PERSPECTIVE

Global warming and rain

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ABSTRACT

As the latent heating power of the atmosphere increased, driven by a 15% increase in the average global concentration of the major greenhouse gas, water vapour, over the previous 40 years, the average global temperature has risen by 1°C and the probability of catastrophic storms has quadrupled. As the average global concentration of water vapour continues to rise at 0.4 percent year. Forcing the average global temperature up at 0.2°C per decade, global warming and the risk of catastrophic storms will only grow. As the latent heating power of the atmosphere increased, the annual number of catastrophic weather-related incidents surged to over 750 in 2019, up from 225 in 1980.

Key Words: *Atmospheric concentration; Greenhouse warming; Temperature; ENSO*

INTRODUCTION

These weather-related catastrophic events have claimed tens of thousands of lives, wiped out entire communities, and caused 4.6 trillion dollars in global weather-related destruction, of which 2.4 trillion dollars is the result of global warming-driven increases in atmospheric latent heating power, as evidenced by the close correlation of major weather-related events with the average global temperature record (correlation coefficient 0.84). The sun and greenhouse gases, or GHGs, heat the Earth. CO2 and water vapour, the major greenhouse gas, are the most important greenhouse gases.

• As greenhouse gas concentrations rise, so does greenhouse heating and global warming.

• Between 1976 and 2019, the rate of evaporation, convection, precipitation, and the rate of release of the potential energy (the "latent heat") of water vapour increased significantly, by 2.4 percent, increasing the average global temperature by 1oC and escalating the rates of evaporation, convection, and precipitation. When compared to the 0.2oC increase from 1880 to 1976, a 96-year span, a 1oC gain since 1976, in less than half that time, is substantial. The global average rate of rise increase in global temperature over the last 50 years has been ten times that of the previous 96 years, and there is no sign that it is slowing down.

• Since 1976, CO2 concentrations have increased by 82 Parts per million, a 0.008% increase in atmospheric concentration.

In response to the claim that changes in water vapour concentration drive climate change, based on the assumption that CO2 is the sole driver, it is claimed that changes in water vapour concentration are driven by changes in CO2 heating, with water vapour heating acting as a feedback effect of CO2 heating. There changes in water vapour heating can occur on their own, independent of CO2 concentration changes.

Increases in the concentration of water vapour, in general, are thought to contribute to greenhouse warming. While climate experts agree that increases in water vapour concentration necessitate an increase in surface temperature, which is entirely consistent. The claim is made that changes in surface temperature are initiated or driven solely or primarily by changes in heating caused by changes in CO2 concentration.

This does not explain temperature decreases, and it does not explain temperature increases, as is the case with El Nio-driven fluctuations. It cannot be science-based to maintain the view that rising surface temperatures are caused or driven by a rise in CO2 concentration and the resulting increase in CO2 heating. The following is a summary of the relationship between climate change and changes in CO2 and water vapour concentrations. The correlation coefficient between year-to-year percentage changes in average global temperature and year-to-year percentage changes in water vapour concentration is 0.98.

If increases in CO2 concentrations produced increases in average global temperature, CO2 concentration variations would be

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correlated with changes in average global temperature throughout time. In any case, and regardless of the source of the continued increase in water vapour concentration, is true reductions in global water vapour concentrations will slow the rate of increase in average global temperature and may even reverse it. That is exactly what a sufficient increase in precipitation will accomplish. However, while the preceding illustrates the role of, consequences of, and underlying causes in annual variations in water vapour concentrations, this has likely occurred for centuries without causing the global warming that has been observed since 1976. What is the motivating force behind this? Since 1976, average increases in precipitation have been lower than average increases in evaporation.

According to a new study, as the Earth warms, two-thirds of the world's land area will experience wetter, more variable circumstances, making catastrophic rainfall and flooding more likely. Flooding has occurred on nearly every continent this month, from the United States to China, India to Italy, in exceptional events that climate scientists say have been exacerbated by human-induced climate change. Global mean surface temperatures are already 1.2 degrees Celsius higher than the pre-industrial average, according to the World Meteorological Association.

Research published today in the journal Science Advances by the Chinese Academy of Sciences' Institute of Atmospheric Physics (IAP) and the UK Meteorological (Met) Office suggests that most areas would see even more intense rainy conditions. One of the most important variables affecting the overall impact of climate change will be changes in rainfall and other forms of precipitation. Rainfall is far more difficult to forecast than temperature, although scientists can make some predictions with confidence about the future.

A warmer atmosphere can store more moisture, and water vapour increases by 7% for every degree centigrade that the temperature rises. It's less obvious how this will translate into changes in global precipitation, but total precipitation volume is anticipated to increase by 1-2 percent every degree of warming. There is evidence that existing moist places will become wetter, but details on how much wetter and what repercussions would be felt on a local basis are more difficult to determine. The arid subtropical regions are expected to become drier and migrate towards the poles. Winters will be wetter across much of Europe, but summers will be drier in central and southern Europe.