New study links extreme weather to climate change

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A corn crop dries up in a field pictured July 28, 2011 near Perryton, Texas. Scientists said Monday they have identified a physical mechanism behind the extreme weather that has plagued many parts of the world in recent years—and that it is tied to climate change.

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Since 2010, for example, the United States and Russia have each suffered scorching heat waves, while Pakistan saw unprecedented flooding.

Scientists from the Potsdam Institute for Climate Impact Research (PIK) have traced the events to a disturbance in the air currents in the northern hemisphere, in a new study out Monday in the Proceedings of the National Academy of Sciences.

"An important part of the global air motion in the mid-latitudes of the Earth normally takes the form of waves wandering around the planet, oscillating between the tropical and the Arctic regions," lead author Vladimir Petoukhov said in a statement.

"During several recent extreme weather events, these planetary waves almost freeze in their tracks for weeks. So instead of bringing in cool air after having brought warm air in before, the heat just stays," he said.

In an ecosystem ill-adapted to long periods of extreme heat, the stress can be disastrous, with high death tolls, forest fires, and agricultural losses.

For instance, during Russia's 2010 heat wave—the worst in its recorded history—wildfires spread out of control, killing dozens of people, burning down thousands of houses and threatening military and nuclear installations.

Global warming, despite its name, is not uniform across the planet. At the poles the bump in temperatures—amplified by shrinking snow cover and ice—is greater than in the swathes between, the scientists explained.

This reduces the temperature differences between the Arctic and the middle latitudes, which affects the flow of air around the globe.

In addition, continents heat and cool more rapidly than large bodies of water, the scientists said.

These two factors "result in an unnatural pattern of the mid-latitude air flow, so that for extended periods the slow synoptic waves get trapped," Petoukhov said.

Fellow author and PIK director Hans Joachim Schellnhuber cautioned that the 32-year period used in the study is too short for definitive conclusions.

"The suggested physical process increases the probability of weather extremes, but additional factors certainly play a role as well, including natural variability," he added.

Nevertheless, he called the new research "quite a breakthrough," that helps explain the relationship between the spate of weather extremes and climate change.