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Nature Reports Climate Change

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The Macmillan Building, 4 Crinan St
 London N1 9XW, UK
 Tel: +44 (0) 20 7833 4000
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the news behind the science, the science behind the news

A RECORD YEAR

2008 went down as the coolest year of the current decade, if still the tenth warmest since instrumental measurements began in 1850. But the past 12 months have done little to cool concerns over the forecast for climate change. If anything, the science that has emerged this year paints a far bleaker picture than the landmark reports released in 2007 from the Intergovernmental Panel on Climate Change.

The latest in a slew of convictions against greenhouse gas emissions, this year scientists for the first time attributed the major changes occurring in physical and biological systems throughout the globe — from early onset of spring to trends in ice melting — to human-caused climate change (page 4). But while conservationists are wrangling with how best to minimize the existing impacts for species and ecosystems, many of the trends are set to gain speed.

Speaking at the 2008 Fall meeting of the American Geophysical Union, which ran from 15–19 December in San Francisco, scientists issued stark warnings along with their latest results. Their models show that, in California, extreme events such as heat-waves now occurring once every 100 years could be happening every year within a century. But even the latest science has failed to predict some of the impacts that are now being witnessed first-hand by scientists, from the accelerated loss of Arctic summer sea-ice to the extensive release of gaseous methane from formerly frozen deposits off the Siberian coast.

The warming caused by carbon dioxide emissions is the chief culprit behind these changes, but other greenhouse gases are now making their presence felt. Most worrying perhaps has been the surge early this year in atmospheric concentrations of methane, a gas with a warming potential twenty-three times that of carbon dioxide. Having maintained a largely constant atmospheric concentration over the past decade, the recent spike in methane remains a mystery and is especially worrisome given the changes occurring in the Arctic. Also on the rise is nitrogen trifluoride, a gas produced in the manufacture of gadgets such as MP3 players and flat-screen TVs. Scientists discovered this year that atmospheric concentrations of the gas have increased 20-fold over the past three decades, yet its emissions remain unregulated.

Although there has been rapid progress in our understanding of the climate system, many questions remain unanswered (page 5). Some of these are issues of attribution such as whether storms will worsen in a warming world. For others the underlying science is settled, but the speed of change remains uncertain. The picture that is now emerging is daunting, but the headway being made in climate science is also encouraging. Only with a robust knowledge of the science can society make informed decisions about how best to respond to the changes underway and the challenges that lie ahead.

OLIVE HEFFERNAN, EDITOR

Published online: 24 December 2008
 doi:10.1038/climate.2008.143

RESEARCH HIGHLIGHTS

- 2 Atmospheric Science**
Methane mystery
 Alicia Newton
- Mitigation**
Facing the future
 Anna Armstrong
- Cryosphere**
Thinning out
 Anna Armstrong
- Anthropogenic change**
Double trouble
 Olive Heffernan
- 3 Paleoclimate**
Calcium connection
 Alicia Newton
- Biodiversity and ecology**
Bad news for bears
 Olive Heffernan

NEWS FEATURES

- 4 What we've learned in 2008**
 Amanda Leigh Mascarelli
- 7 Agency for energy innovation may be funded under Obama**
 Kurt Kleiner

COMMENTARY

- 9 Here comes the flood**
 Janos Bogardi and Koko Warner

BOOKS & ARTS

- 12 Looking back from the future**
 Chris Turney