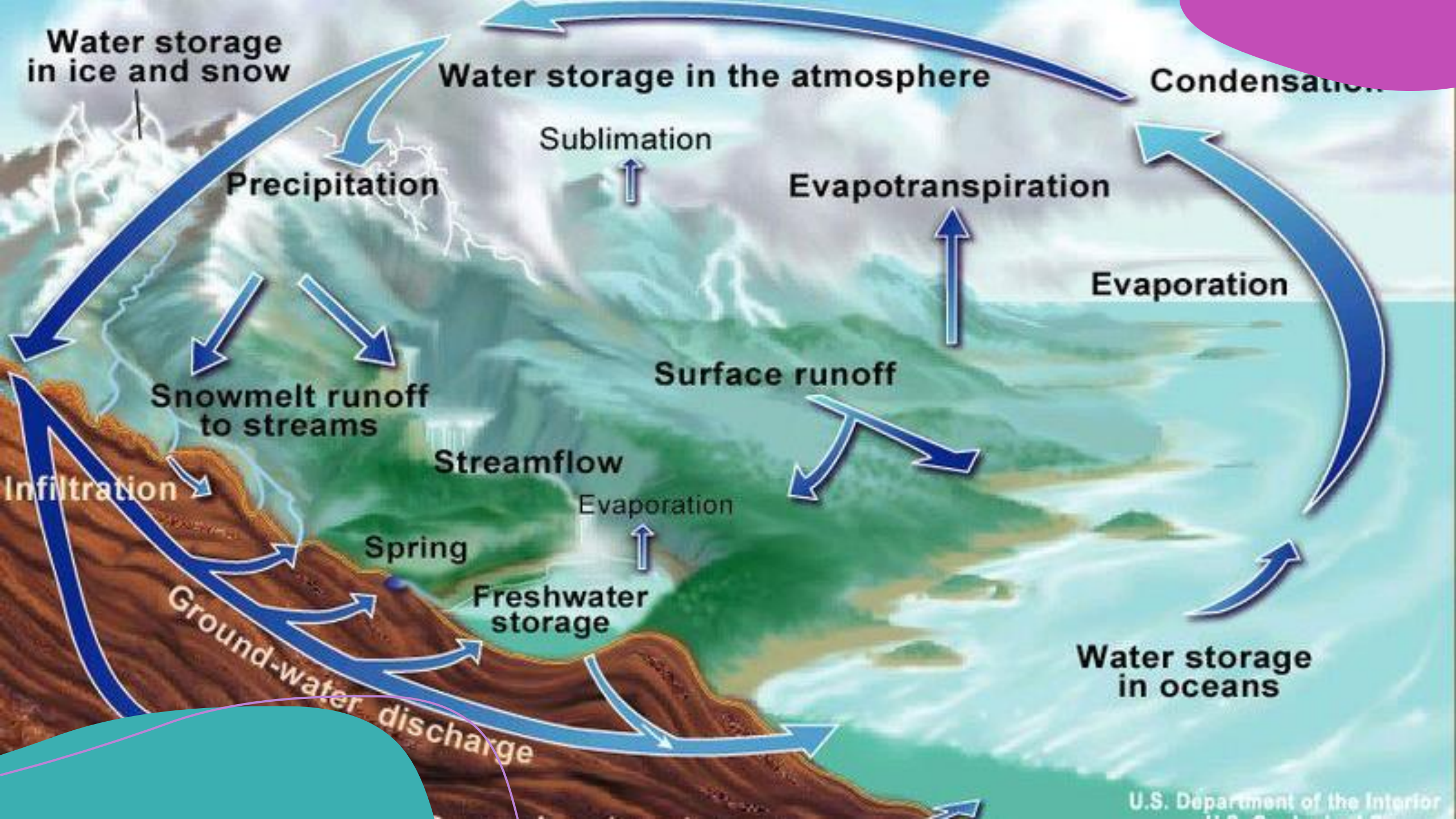
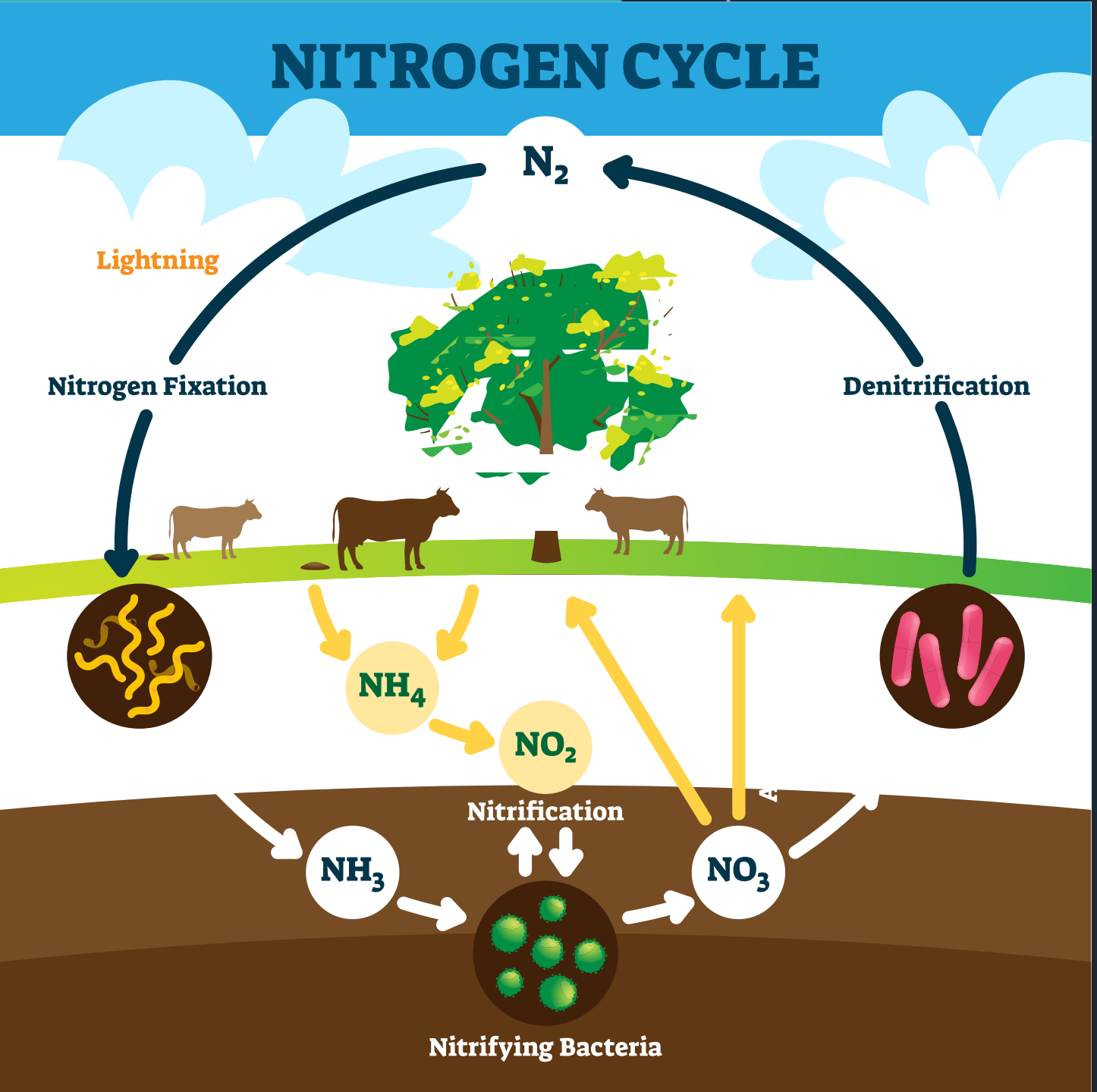
Earth Day 2022

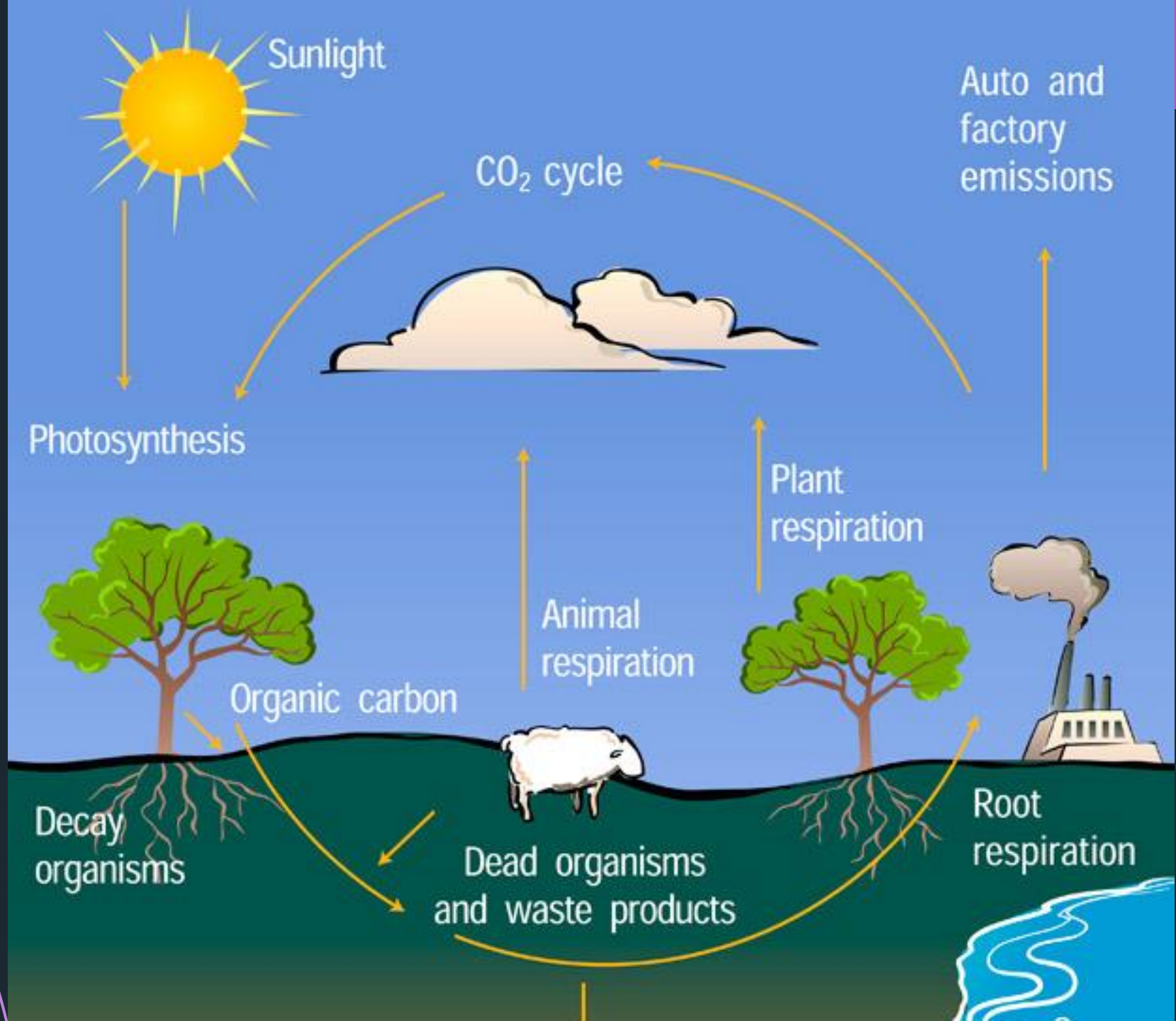
Climate change and some thoughts about Local impact

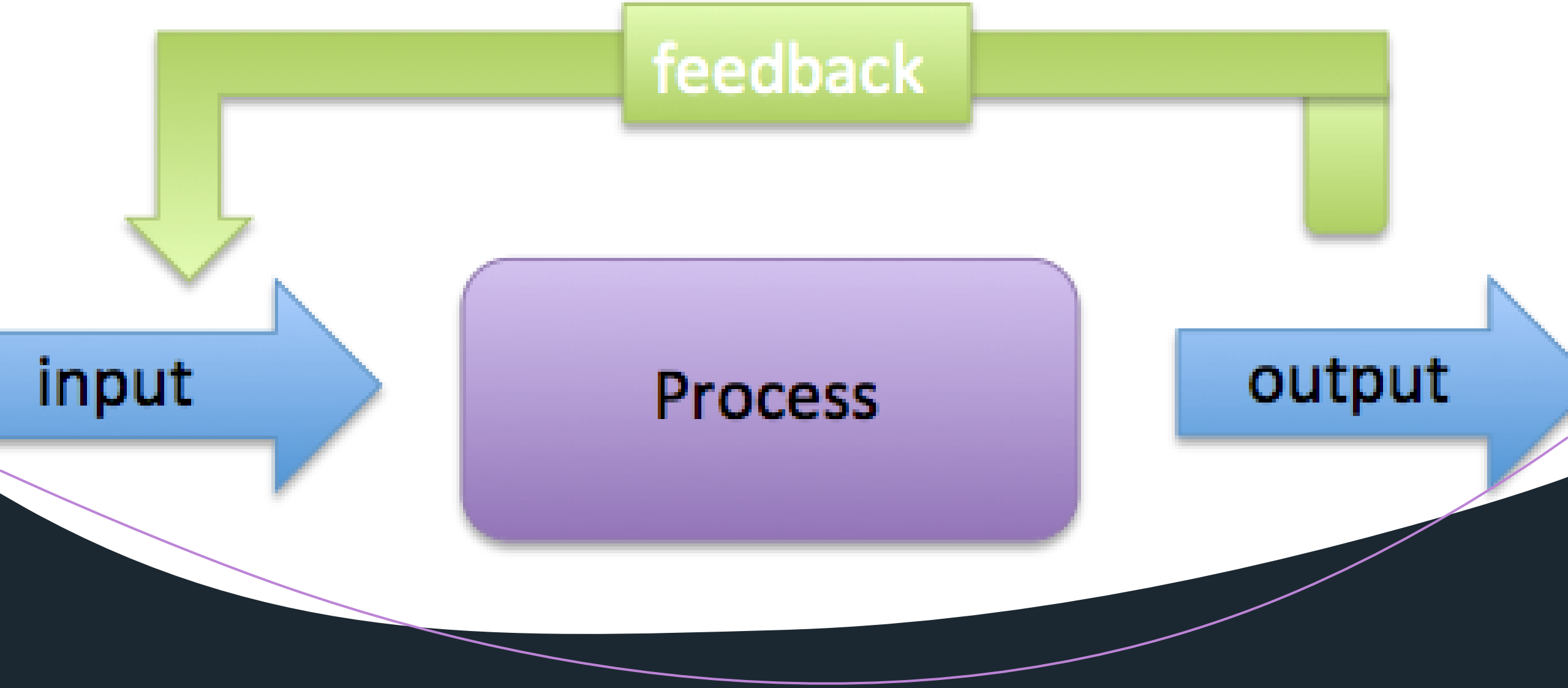

ROAD
CLOSED

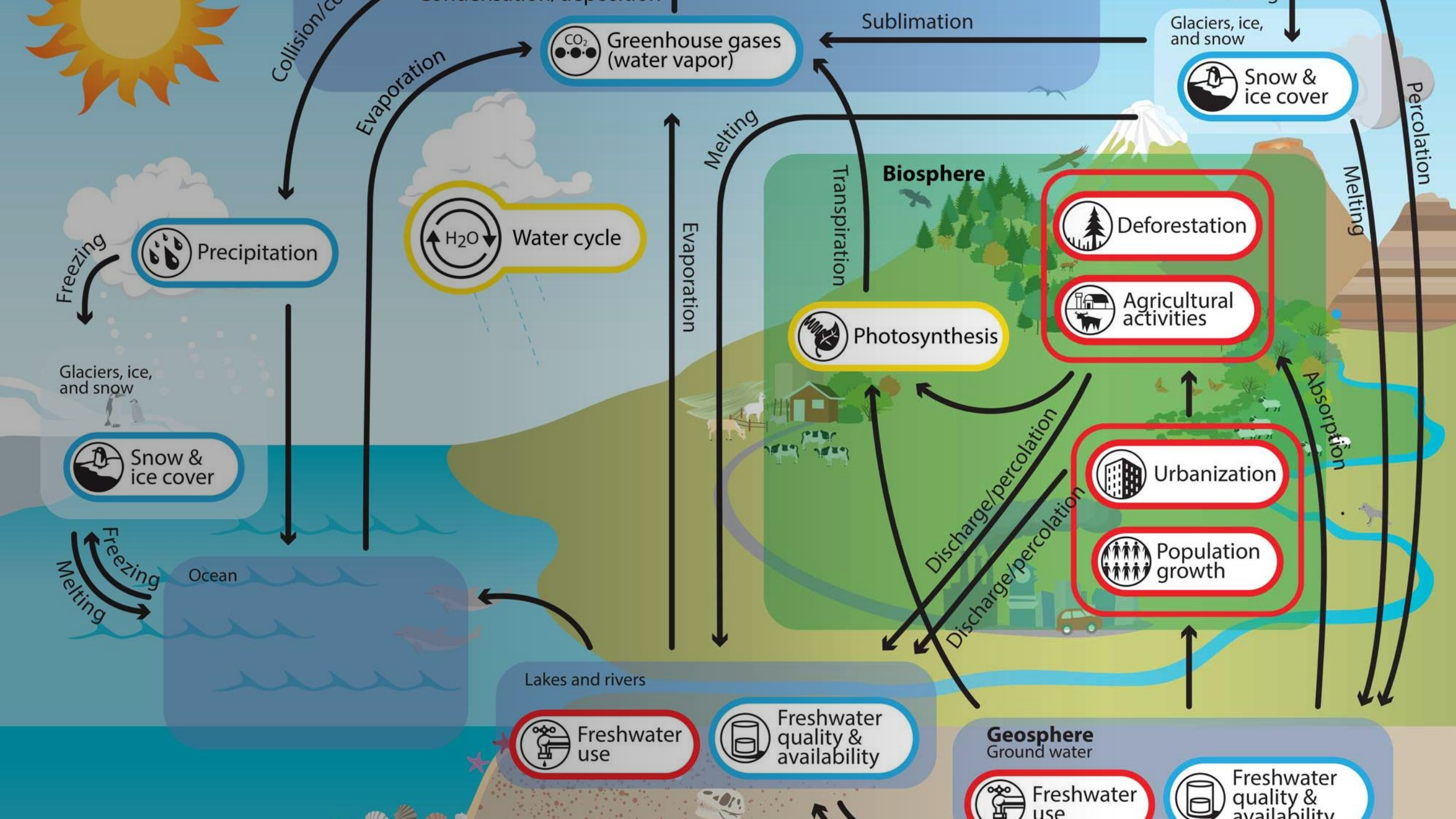

CO_2

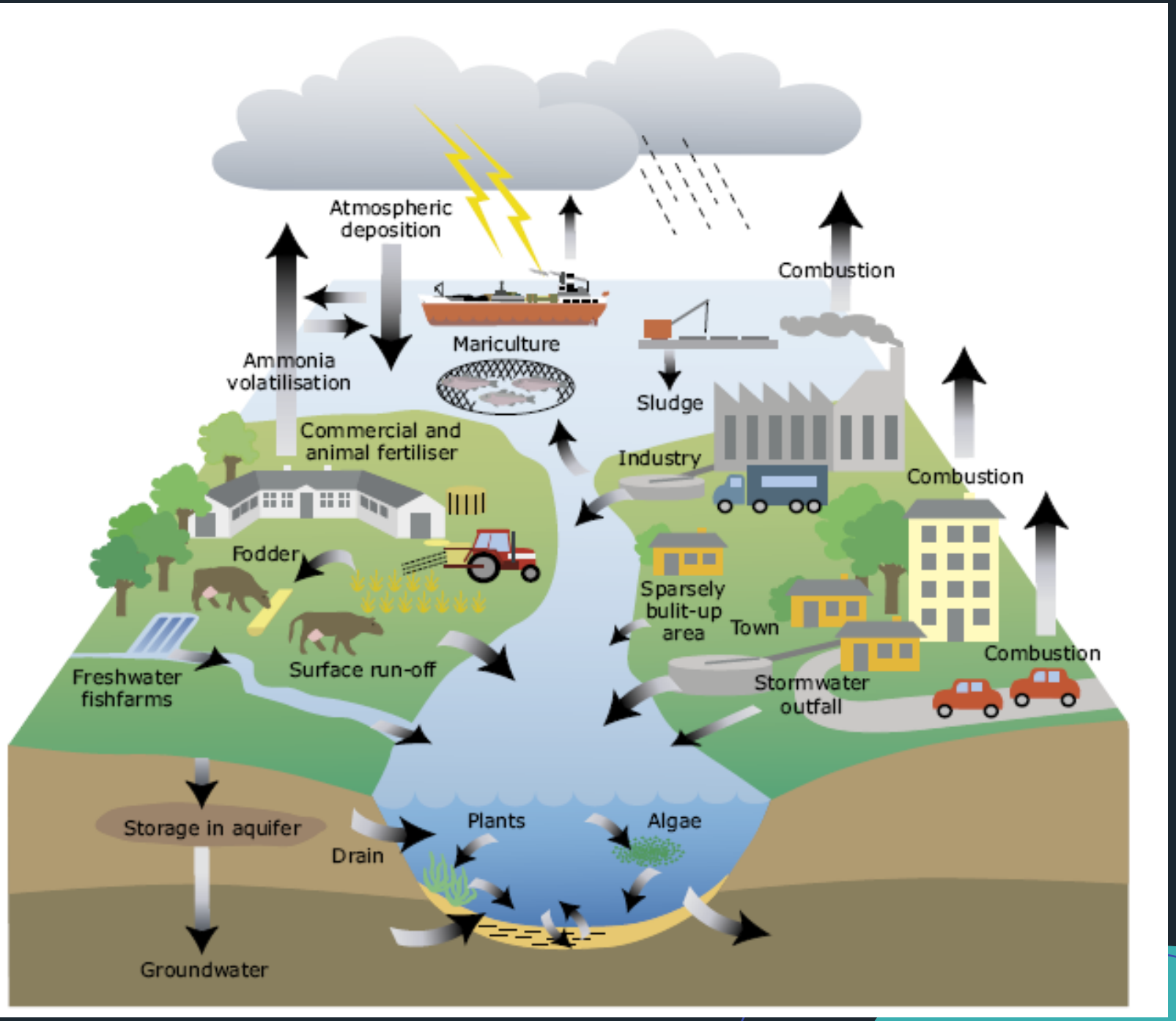

Water storage in ice and snow
Water storage in the atmosphere
Condensation
Sublimation
Precipitation
Evapotranspiration
Evaporation
Surface runoff
Snowmelt runoff to streams
Streamflow
Infiltration
Evaporation
Spring
Freshwater storage
Ground-water discharge
Water storage in oceans
U.S. Department of the Interior

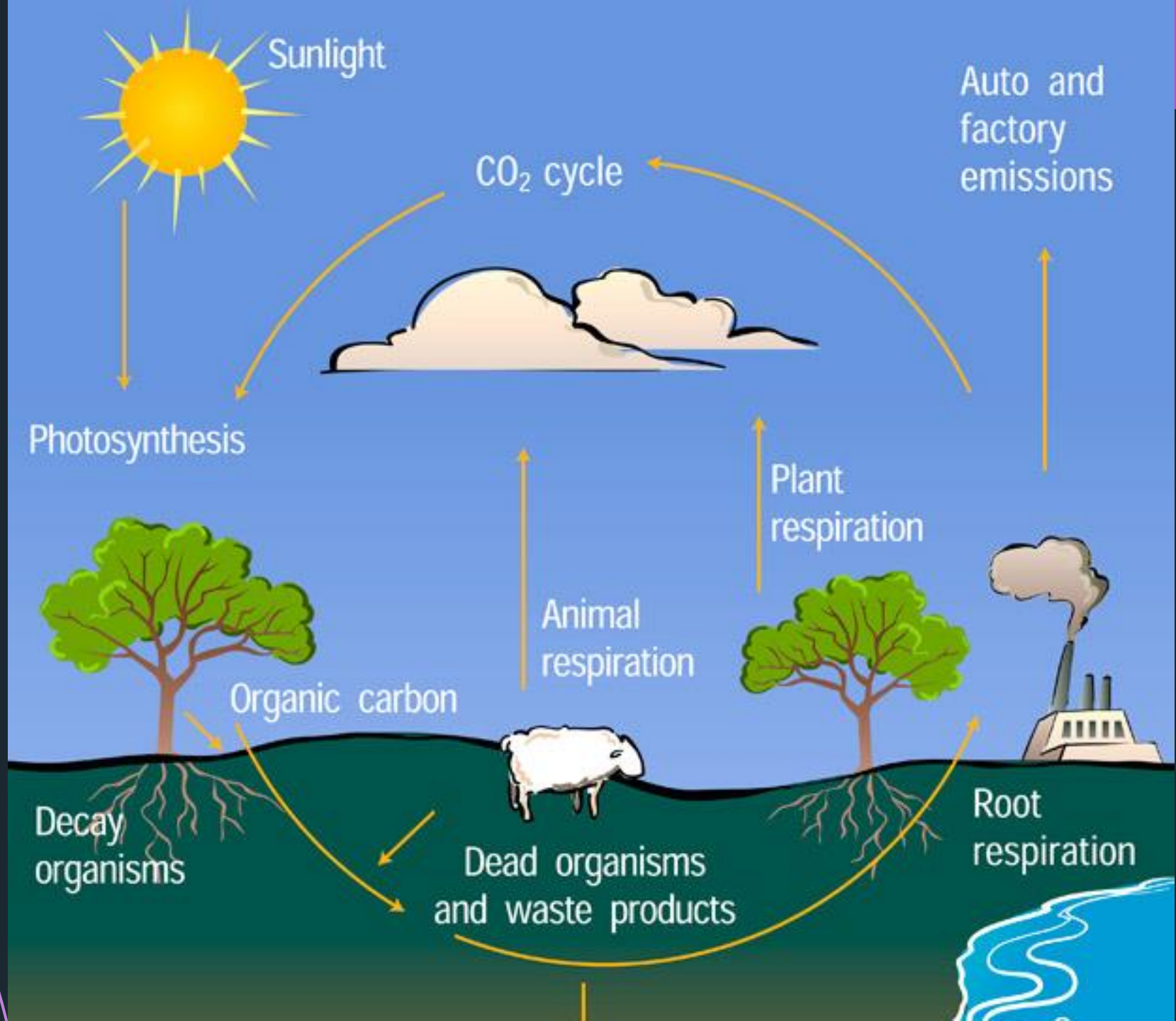

NITROGEN CYCLE
N_2
Lightning
Nitrogen Fixation
Denitrification
NH_4
NO_2
Nitrification
NH_3
NO_3
Nitrifying Bacteria


Sunlight
CO_2 cycle
Auto and factory emissions
Photosynthesis
Plant respiration
Animal respiration
Organic carbon
Decay organisms
Dead organisms and waste products
Root respiration


feedback
input
Process
output


Collision/co
Condensation/deposition
Greenhouse gases (water vapor)
Sublimation
Evaporation
Glaciers, ice, and snow
Snow & ice cover
Percolation
Melting
Water cycle
Precipitation
Freezing
Evaporation
Transpiration
Biosphere
Deforestation
Agricultural activities
Photosynthesis
Glaciers, ice, and snow
Snow & ice cover
Absorption
Urbanization
Population growth
Discharge/percolation
Discharge/percolation
Freezing
Melting
Ocean
Lakes and rivers
Freshwater use
Freshwater quality & availability
Geosphere
Ground water
Freshwater use
Freshwater quality & availability


Atmospheric deposition
Combustion
Mariculture
Ammonia volatilisation
Sludge
Commercial and animal fertiliser
Industry
Combustion
Fodder
Sparsely bulit-up area
Town
Combustion
Surface run-off
Freshwater fishfarms
Stormwater outfall
Storage in aquifer
Plants
Algae
Drain
Groundwater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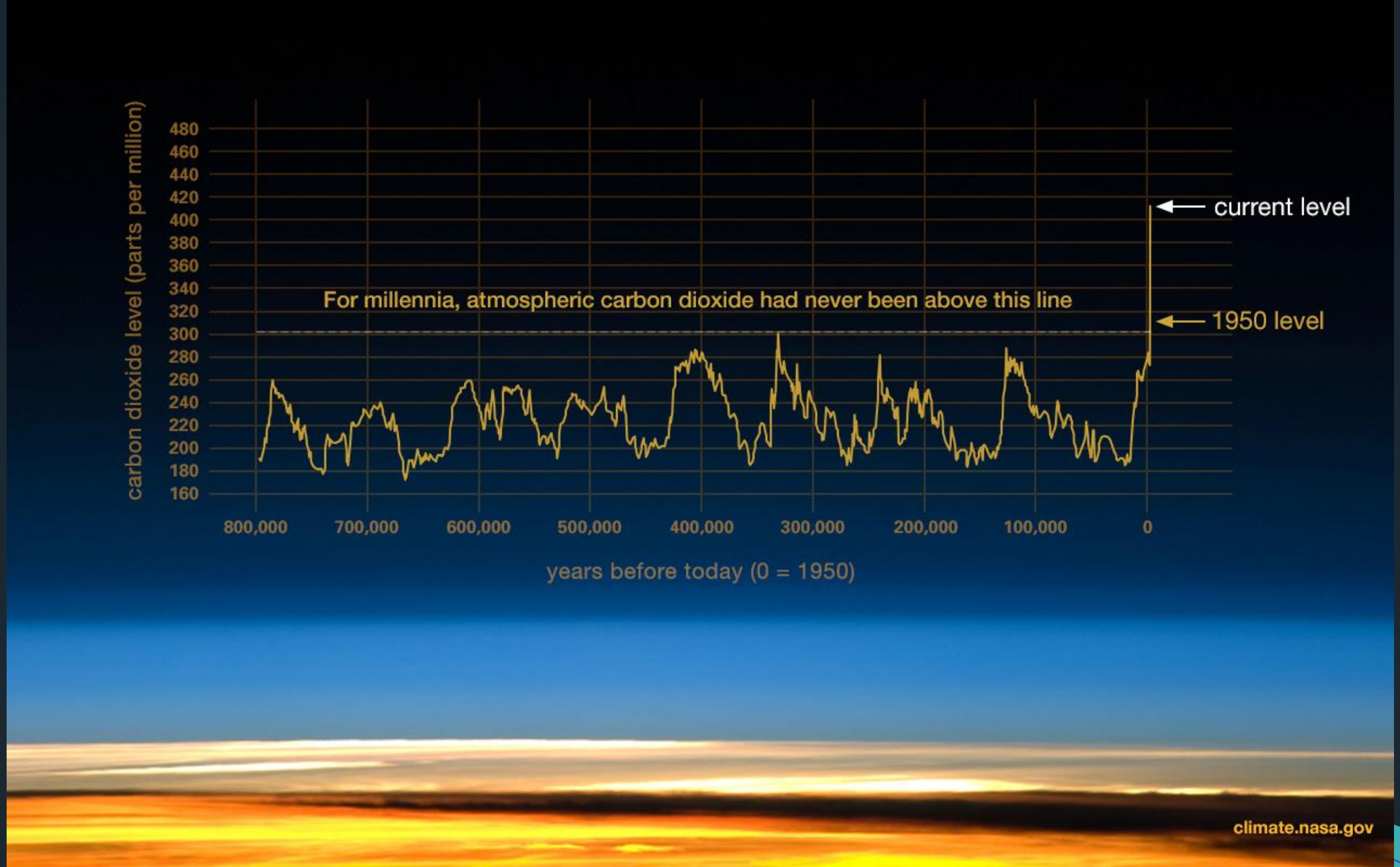
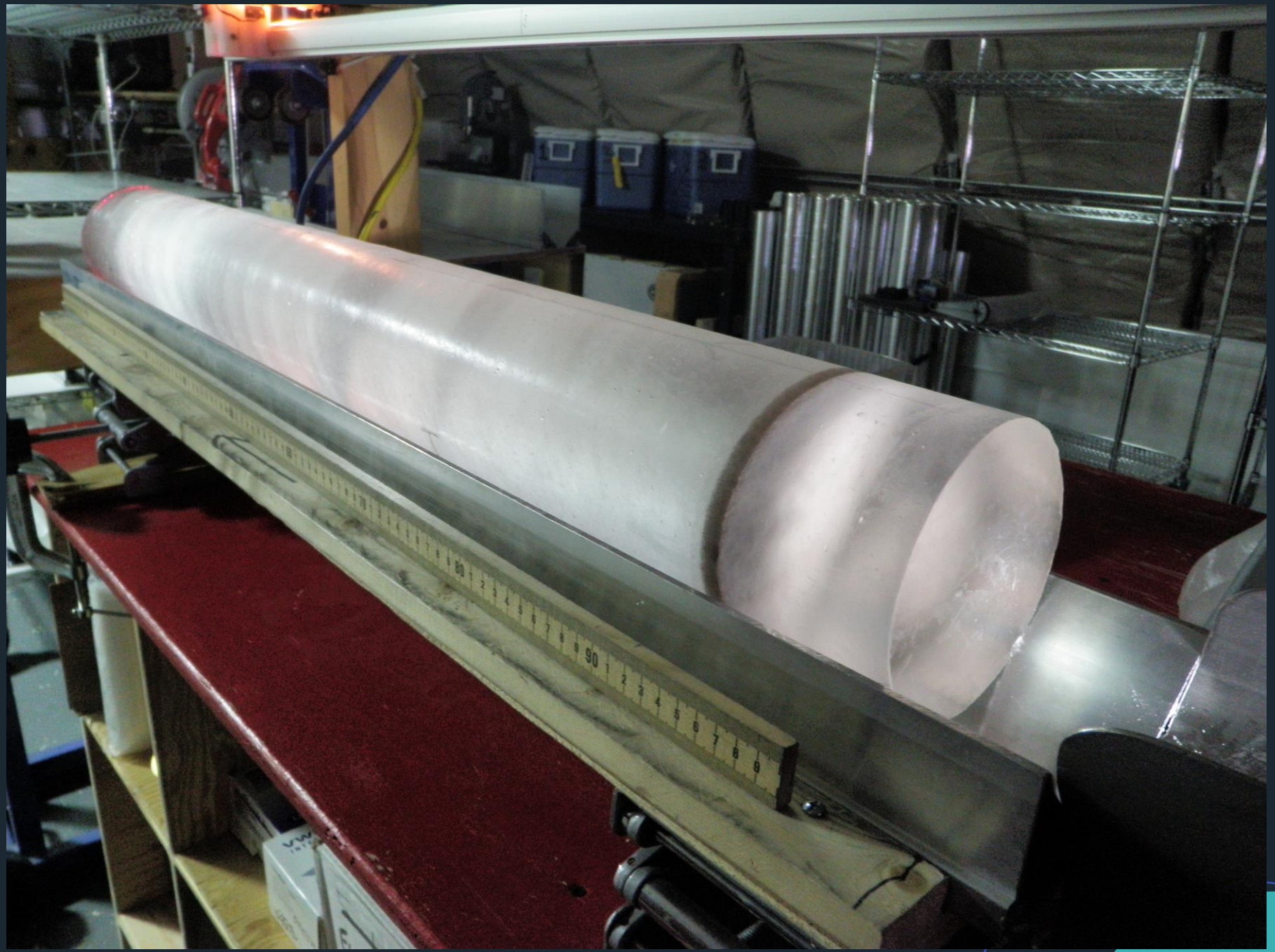
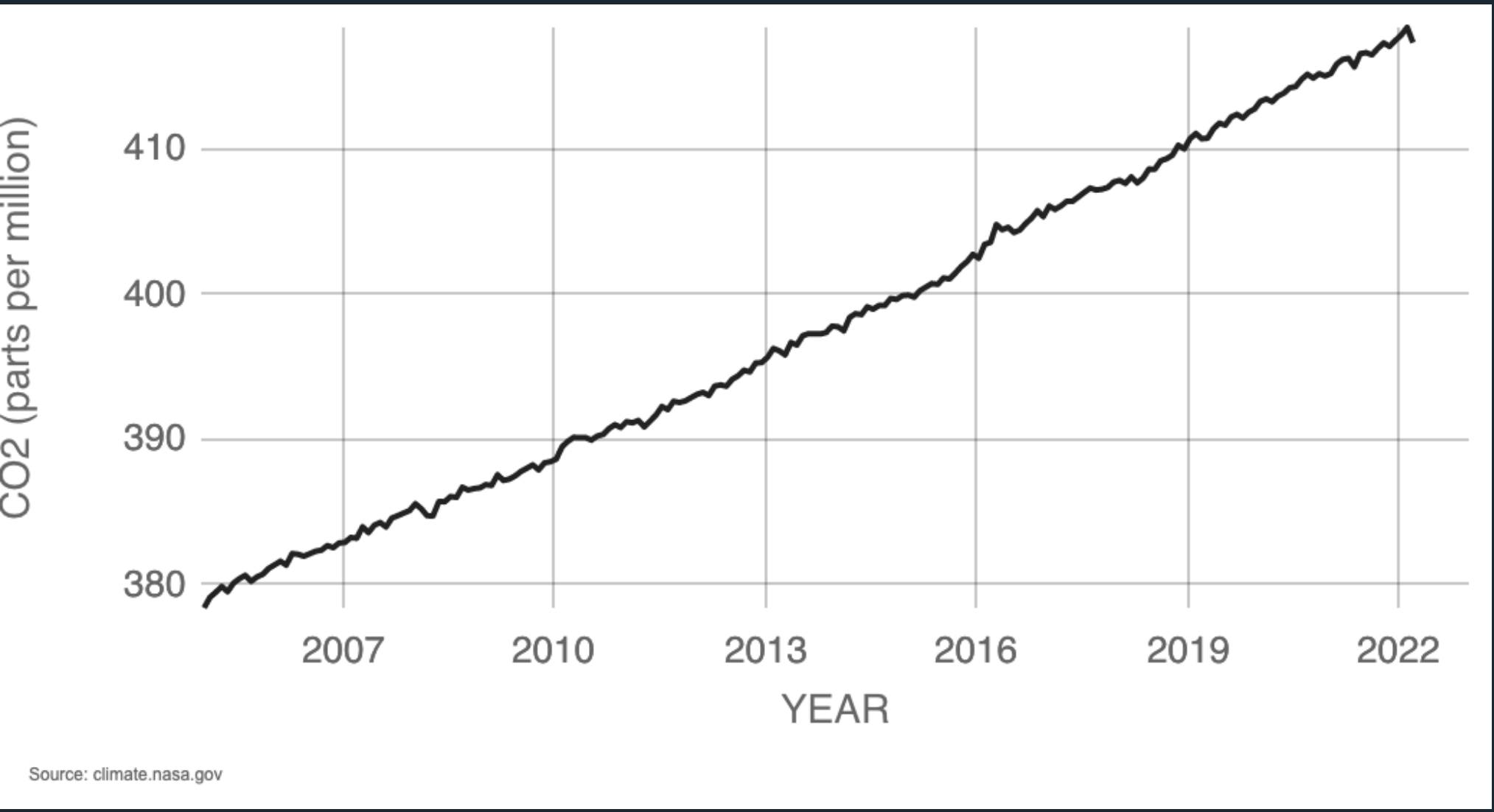
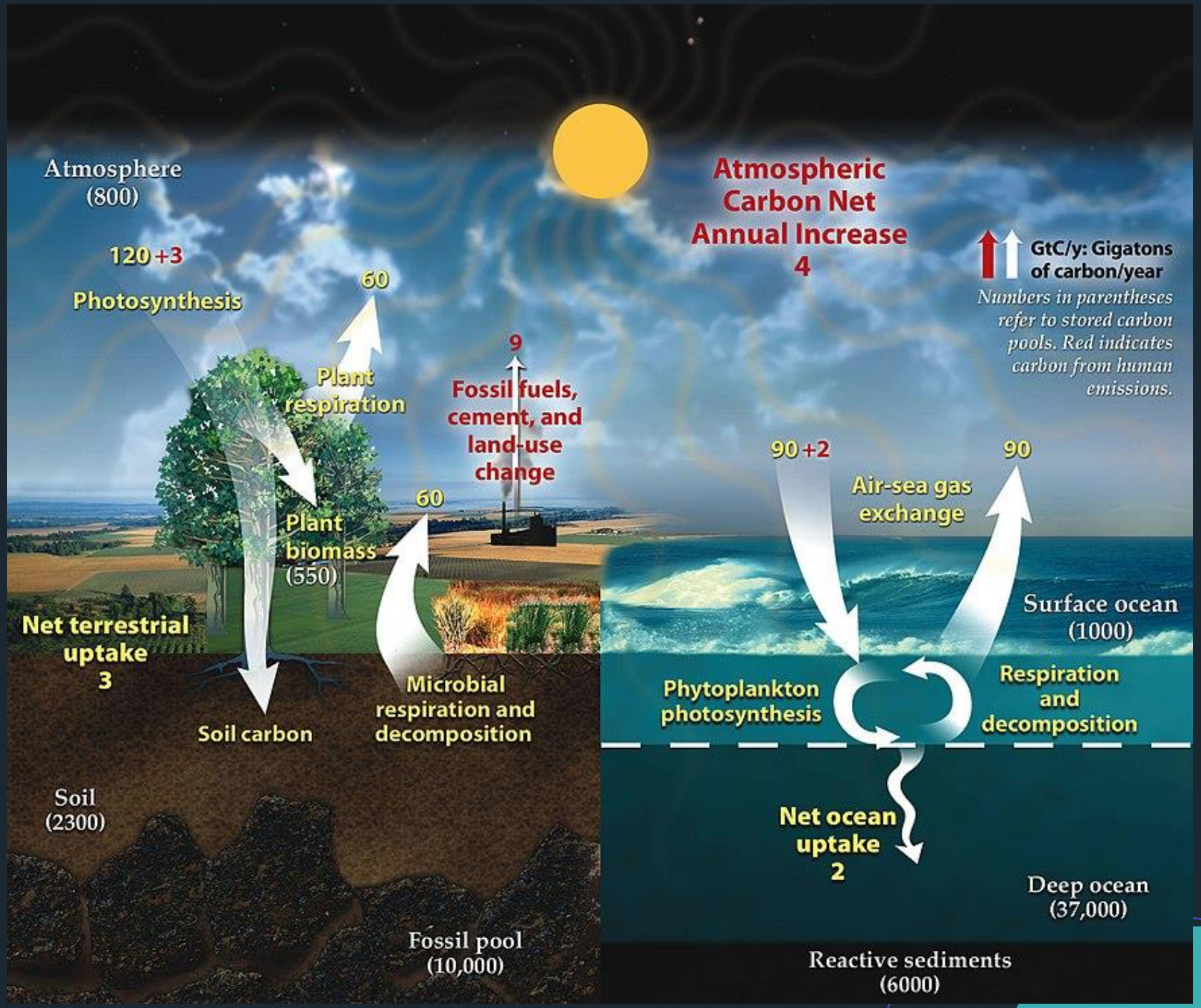
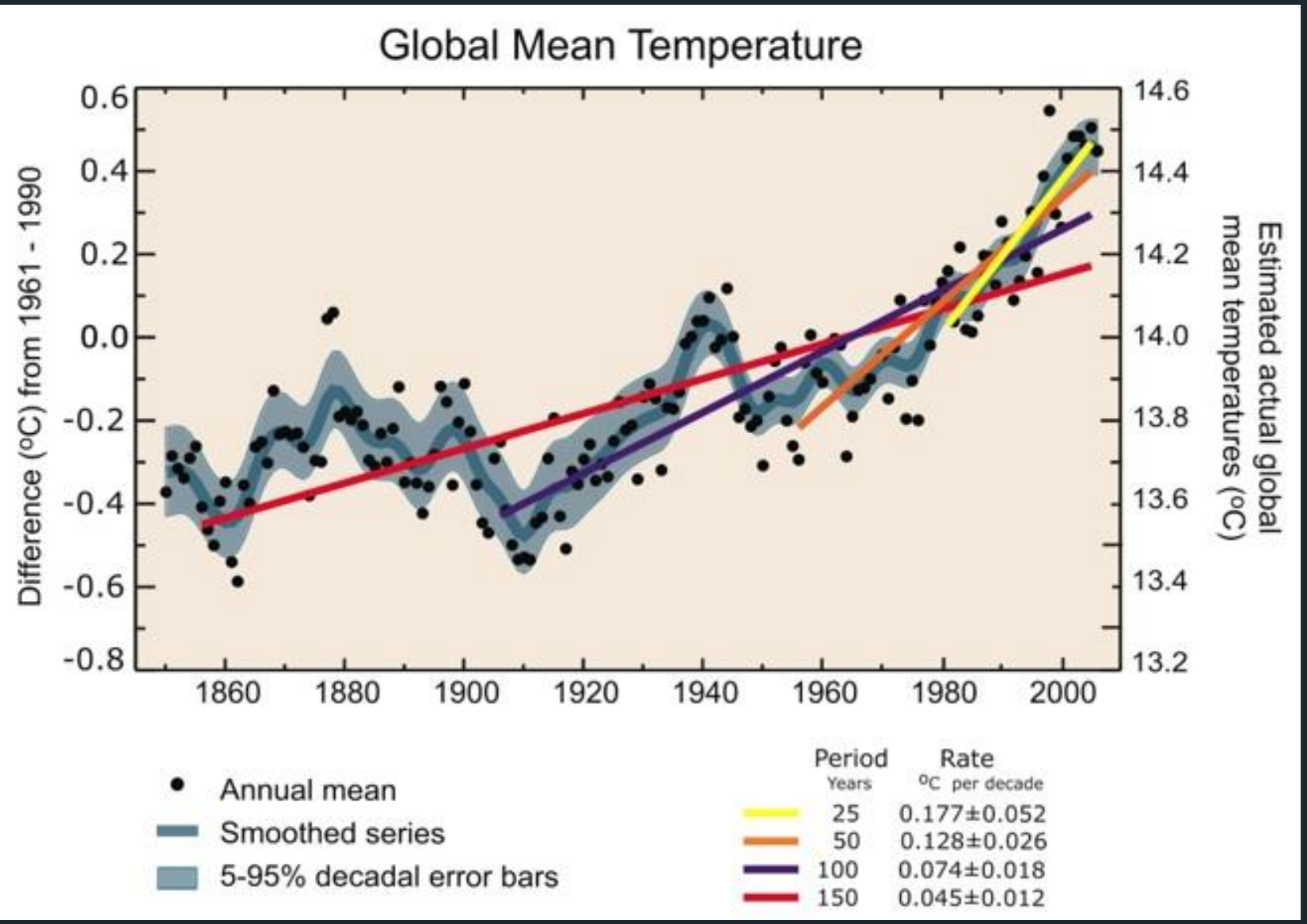

carbon dioxide level (parts per million)
480
460
440
420
400
380
360
340
320
300
280
260
240
220
200
180
160
For millennia, atmospheric carbon dioxide had never been above this line
current level
1950 level
800,000
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0
years before today (0 = 1950)
climate.nasa.gov





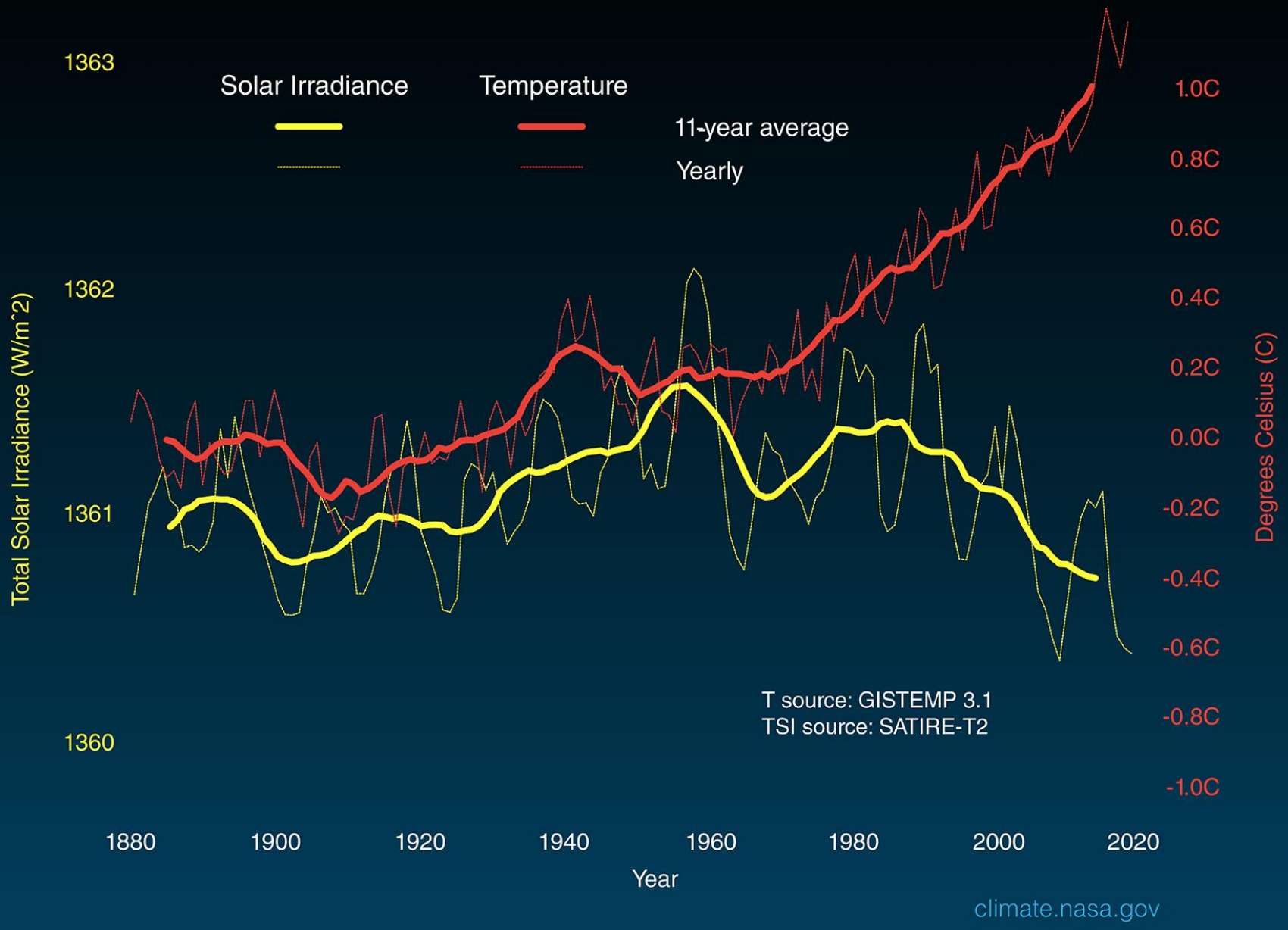
417 ppm today!


Atmosphere
(800)
120 +3
Photosynthesis
60
Plant
respiration
9
Fossil fuels,
cement, and
land-use
change
60
Plant
biomass
(550)
Net terrestrial
uptake
3
Soil carbon
Microbial
respiration and
decomposition
Soil
(2300)
Fossil pool
(10,000)
Atmospheric
Carbon Net
Annual Increase
4
GtC/y: Gigatons
of carbon/year
Numbers in parentheses
refer to stored carbon
pools. Red indicates
carbon from human
emissions.
90 +2
Air-sea gas
exchange
90
Surface ocean
(1000)
Phytoplankton
photosynthesis
Respiration
and
decomposition
Net ocean
uptake
2
Deep ocean
(37,000)
Reactive sediments
(6000)

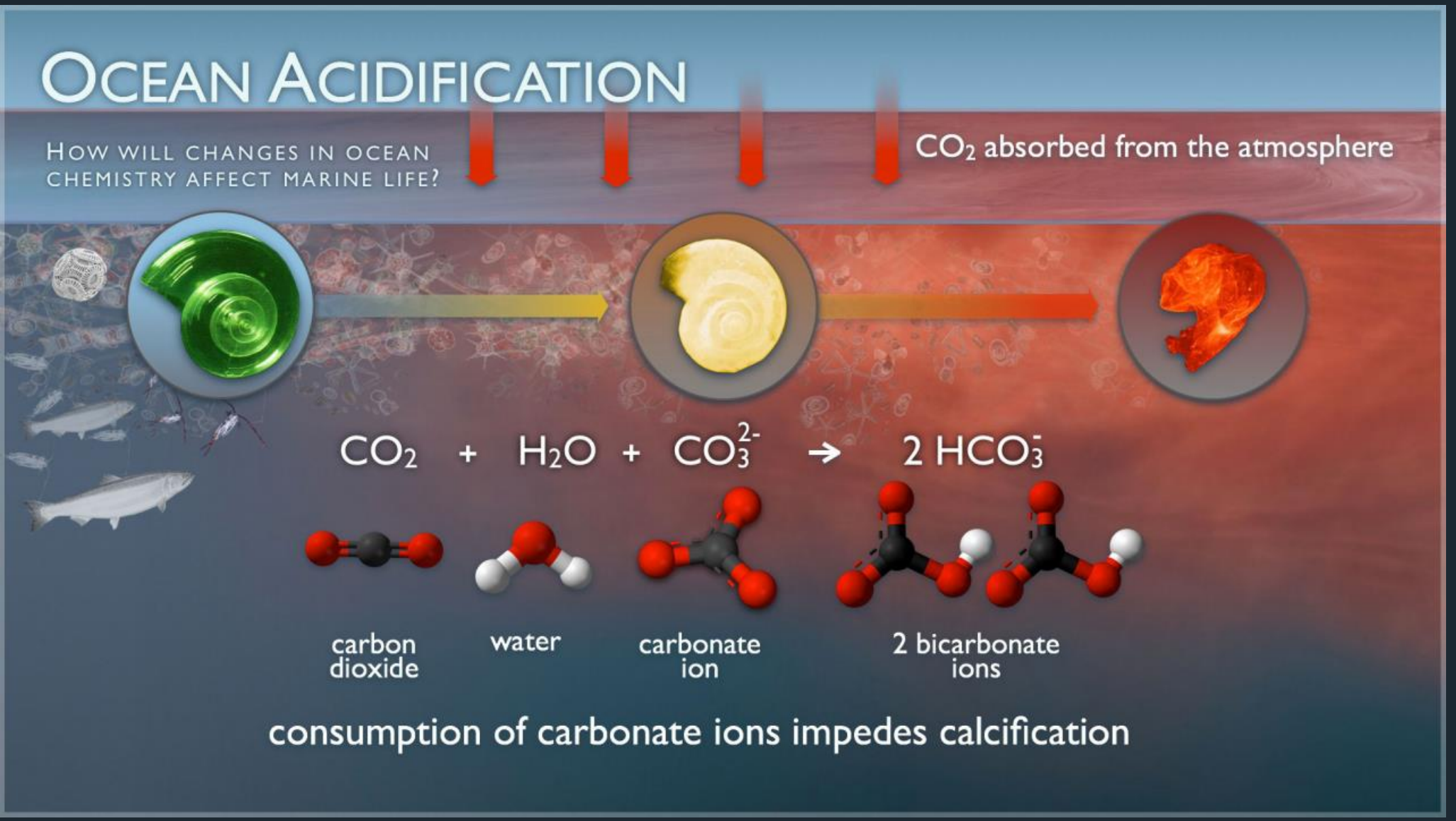


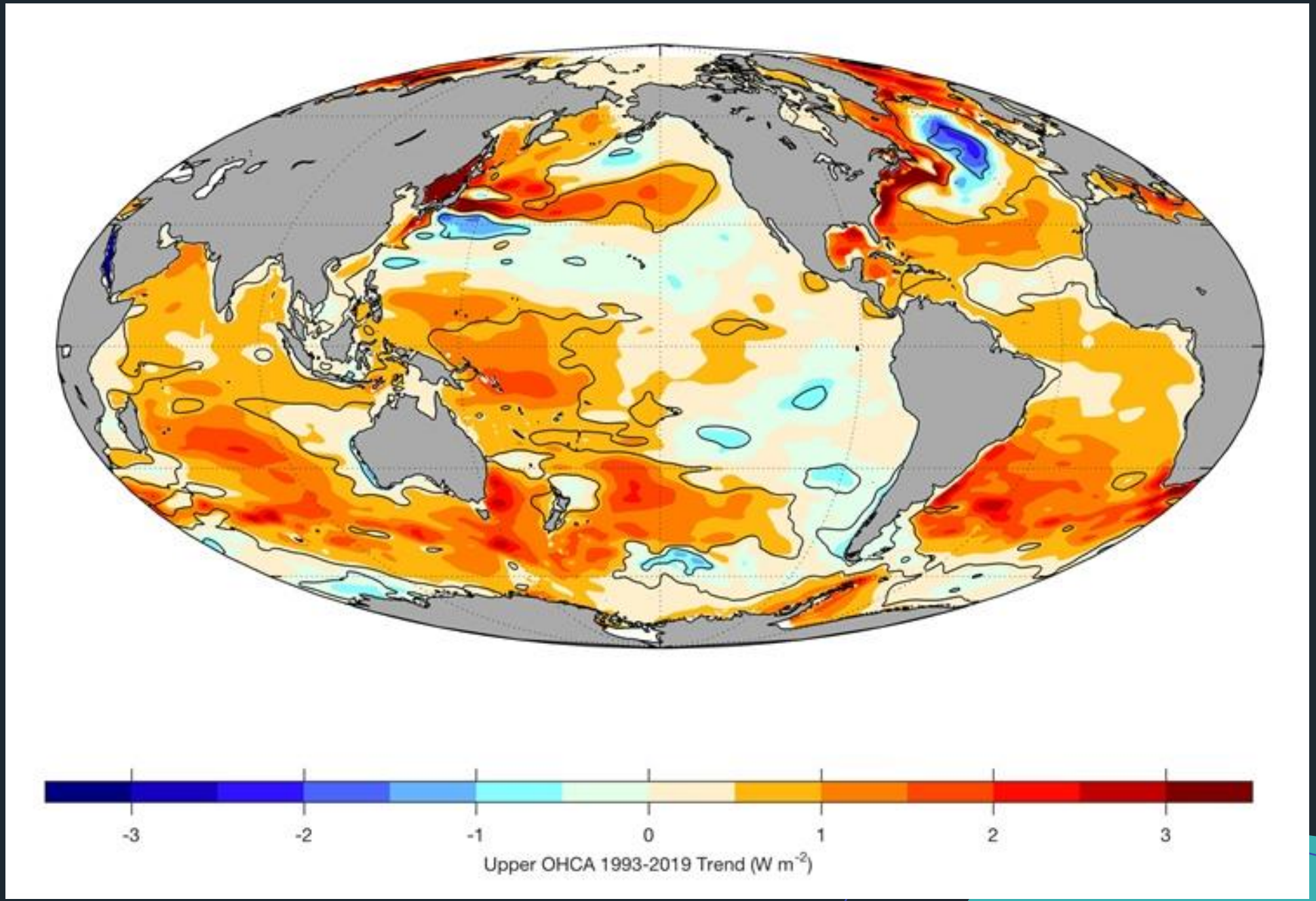
Intergovernmental Panel on Climate Change working group 1 http://ipcc-wg1.ucar.edu/wg1/FAQ/wg1_faq-3.1.html

Temperature vs Solar Activity

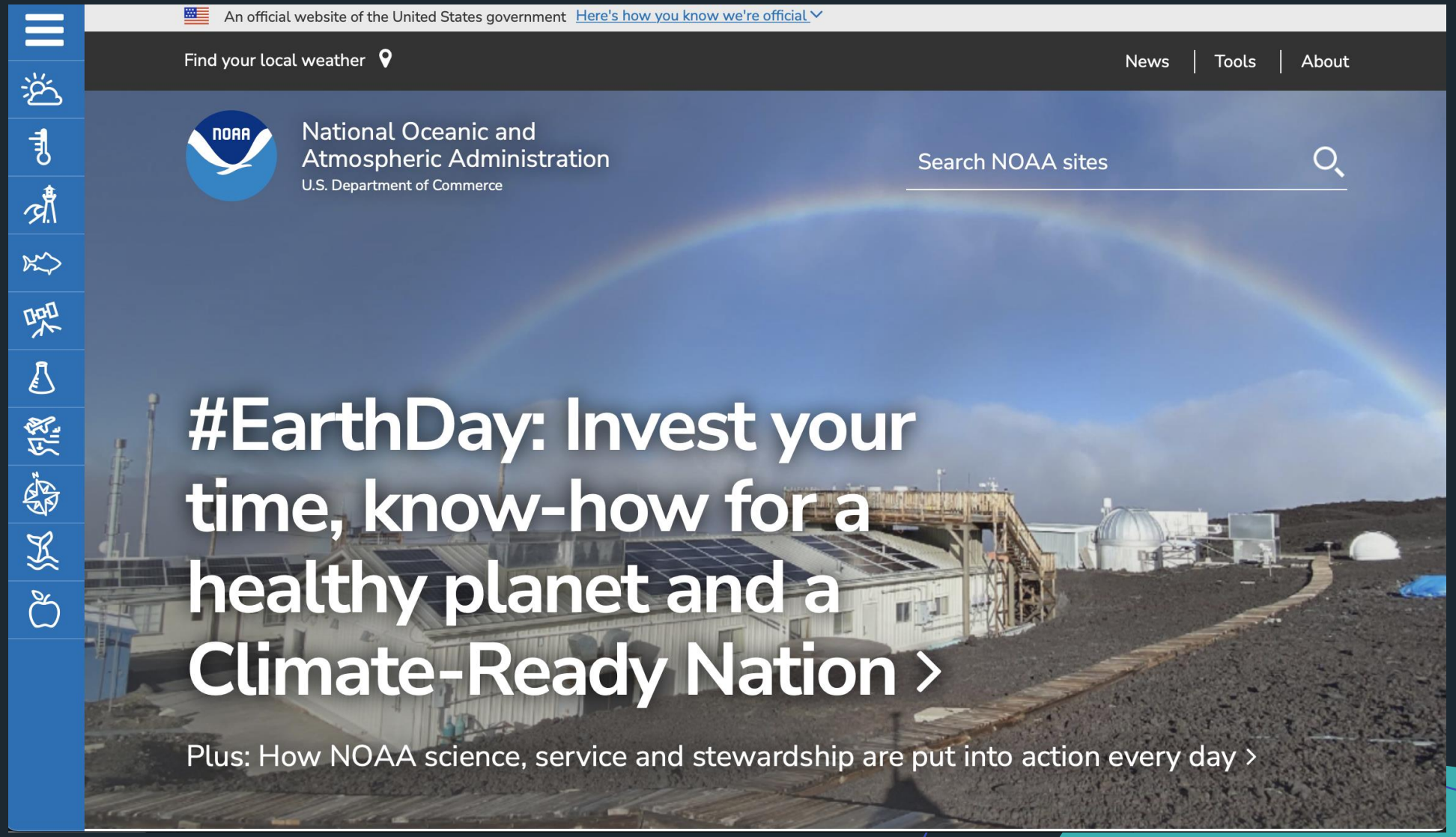


climate.nasa.gov

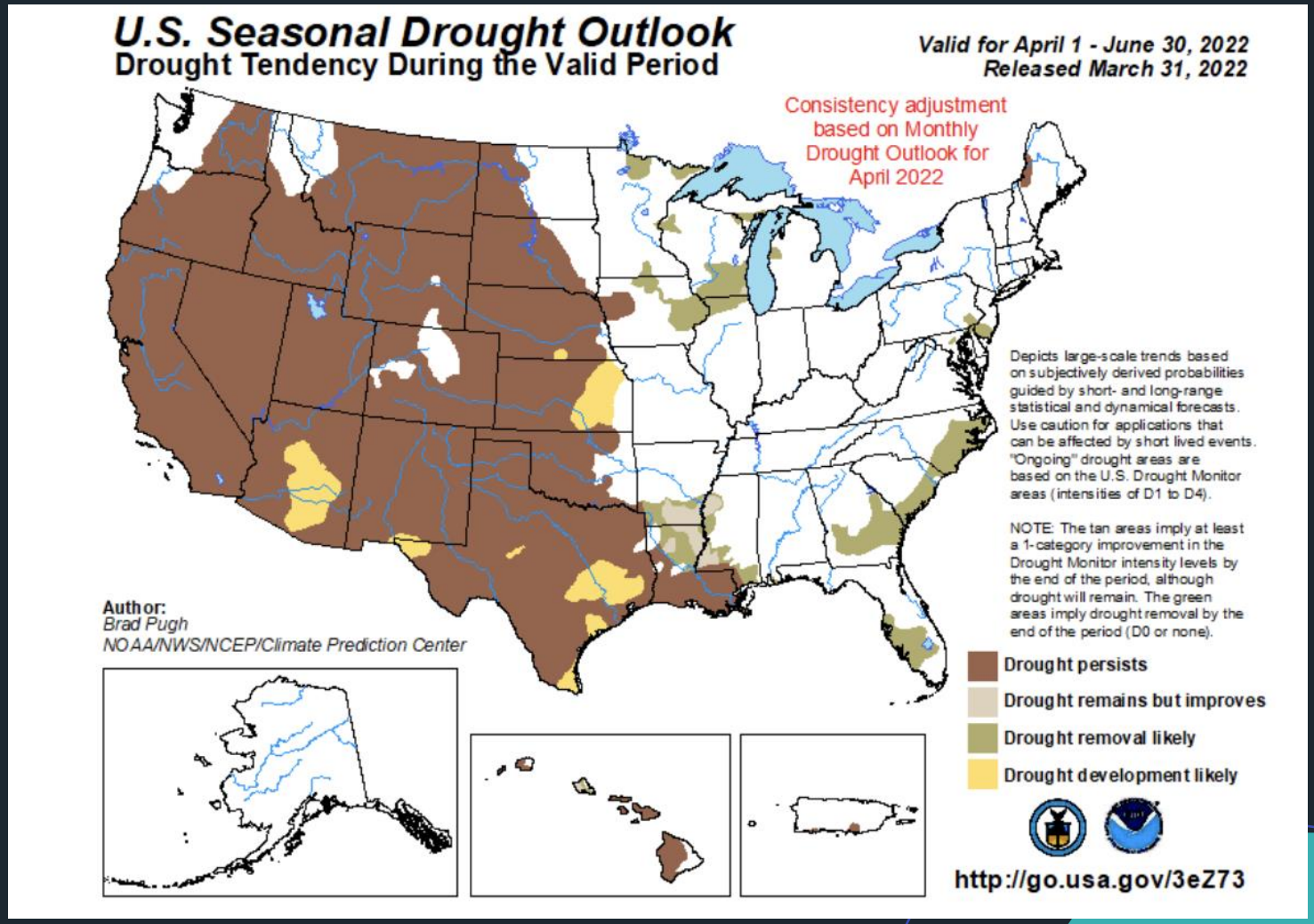

OCEAN ACIDIFICATION
HOW WILL CHANGES IN OCEAN CHEMISTRY AFFECT MARINE LIFE?
CO_2 absorbed from the atmosphere
$CO_2 + H_2O + CO_3^{2-} \rightarrow 2\ HCO_3^-$
carbon dioxide
water
carbonate ion
2 bicarbonate ions
consumption of carbonate ions impedes calcification


-3
-2
-1
0
1
2
3
Upper OHCA 1993-2019 Trend (W m^{-2})

Learn from NOAA.gov for more!



West and Southwest US has been in drought conditions since 2000.

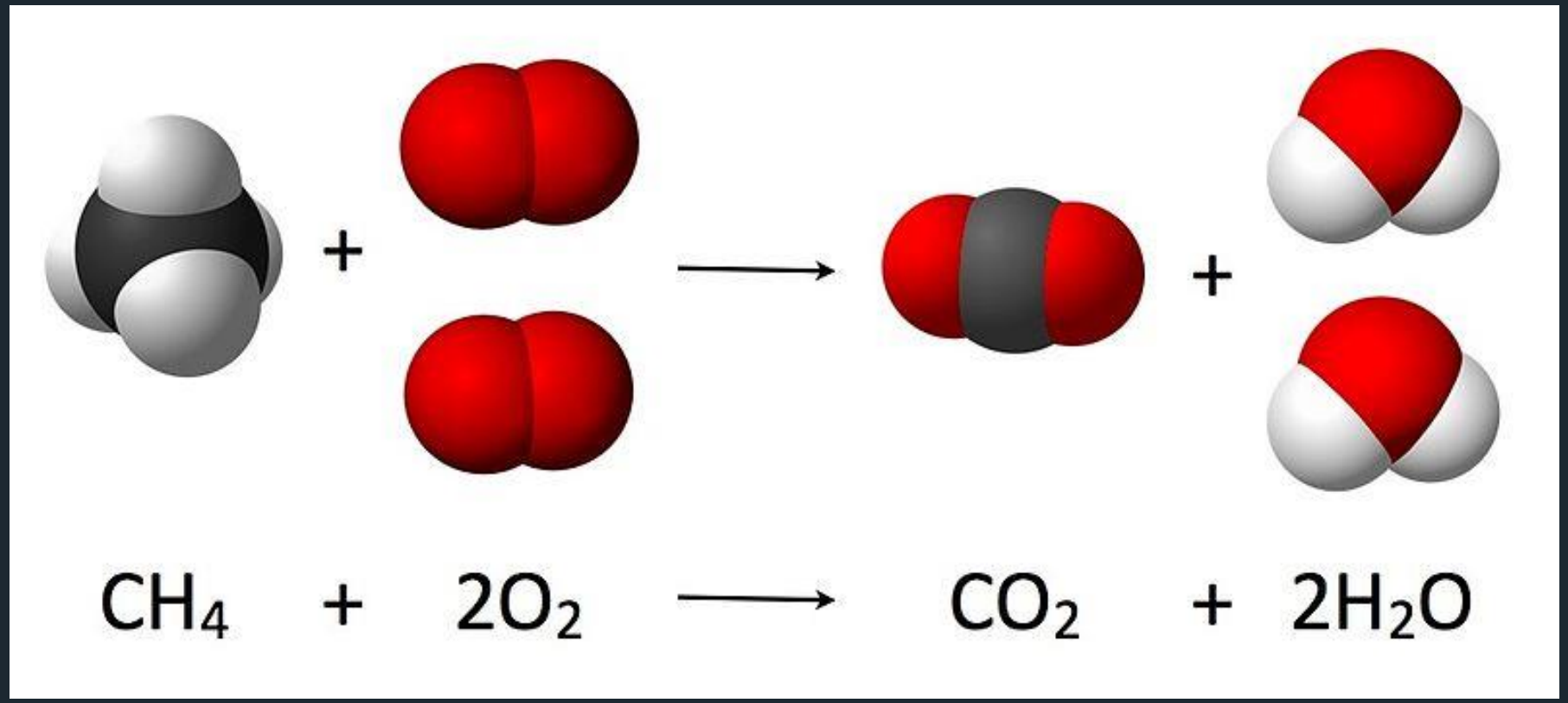


Media is really poor and helping our climate dialogue

Locally, there are ways to help.

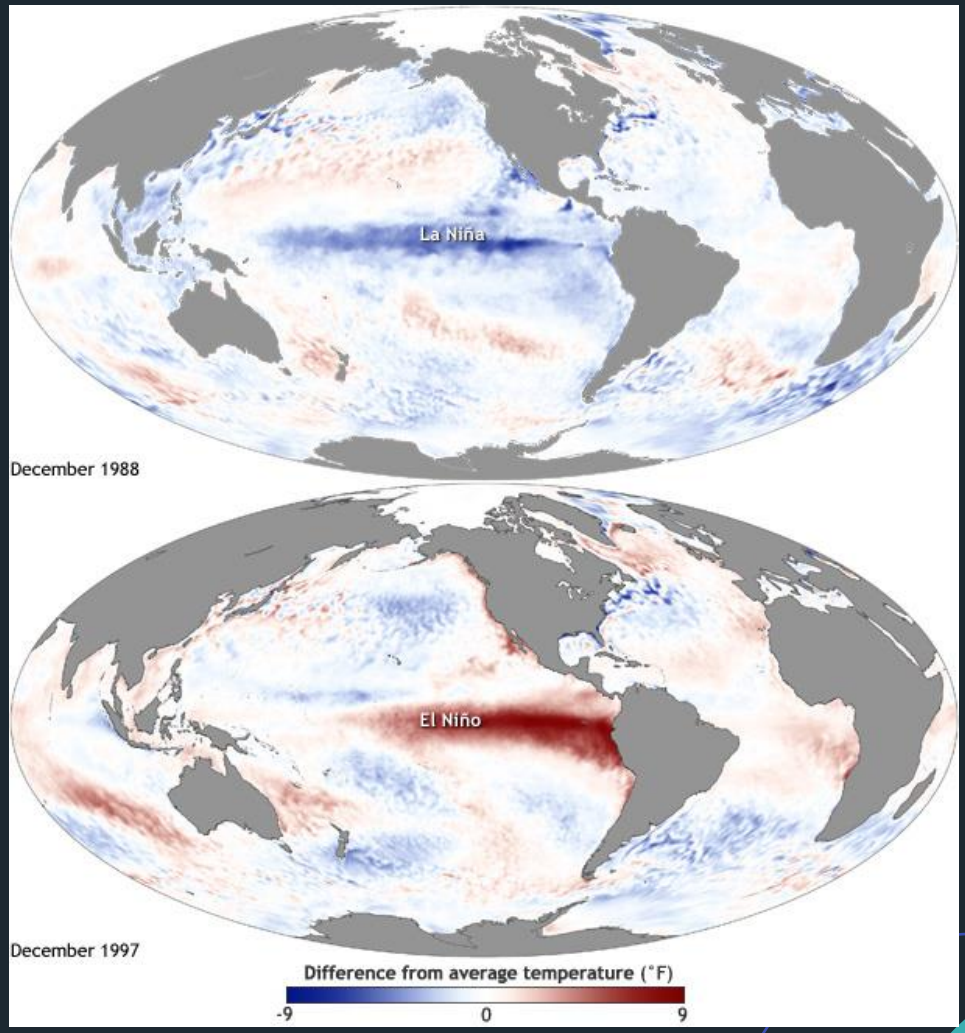

HAPPY
EARTH
DAY
22 APRIL

THE END

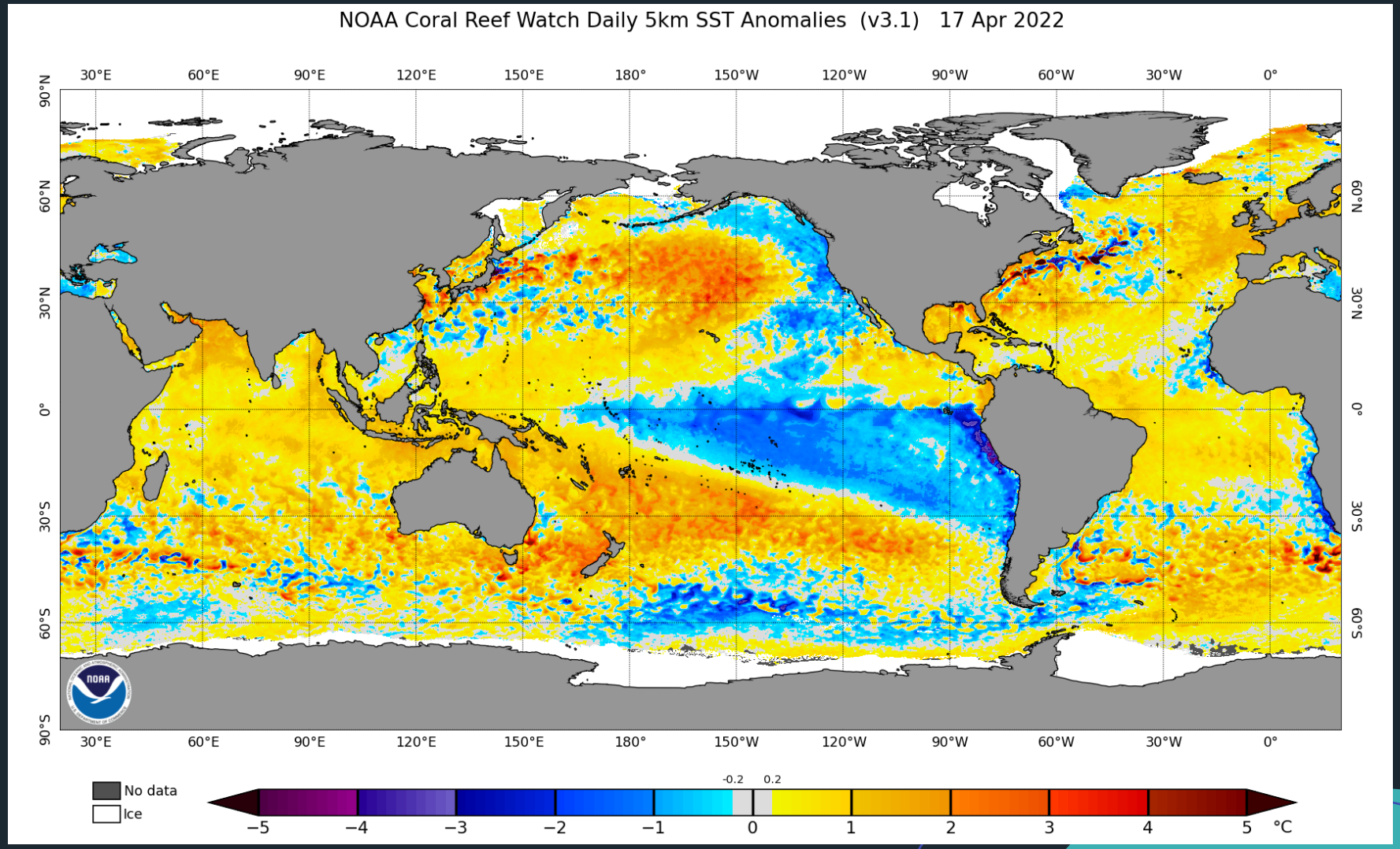


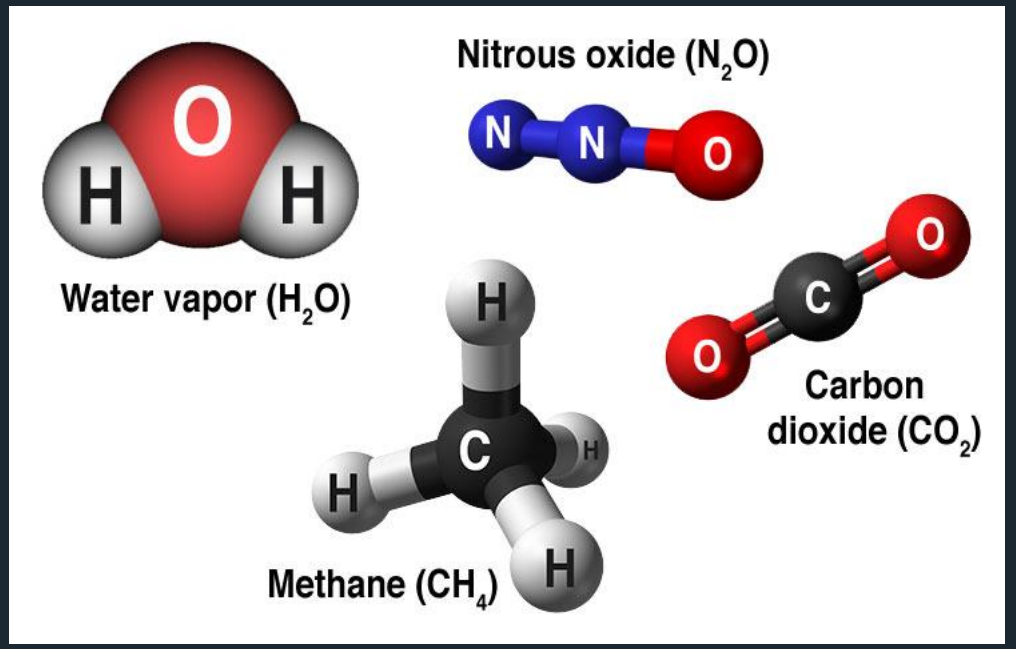
$CH_4 + 2O_2 \longrightarrow CO_2 + 2H_2O$

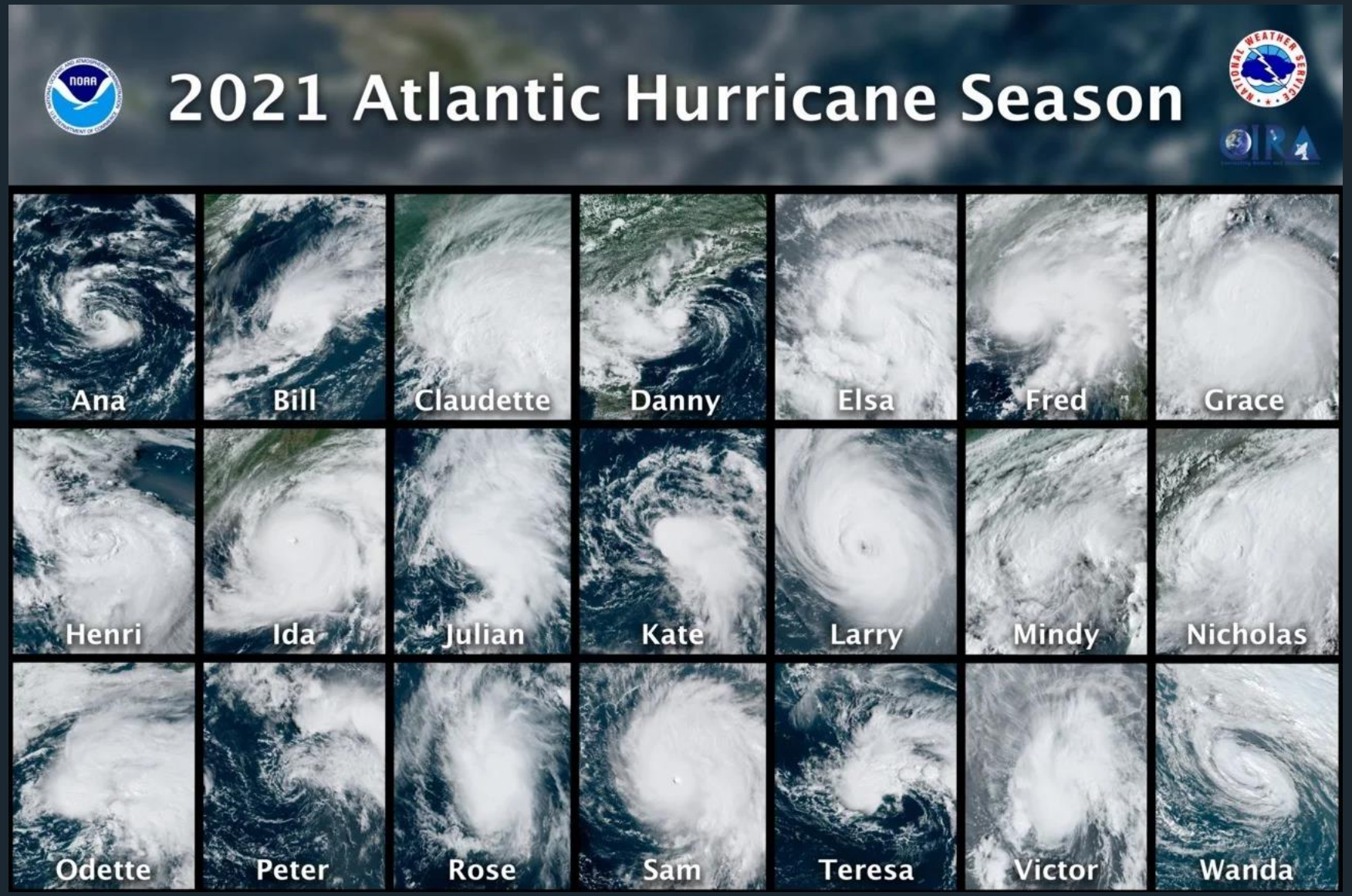
ENSO – El Nino South Oscillation



ENSO – El Nino South Oscillation (Today)




Nitrous oxide (N_2O)
O
H
H
Water vapor (H_2O)
N
N
O
O
C
O
Carbon dioxide (CO_2)
H
C
H
H
H
Methane (CH_4)



All 21 named storms from the busy 2021 Atlantic hurricane season are seen in a composite image from NOAA's GOES East satellite. *NOAA*