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Scientists Warn of Perilous Climate Shift Within Decades, Not Centuries

By [JUSTIN GILLIS](#) MARCH 22, 2016

Photo credit: Charles Ommanney/The Washington Post, via Getty Images



A massive boulder on a coastal ridge in North Eleuthera, the Bahamas. A new research paper claims it was likely moved there by powerful storms during the last warm period of Earth history, 120,000 years ago, and warns that such stormy conditions could recur because of human emissions of greenhouse gases. Credit Charles Ommanney/The Washington Post, via Getty Images

The nations of the world agreed years ago to try to limit [global warming](#) to a level they hoped would prove somewhat tolerable. But a group of leading climate scientists warned on Tuesday that permitting a warming of that magnitude would actually be highly dangerous.

The likely consequences would include killer storms stronger than any in modern times, the disintegration of large parts of the polar ice sheets, and a rise of the sea sufficient to begin drowning the world's coastal cities before the end of this century, the scientists declared.

“We’re in danger of handing young people a situation that’s out of their control,” said [James E. Hansen](#), the retired NASA climate scientist who led the new research. The findings were released Tuesday morning by a European science journal, Atmospheric Chemistry and Physics.

A draft version of the paper had been released last year, and it provoked a [roiling debate](#) among climate scientists. The main conclusions have not changed, however, and a replay of that debate seems likely in the coming weeks.

Virtually all climate scientists agree with Dr. Hansen and his co-authors that society is not moving fast enough to reduce emissions of greenhouse gases, posing grave risks. The basic claim of the paper is that by burning fossil fuels at a prodigious pace and pouring heat-trapping gases into the atmosphere, humanity is about to provoke an abrupt climate shift.

That claim has intrigued some experts who say the paper may help explain puzzling episodes in the [Earth](#)’s past when geological evidence suggests the climate underwent sudden, drastic shifts.

Yet many of the experts remain unconvinced by some of the specific assertions that were made in the draft paper, and they have not all been persuaded by the final version.

“Some of the claims in this paper are indeed extraordinary,” said Michael E. Mann, a climate scientist at Pennsylvania State University. “They conflict with the mainstream understanding of climate change to the point where the standard of proof is quite high.”

Among Dr. Hansen’s colleagues, some of the discomfiture about the new paper stems from his dual roles as a publishing climate scientist and, in recent years, as a political activist. He has been arrested at rallies, and he has joined with a group of young people who [sued the federal government](#) over what they said was its failure to limit global warming.

Dr. Hansen argues that society is in such grave peril that he feels morally compelled to go beyond the normal role played by a scientist and to sound a clear warning. That stance has made him a hero to college students fighting climate change, but some fellow scientists say they believe he has opened himself to the charge that he is skewing his scientific research for political purposes.

The nations of the world agreed to try to limit the warming to 3.6 degrees Fahrenheit, or 2 degrees Celsius, above the preindustrial level, though they have yet to agree on any program remotely ambitious enough to achieve that goal. The Earth has already warmed by about half that amount, with the consequence that virtually all land ice on the planet has started to melt and that the oceans are rising at an accelerating pace.

The paper by Dr. Hansen and 18 co-authors dwells on the last time the Earth warmed naturally, about 120,000 years ago, when the temperature reached a level estimated to have been only slightly higher than today. Much of the polar ice disintegrated then, and scientists have established that the sea level rose 20 to 30 feet.

Climate scientists agree that humanity is about to cause an equal or greater rise in sea level, but they have tended to assume that such a large increase would take centuries. The new paper argues that it

could happen far more rapidly, with the worst case being several feet of sea-level rise over the next 50 years, followed by increases so precipitous that they would force humanity to beat a hasty retreat from today's coastlines.

"That would mean loss of all coastal cities, most of the world's large cities and all their history," Dr. Hansen said in a that accompanied the new paper.

The paper identifies a specific mechanism that the scientists say they believe could help cause such an abrupt climate shift.

Their idea is that the initial melting of the great ice sheets will put a cap of relatively fresh water on the ocean surfaces near Antarctica and Greenland. That, they think, will slow or even shut down the system of ocean currents that redistributes heat around the planet and allows some of it to escape into space.

Warmth will then accumulate in the deeper parts of the ocean, the scientists think, speeding the melting of parts of the ice sheets that sit below sea level. In addition, a wider temperature difference between the tropics and the poles will encourage powerful storms. The paper cites evidence, much of it contested, that immense storms happened during the warm period 120,000 years ago.

The idea of a shutdown in the ocean circulation because of global warming was considered more than a decade ago, and it was rejected by most scientists as unlikely. That did not stop a distorted version of the idea from becoming the premise of the disaster movie "[The Day After Tomorrow](#)," released in 2004.

The new paper may reopen that debate, forcing scientists to re-examine the idea with the more sophisticated computer models of the climate that are available today.

Even scientists wary of the conclusions of the new paper point out that Dr. Hansen has a long history of being ahead of the curve in climate science. As Dr. Mann put it, "I think we ignore James Hansen at our peril."