

Record CO₂ Rise in 2024 Marks New Climate Alarm: WMO Report

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CO₂ Rise Latest News

- According to the **World Meteorological Organization (WMO)**, the **global atmospheric concentration of carbon dioxide (CO₂)** rose by a record **3.5 parts per million (ppm)** between 2023 and 2024, reaching 423.9 ppm, the highest level ever recorded. This increase far exceeds the average annual rise seen during 2011–2020.
- The year 2024 also became the warmest year on record, with global temperatures 1.55°C above pre-industrial levels — the first time the 1.5°C threshold was breached for an entire year.
- The data highlights the failure of the Paris Agreement framework to curb emissions effectively and signals a worsening climate crisis with potentially irreversible impacts if warming continues.

Record Surge in CO₂ Concentrations: Understanding the Trends and Implications

- According to the WMO, the CO₂ concentration in the atmosphere reached 423.9 ppm in 2024, marking a record annual increase of 3.5 ppm — the highest since measurements began in 1957.
- This level is now 152% higher than pre-industrial levels (278.3 ppm).
- Despite global efforts to curb emissions, CO₂ concentrations have risen continuously for over 40 years without a single year of decline.
- The rate of increase has tripled, from 0.8 ppm per year in the 1960s to 2.4 ppm between 2011–2020, before the current unprecedented spike.

Natural vs. Man-Made CO₂ Emissions

- CO₂ is released through both natural and human activities.
- **Natural sources:** respiration, wildfires, volcanic eruptions, and decomposition.
- **Human sources:** burning of fossil fuels, industrial emissions, and deforestation.
- While natural processes absorb almost all the CO₂ they emit through photosynthesis and oceanic absorption, only **half of human-induced emissions** are absorbed.
- The remaining half accumulates in the atmosphere, intensifying the greenhouse effect.

CO₂'s Role Among Greenhouse Gases

- CO₂ is the most abundant GHG, accounting for over 90% of accumulated GHGs in the atmosphere.
- However, it is less potent than other gases like methane (CH₄) and nitrous oxide (N₂O):
 - **Methane:** ~25 times more heat-trapping capacity than CO₂, but lasts 12–14 years.
 - **Nitrous oxide:** ~270 times more potent than CO₂, remains 100–120 years.
 - **CO₂:** persists for hundreds to thousands of years, making its effect cumulative and long-lasting.

Contribution to Global Warming

- CO₂ is responsible for about **66% of total global warming since pre-industrial times**, and about **79% of warming in the past decade**.
- Its persistence in the atmosphere ensures that even small increases have **long-term climate impacts**, reinforcing the urgent need for **deep emission cuts** to prevent irreversible warming.

Why CO₂ Levels Rose Sharply in 2024: Natural and Human Factors Combined

- The record 3.5 ppm rise in CO₂ levels between 2023 and 2024 was not caused solely by human emissions, according to the World Meteorological Organization (WMO).
- Variations in the **natural carbon cycle also played a major role**.
- In 2024, both oceans and land-based carbon sinks absorbed less CO₂ than usual, while widespread forest fires released additional carbon into the atmosphere.
- Global warming itself is weakening natural absorption systems:
 - **Warmer oceans** absorb less CO₂ due to reduced solubility.
 - **Extreme droughts** dry out forests and grasslands, limiting their ability to absorb carbon.

- These feedback effects — reduced absorption and increased emissions — reinforce one another, worsening the CO₂ imbalance and accelerating atmospheric buildup.

Methane and Nitrous Oxide Levels Rise in 2024, Though at a Slower Pace

- In 2024, atmospheric concentrations of methane (CH₄) and nitrous oxide (N₂O) continued to increase, though below the decade's average growth rate, according to WMO data.
 - **Methane (CH₄):** Rose by 8 parts per billion (ppb) to 1,942 ppb, compared to the decadal average increase of 10.6 ppb per year.
 - **Nitrous oxide (N₂O):** Increased by 1 ppb to 338 ppb, slightly lower than the average annual rise of 1.07 ppb in the last decade.
- Cumulatively, CH₄ contributes about 16% and N₂O about 6% of total global warming since pre-industrial times, with the remaining share arising from CO₂ and other greenhouse gases.

Rising Greenhouse Gases Highlight Growing Climate Crisis and Policy Failures

- The WMO Greenhouse Gas Bulletin underscores the worsening challenge of curbing greenhouse gas (GHG) accumulation, as both human activities and destabilised natural systems now drive atmospheric increases.
- Natural processes that once absorbed carbon — such as forests and oceans — are becoming less effective under global warming, amplifying gas buildup.
- Meanwhile, human-controlled emissions continue to rise despite international commitments.
- Even after a decade of the Paris Agreement, global emissions remain high, and the 2030 reduction targets are unlikely to be met.
- With global temperatures surpassing 1.5°C in 2024, the data reveal a deepening climate crisis and the failure of existing frameworks to reverse the trend.

Source: IE

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