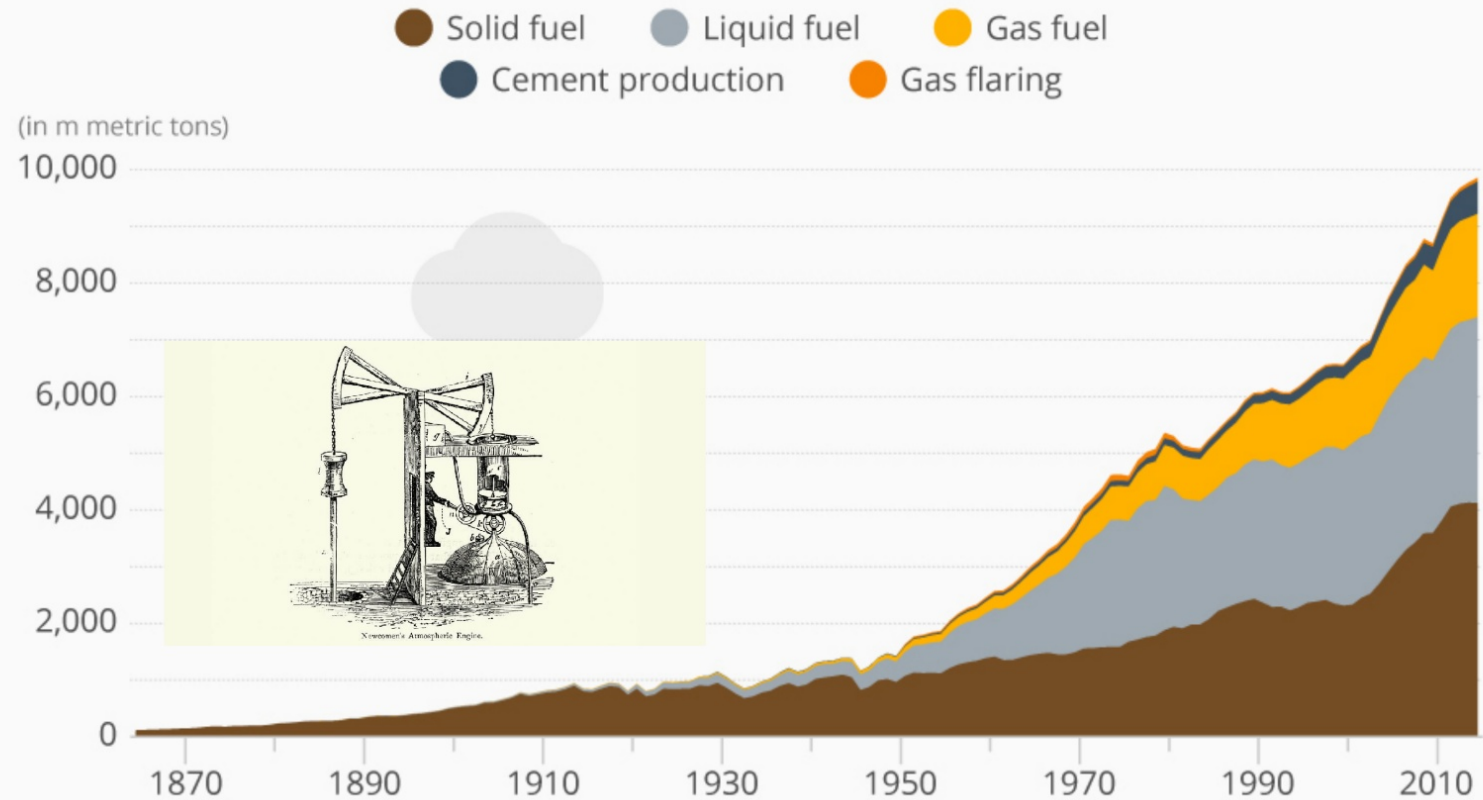


The Carbon Age: 150 Years of CO₂ Emissions

Worldwide carbon emissions from fossil fuel consumption and cement production



@StatistaCharts Source: CDIAC

statista





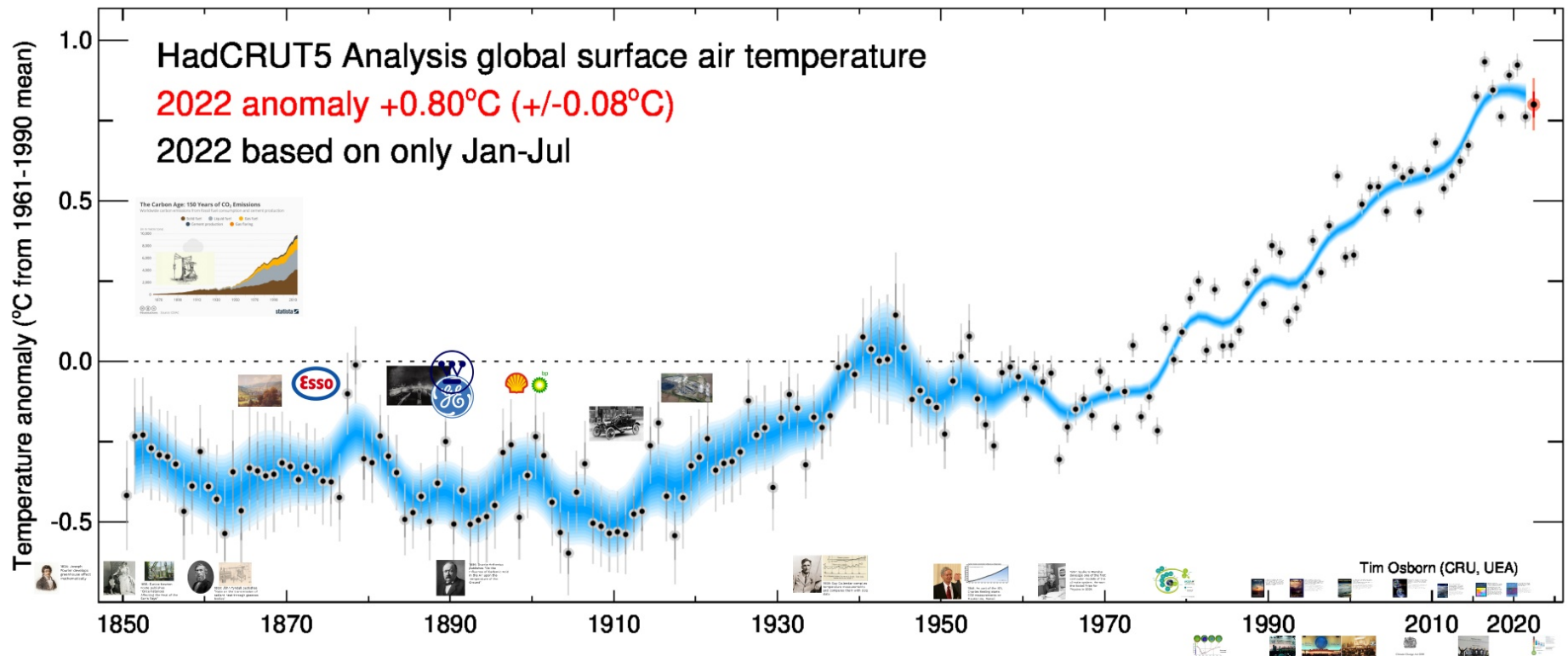








A climate change history

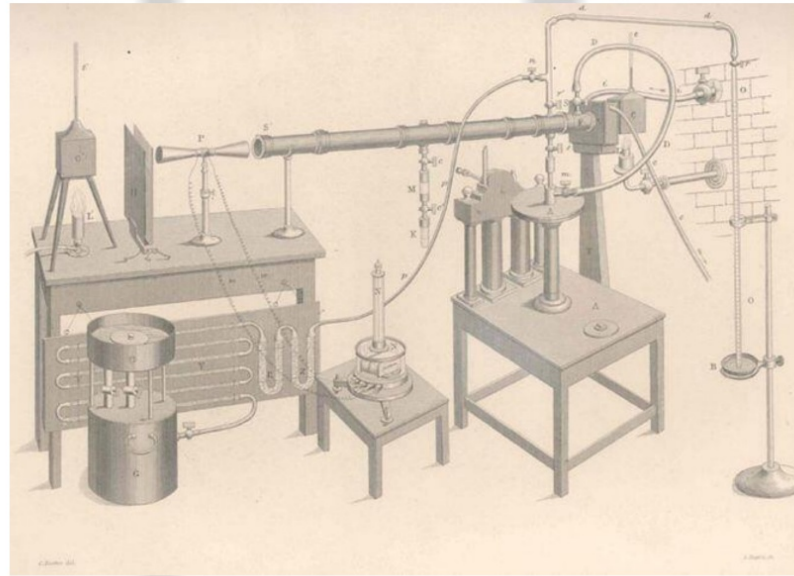
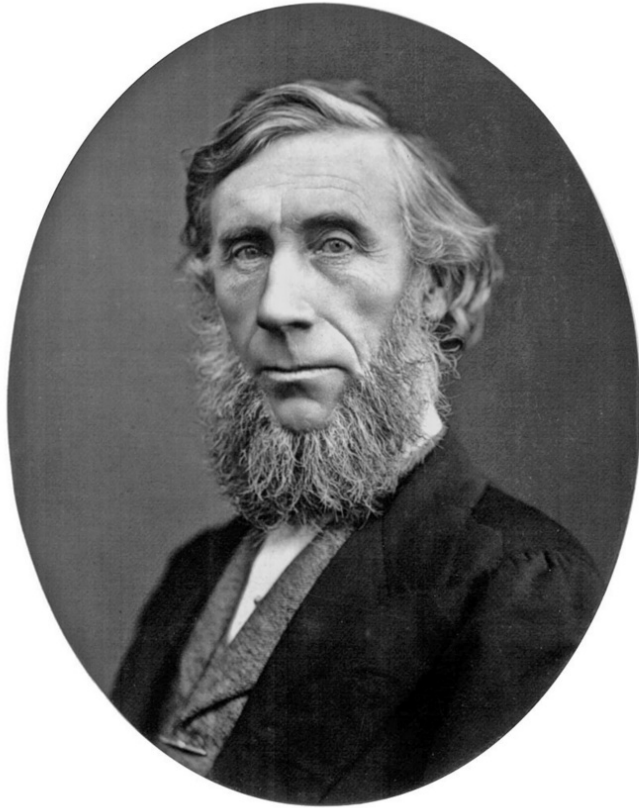




1824: Joseph
Fourier develops
greenhouse effect
mathematically



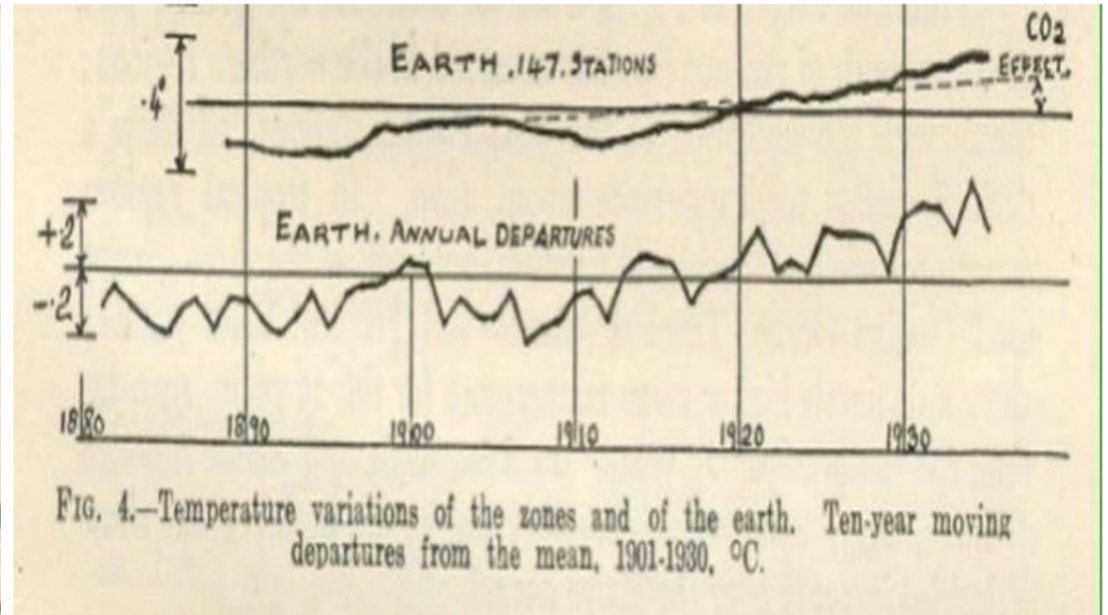
1856: Eunice Newton Foote publishes "Circumstances Affecting the Heat of the Sun's Rays"



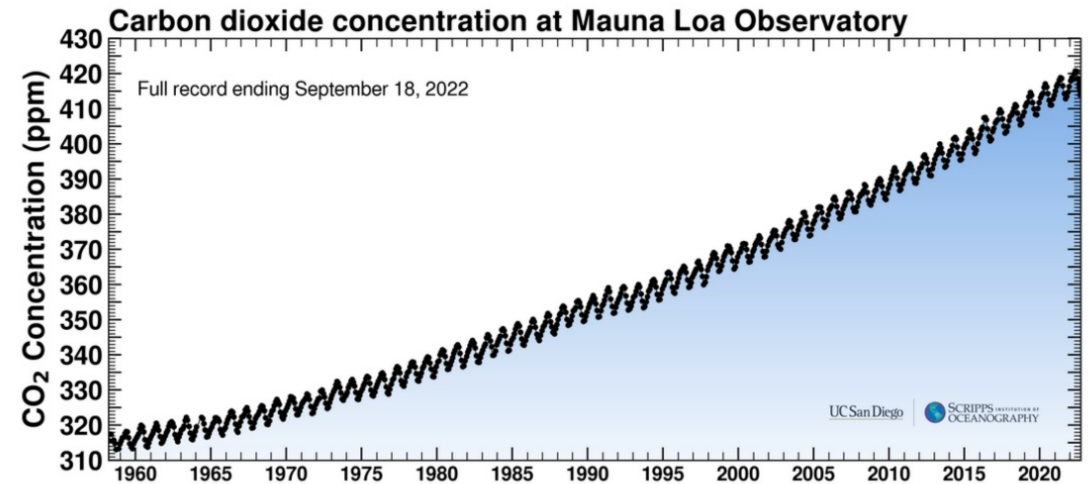
1859: John Tyndall publishes "Note on the transmission of radiant heat through gaseous bodies"



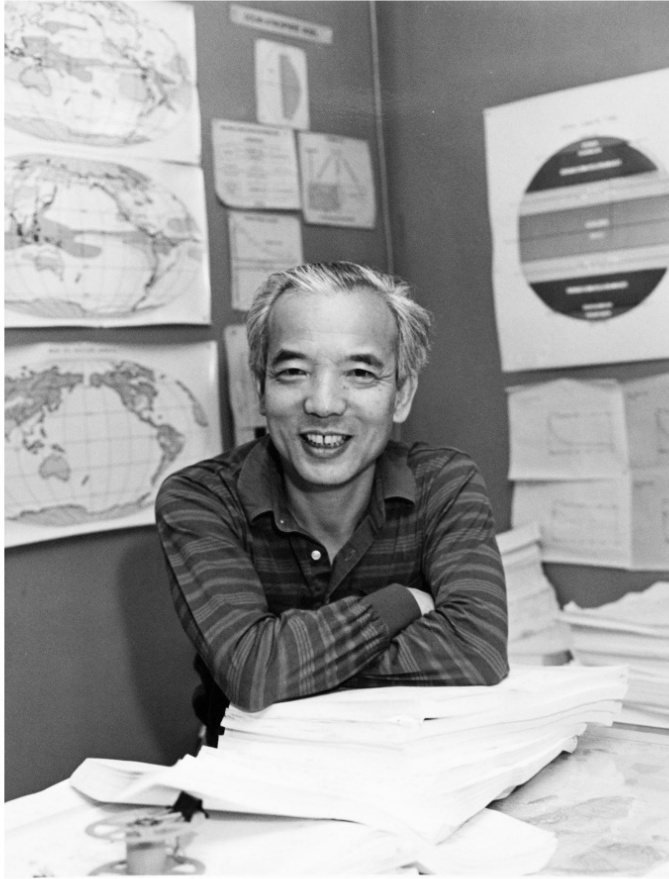
1896: Svante Arrhenius publishes "On the Influence of Carbonic Acid in the Air upon the Temperature of the Ground"



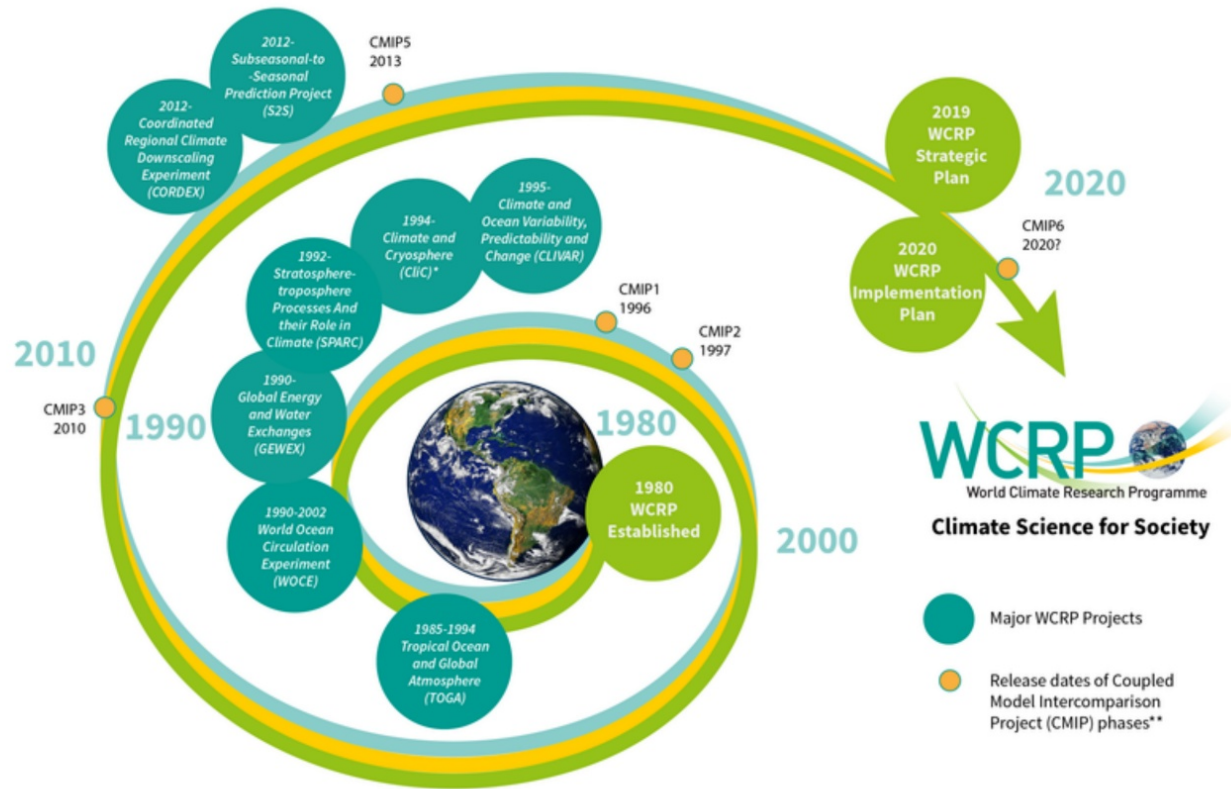
1938: Guy Callendar compiles temperature measurements and compares them with CO₂ data



1958: As part of the IGY, Charles Keeling starts CO₂ measurements on Mauna Loa, Hawaii



1967: Syukuro Manabe develops one of the first computer models of the climate system. He won the Nobel Prize for Physics in 2021.

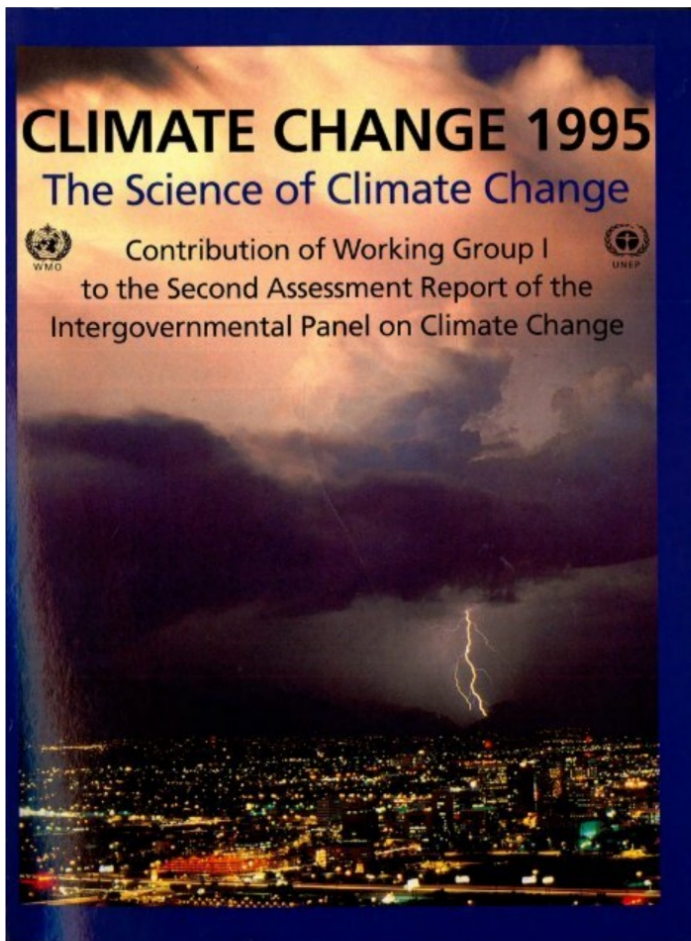


* CliC was formerly the Arctic Climate System Study (ACSYS)
 ** There was no CMIP4



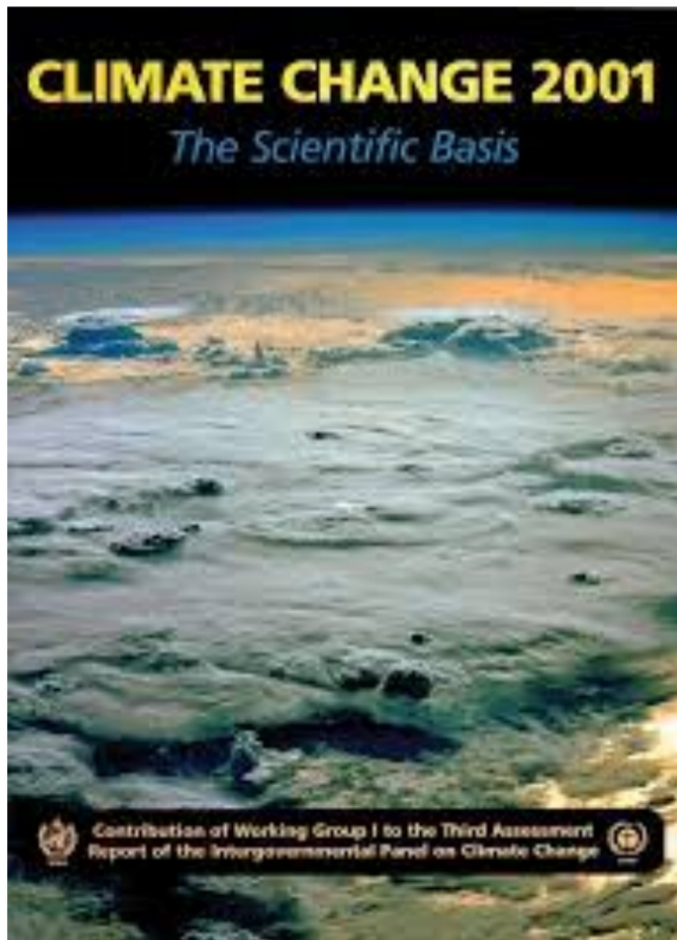
Our judgement is that global mean surface air temperature has increased by 0.3°C to 0.6°C over the last 100 years, with the five global-average warmest years being in the 1980s. Over the same period global sea level has increased by 10-20cm. These increases have not been smooth with time, nor uniform over the globe.





Climate has changed over the past century. At any one location year-to-year variations in weather can be large, but analyses of meteorological and other data over large areas and over periods of decades or more have provided evidence for some important systematic changes.

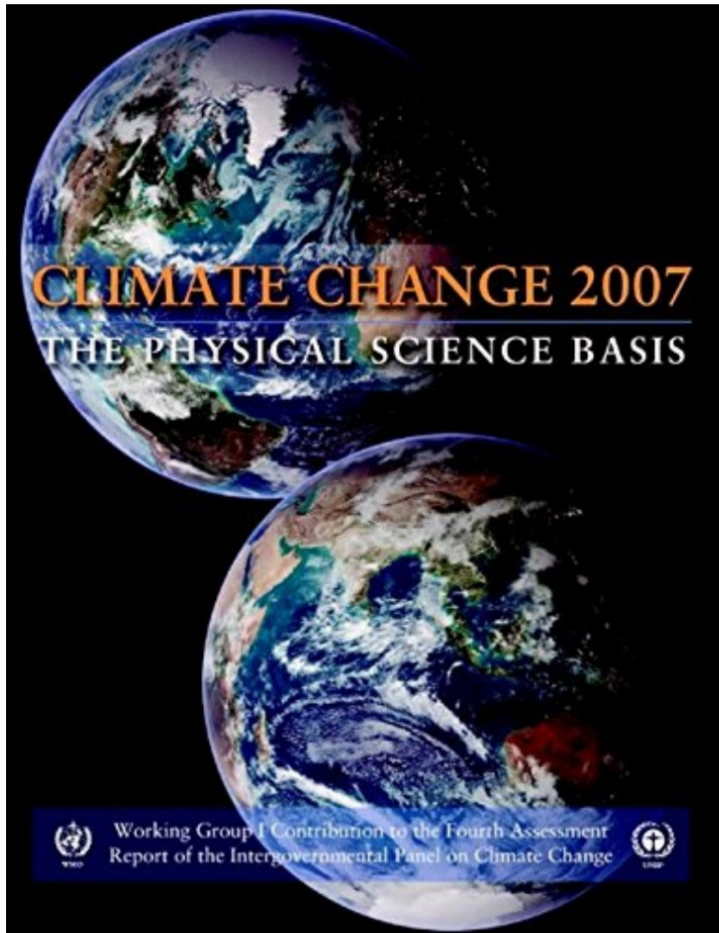
AR1 (FAR): Our judgement is that global mean surface air temperature has increased by 0.3°C to 0.6°C over the last 100 years, with the five global-average warmest years being in the 1980s. Over the same period global sea level has increased by 10-20cm. These increases have not been smooth with time, nor uniform over the globe.



An increasing body of observations gives a collective picture of a warming world and other changes in the climate system.

The global average surface temperature has increased over the 20th century by about 0.6°C.

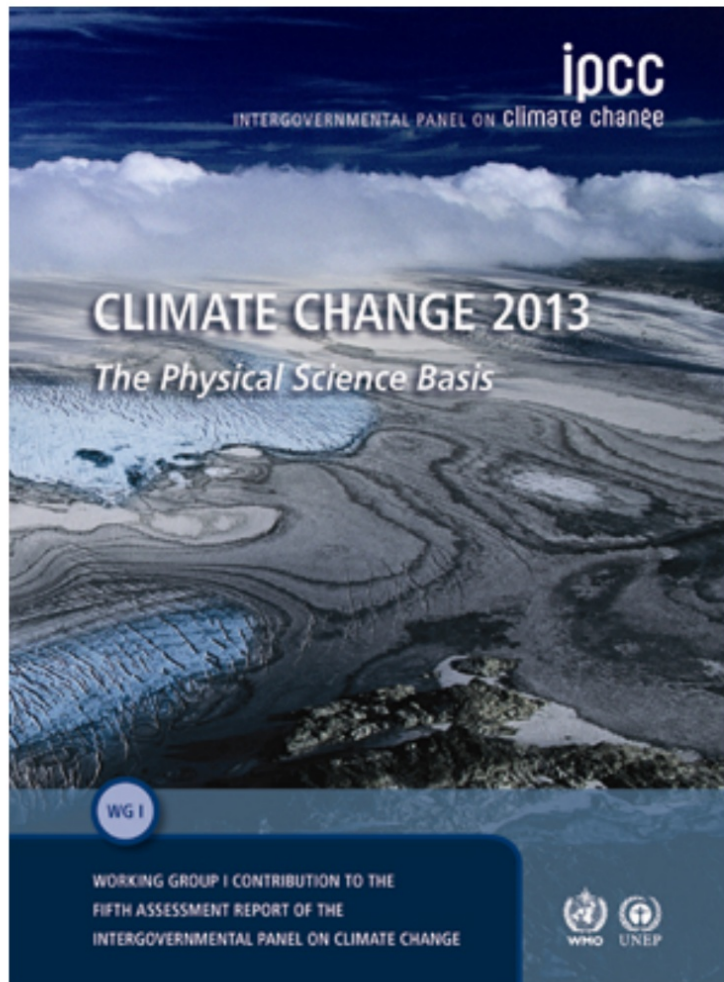
AR2 (SAR): Climate has changed over the past century. At any one location year-to-year variations in weather can be large, but analyses of meteorological and other data over large areas and over periods of decades or more have provided evidence for some important systematic changes.



Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level.

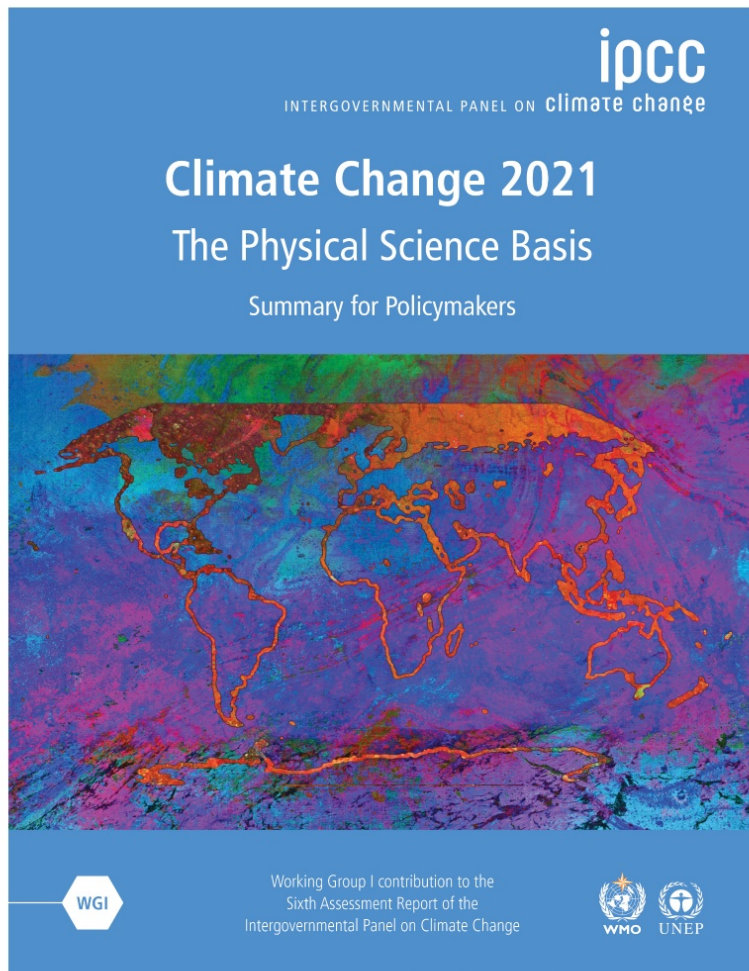
AR3 (TAR): An increasing body of observations gives a collective picture of a warming world and other changes in the climate system.

The global average surface temperature has increased over the 20th century by about 0.6°C.



Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, sea level has risen, and the concentrations of greenhouse gases have increased.

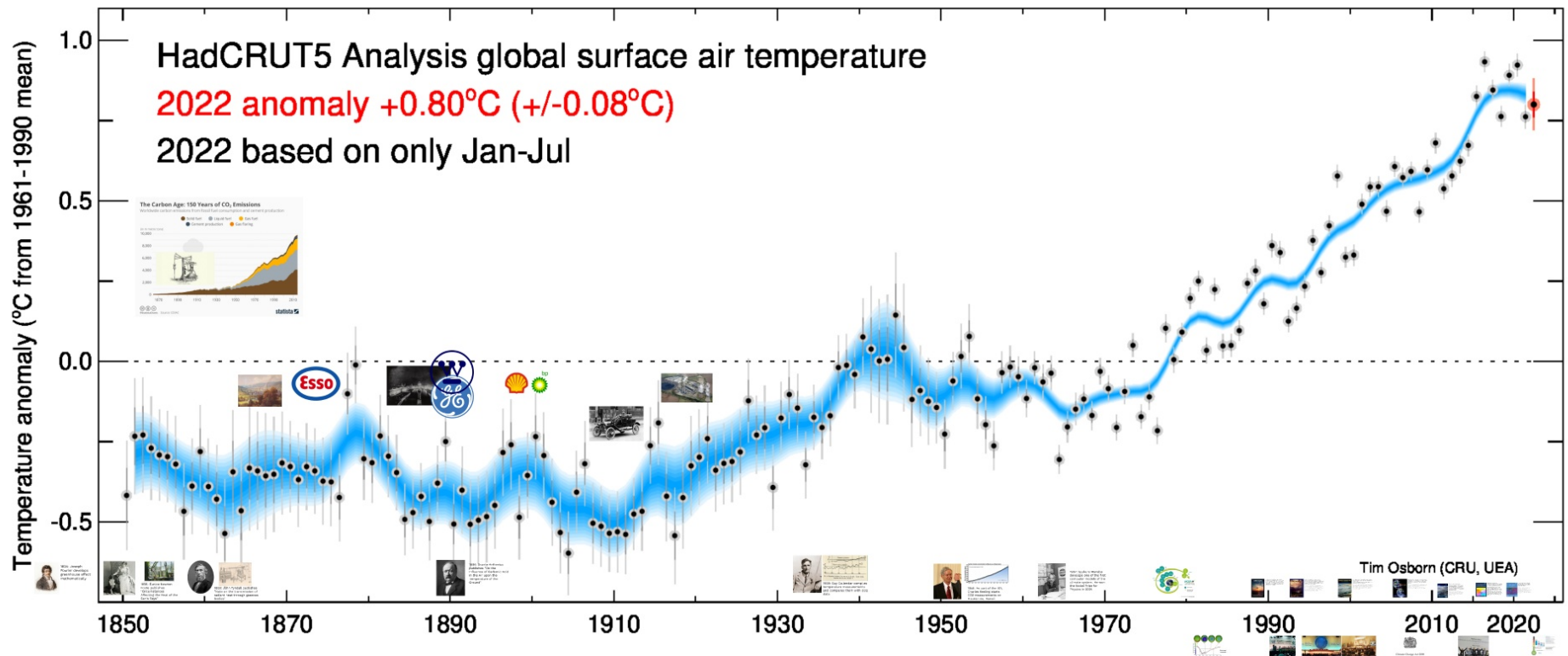
AR4: Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level.

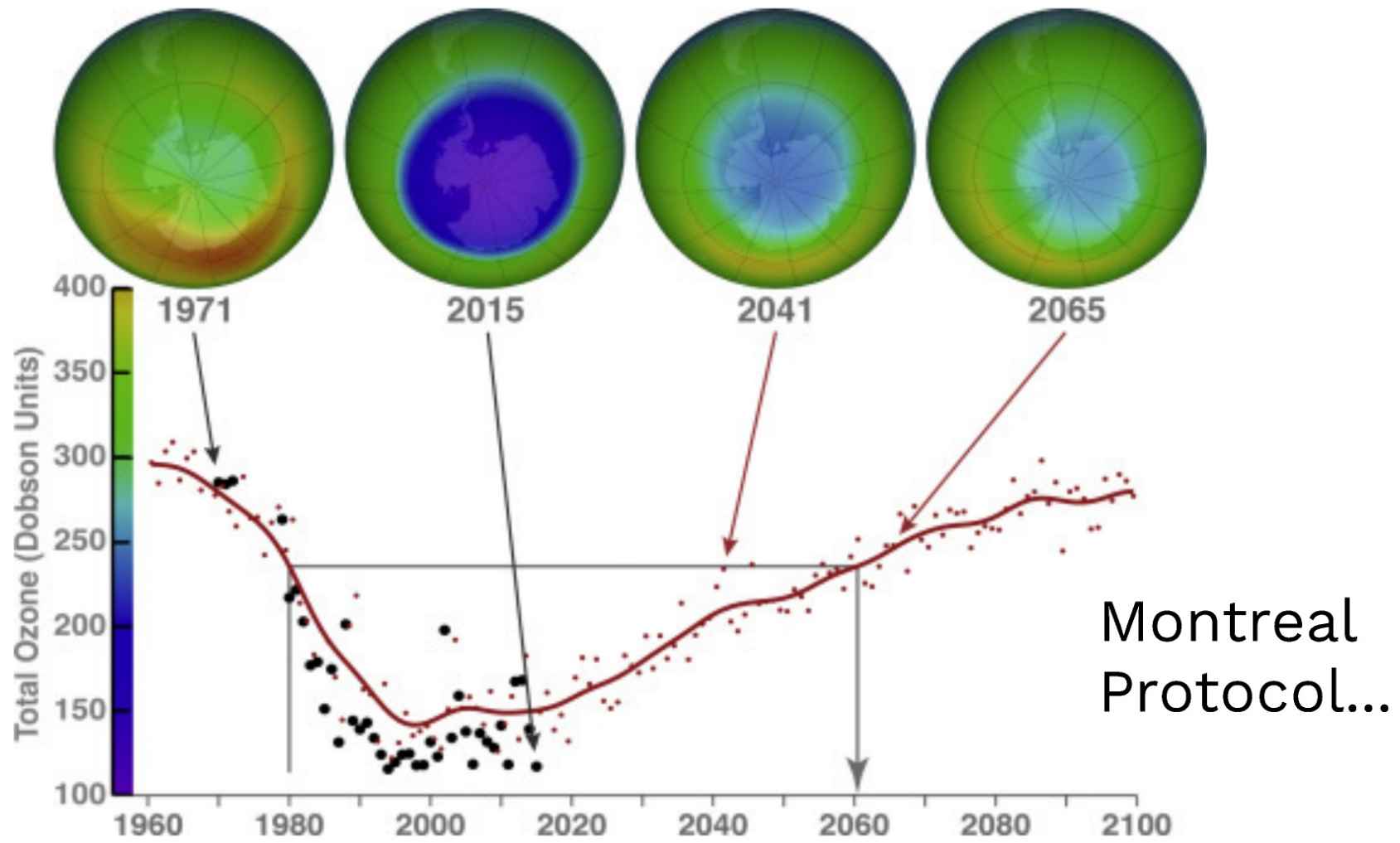


It is unequivocal that human influence has warmed the atmosphere, ocean and land. Widespread and rapid changes in the atmosphere, ocean, cryosphere and biosphere have occurred.

AR5: Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, sea level has risen, and the concentrations of greenhouse gases have increased.

A climate change history







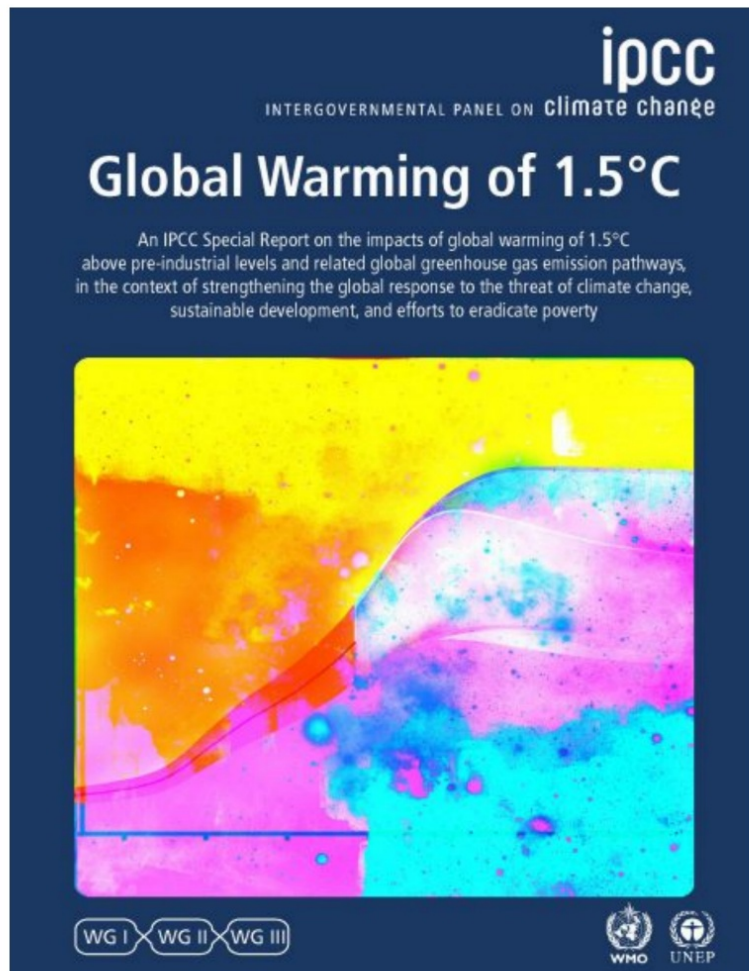






Climate Change Act 2008



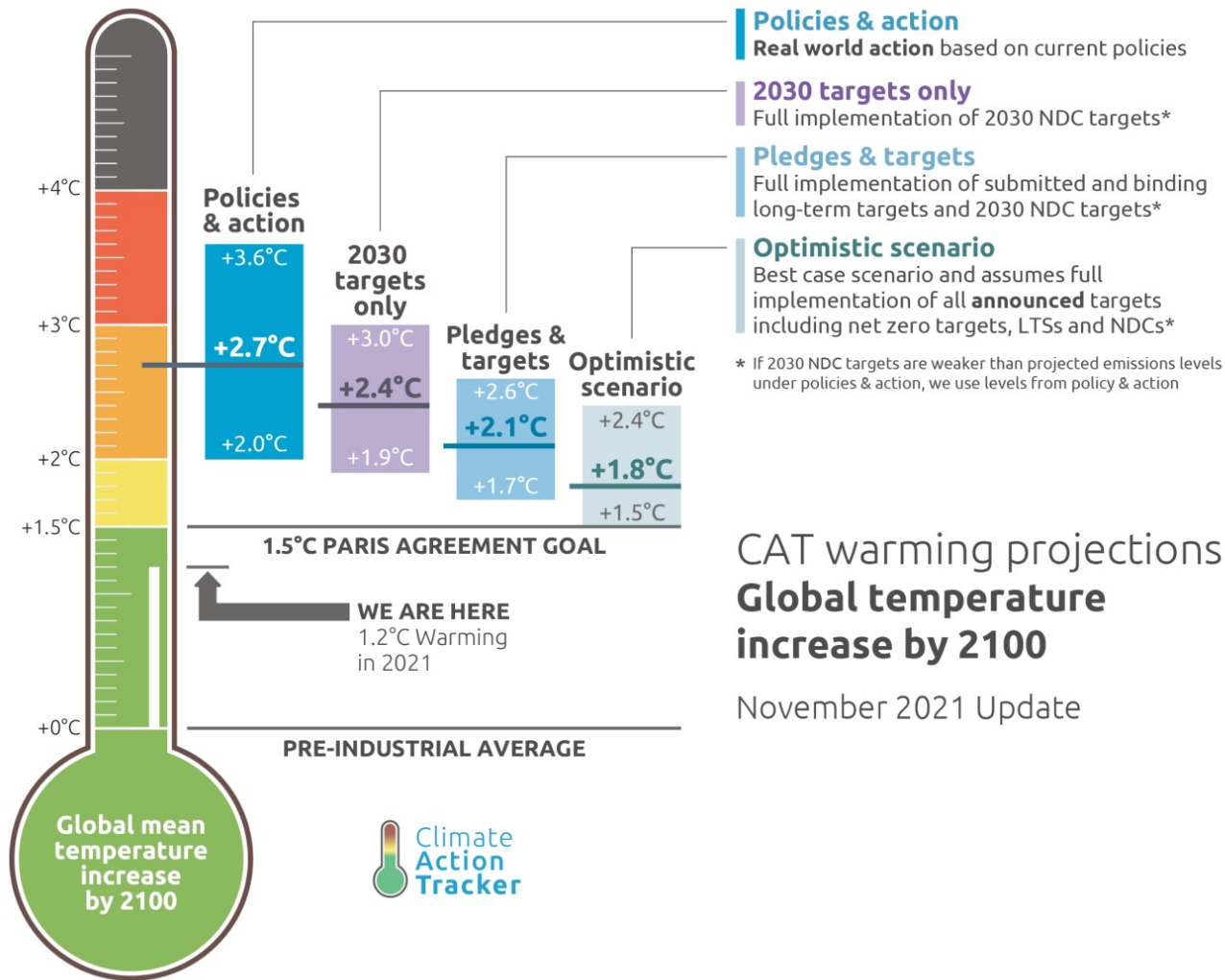


Understanding Global Warming of 1.5°C

Human activities are estimated to have caused approximately 1.0°C of global warming above pre-industrial levels, with a likely range of 0.8°C to 1.2°C. Global warming is likely to reach 1.5°C between 2030 and 2052 if it continues to increase at the current rate. (high confidence)

Warming from anthropogenic emissions from the pre-industrial period to the present will persist for centuries to millennia and will continue to cause further long-term changes in the climate system, such as sea level rise, with associated impacts (high confidence), but these emissions alone are unlikely to cause global warming of 1.5°C (medium confidence).

Climate-related risks for natural and human systems are higher for global warming of 1.5°C than at present, but lower than at 2°C (high confidence). These risks depend on the magnitude and rate of warming, geographic location, levels of development and vulnerability, and on the choices and implementation of adaptation and mitigation options (high confidence).



CAT warming projections Global temperature increase by 2100

November 2021 Update