

Greenhouse gas levels in atmosphere reach new high: WMO

The amount of greenhouse gases in the atmosphere reached a record high in 2012, continuing an upward and accelerating trend that is driving climate change and will shape the future of our planet for hundreds and thousands of years, according to the World Meteorological Organization (WMO).



Credit: G Heath/scienceimage

The WMO's annual [Greenhouse Gas Bulletin](#) shows that between 1990 and 2012, there was a 32 per cent increase in radiative forcing – the warming effect on our climate – because of carbon dioxide (CO₂) and other heat-trapping long-lived gases such as methane and nitrous oxide.

Carbon dioxide, mainly from fossil fuel-related emissions, accounted for 80 per cent of this increase. The atmospheric increase of CO₂ from 2011 to 2012 was higher than its average growth rate over the past ten years, according to the bulletin.

Since the start of the industrial era in 1750, the global average concentration of CO₂ in the atmosphere has increased by 41 per cent, methane by 160 per cent and nitrous oxide by 20 per cent.

What is happening in the atmosphere is one part of a much wider picture. Only about half of the CO₂ emitted by human activities remains in the atmosphere, with the rest being absorbed in the biosphere and in the oceans.

'The observations from WMO's extensive Global Atmosphere Watch network highlight yet again how heat-trapping gases from human activities have upset the natural balance of our atmosphere and are a major contribution to climate change,' said WMO Secretary-General, Michel Jarraud.

'The Intergovernmental Panel on Climate Change (IPCC) in its recent 5th Assessment Report stressed that atmospheric concentrations of carbon dioxide, methane, and nitrous oxide have increased to levels unprecedented in at least the last 800,000 years,' he said.

‘As a result of this, our climate is changing, our weather is more extreme, ice sheets and glaciers are melting and sea levels are rising.

‘According to the IPCC, if we continue with “business as usual”, global average temperatures may be 4.6 degrees Centigrade higher by the end of the century than pre-industrial levels – and even higher in some parts of the world. This would have devastating consequences.’

‘Limiting climate change will require large and sustained reductions of greenhouse gas emissions. We need to act now, otherwise we will jeopardise the future of our children, grandchildren and many future generations.

‘Time is not on our side.’

The bulletin reports on atmospheric concentrations – not emissions – of greenhouse gases. Emissions represent what goes into the atmosphere. Concentrations represent what remains in the atmosphere after the complex system of interactions between the atmosphere, biosphere and the oceans occur.

Carbon dioxide (CO₂)

Carbon dioxide is the single most important greenhouse gas emitted by human activities such as fossil fuel burning and deforestation. According to WMO’s Greenhouse Gas Bulletin, on the global scale, the amount of CO₂ in the atmosphere reached 393.1 parts per million in 2012, or 141 per cent of the pre-industrial level of 278 parts per million. The amount of CO₂ in the atmosphere increased 2.2 parts per million from 2011 to 2012, above the average 2.02 parts per million per year for the past 10 years, showing an accelerating trend.

At the current rate of increase, the global annual average CO₂ concentration is set to cross the 400 parts per million threshold in 2015 or 2016.

Methane (CH₄)

Methane is the second most important long-lived greenhouse gas. Around 40 per cent of methane is emitted into the atmosphere by natural sources (e.g. wetlands and termites), and about 60 per cent comes from human activities like cattle farming, rice agriculture, fossil fuel exploitation, landfills and biomass burning. Atmospheric methane reached a new high of about 1819 parts per billion (ppb) in 2012, or 260 per cent of the pre-industrial level, due to increased emissions from anthropogenic sources. Since 2007, atmospheric methane has been increasing again after a temporary period of levelling-off.

Nitrous oxide (N₂O)

Nitrous oxide is emitted into the atmosphere from both natural (about 60 per cent) and anthropogenic sources (about 40 per cent), including oceans, soil, biomass burning, fertiliser use, and various industrial processes. Its atmospheric concentration in 2012 was about 325.1 parts per billion, 0.9 parts per billion above the previous year and 120 per cent of the pre-industrial level. Its impact on climate, over a 100-year period, is 298 times greater than equal emissions of carbon dioxide.

Source: WMO

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