"The Air We Breathe: It Ain't What It Used To Be"

(To the tune of "The Old Grey Mare, Ain't What She Used to be)"

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The composition of the atmosphere is changing due to burning of fossil fuels, manufacturing processes and agricultural practices. Some of these changes are warming the atmosphere, some are destroying the stratospheric ozone layer and others are producing tropospheric ozone. The NOAA Global Monitoring Division monitors various aspects of the atmosphere from 100s of locations around the Earth. At some, only one parameter is measured, at others up to 250 are monitored.

The greenhouse gas CO_2 passed the 400 ppm level at Mauna Loa Observatory, Hawaii, in May 2013 and in spring 2018 it was 413 ppm. This is a 133 ppm increase since pre-industrial times. Methane, the second most important greenhouse gas, after a decade of no growth, began increasing again in 2007. The likely causes are increased emissions from tropical wetlands and possibly emissions from gas and oil fields.

Chlorofluorocarbons (CFCs) are the main gases that cause ozone destruction in the stratosphere known as the "Antarctic Ozone Hole". The concentrations of the four CFCs controlled under the Montreal Protocol have decreased greatly in the past 20 years and ozone was expected expected to return to pre Ozone Hole concentrations between 2040 and 2050.

But, in a paper published by Montzka et al., *Nature,* **557**,413-417, (2018), a rapid CFC-11 emission increase of ~25% since 2012 has been documented. This surprising increase in emissions comes when the production of CFC-11 has supposedly been phased out. Data from Mauna Loa Observatory, Hawaii, points to the new production of the Montreal Protocol banned CFC-11 as occurring in southeast China.