

Program: How and Why Climate Change is Escalating Extreme Weather (via Zoom)

Speaker: Jim Willson

Introduced by: Karen Bumb

Attendance: 92

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The Zoom copy of today's presentation lives on the Sciencetech Club website and can be accessed by clicking on: <http://www.sciencetechclub.org/zoom/418.mp4>

The presentation "How Climate Change is Escalating Extreme Weather" discussed 1) How this happens, 2) It's not a future problem, it's happening now, and, 3) Mankind has not yet begun achieving the necessary corrective action. Consider the ongoing fires on the west coast which have already burned 3.5 million acres.

Today's speaker, Jim Willson, became acquainted with climate change in 1998 as an Energy Savings Engineer with Honeywell developing a method to determine the quantity of outdoor air going through a building using indoor and outdoor CO2 levels (PPM), and, observing that outdoor CO2 levels began becoming higher each year (1-2 PPM), and, no one knew why. In 2006, in his movie "An Inconvenient Truth", Al Gore gave the answer. What Jim had been seeing for the past 8 years was the ever-increasing level of CO2 in the Earth's atmosphere being driven by our heavily fossil fuel based industrial society. Then, in an article titled "Rough Weather Ahead" in the June 2019 issue of Scientific American, Jennifer Francis, a senior scientist at Woods Hole Research Center in Massachusetts, noted: "But every year it becomes clearer that today's bizarre weather cannot be explained by natural variability. Although in the past, scientists were careful not to directly link climate change to specific weather events, we are now saying that because of climate change, major floods are occurring more often, killer heat waves are hotter and last longer, and, cold spells are sticking around longer.

Each day the Earth receives more energy from the sun than it needs to maintain its temperature. This energy comes in the form of short-wave radiation, mostly in the form of visible and ultraviolet light. At night, the Earth takes the excess energy that it has received and sends it out into space via long wave heat radiation. Greenhouse gases allow sunlight to come in but block heat going out just as glass or plastic does in a greenhouse. This causes the Earth to retain some of that excess energy and become warmer.

There are three types of weather systems. High pressure systems move air from the top of the troposphere and produce air at ground level that is crisp, clear, and chilly. Low pressure systems gather air near the ground and send it to the top of the troposphere – which supplies high pressure systems. Low pressure systems are the home of storms: all day rain, showers, thunderstorms, tornadoes, and hurricanes. Thunderstorms are the most common violent storms in the world, and more occur in the United States than anywhere else in world. Thunderstorms (and hurricanes and tornadoes) get their energy from the "water vapor engine".

Hurricane Florence provided an example of the effect of weather systems and the "water vapor engine". Florence dropped more than 30 inches of rain in places and reportedly killed more than 50 people and millions of animals, while racking up \$20 billion in losses. Floodwaters passing through factory farms, mines, and sewage treatment plants polluted rivers and estuaries for weeks. Florence's wrath will not soon be forgotten. The hurricane's unusual severity can be attributed to specific effects of climate change: greater heat in the air and in the oceans, extra water vapor, a tenacious blocking

high pressure system, and weak steering winds. These factors are in play around the world, favoring rapid storm intensification, heavier precipitation, greater flooding, and stronger storm winds.

Most of the costliest storms since 2000 have involved greater heat in the air and ocean, increased amounts of water vapor (a major fuel of thunderstorms, hurricanes, and tornadoes), tenacious blocking highs, random patches of abnormally warm ocean water, and weak steering winds. These factors are in play around the world, leading to rapid storm intensification, heavier precipitation, greater flooding, and stronger storm winds. 2020 is shaping up to be the most active tropical storm year on record and may well be the first one in which the 26 letters in the alphabet are no longer enough to name all of the season's storms.

Recent surprises include:

*The Winter of 2020 – the warmest ever seen by man.

*The Derecho of August 10 – 11, 2020: Formed in South Dakota, then traveled to Nebraska, Iowa, Illinois, Indiana, and ended its rampage in Ohio. It was especially violent in Cedar Rapids, Iowa, with winds up to 120 MPH (Category 3 Hurricane). It leveled a large number of grain silos and many downtown buildings, left over 200,000 without power and flattened one-third of Iowa's corn and soybean crop (10 million acres). All told the storm was 70 miles wide with an 800 mile path and duration of more than 14 hours.

* Hurricane Laura – August 23 – 28 - From tropical storm (74 mph) to Category 4 (150 mph) in just 36 hours (75% of total power) and was the strongest storm to hit St. Charles since 1856 (tie at 150 mph).

*A wavy jet stream

* Last summer, Lakes Superior, Erie, & Ontario hit historic high water levels.

It appears that in the absence of demand, we see that rather than reducing greenhouse gases, a 45% increase has occurred in the last 29 years. Reasons for a lack of real progress include:

- Climate Denial – a cottage industry well financed by big oil. Pay for articles by any “scientist”. Copy the tobacco industry playbook.
- We'll have to give up all our nice things. Electric cars have better acceleration and are more fun to drive than gas cars – and have 90% fewer parts!!
- Scientists have not become well informed and have not informed others about the current and on-going effects of climate change.

Suggestions to Sciencetech going forward:

- As a body of experienced scientists, we should become personally aware of the things occurring in our environment which are being made worse by climate change.
- When we see these occur and the opportunity arises, we should appropriately let our friends and acquaintances know that they occurred or were made worse by climate change.
- Do not accept the excuse that the weather always varies – it does vary, but only within a certain range.