CO2 LEVELS IN ATMOSPHERE RISING AT DRAMATICALLY FASTER RATE, U.N. REPORT WARNS

By Joby Warrick, Washington Post, September 9

Levels of heat-trapping carbon dioxide in the atmosphere rose at a record-shattering pace last year, a new report shows, a surge that surprised scientists and spurred fears of an accelerated warming of the planet in decades to come.

Concentrations of nearly all the major greenhouse gases reached historic highs in 2013, reflecting ever-rising emissions from automobiles and smokestacks but also, scientists believe, a diminishing ability of the world's oceans and plant life to soak up the excess carbon put into the atmosphere by humans, according to data released early Tuesday by the United Nations' meteorological advisory body.

The latest figures from the World Meteorological Organization's monitoring network are considered particularly significant because they reflect not only the amount of carbon pumped into the air by humans, but also the complex interaction between man-made gases and the natural world. Historically, about half of the pollution from human sources has been absorbed by the oceans and by terrestrial plants, preventing temperatures from rising as quickly as they otherwise would, scientists say.

"If the oceans and the biosphere cannot absorb as much carbon, the effect on the atmosphere could be much worse," said Oksana Tarasova, a scientist and chief of the WMO's Global Atmospheric Watch program, which collects data from 125 monitoring stations worldwide. The monitoring network is regarded as the most reliable window on the health of Earth's atmosphere, drawing on air samples collected near the poles, over the oceans, and in other locations far from cities and other major sources of pollution.
The new figures for carbon dioxide were particularly surprising, showing the biggest year-over-year increase since detailed records were first compiled in the 1980s, Tarasova said in an interview. The jump of nearly three parts per million over 2012 levels was twice as large as the average increase in carbon levels in recent decades, she said.

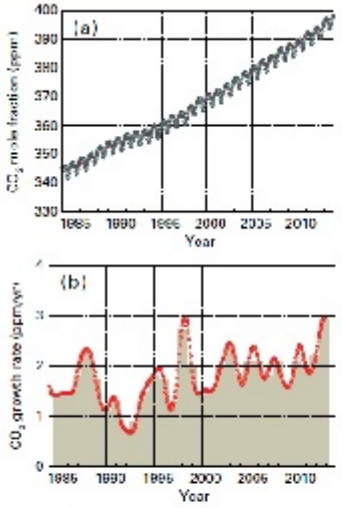

Figure 3. Globally averaged CO_2 mole fraction (a) and its growth rate (b) from 1984 to 2013. Differences in successive annual means are shown as shaded columns in (b).

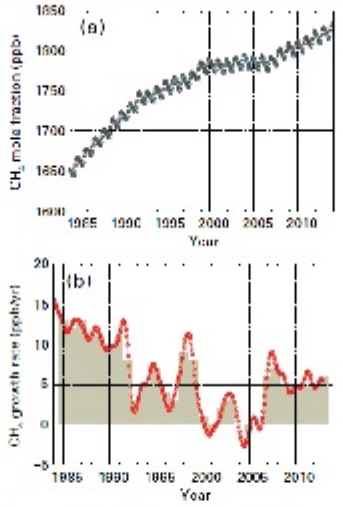

Figure 4. Globally averaged CH_4 mole fraction (a) and its growth rate (b) from 1984 to 2013. Differences in successive annual means are shown as shaded columns in (b).

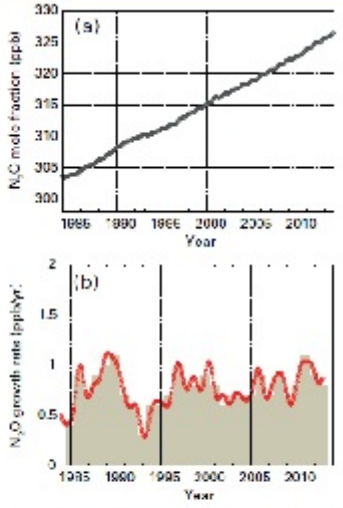

Figure 5. Globally averaged N_2O mole fraction (a) and its growth rate (b) from 1984 to 2013. Differences in successive annual means are shown as shaded columns in (b).

“The changes we’re seeing are really drastic,” Tarasova said. “We are seeing the growth rate rising exponentially.”

The organization’s annual report on greenhouse gas levels was released ahead of a climate summit of world leaders at this year’s U.N. General Assembly meetings in New York. On Sept. 23, President Obama will meet with chief executives from dozens of other countries to discuss ways to lower industrial emissions of carbon dioxide, methane and other gases blamed for heating up the planet.

Natural carbon dioxide is an essential ingredient for life on Earth, enabling green plants to convert sunlight into energy. But at excessive levels it acts as a heat trap, causing the planet to warm. Scientists say that the concentration of carbon dioxide in the atmosphere has been rising since the start of the Industrial Revolution and that the increase has accelerated since the 1990s.

The WMO’s data for 2013 shows the global average level of atmospheric carbon at just under 400 parts per million, about 40 percent higher than in pre-industrial times and higher than in any other period in at least 800,000 years. The symbolically important threshold of 400 parts per million — described by scientists as the level at which more dramatic climactic impacts become likely — will probably be crossed in the next two years, the report said.

“It’s the level that climate scientists have identified as the beginning of the danger zone,” said Michael Oppenheimer, a Princeton University professor of geosciences who was not involved in the WMO report. “It means we’re probably getting to the point where we’re looking at the ‘safe zone’ in the rearview mirror, even as we’re stepping on the gas.”

A landmark report last year by a U.N.-appointed panel of climate scientists warned that, if current trends continue, the world could soon see major disruptions to both natural ecosystems and human civilization, including rising sea levels that could swamp many of the world’s coastal cities. That report, by the Intergovernmental Panel on Climate Change, projected a rise in temperatures of up to nine degrees in the next century unless action is taken to lower carbon dioxide levels in the atmosphere.

Methane, another major greenhouse gas, also rose significantly in the WMO’s latest report, continuing a steady climb that began six years ago. Global concentrations of methane — a byproduct of farming and fossil-fuel extraction, as well as numerous natural processes — are now 2 1/2 times as high as they were at the start of the industrial age, in the mid-18th century, the report said.

The organization’s annual report included, for the first time, figures on the increasing acidification of the oceans stemming from higher levels of greenhouse gases in the atmosphere. As the seas absorb more carbon dioxide from the air, the water’s chemical composition becomes more acidic. Studies extrapolating from the fossil record suggest that the rate of acidification is now “unprecedented, at least over the past 300,000 years,” the WMO said.

Higher acidity in seawater is known to disrupt the life cycles of many marine species — from reef-building corals to shellfish beloved by humans — by interfering with the creatures’ ability to use sea-borne calcium to build their shells.

In an indirect way, the acidification of seawater also exacerbates climate change: The oceans over time become less capable of absorbing carbon from the air, allowing more of the greenhouse gas to accumulate in the atmosphere, the report said.