

**Another Anthropogenic Cause of Global Warming:
Response to the Letter by Shearer et al.**

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Keywords: weather modification, tropospheric particulate emplacement, coal fly ash, global warming, secret large-scale atmospheric spraying program, weather warfare

Abstract

The Letter by Shearer et al. misrepresents the state of knowledge, published in the peer-reviewed scientific literature, relating to the nature of trails behind aircraft. The tabulation of opinions, which is the basis of that Letter, is refuted by evidence published in the peer-reviewed scientific literature. The generalization that all such trails are ice-crystal contrails formed from aircraft exhaust moisture is refuted by photographic and observational evidence from San Diego, California (USA). Published scientific evidence suggests that the wide-spread, pervasive trails behind aircraft are generally particulate trails, not contrails. Three independent lines of evidence, published in the peer-reviewed scientific literature, suggest that the main aerosolized particulate matter is coal combustion fly ash, by-product waste of coal-burning electric utilities. Published epidemiological data and water-leachate data indicate that aerosolized coal fly ash poses serious threats to human health and to the natural environment and its biota. The inferred association of coal fly ash with the jet combustion environment raises the important environmental question, which should be addressed experimentally, of whether that association might produce environmentally toxic methylmercury and/or ozone destroying chlorofluorohydrocarbons. The physical consequences of pervasive emplacement of particulate matter into the troposphere is to retard the fall of rain or snow, heat the atmosphere, retard heat loss from the Earth, and upon settling to ground, to absorb solar radiation and change the albedo of ice and snow. Consequently, I suggest that the purpose of the near-daily, near-global pervasive spraying of particulate matter into the troposphere may be to cause global warming. The inferred anthropogenic global warming, which is independent of greenhouse gas global warming, is likely to have more severe and adverse environmental consequences than envisioned by the IPCC.

Introduction

The recently published Letter “Quantifying expert consensus against the existence of a secret large-scale atmospheric spraying program” by Shearer et al. (1), I submit, provides us a rich opportunity to improve our approach to science-based public discourse and policy making.

The Letter’s tautological “objective science” involves the tabulation of opinion from 77 scientists whose publications were frequently cited, and presumably were recipients of government funding and thus subject to the dictum “do not bite the hand that feeds you.” In any event, tabulating opinions is neither science nor “objective science.” In science, consensus, even “expert consensus,” is nonsense. Science is a logical process, not a democratic one. If scientific correctness were measured by consensus, scientific advances would be virtually impossible. Moreover, scientific “consensus” is shattered by revolutionary discoveries (2).

In addition to tabulating opinions, and calling such tabulation “objective science,” the Letter by Shearer et al. (1) misrepresents the actual state of scientific investigation concerning their subject matter: “*There have been no peer-reviewed studies in the scientific literature addressing SLAP [secret, large-scale atmospheric spraying program] claims.*” That statement is simply not true (3-6).

Scientists, by virtue of their training, experience, and perceived credibility, have a measure of public trust on which basis they can make positive contributions to the wellbeing of our planet and its inhabitants. Molina and Rowland’s warning of the potential destruction of the ozone layer by chlorofluorohydrocarbons is one such example (7). But, regrettably, scientists can also abuse that public trust. In the 1950s and 1960s, more than one thousand nuclear-device tests were conducted at the Nevada Test Site (USA), which involved detonating more than one hundred nuclear devices above ground. Thousands of military personnel, without being told of the potential health risks, were deliberately exposed to nuclear blasts, including “war game” maneuvers that took place directly beneath the atomic clouds. Scientists and physicians connected with that nuclear program misled military personnel, atomic workers, and the population at large as to the risks of radioactivity and radioactive fallout (8-10). Similarly, the intent of the Letter by Shearer et al. (1), whether deliberate or not, is to mislead the scientific community and the public about the existence and public health risks of “a secret large-scale atmospheric program ... commonly referred to as ‘chemtrails or ‘covert geoengineering’” which involves tropospheric aerial spraying of micron and submicron particulate matter.

The 2005 U. S. Air Force document (AFD-051013-001) in part states: “*The ‘Chemtrail’ hoax has been investigated and refuted by many established and accredited universities, scientific organizations, and major media publications. There is no such thing as a ‘Chemtrail’. Contrails are safe and are a natural phenomenon. They pose no health hazard of any kind.*” That document sets forth two major disinformation themes, namely, that covert tropospheric particulate spraying does not exist, and that the aerial trails, observed and reported by millions of

concerned citizens in the U. S. and throughout the world, are harmless contrails, ice crystals formed from the water in aircraft engine exhaust. The same two themes dominate the Letter by Shearer et al. (1). Their collection of opinions, based on merely four photographs of aerial trails, is without scientific merit. It serves only to deceive the public. There exist millions of photographs and video footage to “select” from and *subject to careful scientific analysis*.

Methods

The generalization that all trails behind aircraft are harmless ice-crystal contrails is refuted by photographic and observational evidence showing that trails behind aircraft in San Diego, California (USA) have physical characteristics inconsistent with ice-crystal contrails, but wholly consistent with aerosolized particulate trails which published evidence suggests are anything but harmless.

The tabulated opinions relating to Internet-posted 3-element rainwater measurements are refuted by my own 8-element rainwater measurements, published in peer-reviewed scientific literature. The particulate-nature of trails behind aircraft is buttressed by two additional lines of evidence likewise published in peer-reviewed scientific literature.

Results

Particulate trails behind aircraft

Aircraft exhaust condensation trails, commonly referred to as contrails, form under conditions of high humidity, low temperature and abundant exhaust water vapor (11, 12). The air above San Diego, California (USA), where I have lived for 45 years, is warm and dry, not at all conducive to the formation and persistence of contrails. The ice-crystals that comprise contrails, if they form at all, disappear by sublimation typically in a matter of seconds, a few minutes at most. When particulate matter is sprayed into the troposphere by jets, the particulate spray-trails superficially resemble ice-crystal contrails, at least initially. But then the particulate matter begins to spread, sometimes briefly forming cirrus-like artificial clouds, before further spreading out to form a white haze. Repeated aerial spraying over a period of several hours can make an otherwise cloudless sky artificially overcast; heavy spraying can cause the overcast to have a brownish hue. Figure 1 shows a few examples, photographs of the San Diego sky taken on days when there were no natural clouds and no marine layer onshore. On many days before the heavy spraying I observed commenced, the San Diego sky-color was azure blue, without natural clouds; now the sky is frequently whitish in color.



Figure 1. Six views of the San Diego, California (USA) sky taken when there were no natural clouds or onshore marine layer. **Upper left:** Shows two nearly side by side jet-laid particulate trails in the same physical environment, with one trail abruptly turned off. The artificial clouds formed from previous jet-laid particulate trails that diffuse and/or spread with the wind. **Upper right:** Sunlight scattered by particulates that have spread from jet-laid particulate trails to form a white haze. **Middle left:** The sky rapidly becoming overcast by heavy particulate spraying. **Middle right:** The sky overcast by particulates from heavy spraying. Note the brownish hue. **Bottom left:** Multiple particulate trails in the San Diego sky. **Bottom right:** Whitish haze instead of azure blue sky caused by particulate spraying. The blue strip at the top of this image, from a photo of unsprayed San Diego sky, is shown for comparison. All of the images shown here are inconsistent with contrails, ice crystals from aircraft exhaust moisture, which do not long persist in the warm, dry sky above San Diego.

Rainwater

The Letter by Shearer et al. (1) uses a questionnaire to solicit opinions about the measurements posted on the Internet that show aluminum, barium, and strontium concentrations in rainwater. If a scientist questions published or posted analyses, he/she should independently take samples and obtain analyses; that is how legitimate science progresses, not by collecting opinions from persons who have not made such measurements. Over a period of a year, I sampled rainwater which I had analyzed for eight elements (Al, Ba, Sr, Ca, Mg, S, Fe, and B) using three commercial certified laboratories for validation. I showed (4-6) that those elements occur in the same range of relative proportions as they occur in the water-leachate of coal fly ash (13). In other words, the evidence indicates that the aerosolized particulate matter has the same water-leach characteristics as coal fly ash. In addition, I showed that as many as 14 elements measured in dust collected from HEPA air filters run outdoors for three months likewise occur in the same range of relative proportions as in samples of coal fly ash (13, 14).

Discussion

Crushing rock to provide the multi-megaton quantities of particulate matter needed for near-daily aerial spraying across much of the U. S., Canada, Europe, and elsewhere would be prohibitively expensive. Evidence published in the peer-reviewed scientific literature suggests instead that a major waste product of coal-burning electric utilities, coal fly ash, is most likely the main particulate matter being employed for aerial spraying (3-6). When coal is burned, the heavy ash settles and the very fine ash, called coal fly ash, which previously exited power-plant smokestacks, is now trapped electrostatically in the U. S. and other western nations. Minimal treatment, such as cyclone-classifier separation of the ultra-fine component of coal fly ash and perhaps mixing in additives to counteract van der Waals forces, is all that is required to process this industrial waste material for aerial spraying.

For particles to remain suspended for some reasonable time in the troposphere they must be micron (μm) or submicron in diameter. Without even knowing the identification of the specific particulate matter being sprayed, one should rightly be alarmed by the adverse public health implications derived from epidemiological studies of pollution particles $\leq 2.5 \mu\text{m}$ across, commonly referred to as $\text{PM}_{2.5}$. As known from pollution studies, $\text{PM}_{2.5}$ particles have been found to be associated with increased hospital admissions (15), low birth weight (16), morbidity and premature mortality (17-19), lung inflammation and diabetes (20), risk for cardiovascular disease (21), and reduced male fertility (22). And yet the long-term health risks of particulate aerosol spraying may be considerably more severe.

When coal forms it traps many chemical elements. When it is burned, the toxic heavy metals and radioactive elements tend to concentrate in the coal fly ash; many of these elements are readily extracted with water (13). When inhaled, $\text{PM}_{2.5}$ particles settle deep in terminal airways and alveoli where they remain for long periods of time. Not only do the radioactive elements and

hexavalent chromium pose potential dangers for the formation of lung cancer, other toxins are extracted by body moisture, including aluminum in a chemically mobile form, implicated in neurological disorders, and arsenic, which can cross the placenta to the fetus, potentially placing the child at risk for birth defects. There may be additional adverse health consequences other than those mentioned here.

Tropospheric aerosolized coal fly ash poses dangers to environmental health similar to those posed by acid rain, principally liberating aluminum in a water soluble form that is detrimental to many plants and animals (23); aluminum is implicated in neurological disorders in bees and other biota (24-26). White fibers are sometimes observed associated with aerial spraying, and have been photographed and tested. I showed (6) that as many as 17 elements in one sample of white fibers occur in the same range of relative proportions as in samples of coal fly ash (13, 14), which suggests to me the possibility that coal fly ash may be sometimes subjected to the jet combustion environment. Among the possible consequences, which should be experimentally validated, is the question of whether in that hydrocarbon-rich environment toxic methylmercury and ozone-depleting chlorinated-fluorinated hydrocarbons are produced.

Aerosolized coal fly ash poses long-term health risks analogous in many ways to those of radioactive fallout from aboveground nuclear testing in the 1950s and 1960s. But there are profound differences in the behaviors of the scientific community then and now. During aboveground nuclear testing, government scientists deceived the public about the health risks of radioactive fallout, and public health officials confined themselves to writing memos for the files (8). *But the scientific community at large freely investigated the health risks.* In fact, the aboveground nuclear testing ended as a consequence of the public outcry over the risks of strontium-90 becoming incorporated in infant's and children's bones and teeth (27). Now, by contrast, the public, the scientific community, and scientific journals are subject to an orchestrated disinformation assault.

There are disinformation websites, such as the two operated by non-scientist Mick West, one of the co-authors of the Letter by Shearer et al. (1), metabunk.org and contrailscience.com. The following "meta description" from the latter website calls into question the objectivity and intent of that Letter: "*Investigation of the science and history behind "chemtrails", showing that they are really contrails.*" Science is about truth, not deception, not deceit (28) and scientific journals should not be used to deceive the scientific community – and the public.

There is another orchestrated disinformation activity that has profound implications with respect to the freedom to publish scientific discoveries. Soon after I published peer-reviewed scientific articles relating to the tropospheric particulate spraying, the editors and journals were attacked with multiple lies, misinformation, and demands for retraction. In two instances with public health journals, the attacks resulted in my papers being retracted *without my being allowed to see the specific allegations or to respond to them*, contrary to usual scientific journal protocol (29). In at least one of those instances an individual traveled to meet face to face with the editor to

‘encourage’ retraction. Those retractions are not *faits accomplis* by any means. No one has the right to poison humanity, especially the most vulnerable: pregnant women, children, the elderly, and those with compromised immune and respiratory systems. And no one has the right to deceive the public about public health risks of such activities. Especially not scientists and the editors and publishers of scientific journals.

There is a commonality about the lack of candor with respect to public health risks during the aboveground nuclear testing and the present tropospheric particulate spraying. If the true health risks were known to the public, both programs undoubtedly would have been promptly ended by vociferous demands from the public and from Congress.

During the aboveground nuclear testing, the detonations were visible from great distances, and the arms-race motivation was clear from press coverage of Soviet aboveground nuclear detonations. By contrast, even though the aerial spraying is often quite visible, there is an active disinformation campaign to deceive the public into wrongly believing that the particulate trails are harmless ice crystals from aircraft exhaust contrails. What might be the motives for the aerial spraying? Although undisclosed, potential motives may be ascertained by understanding the physical consequences of particulate spraying. Beginning in the late 1940s, the technology was developed to enhance nucleation of rain or snow by seeding clouds with silver iodide or dry ice (solid carbon dioxide). This technology finds application in agriculture and recreational skiing, as well as warfare; it was utilized during the Vietnam War to extend the monsoon season to impede movement of troops and supplies along the Ho Chi Minh Trail (30, 31).

Blanketing the region where clouds form with particulate pollution, by contrast, *impedes* nucleation of rain and snow by blocking droplet aggregation and by absorbing moisture (5). Over sustained periods of time such aerial particulate spraying can cause drought. When heavily-laden clouds, no longer able to hold their moisture burden, eventually release their rain, downpours and intense storms can result (32). Tropospheric aerosolized particulate matter absorbs solar energy and concomitantly heats the atmosphere, as well as retards heat loss from Earth’s surface in the same manner as natural clouds. Furthermore, the particulate matter settles to Earth where it can further absorb solar energy and change the albedo of snow and ice. *The widespread, near-daily aerial spraying, I submit, leads to global warming* with potentially far more severe consequences on the environment than presently envisioned by the IPCC.

Why deliberately cause global warming? One can only speculate on the many possible reasons, such as melting Arctic and Antarctic ice to get at petroleum and other strategic resources, or opening a northern passage for commercial shipping, or creating a global-health situation that warrants globally sovereign institutional controls over human activity. Or for fortunes to be made. Moreover, applied locally and pervasively, particulate spraying can be used for military purposes to cause drought, which can lead to crop failures, livestock demise, human suffering and even starvation; all of which can destabilize governments of sovereign nations (5).

Conclusions

I have shown that the Letter by Shearer et al. (1) misrepresents the state of knowledge, published in the peer-reviewed scientific literature, relating to the nature of trails behind aircraft. The tabulation of opinions, which is the basis of that Letter, is refuted by evidence published in the peer-reviewed scientific literature. The generalization that all such trails are ice-crystal contrails formed from aircraft exhaust moisture is refuted by photographic and observational evidence from San Diego, California (USA). Published scientific evidence suggests that the wide-spread, pervasive trails behind aircraft are generally particulate trails, not contrails, except in unusual circumstances of high humidity, low temperature, and abundant exhaust moisture.

Three independent lines of evidence, published in the peer-reviewed scientific literature, suggest that the main aerosolized particulate matter is coal combustion fly ash, by-product waste of coal-burning electric utilities. Epidemiological data and water-leachate data indicate that aerosolized coal fly ash poses serious threats to human health and to the environment and its biota. The inferred association of coal fly ash with the jet combustion environment raises the important environmental question, which should be addressed experimentally, of whether that association might produce environmentally toxic methylmercury and/or ozone destroying chlorofluorohydrocarbons.

The physical consequences of pervasive emplacement of particulate matter into the troposphere is to retard the fall of rain or snow, heat the atmosphere, retard heat loss from the Earth, and upon settling to ground, to absorb solar radiation and change the albedo of ice and snow.

Consequently, I suggest that the purpose of the near-daily, near-global pervasive spraying of particulate matter into the troposphere is to cause global warming. The inferred anthropogenic global warming, which is independent of greenhouse gas global warming, very likely has much more severe and adverse environmental consequences than envisioned by the IPCC.

By virtue of their ability to understand our planet's natural behavior, scientists have an implicit responsibility to humanity, and to provide insight and understanding to help shape democratic (voter-informed) government policy on environmental and public health matters. It is important therefore that scientists maintain their objectivity and integrity in such matters, and not be persuaded or coerced into deceiving the public about ill-conceived, potentially harmful endeavors.

Acknowledgements

I certify that I have no conflicts of interest. Environmental Voices graciously offered to cover Environmental Research Letters' publication fees.

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