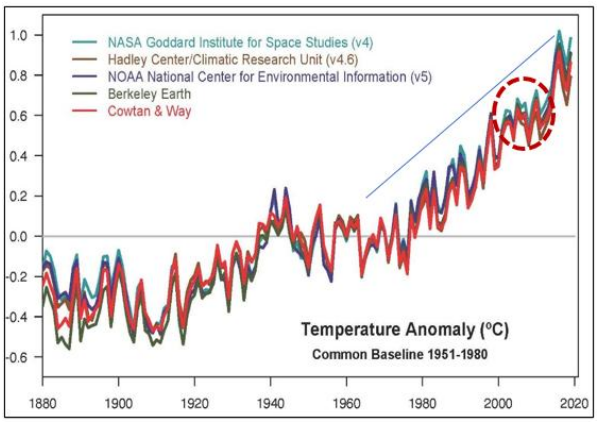
**AGW due to ChloroFluorocarbons – An alternative to the Greenhouse Climate Model**




*Global Temperature Anomaly (NASA)*

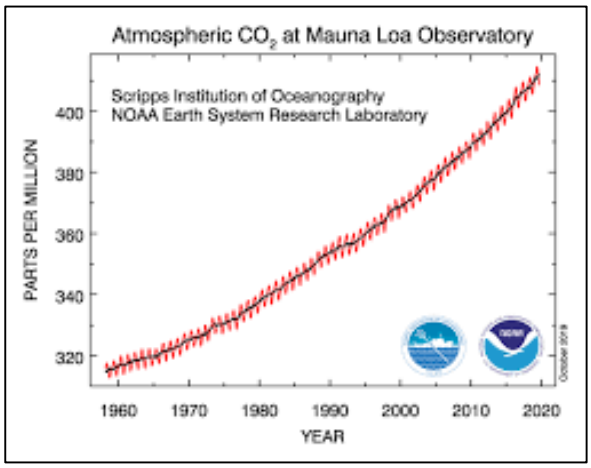
Assuming temperature plots are approximately accurate.

Temperatures started to rise in 1950s.

From 1951-1998 increased at 0.12°/decade

Hiatus **1998-2012** when rate slowed to 0.05°/decade

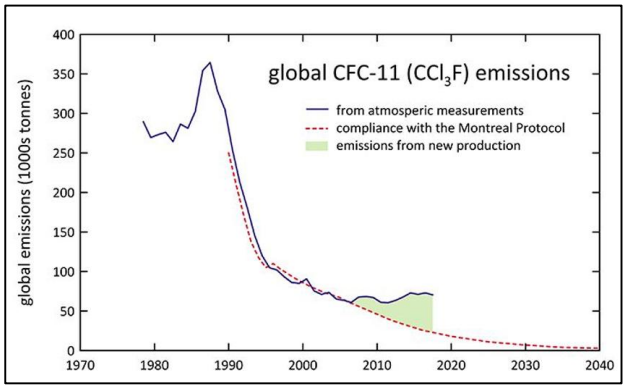
Then 2013-present has reverted to 0.12°/decade




*$CO_2$ Concentrations, Maunu Loa (NOOA)*

CO2 concentration shows increasing rate through time.

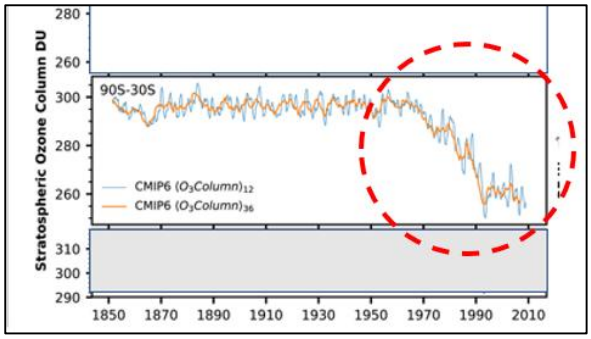
No evidence of hiatus in 1998 - 2012




*Global CFC Emissions (Paul Crumell, CSIRO)*

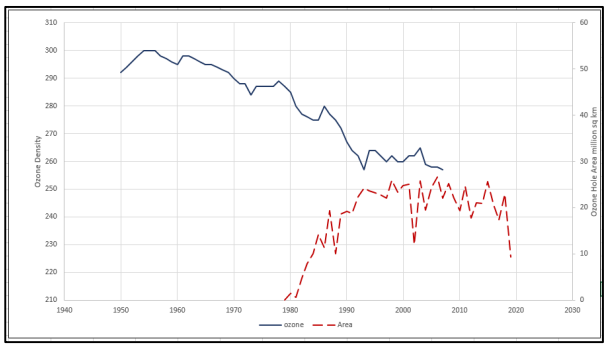
CFC emissions peaked around 1987 (Montreal Protocol). Rapid decline 1987 – 1995, then more gradual decline

From 2008 China emitting CFCs – slowed recovery of ozone



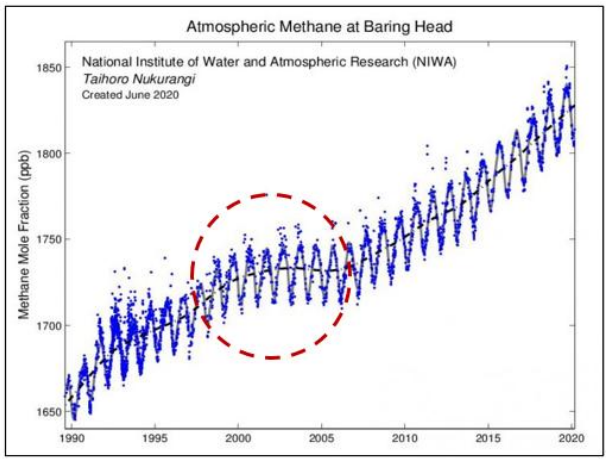

Plot of ozone density in southern hemisphere stratosphere. Significant depletion started around 1970 and continued until the early 1990s.

*Ozone column in southern hemisphere (Checa-Garcia et al, 2018)*




Ozone density (blue) and area of southern hemisphere ozone hole (red). Maximum area reached in 1990s and only recovering in 2018.

*Ozone column and area of ozone hole*



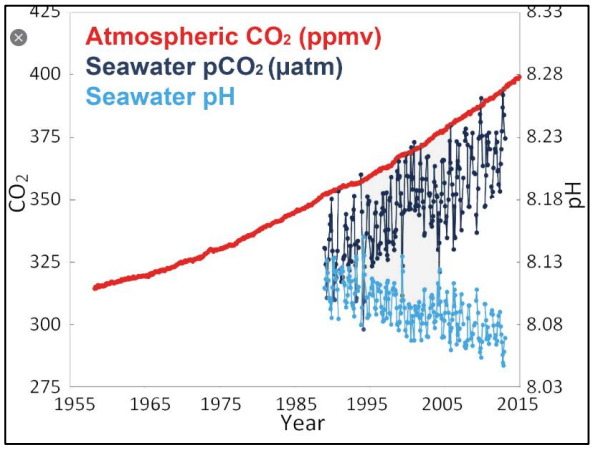

Methane emissions far larger than atmospheric concentrations.

Methane reacts with ozone to form CO2 + H2O

**$CH_4 + O_3 \rightarrow CO_2 + H_2O + H_2$**

Methane is therefore residual. Increasing trend until 1998 -2006

*Methane concentrations, Baring Head (NIWA)*

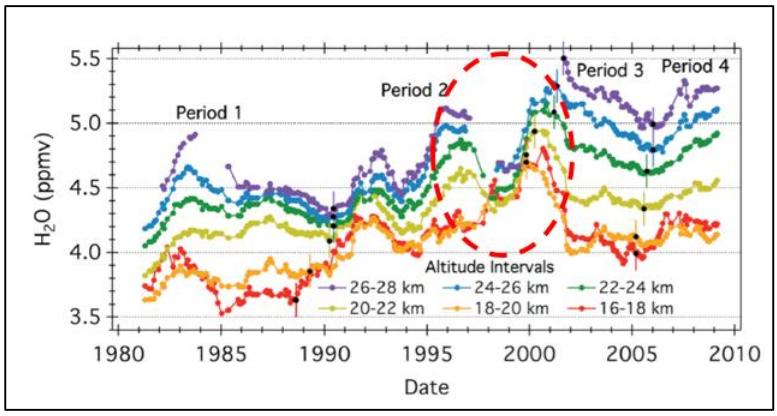



In the presence of ultraviolet light a photoelectrical reaction occurs with chlorine (from CFCs) to produce hydrochloric acid

**CH4 + O3 + Cl → CO2 + H2O + 2HCl**

*Ocean pH, Hawaii (NOOA)*

Water vapour concentration has increased, with a drop from 1997 - 2002

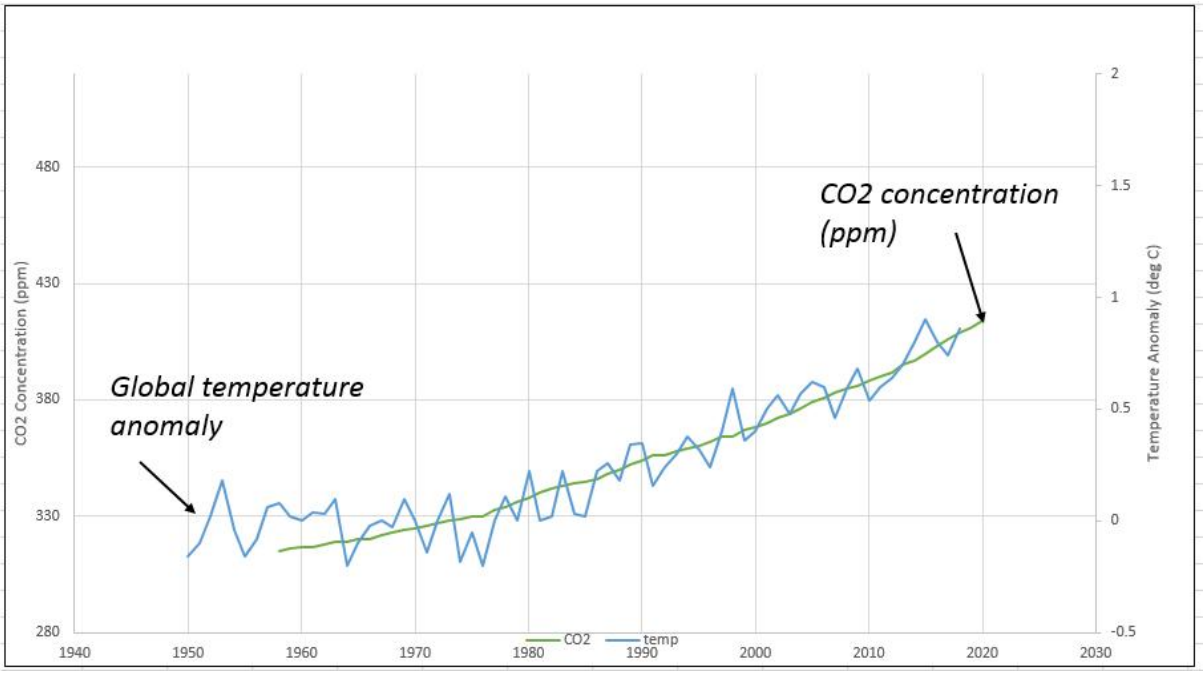



*Stratospheric water vapour trends over Colorado (Hurst et al. 2011)*

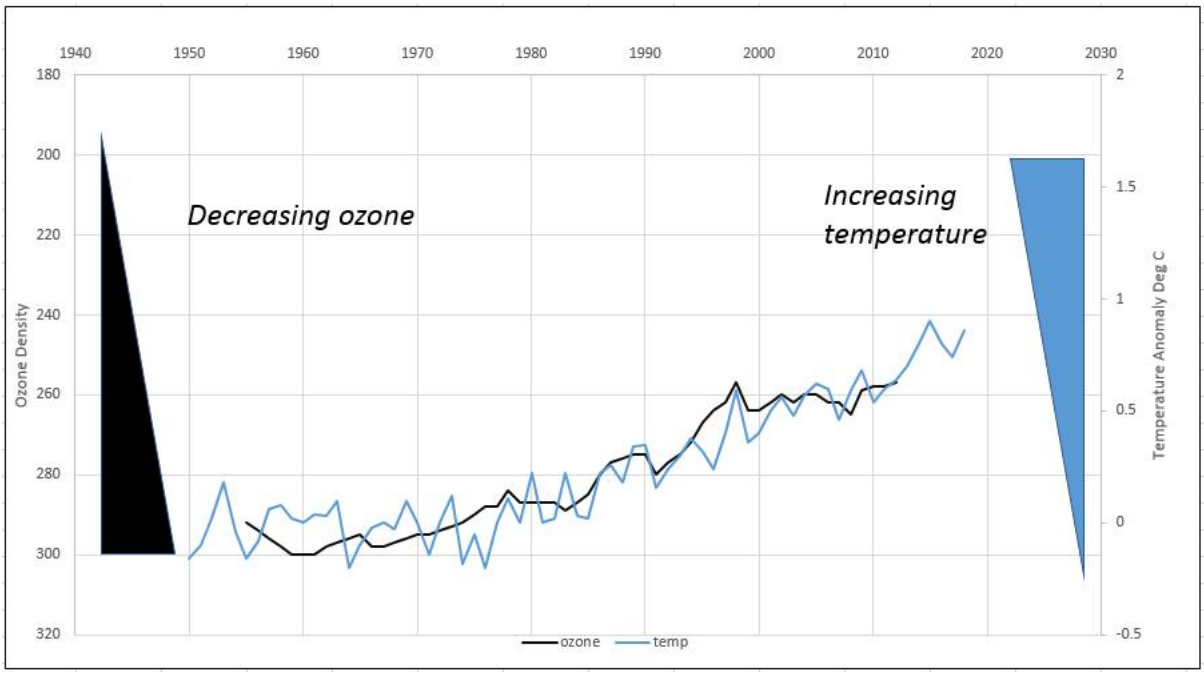
Reduction in production of CFCs from 1987-1995 is reflected in stabilisation of ozone density from 1992, water vapour from 1997 and methane concentrations from 1999 and resulted in temperature hiatus from 1987 – 2012.

Resumption of production by China has slowed or reversed these trends.

Greenhouse model is based on apparent correlation between temperature and CO2 concentration – there is no direct evidence of CO2 concentration controlling temperature.




*Temperature anomaly plotted against CO2 concentrations.*




*Temperature anomaly plotted against ozone density (inverted and with a lag time of around 5 years)*

CFC model is based on apparent correlation between ozone density and temperature. There is evidence for this – increased UV, increased evaporation, increased methane.