Mystery Climate Mechanism May Counteract Global Warming

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A new study by two physicists at the University of Rochester suggests there is a mechanism at work in the Earth's atmosphere that may blunt the influence of global warming, and that this mechanism is not accounted for in the computer models scientists currently use to predict the future of the world's temperature. The researchers, David H. Douglass and Robert S. Knox, professors of physics, plotted data from satellite measurements of the Earth's atmosphere in the months and years following the volcanic eruption of Mount Pinatubo in 1991. The results, published in an upcoming issue of *Geophysical Research Letters* (and now online), show that global temperatures dropped more and rebounded to normal significantly faster than conventional climate models could have predicted.

"All we did was chart the data," says Douglass. "We can be confident that our numbers are accurate because we aren't using computer models and assumptions; we're using simple observations. Despite whatever models might say, the analysis of the actual data says that the atmosphere rebounded from the Pinatubo volcano much faster than was expected." In addition, the analysis of Douglass and Knox showed that the amount of the cooling measured could be explained only if there was some mechanism producing a kind of self-correcting feedback. In other words according to Douglass " This feedback mechanism prevented the Earth from becoming much colder."

In an attempt to approach the climate warming issue from a data-centered, rather than model-centered, way, Douglass and Knox looked for a global temperature-changing event that was well-recorded and did not occur at the same time as other events, such as El Nino or particularly high solar activity. They found their candidate in the Mount Pinatubo eruption in the Philippines, the largest volcanic eruption in the 20th century. The volcano forced millions of tons of debris into the Earth's atmosphere, which blocked some of the Sun's heat from reaching the Earth. The average temperature of the world dropped more than half a degree immediately following the eruption.

The Rochester team zeroed in on the years during and after the eruption, and extracted satellite temperature data to carefully plot the rate at which the atmosphere rebounded to its pre-volcanic temperature. Within a single year, the global temperature was already rebounding, and within roughly five years, it was back to normal.

When conventional atmosphere models were used to predict the rebound, they suggested that the rebound would have been much slower, taking many years to finally reach equilibrium.

"This return to normal temperatures is important because some climate models say that volcanoes affect the global climate for much longer, and that would mean they would have a cumulative effect, where each cools the atmosphere a little more," says Douglass. "This is used as a justification to say that volcanoes are helping to mask the effects of human pollution. But if volcanoes' effects last only a few years, then there is no accumulated cooling, and we can't say they're masking anything."

Douglass and Knox point out that the mechanism producing the negative feedback may be the "Infrared Iris effect" due to clouds proposed by MIT professor Richard Lindzen. Clouds can both cool the Earth by reflecting light from the Sun, and warm the Earth by trapping heat between them and the ground. Since cloud formation is influenced by temperature and humidity changes in the atmosphere, the team suspects that clouds may form and dissipate in a way that tends to push the global temperatures back to steady normal.

Since the explanation of Pinatubo by the computer models was wrong in regard to the response time and the negative feedback, Douglass asks, “Are the computer models right when they consider the change to the climate caused by carbon dioxide?”

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