



Tipping Points Update January 2021

Tipping point definition: 1. the time at which a change or an effect cannot be stopped:

<https://dictionary.cambridge.org/dictionary/english/tipping-point>

Most of what we read about global warming concerns information about the rise and continued increase in the warming of Earth. Why is there not more emphasis on the fact that at some point in recent years we reached a tipping point with changes in the rate of change in the increasing levels of CO_2 in the troposphere?

This is similar to altering the circuitry of a voltage regulator such that an increase of the output voltage results in positive feedback rather than negative feedback until the regulator burns up. However, if the wires were just crossed and the variable resistor left unaltered, the voltage would increase at a steady, predictable rate.

With CO_2 , we are experiencing variably increasing, positive feedback with unequal ratios; thus predictability is limited. Unfortunately, this

situation leads to considerable uncertainty. It is this uncertainty that swings back to bite the backsides of climate scientists and encourages the efforts of paid dissenters to sow doubt in the minds of the public. Regardless of the unpredictable rate of change, there is enough data collected to recognise an alarming, no frightening state of affairs!

"If fossil fuels continue to be extracted at the same rate over the next 28 years as they were between 1988 and 2017, says the report, global average temperatures would be on course to rise by 4°C by the end of the century. This is likely to have catastrophic consequences including substantial species extinction and global food scarcity risks."

"Analysis of NOAA (National Oceanic and Atmospheric Administration) measurements show the growth rate of CO₂ in the atmosphere is accelerating. It averaged about 1.6 ppm per year in the 1980s and 1.5 ppm per year in the 1990s, but increased to 2.2 ppm per year during the last decade."

<https://scripps.ucsd.edu/programs/keelingcurve/2018/06/07/another-climate-milestone-falls-at-mauna-loa-observatory/>

"On May 9, 2013, the daily average concentration of carbon dioxide (CO₂) in the atmosphere surpassed 400 parts per million (ppm) for the first time at the Mauna Loa Observatory in Hawaii, where the modern record of observations began back in 1958."

"Carbon dioxide levels measured at NOAA's Mauna Loa Atmospheric Baseline Observatory averaged more than 410 parts per million in April and May, 2018, the highest monthly averages ever recorded."

"Atmospheric carbon dioxide measured at Mauna Loa Observatory reached a seasonal peak of 417.1 parts per million for 2020 in May, the highest monthly reading ever recorded, scientists from NOAA and Scripps Institution of Oceanography at the University of California San Diego announced today."

"This year's peak value was 2.4 parts per million (ppm) higher than the 2019 peak of 414.7 ppm recorded in May 2019. NOAA scientists reported a May average of 417.1 ppm. Monthly carbon dioxide (CO₂) values at Mauna Loa first breached the 400 ppm threshold in 2014, and are now at **levels not experienced by the atmosphere in several million years.**"

"The annual mean rate of growth of CO₂ in a given year is the difference in concentration between the end of December and the start of January of that year."

"The estimated uncertainty in the Mauna Loa annual mean growth rate is 0.11 ppm/yr. This estimate is based on the standard deviation of the differences between monthly mean values measured independently by the Scripps Institution of Oceanography and by NOAA/GML. The annual growth rate measured at Mauna is not the same as the global growth rate, but it is quite similar. One standard deviation of the annual differences MLO minus global is 0.26 ppm/year."

<https://www.esrl.noaa.gov/gmd/ccgg/trends/gr.html>

Year by year readings since 1959

NOAA's Mauna Loa Atmospheric Baseline Observatory

<https://www.esrl.noaa.gov/gmd/ccgg/trends/gr.html>

<u>year</u>	<u>ppm/yr</u>	<u>year</u>	<u>ppm/yr</u>	<u>Increase of</u>	
		Increase 59 - 68			
1959	0.94	1959	0.94		
1960	0.50	1968	1.06	.12	12.7%
1961	0.96				
		Decrease 69 - 78			
1962	0.64	1969	1.35		
1963	0.71	1978	1.31	-.04	0%
1964	0.32				
		Increase 79 - 88			
1965	1.02	1979	1.80		

1966	1.28			
		1988	2.16	.36 20%
1967	0.70			
1968	1.06			
1969	1.35			

Increase 89 - 98

1989	1.36		
1998	2.95	1.59	116%

Increase 99 - 08

1999	0.92		
2008	1.57	.65	70.6%

Increase 09 - 18

2009	2.02		
2018	2.86	.84	41.5%

So, the annual mean growth rate of CO₂ has increased 32.7% over the first 30 years of measurements and a whopping 228.1% over the next 30 year period ending in 2018. I've organised these readings in hopes of better illustrating the fact that a tipping point has been reached and that not only is the amount of CO₂ in the atmosphere increasing but the rate of increase is also increasing. If the reader is not shocked and deeply concerned about these figures then I suggest they get out more, using a phrase by John Michael Greer.

Unfortunately, there are a couple of additional frightening situations taking shape. One, there are serious consequences that will also increase due to the slow dissipation of CO₂ already in the atmosphere and that will seriously delay, if not terminate the natural ability of Gaia to re-balance the forces that have caused the problem in the first place. Two, the orbital changes that have caused a cooling period and drop in atmospheric CO₂ may skip a whole cycle leading to unknown climatic conditions that will threaten the future of life on Earth as we know it. See: <http://www.earthenspirituality.com/global-warming/>

1970	1.00
1971	0.81
1972	1.74
1973	1.18
1974	0.95
1975	1.07
1976	0.80
1977	2.15
1978	1.31
1979	1.80
1980	1.68
1981	1.43
1982	0.99
1983	2.11
1984	1.39
1985	1.27
1986	1.46
1987	2.21
1988	2.16
1989	1.36
1990	1.16
1991	1.04
1992	0.46
1993	1.35
1994	1.94
1995	1.99
1996	1.22
1997	1.93
1998	2.95
1999	0.92
2000	1.61
2001	1.61
2002	2.50
2003	2.27

2004	1.60
2005	2.54
2006	1.69
2007	2.26
2008	1.57
2009	2.02
2010	2.32
2011	1.91
2012	2.61
2013	2.01
2014	2.20
2015	2.95
2016	3.01
2017	1.92
2018	2.86
2019	2.46
2020	2.26

December 2019 411.76 ppm

December 2020 414.02 ppm
Coronavirus pandemic.

Increase 2.26 ppm, despite the

<https://www.esrl.noaa.gov/gmd/ccgg/trends/gr.html>

