

Study: Half of warming heat missing

'Will come back to haunt us,' researcher says

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WASHINGTON - The rise in greenhouse gases in the atmosphere means far more energy is coming into Earth's climate system than is going out, but half of that energy is missing and could eventually reappear as another sign of climate change, scientists said Thursday.

In stable climate times, the amount of heat coming into Earth's system is equal to the amount leaving it, but these are not stable times, said John Fasullo of the U.S. National Center for Atmospheric Research, a co-author of the report in the journal Science.

The gap between what's entering the climate system and what's leaving is about 37 times the heat energy produced by all human activities, from driving cars and running power plants to burning wood.

Half of that gap is unaccounted for, Fasullo and his co-author Kevin Trenberth reported. It hasn't left the climate system but it hasn't been detected with satellites, ocean sensors or other technology.

It might lurk in deep ocean waters in areas sensors don't reach. Some of it could be the result of imprecise measurement or processing of satellite or sensor data. But the greenhouse-caused heat gap is definitely there, the authors said.

"The heat will come back to haunt us sooner or later," Trenberth said. "It is critical to track the build up of energy in our climate system so we can understand what is happening and predict our future climate."

By pumping greenhouse gases like carbon dioxide into the atmosphere, humans have caused this imbalance, and "it is this imbalance that produces 'global warming,'" the authors wrote.

Much of the heat gap is evident in warming ocean waters, melting polar ice and other signs of climate change, but half of it is nowhere to be found, Trenberth and Fasullo reported.

That doesn't mean it's gone. It could show itself as an abrupt El Nino pattern, where tropical Pacific waters warm up and influence weather in North and South America.

"There is a wide range of possibilities for what may end up happening with the missing energy," Fasullo said. "It is clear however that the system cannot sequester heat indefinitely without a surface temperature response."

"The potential impacts of such a response are likely to be as diverse as those associated with climate change, in my view," he wrote.

These potential impacts of climate change include increased droughts, floods and wildfires, rising sea levels and more severe storms, the U.N. Intergovernmental Panel on Climate Change has reported.

Last year was one of the five warmest on record, and the decade from 2000-2009 was the warmest decade on record, according to the World Meteorological Organization, but Trenberth said there has recently been some stagnation in global surface temperatures, including some cold spells in Europe, Asia and the United States this past winter.

He said this stagnation was due to natural variability, while at the same time, sea levels have continued rising at the same rates as previously, and the melting of glacial and Arctic sea ice has picked up.

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