More Moisture in the Air?

By Meteorologist Karl Bohnak

Water vapor accounts for about 95 percent of earth's natural "greenhouse" effect. Carbon dioxide gets all the attention because that is what is released in the burning of fossil fuels. Yet it accounts for less than 4 percent of the total greenhouse effect. For the anthropogenic global warming argument to work, water vapor must increase along with CO_2. $C0_2$'s contribution—natural and manmade—is just not enough to raise global temperatures as much as climate models predict. Two recent studies claim to show that moisture has indeed increased and go further in stating this increase is tied to human activity.

The latest edition of the Bulletin of the American Meteorological Society (BAMS) summarizes the findings of these papers in their "Nowcast" feature section. The first study, published in the *Proceedings of the National Academy of Sciences*, is titled "Identification of human-induced changes in atmospheric water content." In it, an increase in atmospheric water vapor content was found. Then, a fingerprint examination of water vapor content in the atmosphere was conducted using computer models. The researchers claim to have found a "human fingerprint" on the increase, stating that other natural factors such as solar forcing or the atmosphere's recovery from the eruption of Mt. Pinatubo in 1991 could not explain the increase.

Roger Pielke, Sr., Senior Research Scientist at the Cooperative Institute for Research in Environmental Studies (CIRES) commented on this study at Climate Science: "The…paper shows no trend in absolute humidity since 1998 despite surface temperature increasing since then! Indeed, plotting the model data since 1900 is disingenuous, since there is no data to compare with." (Data from the satellite based Special Sensor Microwave Imager (SSM/I) was used, which is only available from 1988 on.)

The second paper was published in *Nature* and is entitled, "Attribution of observed surface humidity changes to human influence." It states there has been a global increase of 2.2 percent in humidity in the years 1973-2002. The authors claim they found a "clear influence of manmade gases on increased humidity." To this, Pielke commented: "The…paper only deals with surface humidity (which as shown on Climate Science is very significantly altered by land use.)" In an email to ICECAP, he went further, stating that "model simulations are used to test the explanation. This is not the scientific method."

On the other hand, Pielke coauthored a paper which does not support the findings of the above studies. In it, lower-tropospheric temperatures over North America had indeed increased between 1979 and 2006, but precipitable water vapor and total precipitable water content had not. This suggests that climate model assumptions of constant relative humidity in a warmer world may be all wet.

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