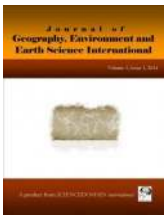

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Further Evidence of Coal Fly Ash Utilization in Tropospheric Geoengineering: Implications on Human and Environmental Health

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Authors' contributions

This work was a joint effort between the authors that is part of an ongoing collaboration aimed at providing scientific, medical, public health implications and evidence related to the near-daily, near-global covert geoengineering activity. Author JMH was primary responsible for geophysical considerations. Author MW was primarily responsible for medical and public health considerations. Both authors read and approved the final manuscript.

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ABSTRACT

We disclose a fourth independent line of evidence, based on the co-precipitation technique, pointing to coal fly ash as the material utilized in tropospheric geoengineering, and describe some of the adverse environmental and public health risks associated with its persistent application. During a snow storm, the fluffy snow traps geoengineering-aerosol-particulates and brings them down with the snow. The results of the ICP-MS analytical measurements of the snow-melt particulates we tested are consistent with three independent lines of evidence that coal fly ash is the main aerosolized particulate used for tropospheric geoengineering. Coal fly ash tropospheric geoengineering inhibits rainfall to change weather/climate which disrupts habitats, including arable habitats. Long periods of artificially induced drought can wreak economic disaster on farmers, and shift the delicate balance in nature, weakening natural defenses and giving a boost to aggressive

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pathogens. Coal fly ash when exposed to water or body fluids can release a host of toxic chemicals including neuro-toxic aluminum in a chemically mobile form and carcinogens such as arsenic, hexavalent chromium, and the radioactive elements, uranium, thorium and their daughter products. The only safe geoengineering is no geoengineering at all.

Keywords: Aerosols; tropospheric spraying; weather modification; climate modification; climate change; coal fly ash; geoengineering; particulate pollution.

1. INTRODUCTION

Currently there is much discussion in the scientific community as to the possibility of geoengineering our planet at some time in the future, where geoengineering is taken to mean the deliberate large-scale manipulation of Earth's environment for the purpose of weather and/or climate modification. Yet the academic debate is constrained to a futuristic hypothetical domain of stratospheric geoengineering, notably without reference to the ongoing tropospheric weather/ climate modification that has progressed covertly with increasing scope and intensity since the late 1990s [1,2]. In recent years, tropospheric weather/climate modification activities have become a near-daily, near-global occurrence witnessed by millions of people [3-5]. But there have been no explanations from officials as to its purpose or the risks posed to human and environmental health. Moreover, through an organized campaign, the public has been deceived as to the existence, operations, and risks [6]; there is precedent for this public and environmental health deception.

During 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 aboveground [7]. 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 [8,9]. Local residents were never clearly informed of the risks or provided with ways to minimize those risks [8].

Public knowledge of the potential health risks of aboveground nuclear explosions, especially from radioactive fallout, was minimized by both the military and the U.S. Atomic Energy Commission [10]. The fear was that adverse publicity might have caused protests and objections to such testing. Misleading and deceiving people about the health risks was the usual operating procedure; even Nevada Test Site personnel who had suffered exposure to radiation were routinely told that they had received less exposure than they actually had [8]. Moreover, non-consenting Americans, including pregnant women and just-born infants, were surreptitiously subjected to radioactive substances [11,12].

The military and the U.S. Atomic Energy Commission also displayed little concern for environmental health. In a remote region of the South Atlantic Ocean, for example, the military detonated five bombs, three of fission type and two thermonuclear (hydrogen), so high in the atmosphere that the ionosphere was disrupted. This caused a disruption in communications lasting for several days over the region. Subsequently, a much larger thermonuclear bomb was detonated sufficiently high in space to disrupt the Van Allen belts for hundreds of years [7,13].

The aboveground nuclear testing eventually cane to an end as a result the public outrage over the health risks to children from strontium-90 incorporation in their bones and teeth, which was revealed by independent scientists [14].

Now, there is a new threat to environmental and public health posed by tropospheric geoengineering that had its beginnings in pursuit of the technology for weather-warfare. Military planners have long dreamed of controlling the weather to provide optimum conditions for their battle strategies while providing adverse conditions for their enemies. The technique of cloud-seeding with silver iodide or solid carbon dioxide (dry-ice) was used during the Vietnam War to enhance nucleation of rain to prolong the monsoon season so as to inhibit movement of troops and supplies. But causing rain more-or-less on demand was only the first step; military planners wanted to inhibit or delay rainfall, a technique that could be used to cripple a sovereign nation's agricultural economy and cause human suffering [5].

The methodology to inhibit rainfall is known from pollution studies and involves spraying micron or

submicron pollution particles into the region where clouds form to interfere with moisture droplets coalescing to become sufficiently massive to form rain drops. Since the late 1990s, numerous witnesses have observed particulate trails sprayed by jet-aircraft across the sky. Soon after being released, the trails start to spread out, sometimes briefly appearing similar to cirrus clouds before further spreading to leave a white haze in the sky (Fig. 1). There has been a deliberate effort to deceive the public into believing that the particulate trails are jet contrails made of ice crystals [6]. But contrails only form at low temperatures and high humidity provided there is sufficient water vapor in the aircraft exhaust [15]. Contrails rapidly disappear by evaporation (sublimation) into invisible gaseous water. Contrails do not routinely leave a persistent white haze in the sky as does particulate spraying, which in instances of heavy aerial spraying takes on a brownish hue.

Fig. 1. Images of tropospheric particulate trails in the sky. Top: Geneva Switzerland, courtesy of B. Wright; Middle: Left, Chula Vista, California (USA), courtesy of R. Beas; Right, San Diego, California (USA), courtesy of J. M. Herndon; Bottom: Sacramento, California (USA) showing white particulate haze, courtesy of D. Whitman

The identification of the particulate-pollutant sprayed into the troposphere has never been openly disclosed. So far, however, there are three independent lines of scientific evidence that the particulate matter is coal combustion fly ash [3-5], the light ash that in Western nations formally exited smokestacks of coal-burning utilities, but now by regulations must be trapped and sequestered. Coal fly ash is a major industrial waste product worldwide and occurs in micron and submicron size particles which are readily available for geoengineering with minimal subsequent processing. But coal fly ash contains a concentrate of many toxic elements originally present in coal.

The purpose of this article is to disclose a fourth line of evidence pointing to coal fly ash as the geoengineering-utilized material and to describe some of the adverse environmental and public health risks associated with its persistent application.

2. MATERIALS AND METHODS

Co-precipitation is a widely used chemical separation technique useful for bringing down a trace precipitate whose abundance is too low drop from solution on its own or to be separated efficiently by filtration or centrifugation. By co-precipitation the low-abundance substance can be efficiently gathered and dropped by simultaneous precipitation of an abundant, and preferably flocculent co-precipitate. For example, traces of radium can be co-precipitated with much larger amounts of barium sulfate [16] or plutonium can be separated from seawater by co-precipitation with much larger amounts of ferrous hydroxide [17]. There are industrial variants of co-precipitation, for example, used in gold recovery [18], water treatment [19], and dewatering [20], that involve adding substances to cause coagulation and flocculation followed by sedimentation/flotation.

The principles underlying the co-precipitation technique provide the basis for another method to ascertain the chemical composition of the particulate-pollution matter used for tropospheric geoengineering. The idea is that during a snow storm, the fluffy snow will trap the geoengineering-aerosol-particulates and bring them down with the snow.

Fresh snow was collected during a snowstorm on March 31, 2016 at Pearson, Wisconsin (USA), and allowed to melt yielding initially 105 mL of liquid in a clean plastic container which was allowed to slowly evaporate. After most of the

liquid had evaporated, the sample was diluted to 50 mL with 5% HNO_3 solution and vortexed to break the solids loose from the sides of the container. Next the sample was digested per EPA method 200.7/6010b. After digestion the sample was diluted to 52.5 mL and analyzed by Inductively Coupled Plasma Mass Spectrometry (IPC-MS) by Northern Lake Service, Inc. Analytical Laboratory and Environmental Services in Crandon, Wisconsin (USA).

3. RESULTS AND DISCUSSION

Fig. 2 shows the elemental analyses, normalized to barium, indicated by X's, of the solid matter brought down by the snow storm. The solid red lines indicate the ranges of the corresponding element ratios measured in 23 samples of European coal fly ash [21]. The blue lines indicate similar ranges for 12 American coal fly ash samples [22]. The variation in the ranges of the European and American coal fly ash result primarily as a consequence of different relative amounts of accessory elements that occur in coal. Variation also occurs as a result of different physical burner conditions. Note that the X's fall within or very near the ranges for the entire 22 element ratios determined from the evaporated snow-melt. This constitutes a preponderance of evidence that the snow had captured and brought down aerosolized coal fly ash.

Statistical treatment of the measured elemental ratios is inappropriate as the comparison is not being made to one related set of data but to a group of independent sets of potentially variable populations. Nevertheless, there are two other independent sets of data which lend confidence to the coal fly ash data interpretation. These are elemental analyses of dust collected with high-efficiency air filters run outdoors for periods of three months, indicated by up-facing triangles, and fibers found on grass after snow had melted, indicated by open circles [4,5]. Whereas these three independent data sets are compared directly with coal fly ash, there is yet another different type of comparison. Analytical measurements of element ratios in filtered rainwater, presumably leached from aerosolized coal fly ash, are compared with laboratory leachate data on coal fly ash [3,4]. Those results show that the aerosolized particulate matter has the same water-leach characteristics as coal fly ash.

The results of the analytical measurements of the snow-melt particulates, as described here are consistent with three independent lines of evidence that coal fly ash is the main aerosolized particulate. This is also consistent with the economics and logistics of near-daily, near-global tropospheric spraying. Coal fly ash is a major industrial waste product that in Western nations must be trapped and sequestered. As trapped it is composed of micron and submicron size grains. Coal-burning utilities possess the necessary production facilities for electrostatic trapping coal fly ash. These extant facilities might even with little difficulty add cyclone classifiers (separators) to further separate an ultrafine product. These facilities are out of public view and possess the transportation infrastructure necessary for receiving coal deliveries, which can as well be used to deliver coal fly ash to air bases.

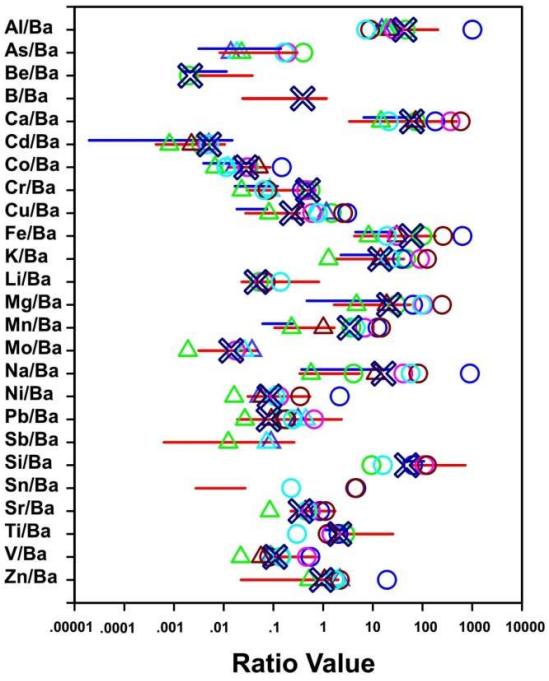

Fig. 2. Element-ratios determined for melted snow concentrate are indicated by X's: For comparison: Red lines and blue lines, respectively, are the measured element-ratio ranges of European and American coal fly ash samples, circles are element-ratios of samples of fibers found on grass as snow melted in Laona, Wisconsin (USA) on March 19, 2015, and up-facing triangles are element-ratios determined on dust collected on high-efficiency air filters operated outdoors for three month periods [4,5]

Furthermore, for utilization of tens of millions of tons per year, coal fly ash is much less costly

than manufactured ultra-fine particulates. Moreover, it has desirable properties for weather/ climate alteration. Coal fly ash retards the nucleation of rain not only by interfering with moisture droplet coagulation, but also by absorbing moisture. Sprayed into the troposphere, coal fly ash retards heat loss from the Earth and warms the atmosphere. As the typically dark ash settles on ice and snow it absorbs heat and changes the albedo. All of these properties suggest that one effect of the ongoing tropospheric geoengineering, whether intended or not, is to intensify the warming of the planet. The aerosolized coal fly ash also increases the electrical conductivity of atmospheric moisture [21], which may be of interest to those involved in electromagnetic radiation activities.

During the era of aboveground nuclear testing, the public was aware of the nuclear detonations, although misled as to the environmental and public health risks. The current troposphere geoengineering differs, however, in that there is a massive disinformation campaign to deceive the public both about its existence and the adverse consequences. It is therefore important to improve upon the technique described in this short communication and to apply it widely. One improvement would be to simultaneously collect a snow sample to melt for water testing according to the published rainwater-testing protocol [4]. The reason is that coal fly ash is readily water-leachable and those results can be compared to coal fly ash water-leach laboratory measurements. Another improvement for future investigations would be to use a portion of the collected particulates for ICP-MS measurements and use another portion for scanning electron microscopy (SEM) with energy-dispersive x-ray analysis (EDX). Those results could then be compared with similar studies of coal fly ash.

Tropospheric geoengineering with aerosolized coal fly ash, with its large number of toxic heavy-metal elements, adversely affects environmental and public health in a plethora of ways, that are well beyond the scope of this communication. Indeed, many of the adverse consequences surely have not yet been envisioned. As the scientific community has ignored the aerial spraying and its likely consequences, we herewith provide a brief overview of our perceptions of those consequences which may serve as a roadmap for future discussions and investigations.

Life on Earth exists in complex and interrelated interactions among diverse biota and their physical environments. Half a century ago, in her book *Silent Spring*, Rachel Carson called attention to the senseless and pervasive damage to Earth's creatures and their environment caused by widespread, reckless applications of pesticides. Her book launched the modern environmental movement [23]. The environmental organizations that grew out of that movement, however, apparently have not noticed the new threat to virtually all biota, including humans, from the tropospheric spraying of coal fly ash, a threat potentially much more devastating than that which Rachel Carson addressed.

One major purpose of coal fly ash tropospheric geoengineering is to inhibit rainfall either to change weather/climate or to deliberately cripple an agricultural economy and inflict hardship and suffering [5]. Concerted tropospheric geoengineering with coal fly ash disrupts habitats, including habitats where humans have found arable conditions. Long periods of artificially induced drought can wreak economic disaster on farmers, and shift the delicate balance in nature, weakening natural defenses and giving a boost to aggressive pathogens, such as extreme-tolerant fungi. Added to soil coal fly ash can alter the pH and release readily leached toxins such as aluminum in a chemically mobile form which is detrimental to many plants and animals, including humans [24].

Coal fly ash is an unnatural product which when exposed to water or body fluids can release a host of toxic chemicals including aluminum in a chemically mobile form. Aluminum is associated with and implicated in human neurological diseases, such as Autism Spectrum Disorders, Alzheimer's, Parkinson's and Attention Deficit/Hyperactivity Disorder [25-29]. Aluminum is similarly involved in neurological disorders of bees [30], rats [31], rabbits [32] and presumably other creatures. Aluminum is also thought to decrease male fertility [33]. Yet aluminum is but one of a number of toxic heavy-metal elements contained in coal fly ash that can be extracted by water or by body moisture; these include, for example, carcinogens such as arsenic, hexavalent chromium, and the radioactive elements, uranium, thorium and their daughter products.

Evidence indicates that coal fly ash has been being sprayed into the troposphere for at least 15 years, and, because the covert nature of the

operation, there have been virtually no public health and environmental health investigations in the scientific literature, a situation the authors believe the scientific community should no longer ignore. Some guidance, however, is available from extensive studies [34] of pollution particles ≤ 2.5μ across, approximately the same particle size range of aerosolized coal fly ash [35]. Pollution particles in that size range ($PM_{2.5}$) from epidemiological studies are associated with: Alzheimer's disease [36,37], lung cancer [38], risk for stroke [39], risk for cardiovascular disease [40], lung inflammation and diabetes [41], reduced renal function in older males [42], morbidity and premature mortality [43-45], decreased male fertility [46], low birth weight [47], onset of asthma [48], and increased hospital admissions [49].

Scientists should be good stewards of our planet and strive to improve the human condition. Such a fundamental moral orientation makes it imperative to be publicly forthright about the risks entailed by technologies such as tropospheric geoengineering. The health risks to humanity and indeed all biota posed by such geoengineering, however shielded by the demand for national security and secrecy, must be rigorously explored, at least by researchers privileged to live inside democratic societies. Should the academics that debate a futuristic hypothetical domain of stratospheric geoengineering, notably without reference to the ongoing tropospheric weather/climate modification, wake up and look at the evidence and the implications on environmental and public health presented here, they might experience a sobering reality.

4. CONCLUSION

We disclose a fourth independent line of evidence pointing to coal fly ash as the tropospheric geoengineering-utilized material and described some of the adverse environmental and public health risks associated with its persistent application. The principles underlying the co-precipitation technique provide the basis for this new method to ascertain the chemical composition of the particulate-pollution matter used for tropospheric geoengineering. The idea is that during a snow storm, the fluffy snow will trap the geoengineering-aerosol-particulates and bring them down with the snow. The results of the ICP-MS analytical measurements of the snow-melt particulates are consistent with three independent lines of evidence that coal fly ash is the main aerosolized particulate, published in the scientific literature between 2015-2016 [3-5].

One consequence of coal fly ash tropospheric geoengineering is to inhibit rainfall to change weather and/or climate. Concerted tropospheric geoengineering with coal fly ash disrupts habitats, including arable habitats. Long periods of artificially induced drought can wreak economic disaster on farmers, and shift the delicate balance in nature, weakening natural defenses and giving a boost to aggressive pathogens.

Coal fly ash is an unnatural product which when exposed to water or body fluids can release a host of toxic chemicals including aluminum in a chemically mobile form which is implicated in or associated with human neurological diseases, such as Autism Spectrum Disorders, Alzheimer's, Parkinson's and Attention Deficit/ Hyperactivity Disorder. Aluminum is similarly involved in neurological disorders of bees, rats, rabbits and presumably many other creatures.

Coal fly ash contains a number of toxic heavy-metal elements that can be extracted by water or by body moisture; these include, for example, carcinogens such as arsenic, hexavalent chromium, and the radioactive elements, uranium, thorium and their daughter products.

The only safe geoengineering is no geoengineering at all.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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