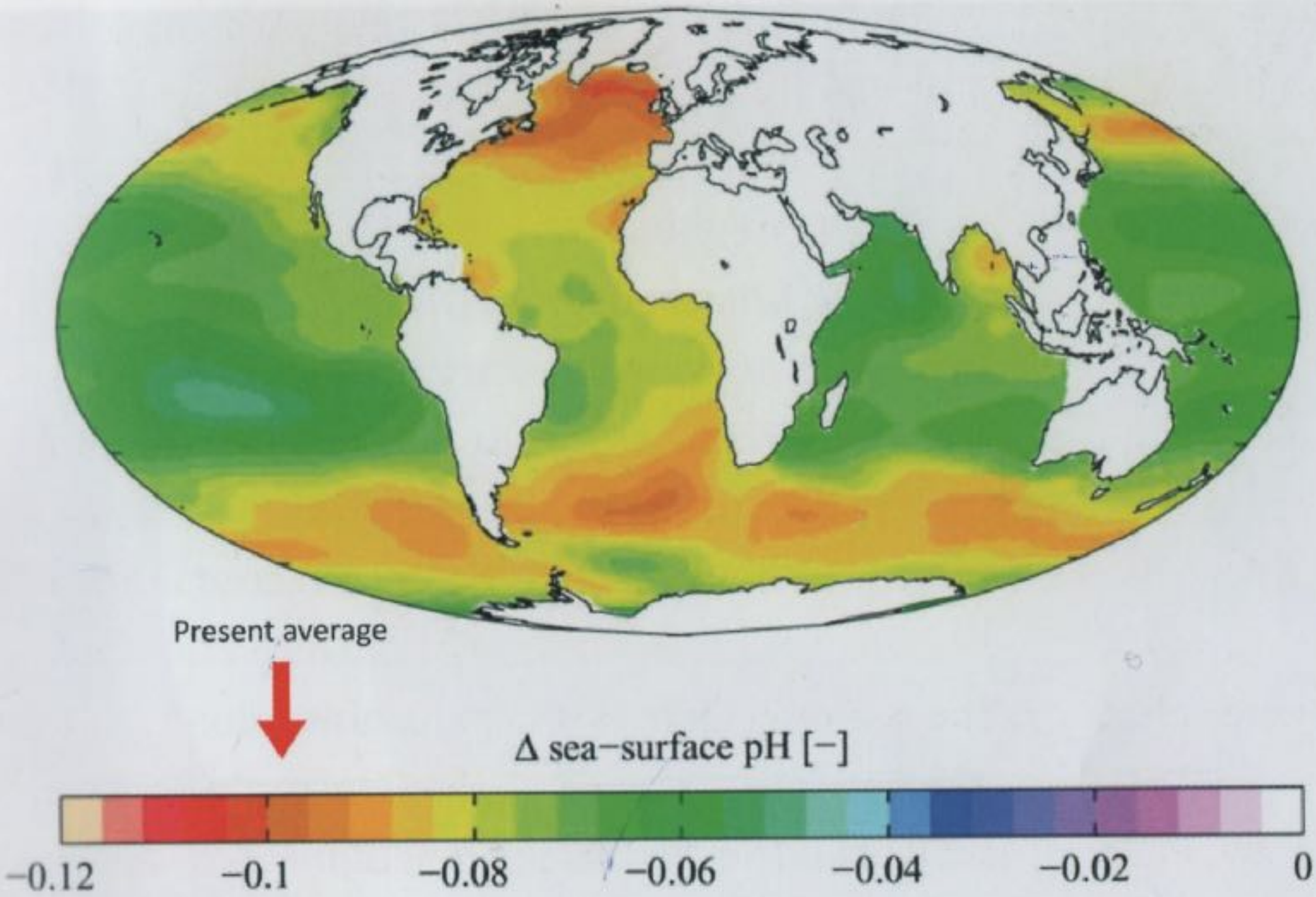
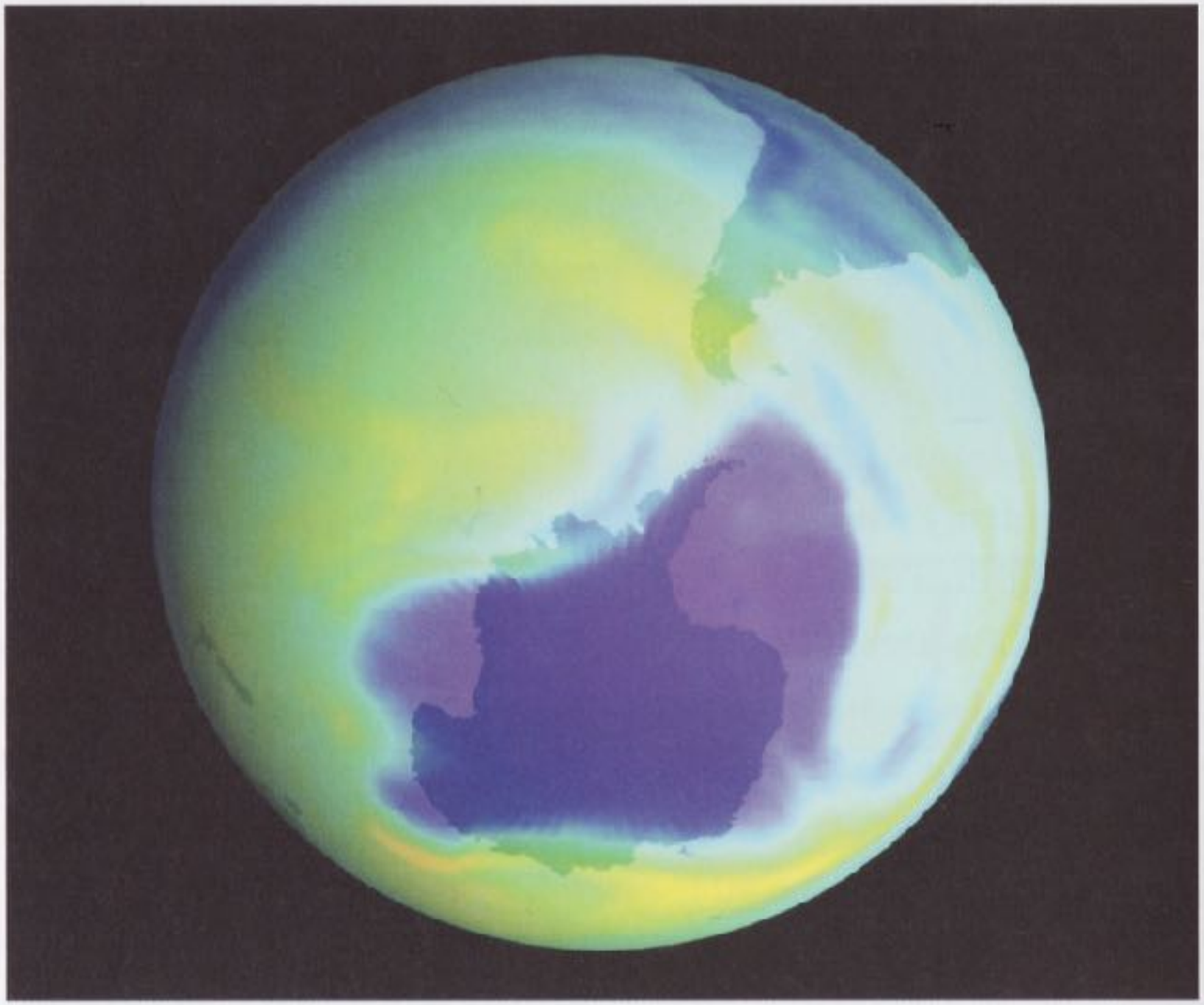


0.2 Ocean pH changes

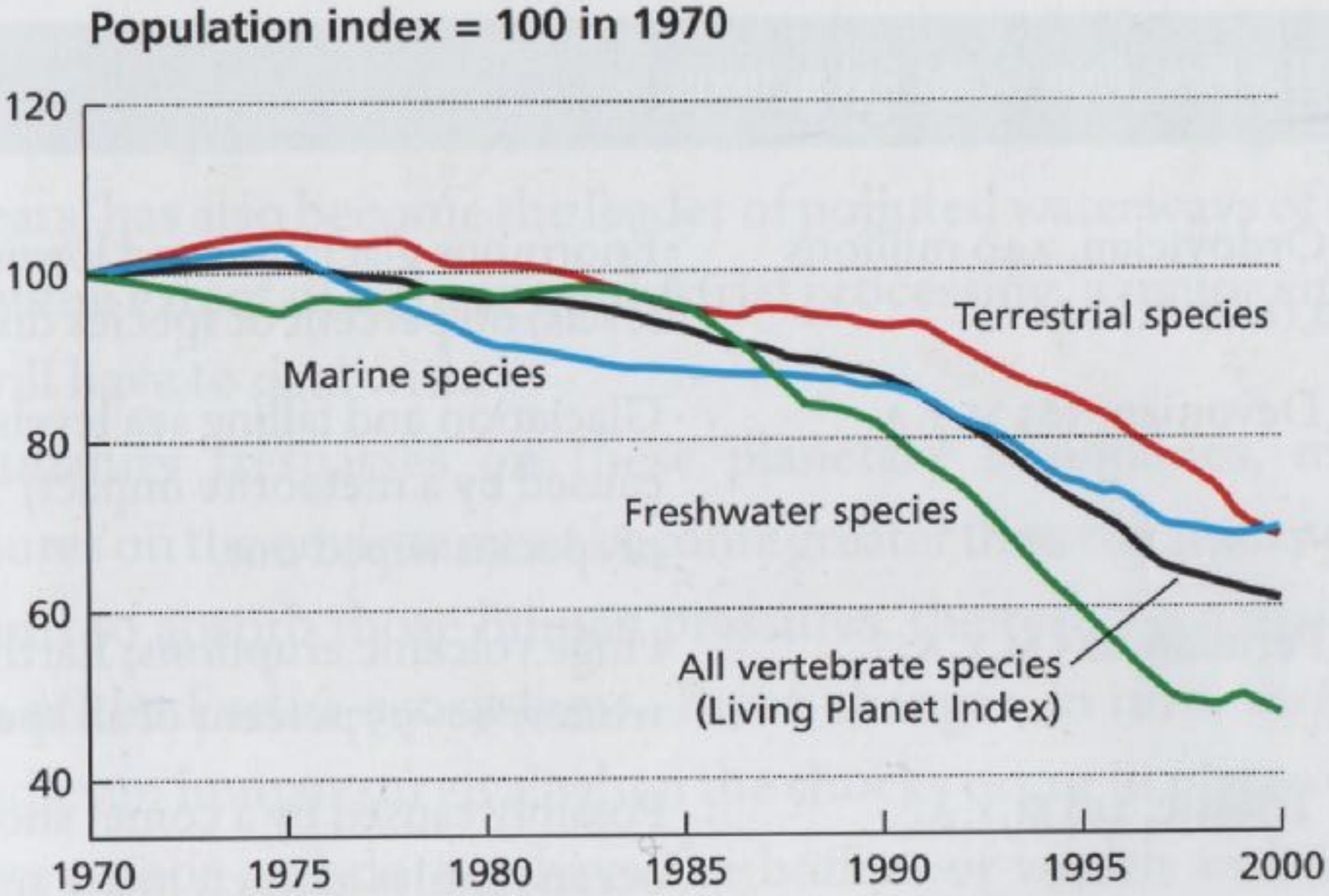
"Estimated change in annual mean sea surface pH between the pre-industrial period (1700s) and the present day



6.3 NASA satellite image of ozone layer 1985)

6.4 Young boy swimming in algal bloom in Shandong, China

Photo: Reuters/China Daily.

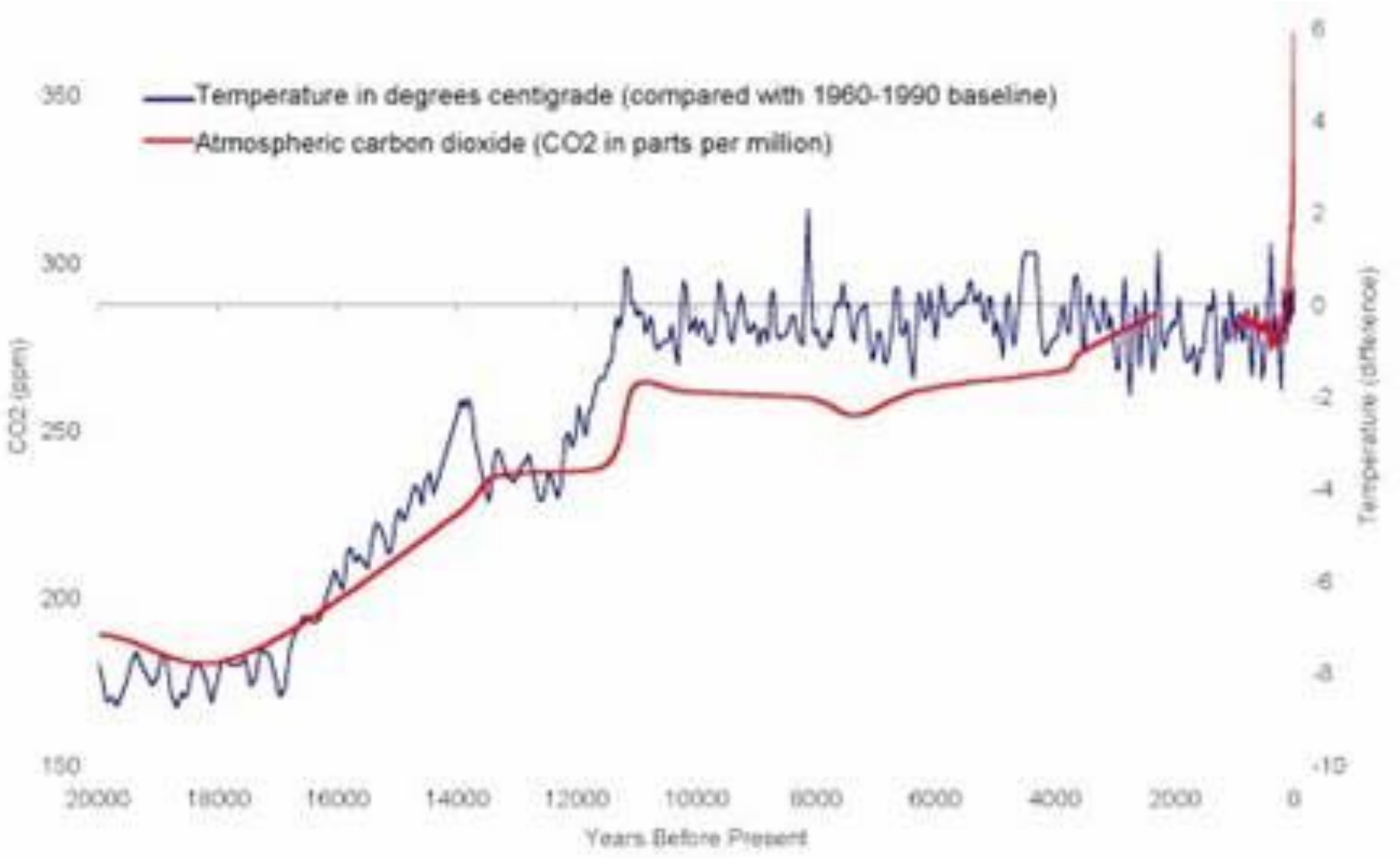


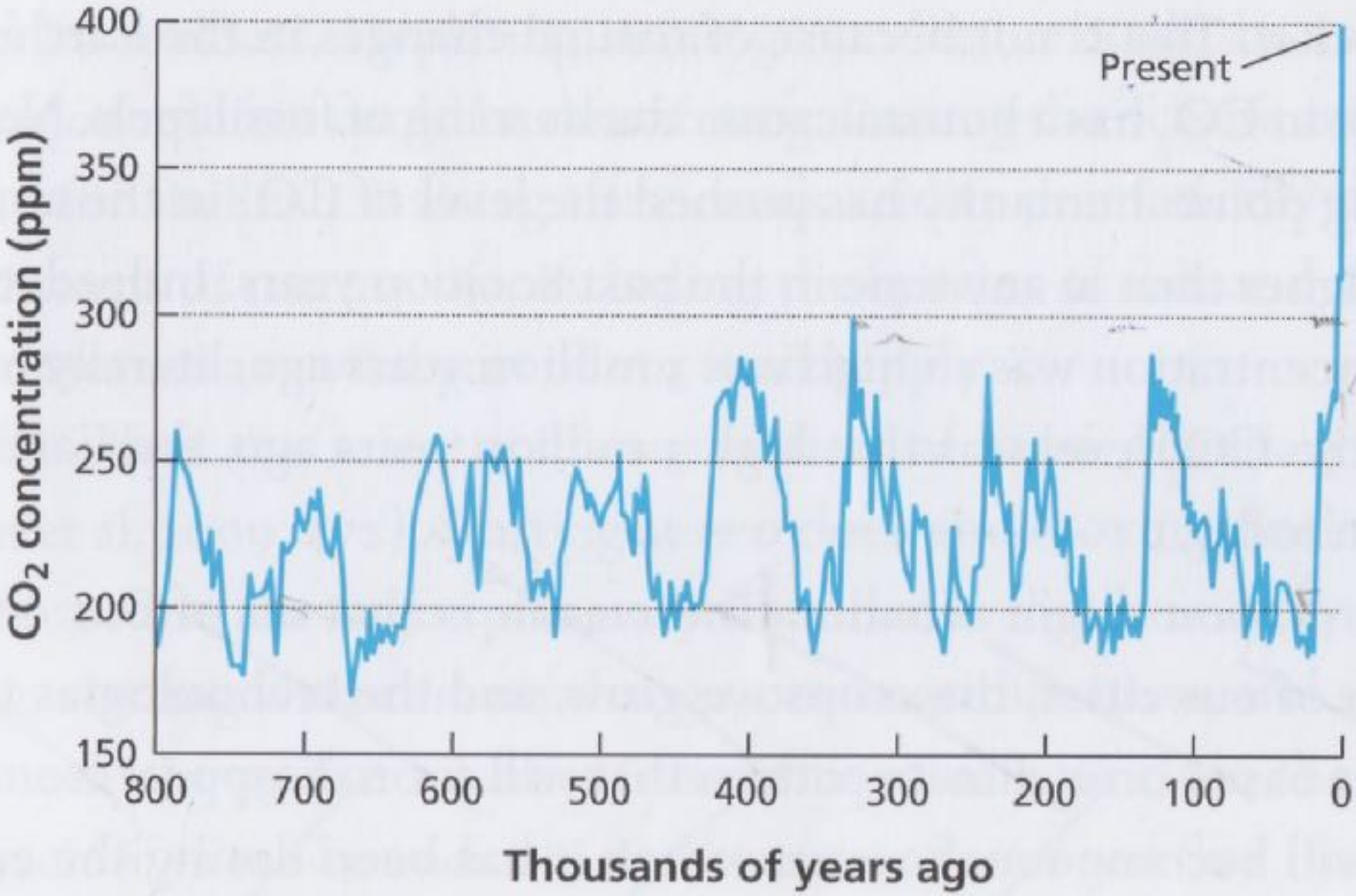
0.6 The Living Planet Index of biodiversity (1970–2000)

Source: World Wildlife Fund. 2012. "Living Planet Report 2012." Gland, Switzerland: WWF International.

Table 6.1 The First Five Great Extinctions

1. End of the Ordovician, 440 millions of years ago (M.Y.A.	Enormous glaciation and lowering of sea levels; 60 percent of species disappeared.
2. End of the Devonian, 365 M.Y.A.	Glaciation and falling sea levels; possibly caused by a meteorite impact; 70 percent of species wiped out.
3. End of the Permian, 225 M.Y.A.	Huge volcanic eruptions; Earth became winter; 90–95 percent of all species extinct.
4. End of the Triassic, 210 M.Y.A.	Possibly caused by a comet shower; most ocean reptiles extinct; many amphibians extinct.
5. End of the Cretaceous called the KT extinction), 65 M.Y.A.	Meteorite struck Earth; dinosaurs, marine reptiles, ammonoids, and many species of plants were wiped out; mammals, early birds, turtles, crocodiles, and amphibians less affected.

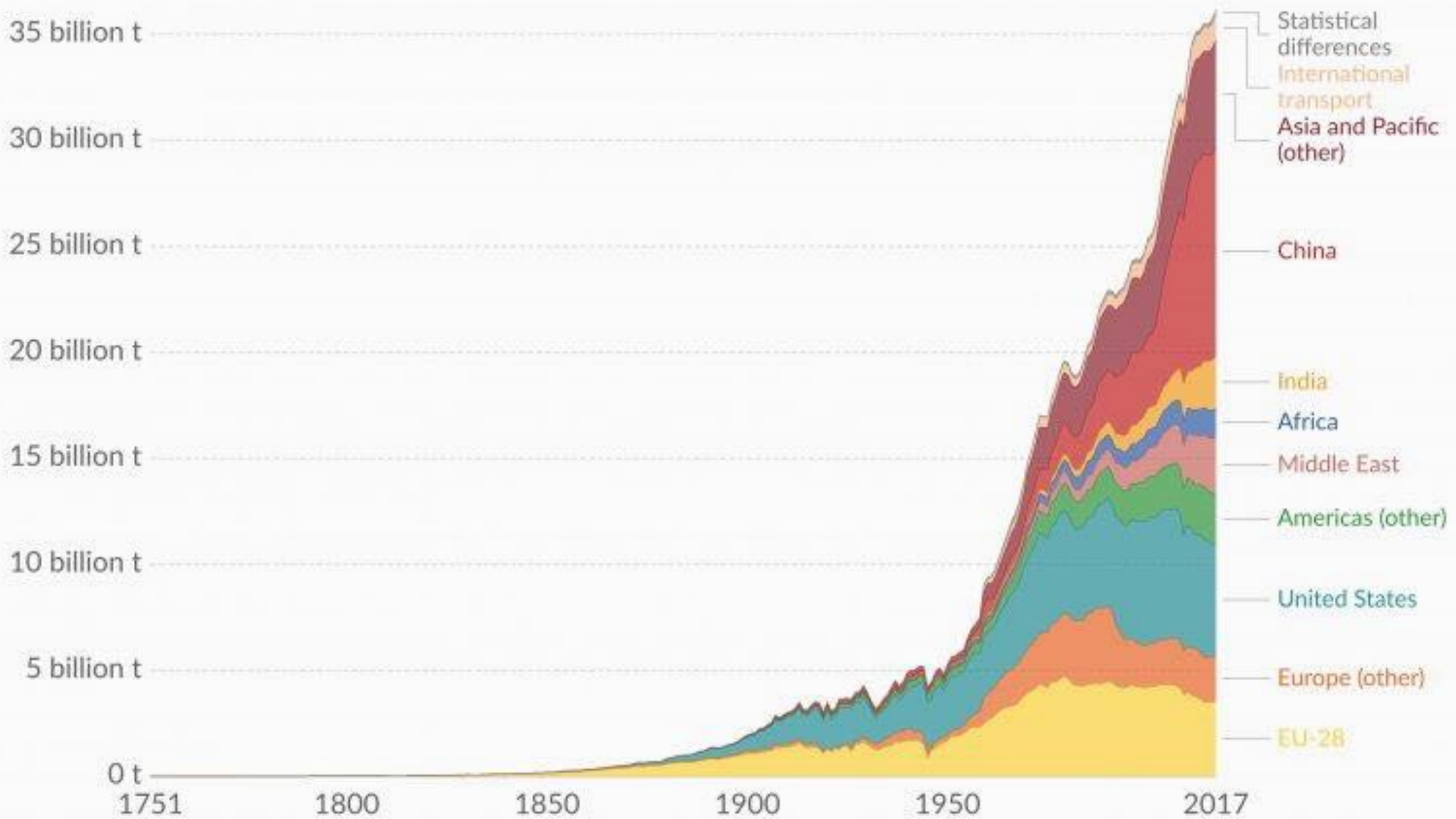

Temperature in degrees centigrade (compared with 1960-1990 baseline)
Atmospheric carbon dioxide (CO2 in parts per million)
CO2 (ppm)
Temperature (difference)
360
300
250
200
150
6
4
2
0
-2
-4
-6
-8
-10
20000
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
Years Before Present



1.18 CO_2 in the atmosphere over the past 800,000 years

Annual total CO_2 emissions, by world region

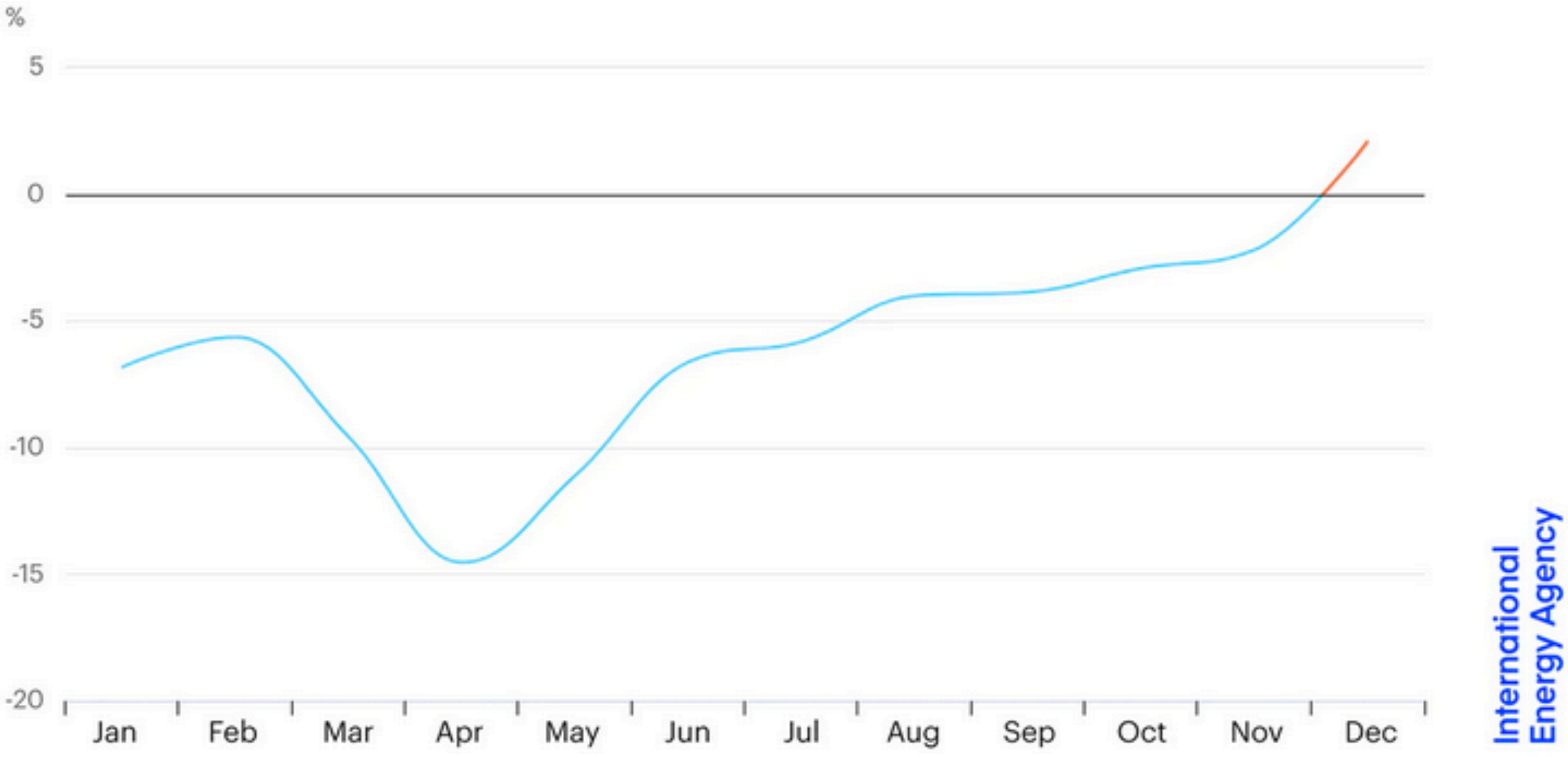
Our World in Data

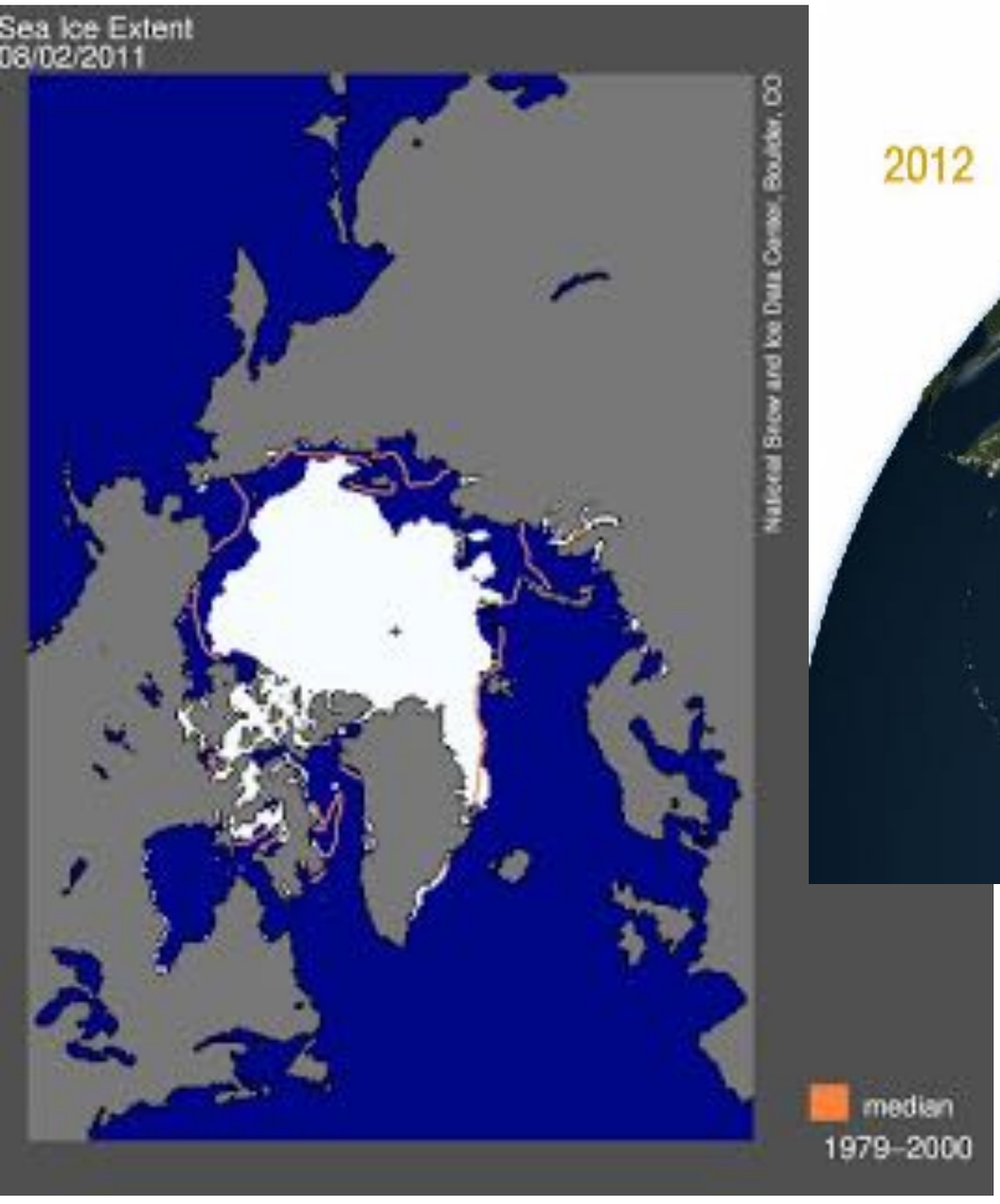


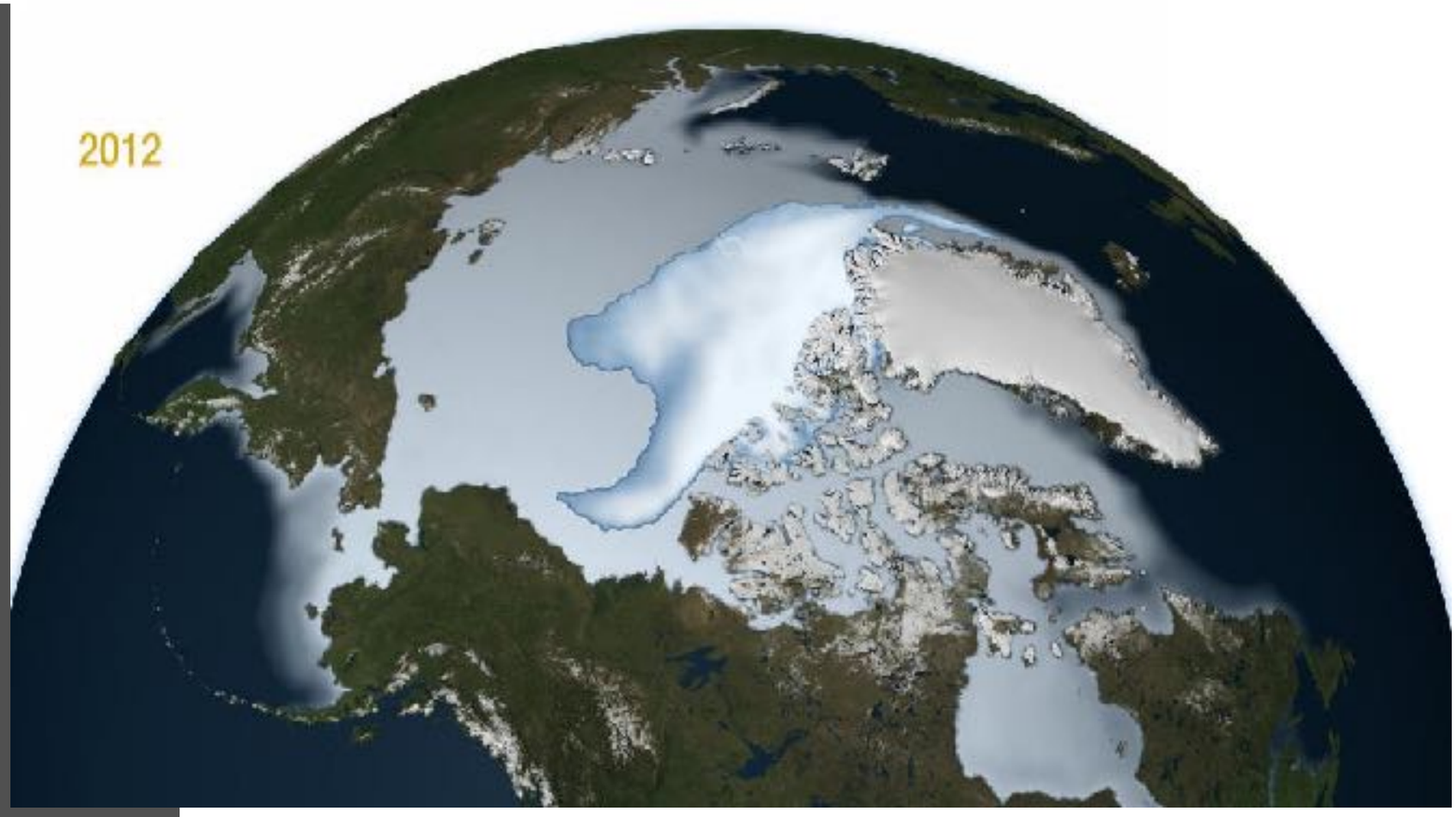
Source: Carbon Dioxide Information Analysis Center (CDIAC); Global Carbon Project (GCP)
Note: The difference between the global estimate and the sum of national totals is labeled "Statistical differences".
OurWorldInData.org/co2-and-other-greenhouse-gas-emissions • CC BY

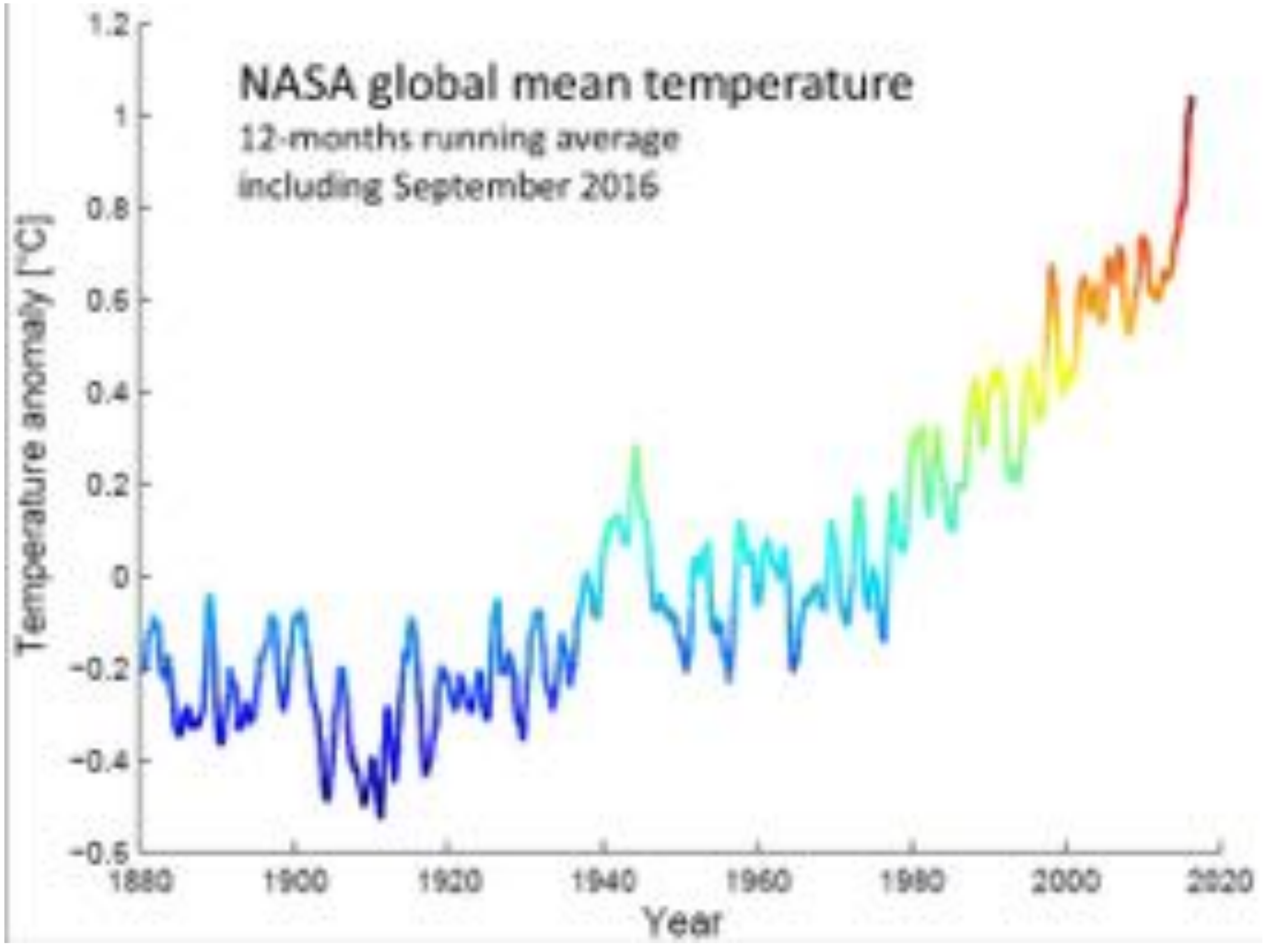
Monthly evolution of global CO_2 emissions, 2020 relative to 2019

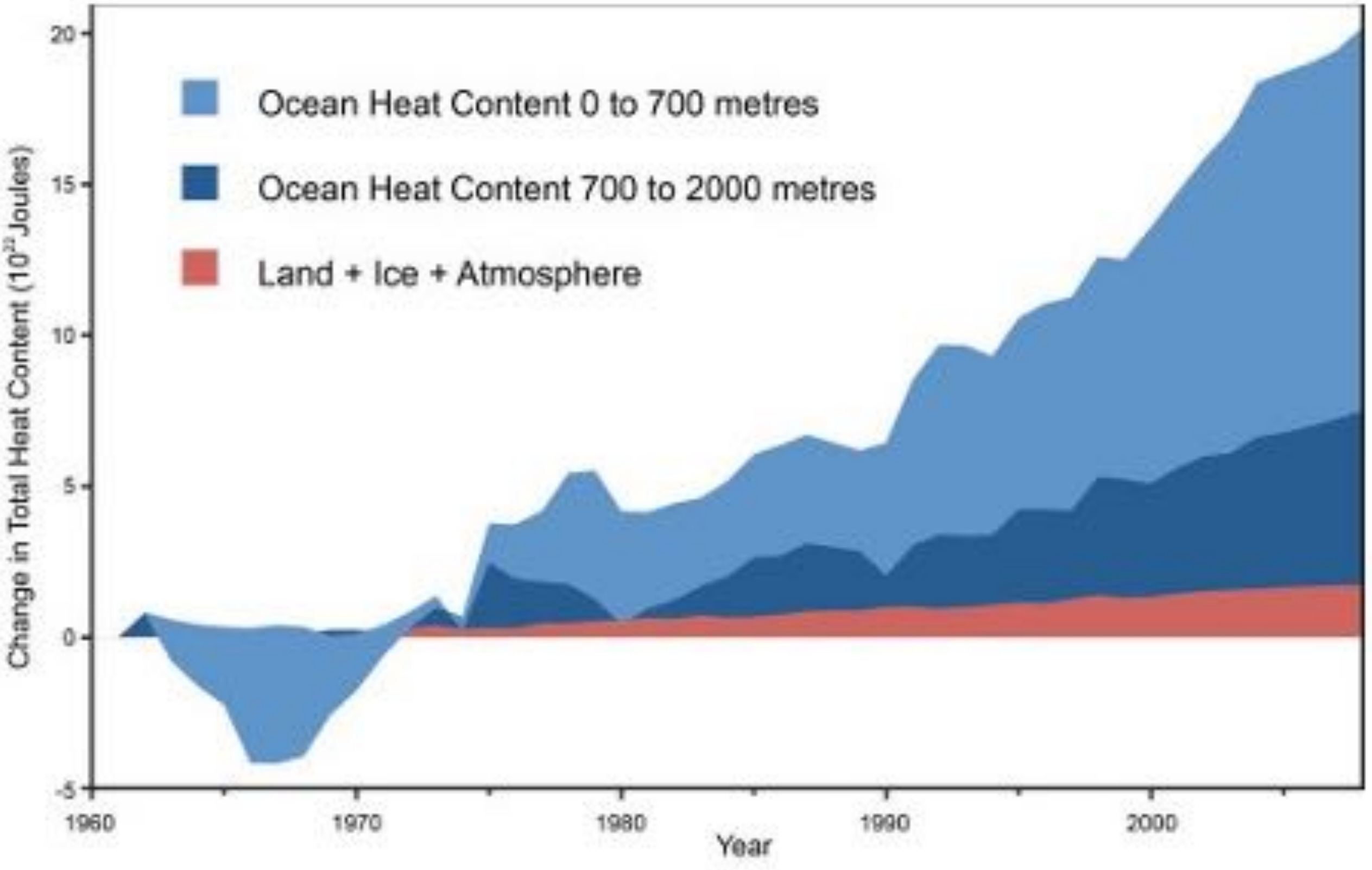
Global Energy Review: CO_2 Emissions in 2020

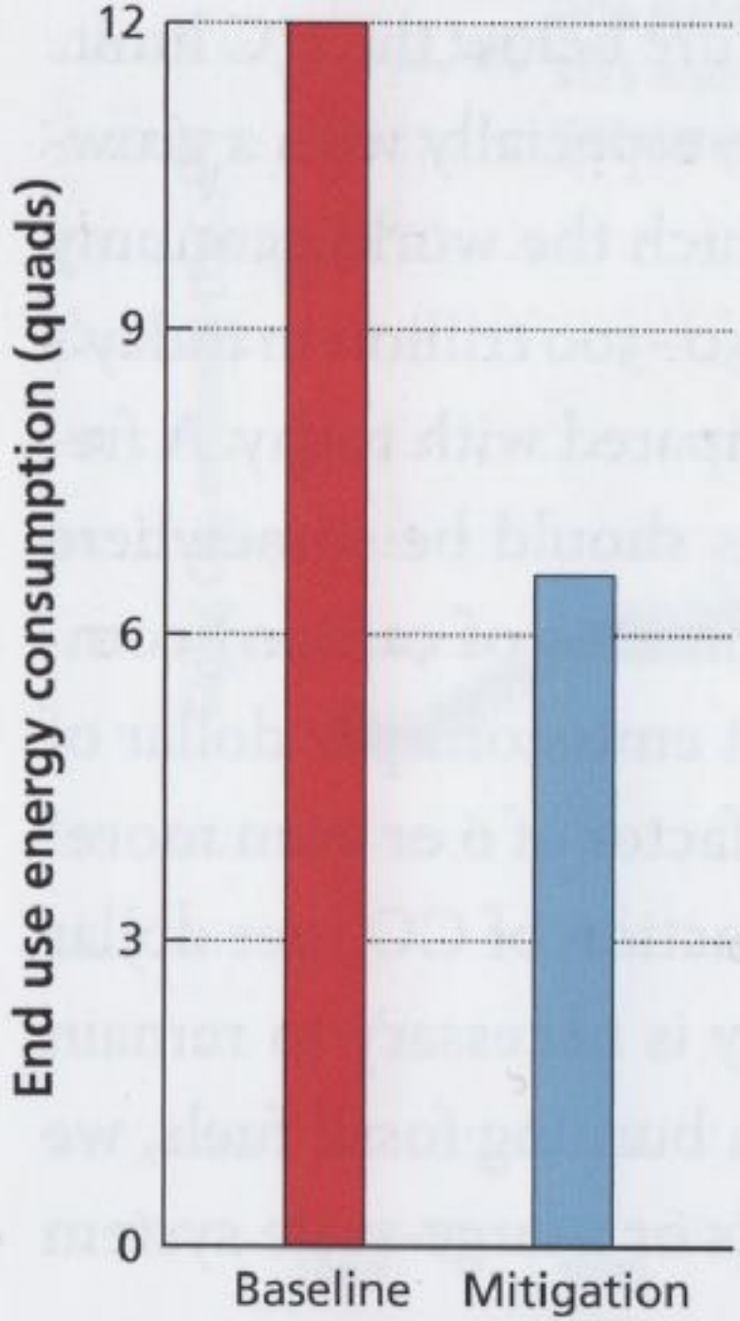


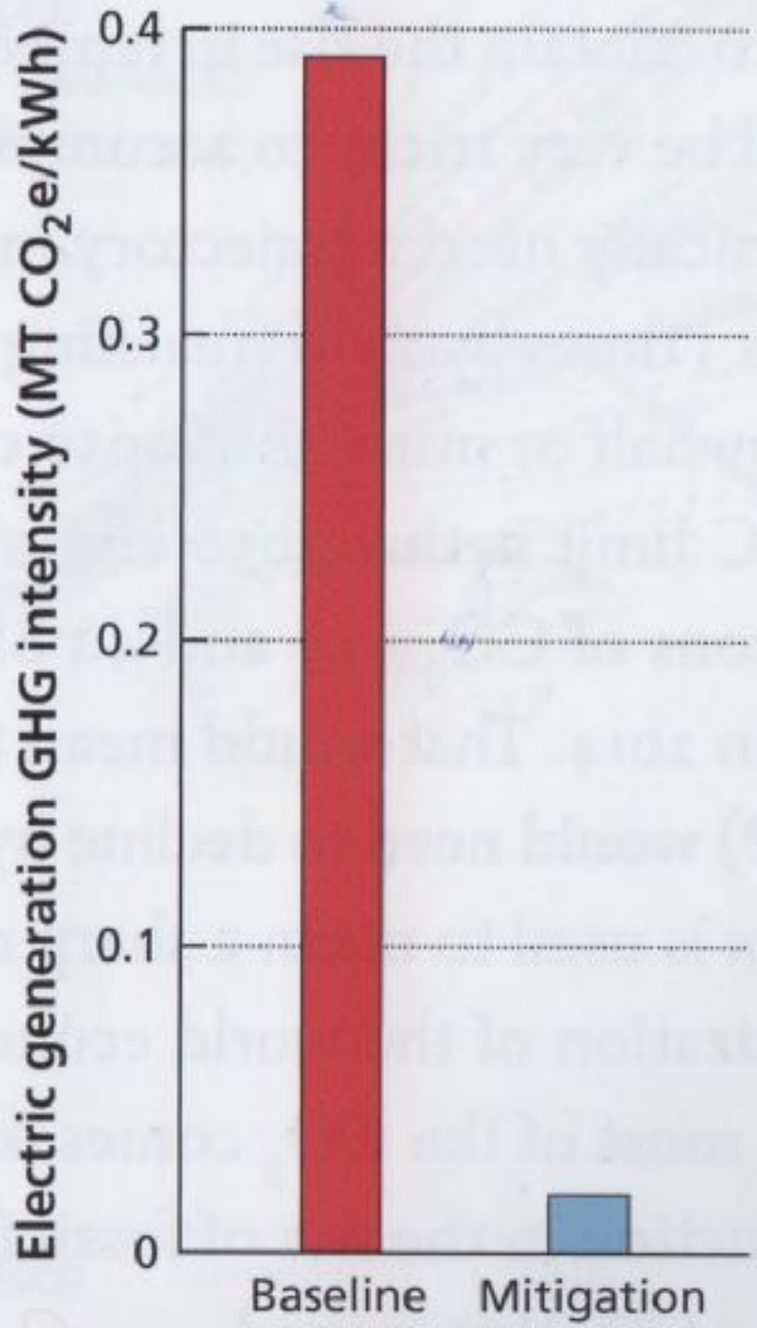

Sea Ice Extent
08/02/2011
National Snow and Ice Data Center, Boulder, CO
median
1979–2000

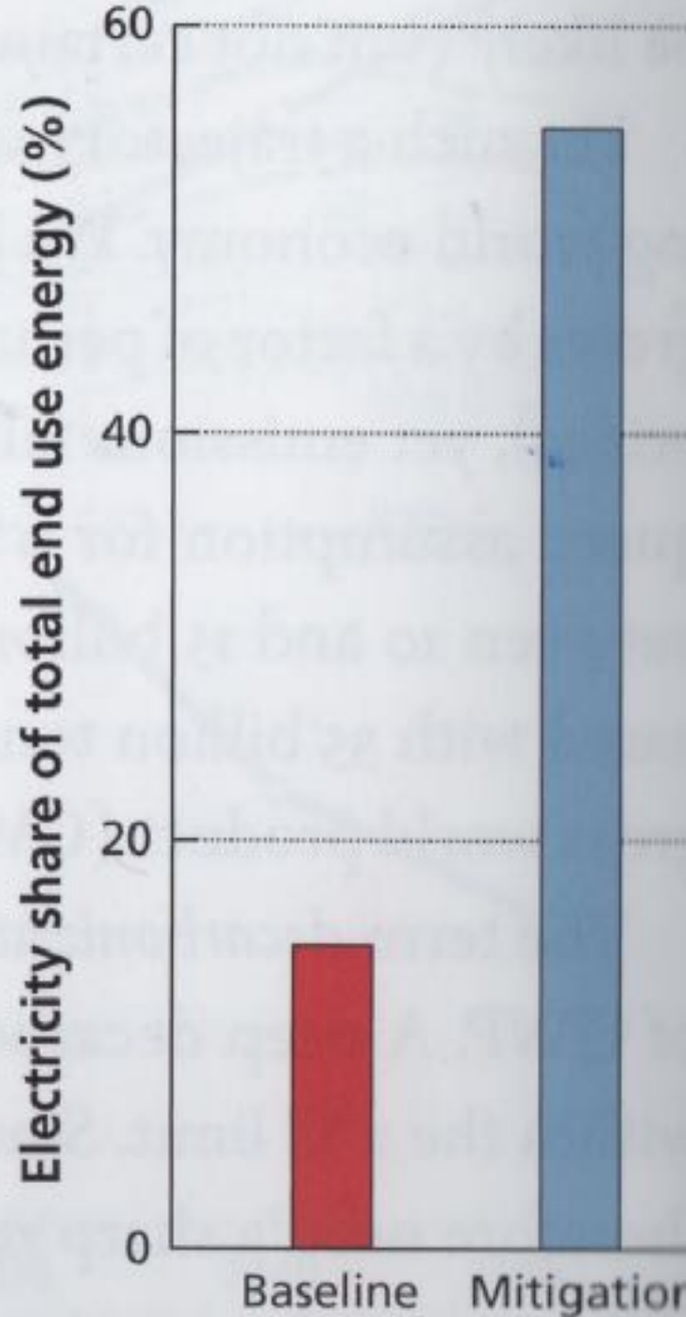

2012


NASA global mean temperature
12-months running average
including September 2016
Temperature anomaly [°C]
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.5
1880
1900
1920
1940
1960
1980
2000
2020
Year


Ocean Heat Content 0 to 700 metres
Ocean Heat Content 700 to 2000 metres
Land + Ice + Atmosphere
Change in Total Heat Content (10^{22} Joules)
20
15
10
5
0
-5
1960
1970
1980
1990
2000
Year

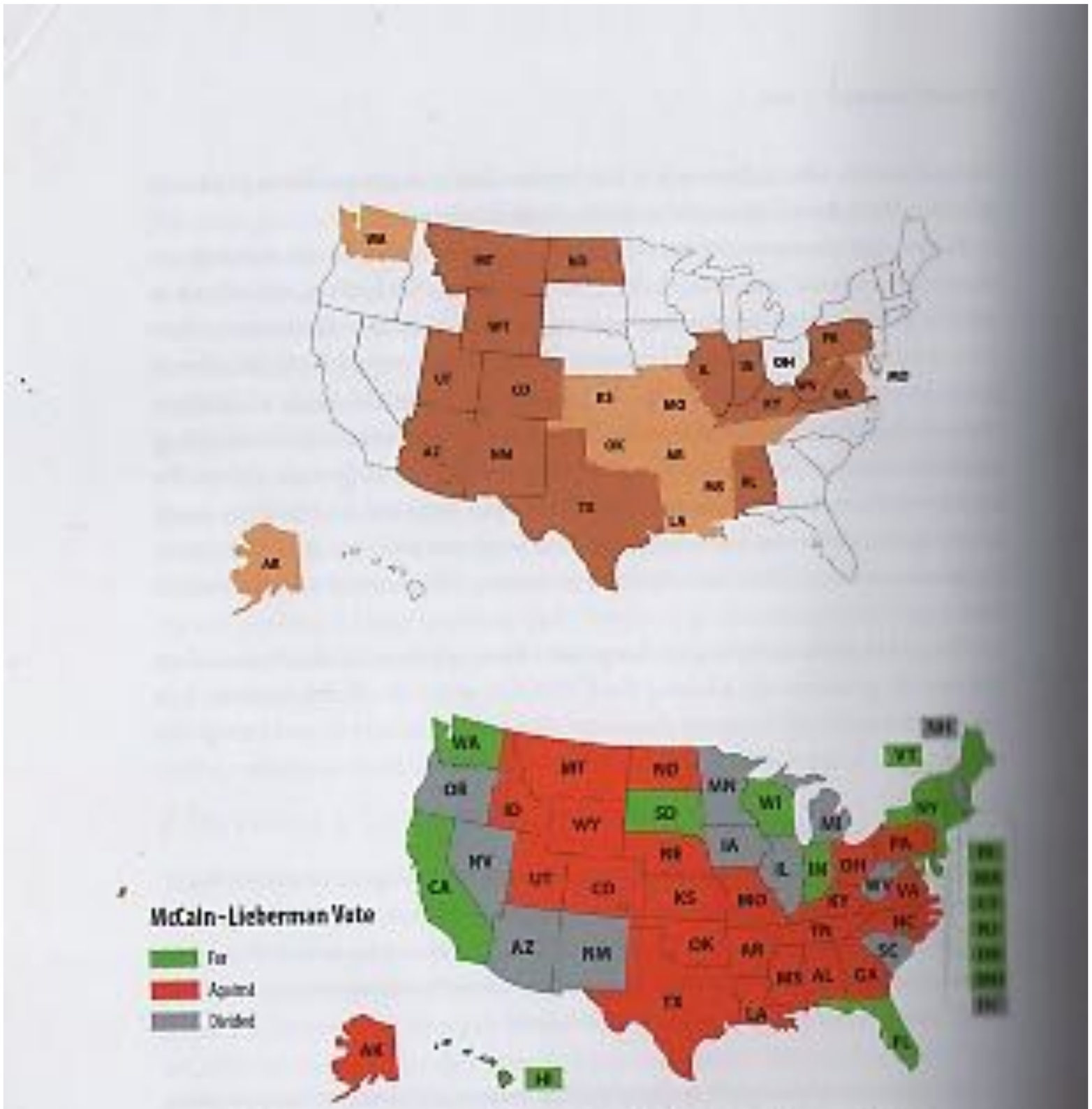






12.14 Three energy transformations to reduce GHGs in California by 2050

Source: Williams, James H., Andrew DeBenedictis, Rebecca Ghanadan, Amber Mahone, Jack Moore, William R. Morrow III, Snuller Price et al. 2012. "The Technology Path to Deep Greenhouse Gas Emissions Cuts by 2050:



12.30 Coal producing states vs. Climate Stewardship Acts voting patterns

Source: U.S. Department of Energy & U.S. Senate.

Data: CDIAC/GCP

CO_2 emissions (Gt CO_2/yr)

12
10
8
6
4
2
0

1960
1970
1980
1990
2000
2010
16

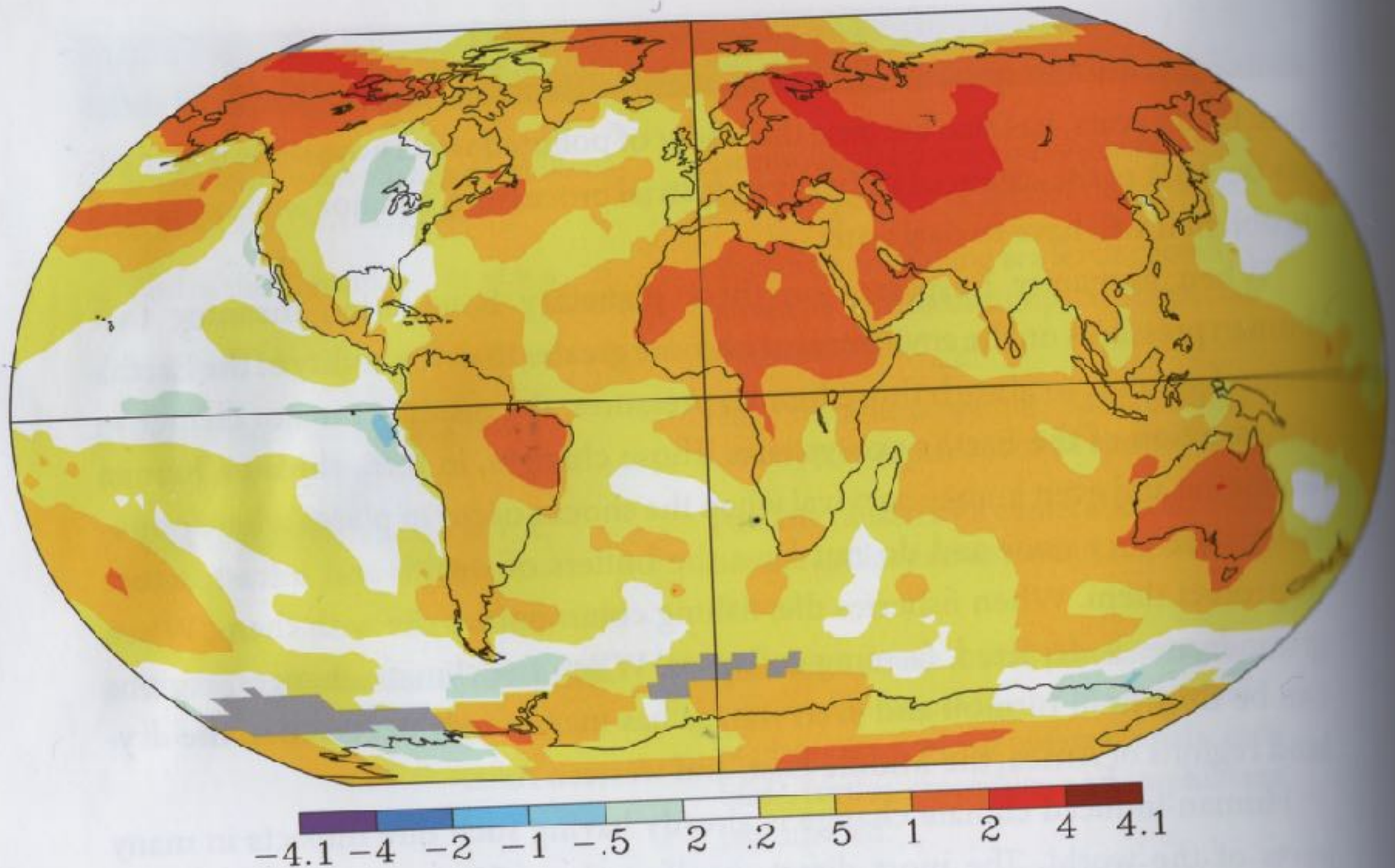
China –0.3%
Growth over 2015

USA –2.1%

EU28 –0.3%

India +4.5%

Global Carbon Project



6.6 Surface temperatures in 2013 compared with 1951–80

Source: Calculated at http://data.giss.nasa.gov/cgi-bin/gistemp/nmaps.cgi?sat=4&sst=3&type=anoms&mean_gen=0112&year1=2013&year2=2013&base1=1951&base2=1980&radius=1200&pol=rob.