



Thai floods 2011



Hurricane Katrina 2005



Texas drought 2011

## CLIMATE CHANGE

# Humans Are Driving Extreme Weather; Time to Prepare

An international scientific assessment finds for the first time that human activity has indeed driven not just global warming but also increases in some extreme weather and climate events around the world in recent decades. And those and likely other weather extremes will worsen in coming decades as greenhouse gases mount, the report finds.

But uncertainties are rife in the still-emerging field of extreme events. Scientists cannot attribute a particular drought or flood to global warming, and they can say little about past or future trends in the risk of high-profile hazards such as tropical cyclones. Damage from weather disasters has been climbing, but the report can attribute that trend only to the increasing exposure of life and property to weather risks. Climate change may be involved, but a case cannot yet be made.

Despite the uncertainties, the special report from the Intergovernmental Panel on Climate Change (IPCC) released 18 November stresses that there is still reason for taking action now. The panel recommends “low-regrets measures,” such as improvements in everything from drainage systems to early warning systems. Such measures would benefit society in dealing with the current climate as well as with almost any range of possible future climates.

The report takes a cautious, consensus-based approach that draws on the published literature. Headlines and even some scientists may point to the current Texas drought or the 2003 European heat wave as the result of the strengthening greenhouse. But the report finds that extreme weather and climate events are far too rare to blame any one of them on global warming. A 29-page summary released

for policymakers has one sentence on the subject: “Attribution of single extreme events to anthropogenic climate change is challenging.”

The report does find “evidence ... of change in some extremes.” These are generally lower-profile changes. For example, the report finds that it is likely that the number of cold days and nights has decreased since 1950. In many regions “there is *medium confidence* that the length or number of warm spells, or heat waves, has increased.” And the frequency of heavy precipitation events has changed in some regions, with increases being more likely than decreases.

There is no sign that any of these climate changes has been driving the obvious rise in economic losses from weather- and climate-related disasters, the report finds. Instead, it says, “the major cause of the long-term increases in economic losses” has been an increase in the number of dangerously placed people and their increasing wealth. More and more people have been living in the path of disastrous weather, whether poor people with nowhere else to live but low-lying deltas or the rich flocking to the coastlines.

Advocates and some scientists have pushed mounting disasters as reasons for action to rein in global warming. But “as compelling as disasters are,” says climate policy analyst Roger Pielke Jr. of the University of Colorado, Boulder, “I’ve never thought disasters were an appropriate use” for advocating reduction of greenhouse emissions. “I give some credit to the IPCC,” he says.

The report does find reasons to take certain kinds of action. It points to evidence that at least some of the recent changes can be attributed to humans. “It is *likely* that” human

influences have raised the lowest and highest temperatures in a day on a global scale. And the intensification of extreme precipitation can likely be attributed to human influence. Based on climate model results and basic physics, these and perhaps other trends are likely to continue and accelerate as the greenhouse strengthens. Tropical cyclone maximum wind speeds are likely to increase, the report says, droughts will intensify in some regions, and sea level will continue to rise, flooding low-lying coastal areas.

Even with trends in extreme events continuing, “in many regions, the main drivers for future increases in economic losses due to some climate extremes will be socioeconomic in nature,” according to the report. That is, the main driver will be increasing exposure of rich and poor to climatic hazards, with the poor being more vulnerable than the rich. But whatever the drivers of future losses and whatever the uncertainties, low-regrets actions can be taken now, according to the report. “Even with substantial uncertainties about extremes and extreme events that may lie ahead,” says Thomas Wilbanks of Oak Ridge National Laboratory in Tennessee, a report lead author, “there are things that we can—and should—be doing now to increase our resilience.”

The report lists actions that it says would improve human well-being in the short term while laying a foundation for tackling the changes that appear to be in the offing. Planning land use, managing ecosystems, and improving water supplies and irrigation systems all provide “chances to make the world more livable while decreasing risk” from future climate changes, said Christopher Field of Stanford University in Palo Alto, California, a co-chair for the report. Rajendra Pachauri, chair of the IPCC, added his hope that that message and the rest of the report would be well received at the 2011 United Nations Climate Change Conference that starts 28 November in Durban, South Africa.

—RICHARD A. KERR

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