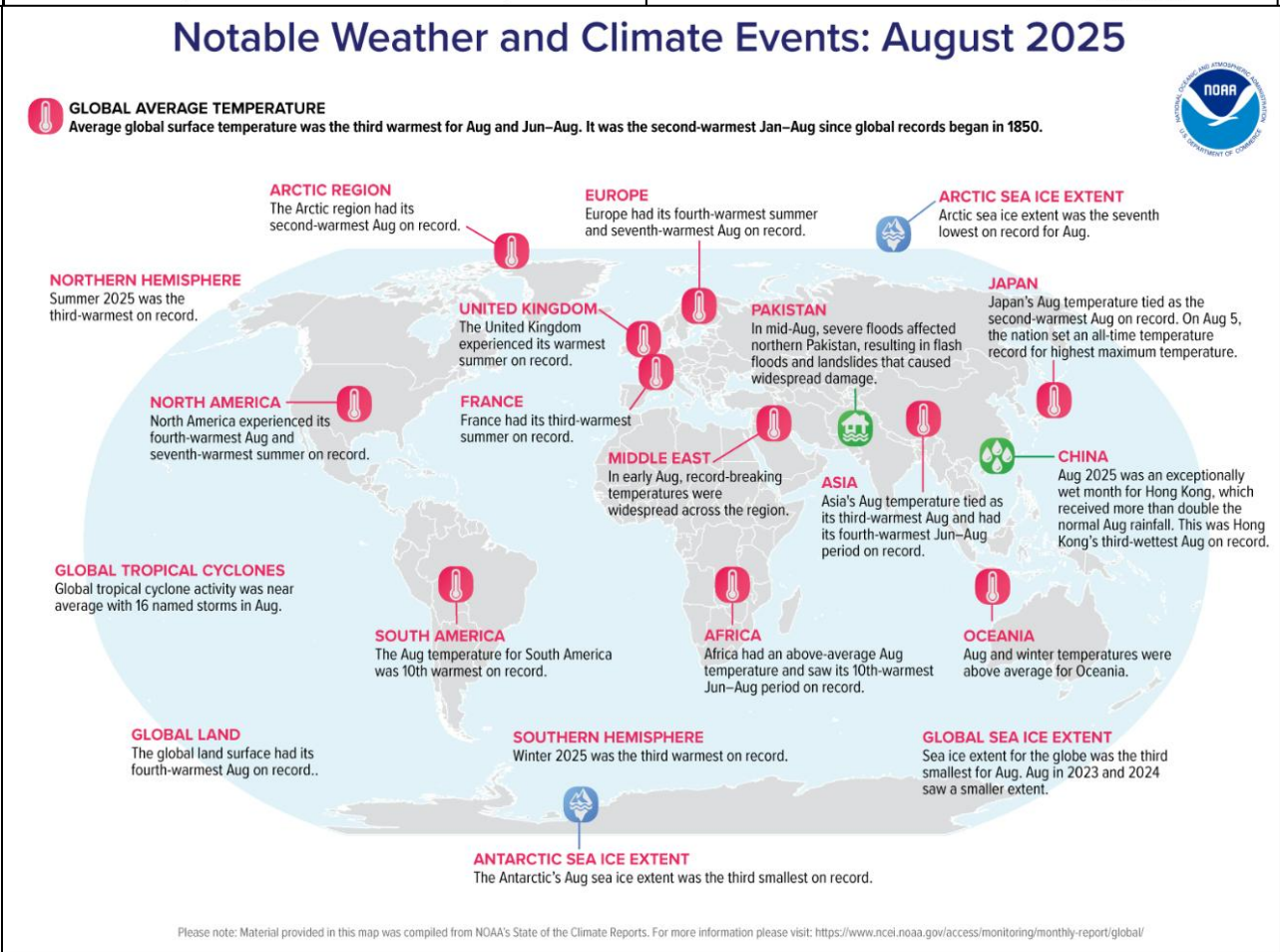
The global ocean-only surface temperature for August 2025 was the third-highest on record for August, with a temperature 0.91°C (1.64°F) higher than the 20th-century average. Only Augusts of 2023 and 2024 were warmer.

August temperatures were above average across much of the globe's surface, and parts of every continent. The most significant warm temperature departures were in the Northern Hemisphere's northern latitudes, as well as central Antarctica. Record-high August temperatures covered 6.3% of the world's surface.









CONTACT

Chief Meteorologist Sunny Wescott

LinkedIn: https://www.linkedin.com/in/sunnywescott/

- Email: Sunny@unlimitedweather.com
- Download: https://linktr.ee/swescott

More Questions?
Reach out instantly
on Aid Arena!

HELPFUL STARTS

- NOAA Repository:

https://www.ncei.noaa.gov/cdo-web/

- Frontal Boundaries:

https://aviationweather.gov/gfa/#progchart

- Infographics:

https://www.climatecentral.org/

- World Meteorological Organization:

https://wmo.int/topics/extreme-weather