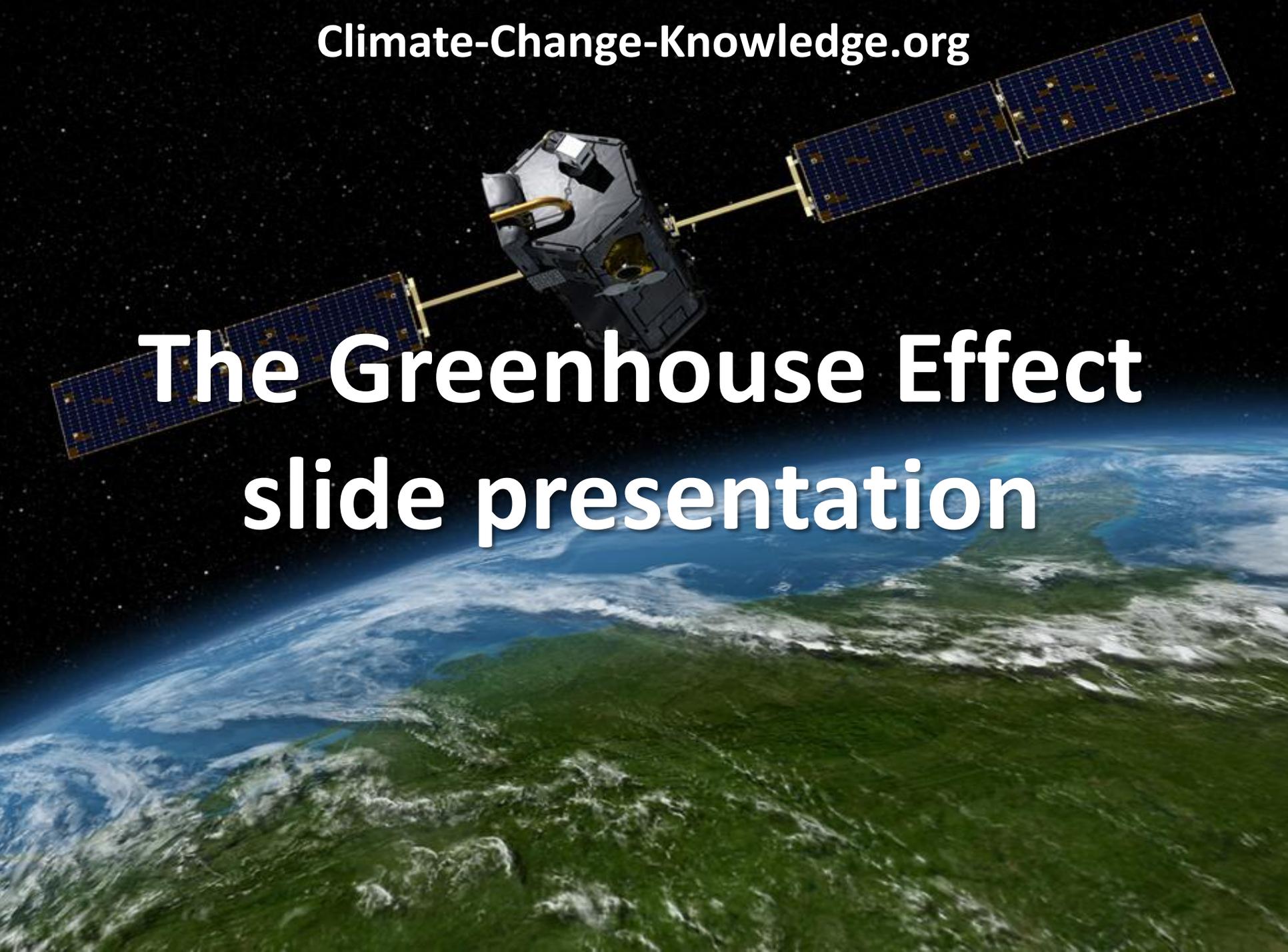
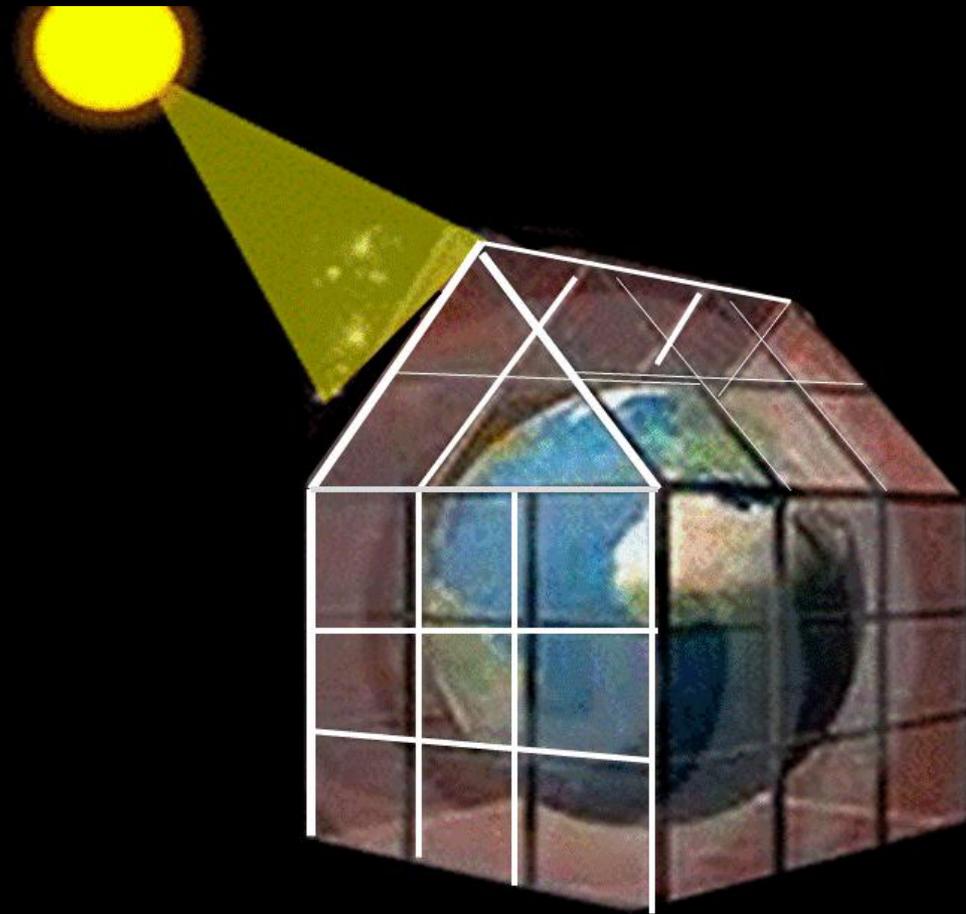


The Greenhouse Effect slide presentation



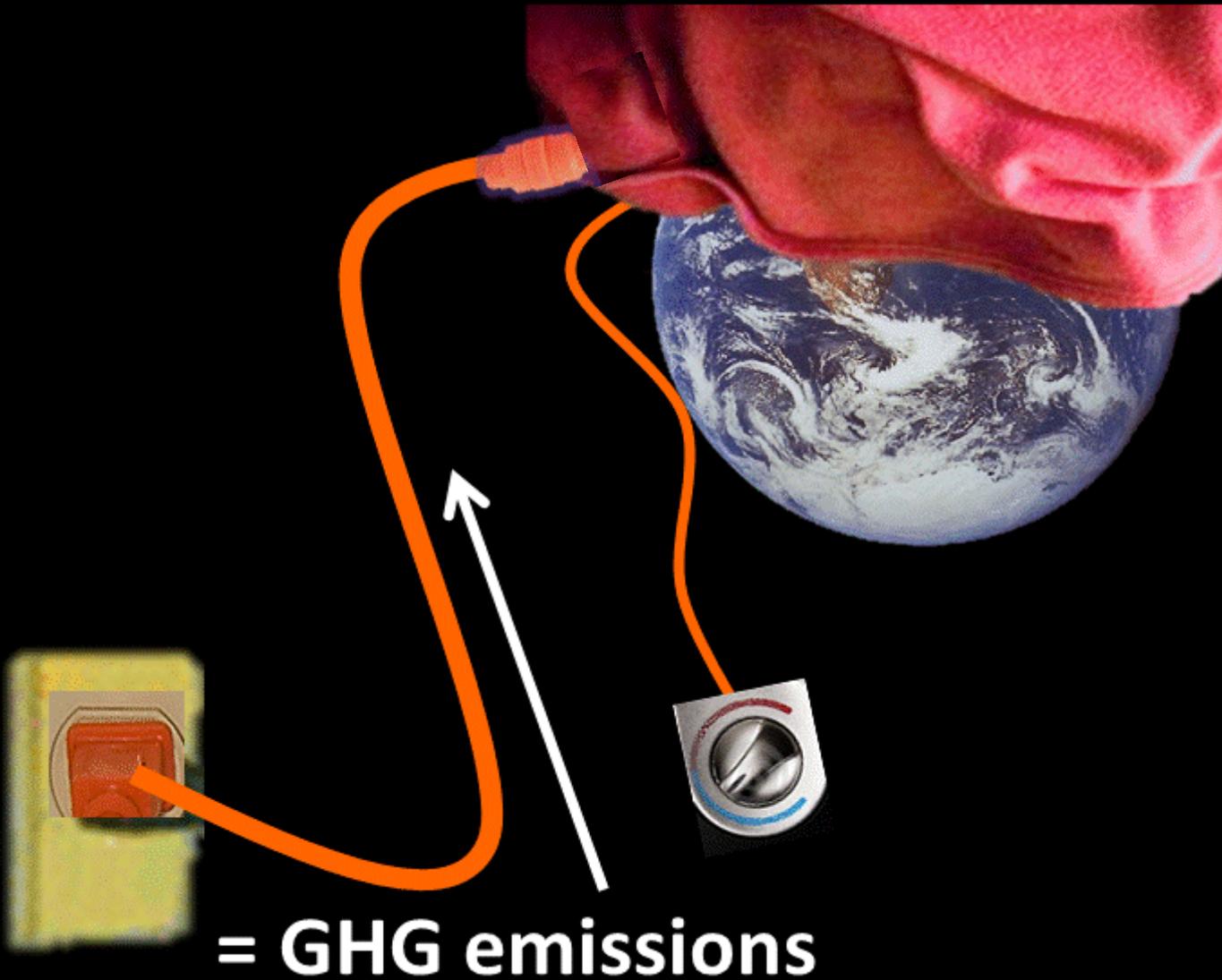
Greenhouse gases (GHGs) in the atmosphere have a heat trapping effect, like the glass of a greenhouse traps heat from the sun, heating up the greenhouse. Light energy passes easily through glass into the greenhouse but the heat energy cannot pass through the glass well.



Insulating scarf effect



Electric blanket effect



About 30% of incoming solar energy is reflected back out to space by light colored clouds and planet's surface.

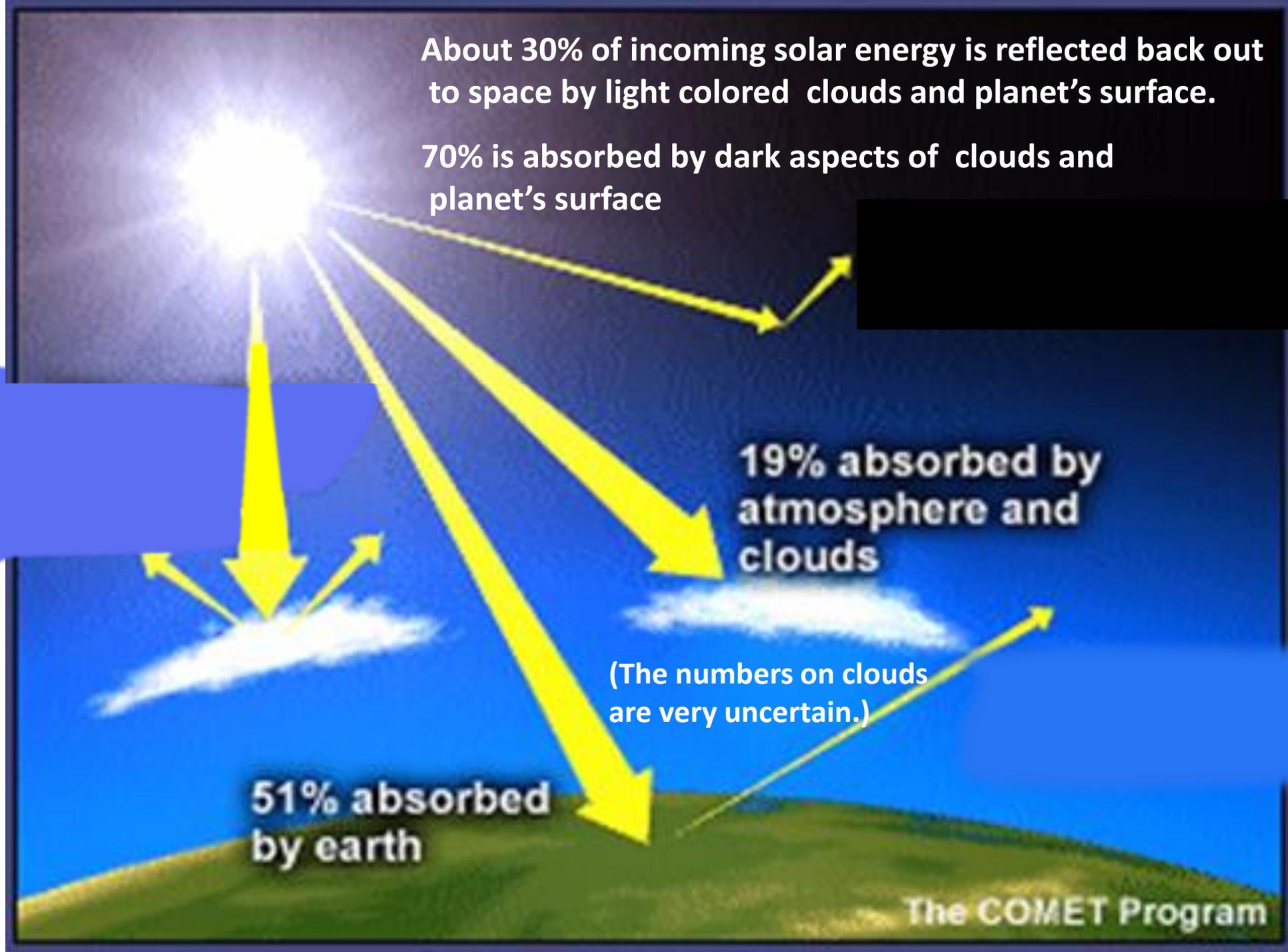
70% is absorbed by dark aspects of clouds and planet's surface

19% absorbed by atmosphere and clouds

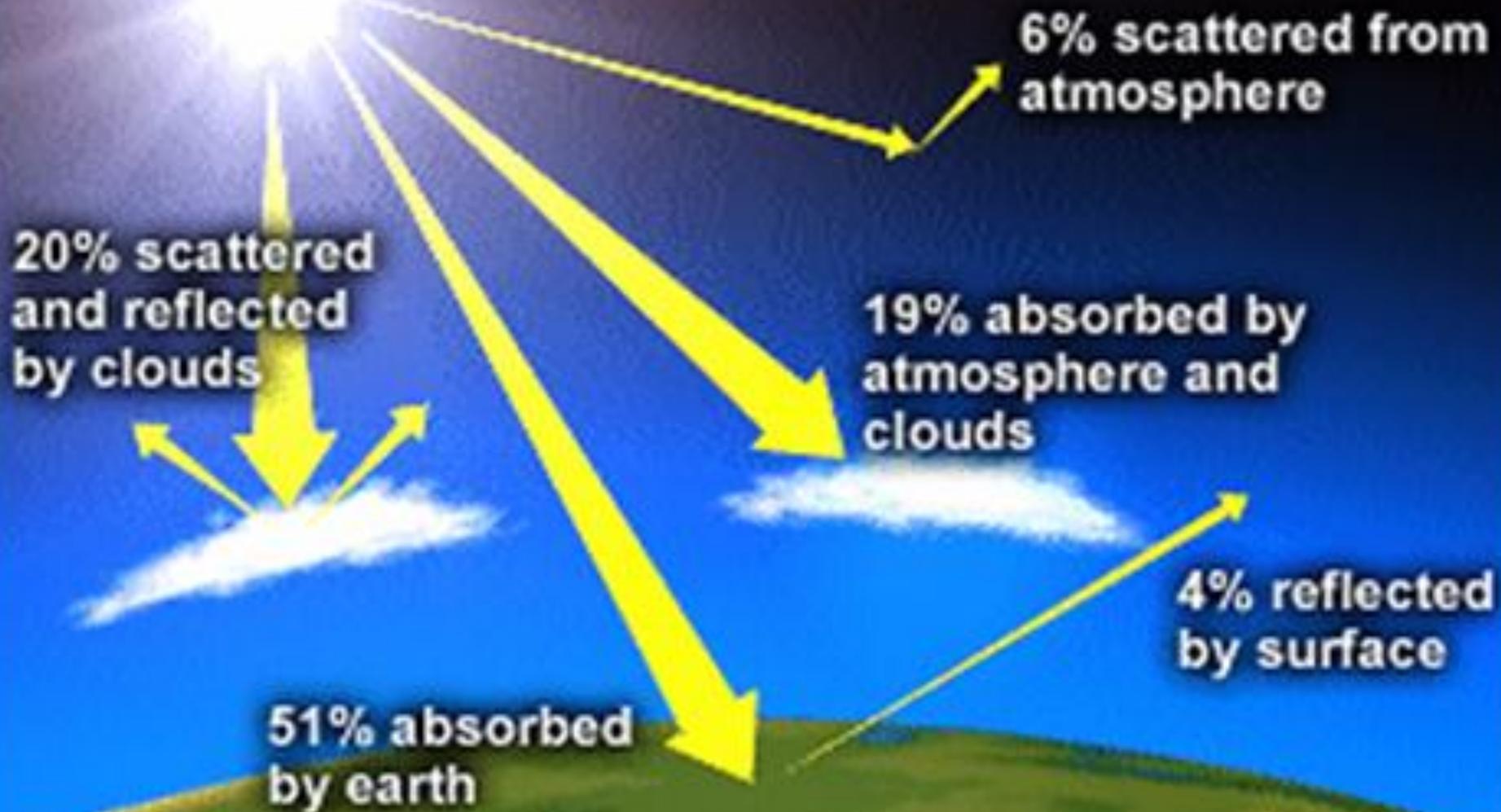
(The numbers on clouds are very uncertain.)

51% absorbed by earth

The COMET Program



(The numbers on clouds are very uncertain.)



Incoming solar radiation

short wave length

Reflected by cloud
and atmosphere

Outgoing longwave
radiation

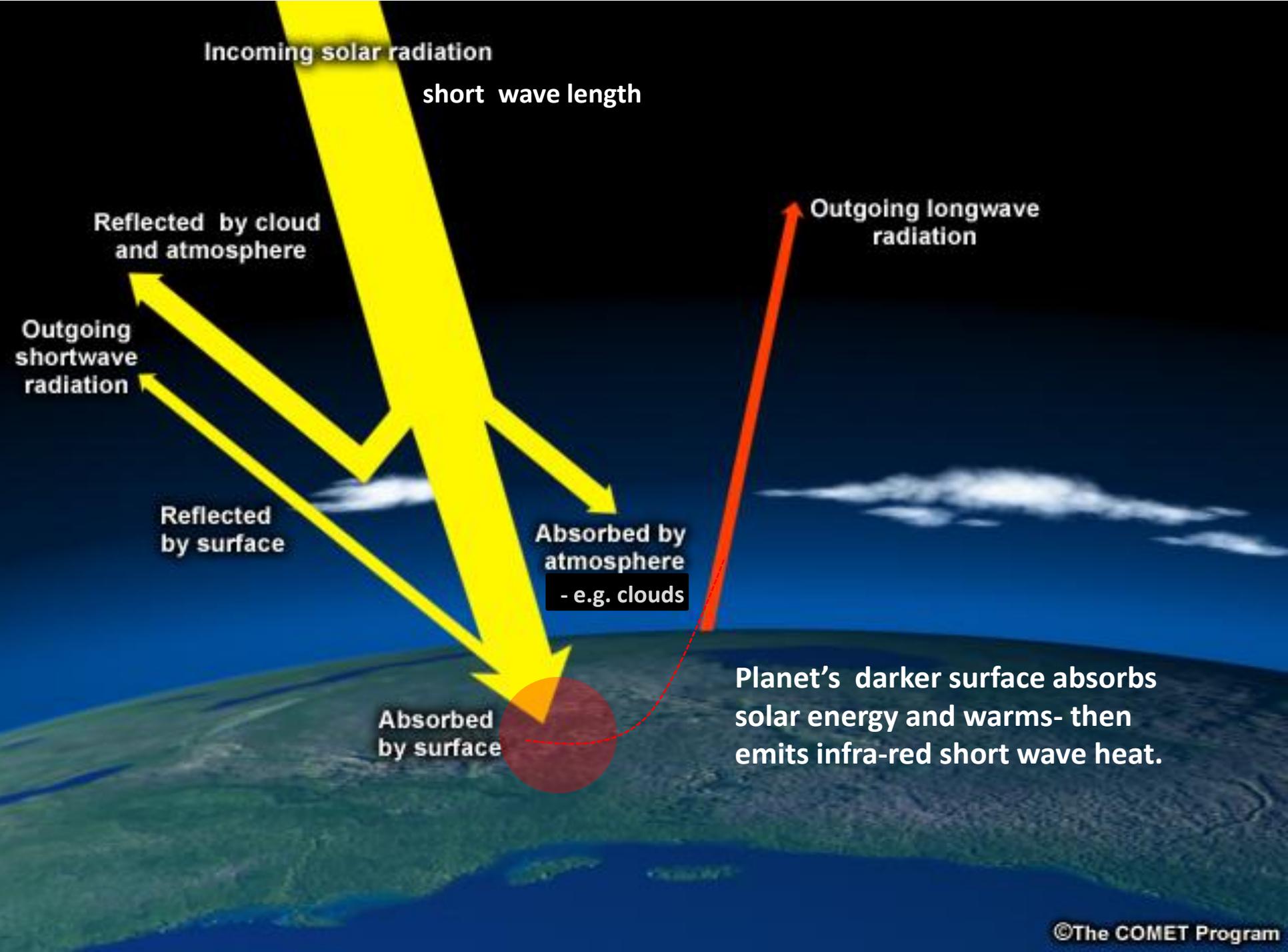
Outgoing
shortwave
radiation

Reflected
by surface

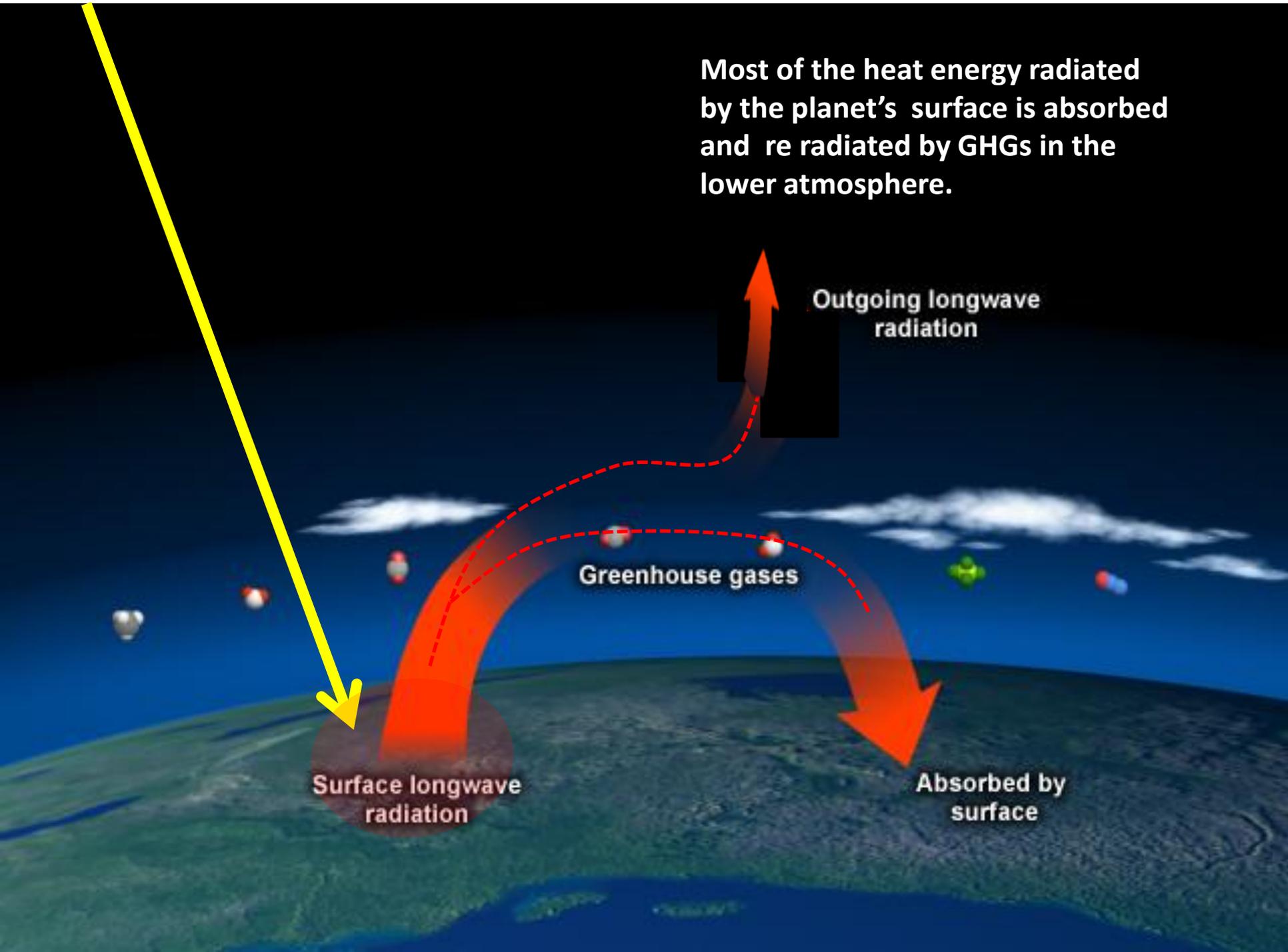
Absorbed by
atmosphere
- e.g. clouds

Absorbed
by surface

Planet's darker surface absorbs
solar energy and warms- then
emits infra-red short wave heat.



Most of the heat energy radiated by the planet's surface is absorbed and re radiated by GHGs in the lower atmosphere.

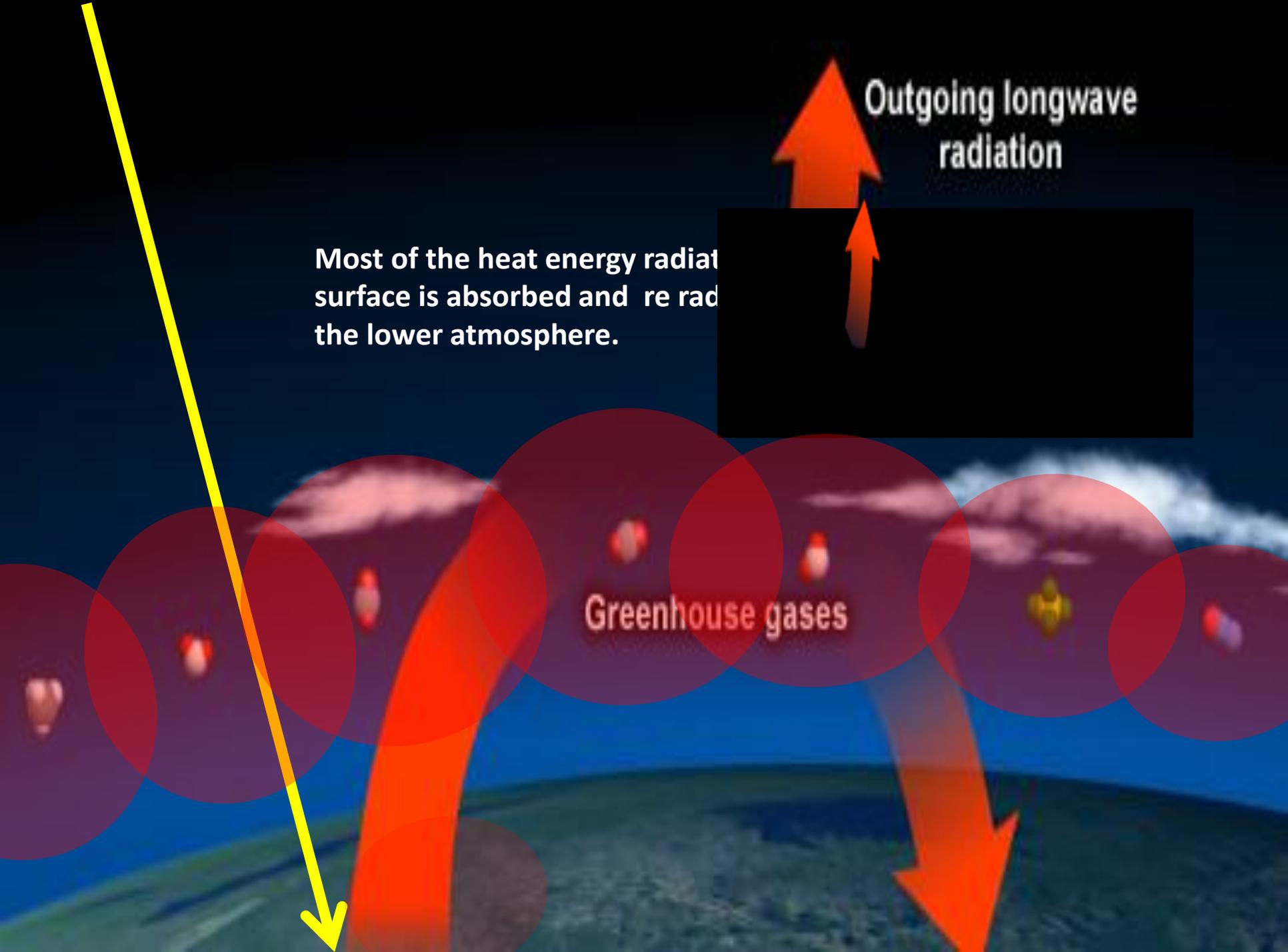


Surface longwave radiation

Greenhouse gases

Outgoing longwave radiation

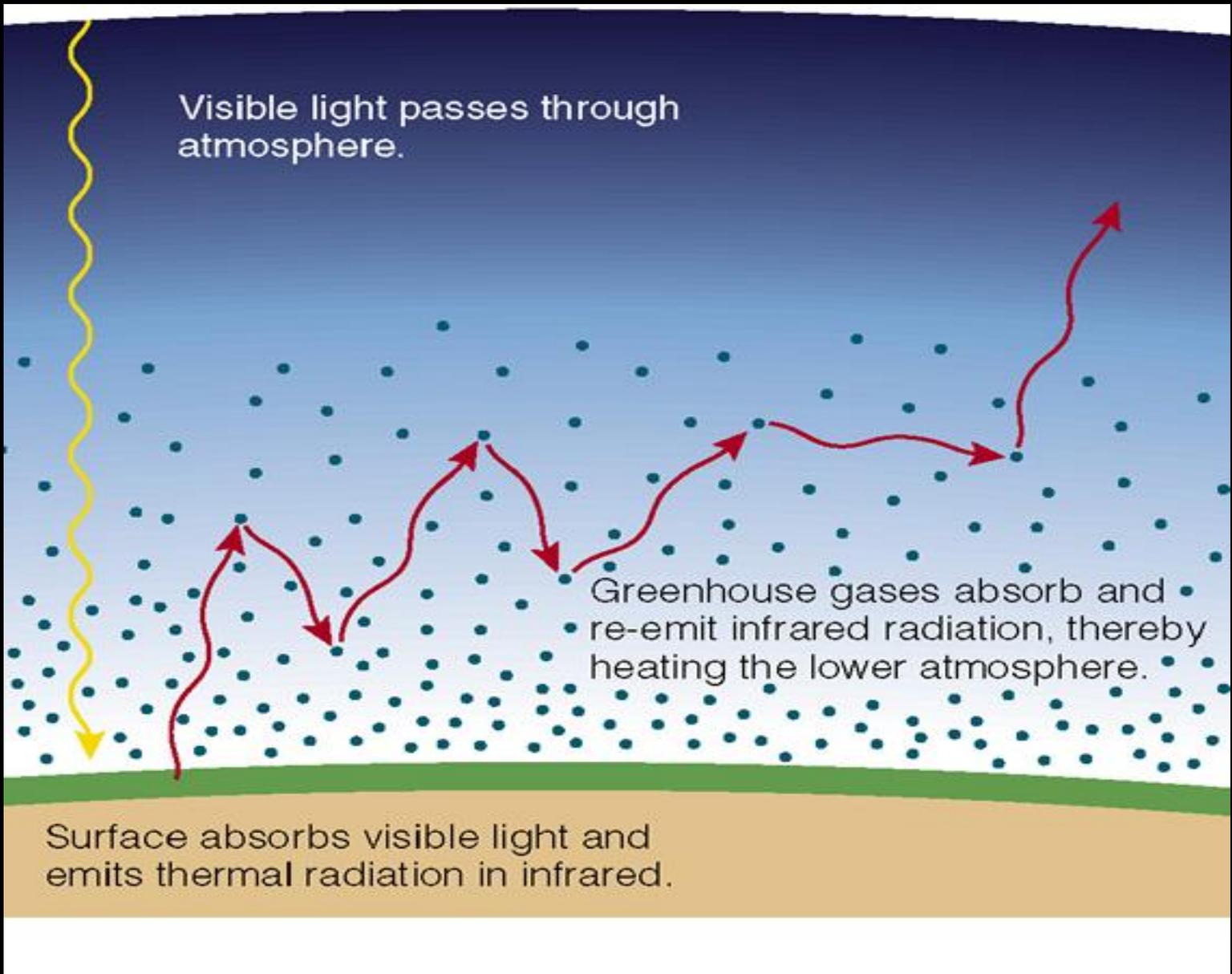
Absorbed by surface



Outgoing longwave
radiation

Most of the heat energy radiated from the surface is absorbed and re-radiated by the lower atmosphere.

Greenhouse gases





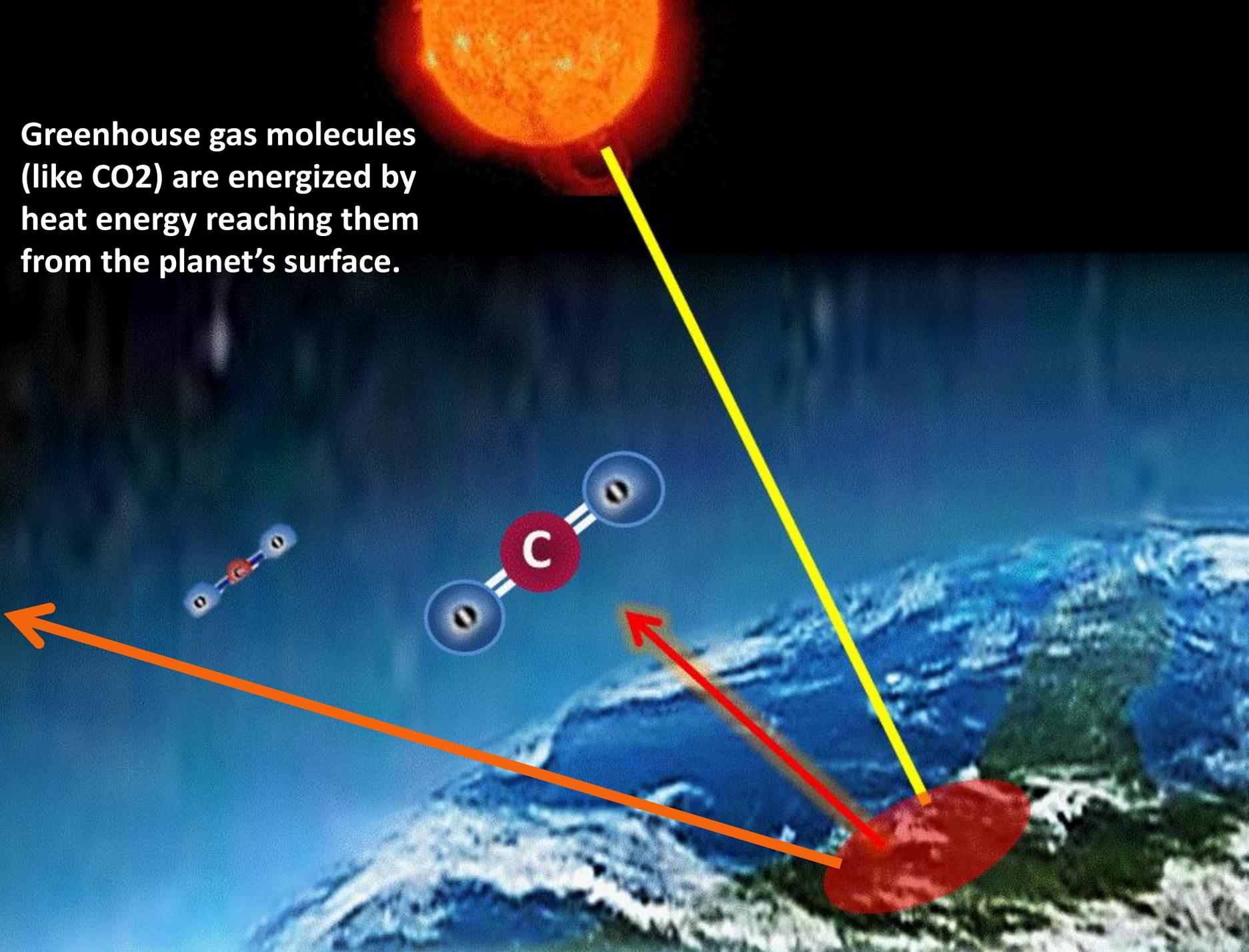
Short wave light energy from the sun passes through GHGs in the atmosphere not affecting them

The planet's surface warms and radiates infra-red out to space

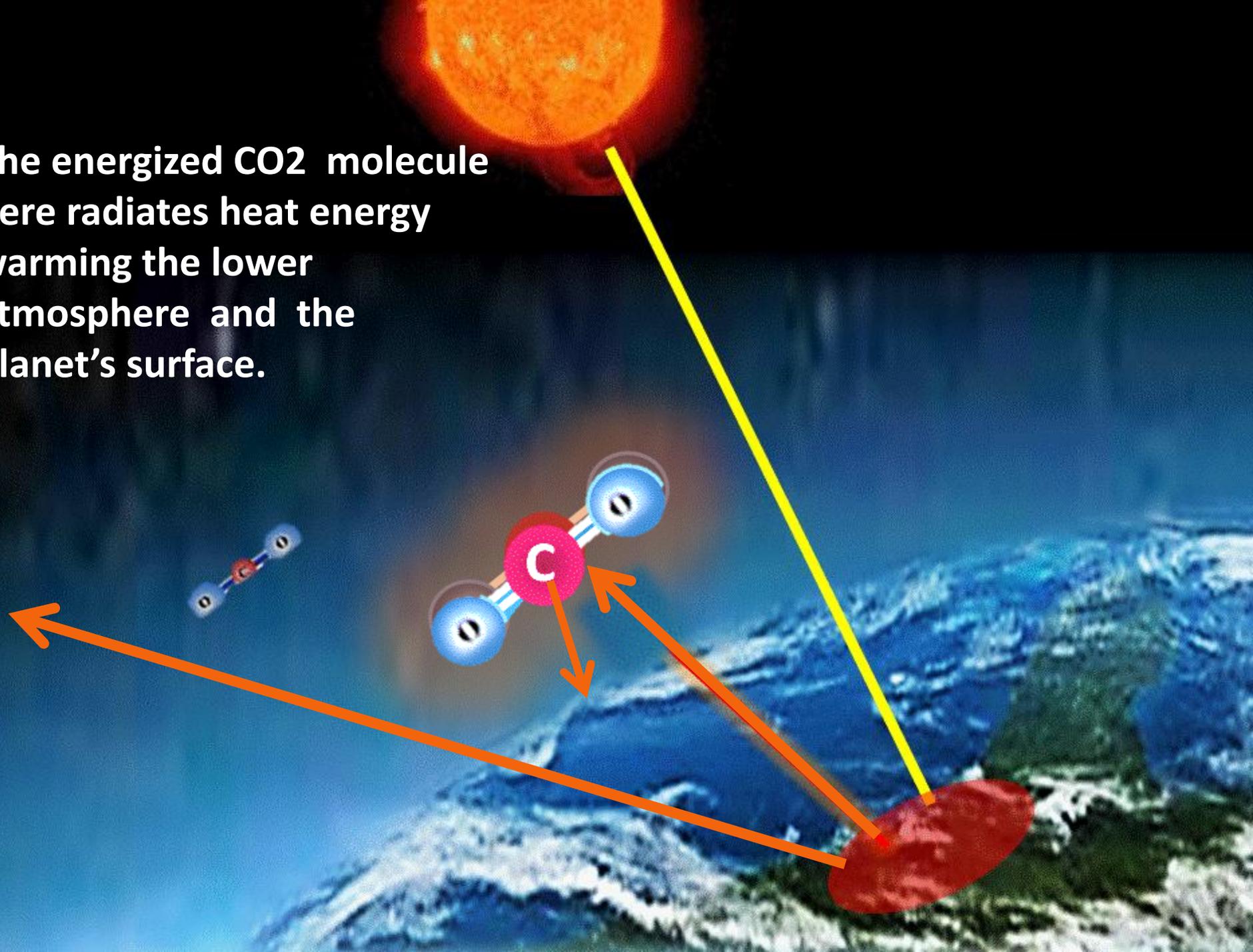


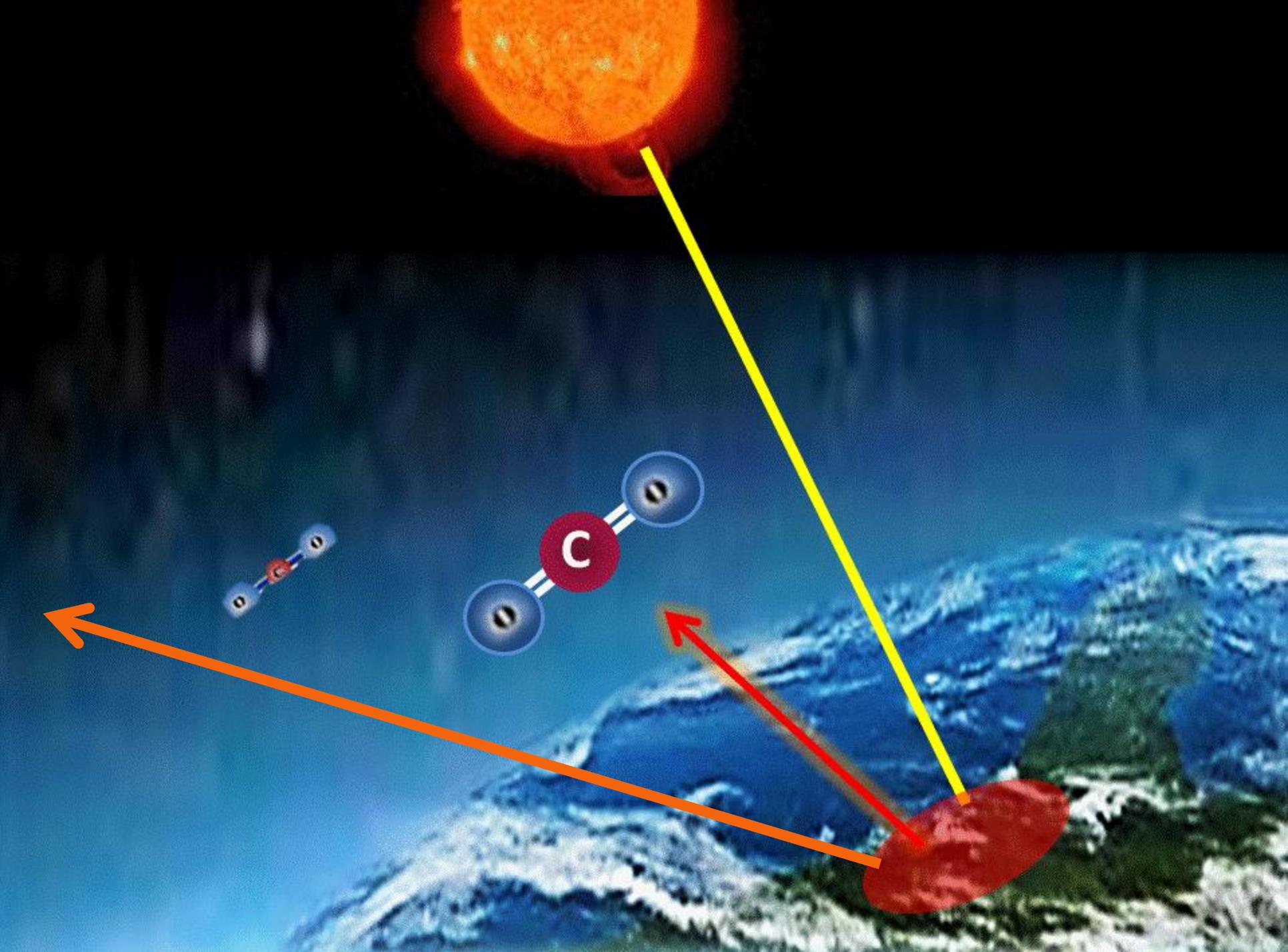
Reaching the planet's surface solar energy becomes infra-red heat energy.

Greenhouse gas molecules (like CO₂) are energized by heat energy reaching them from the planet's surface.

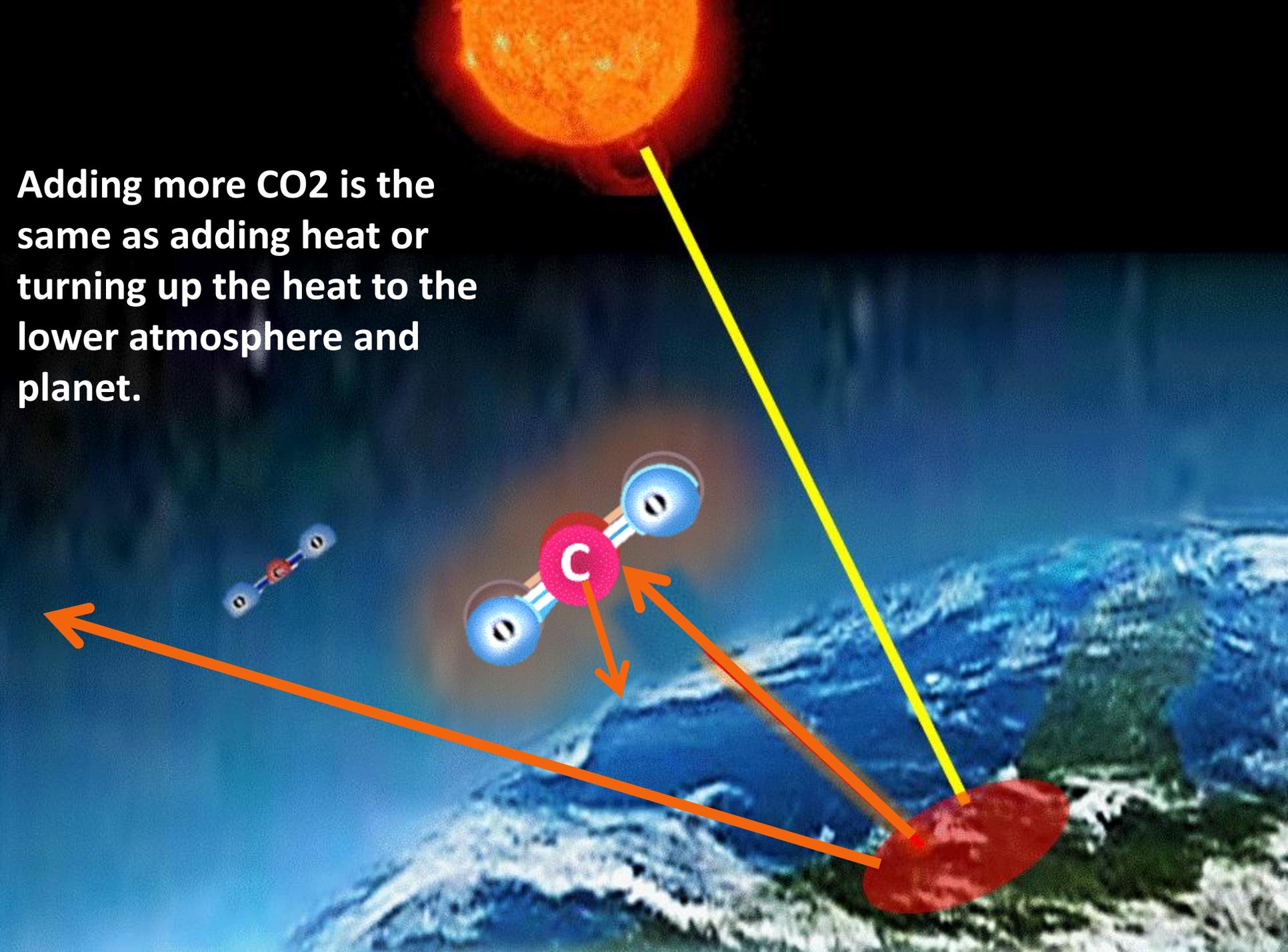
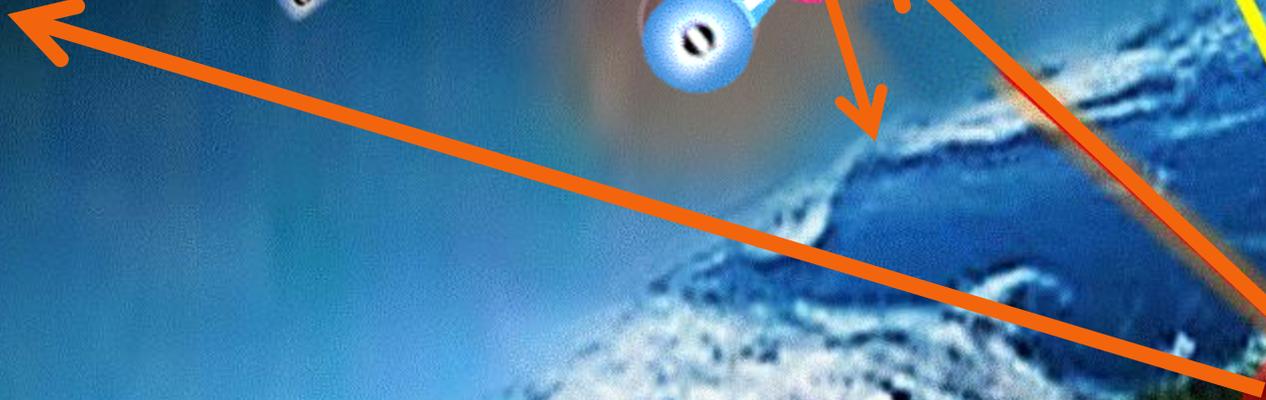
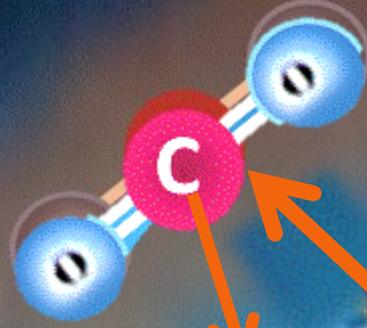
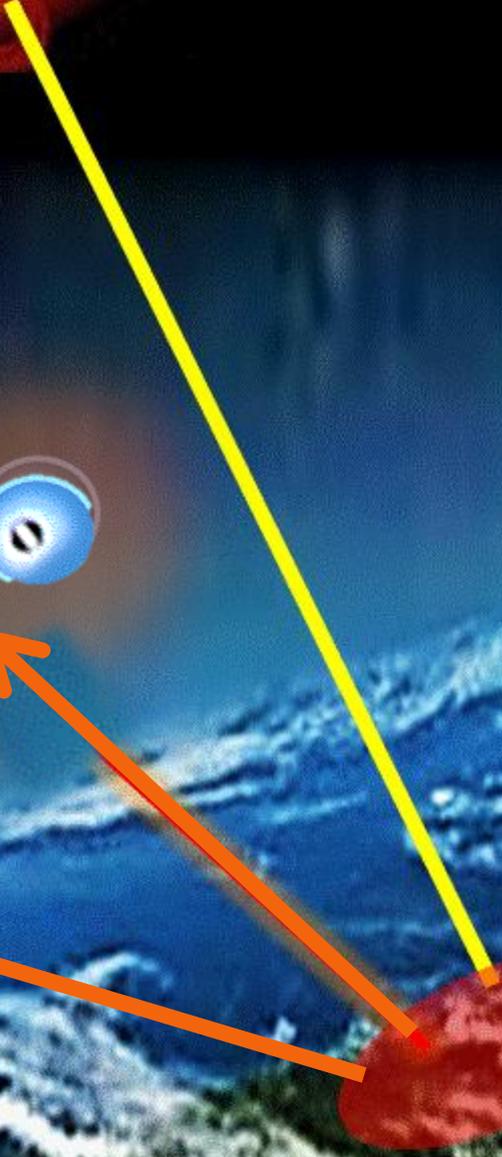
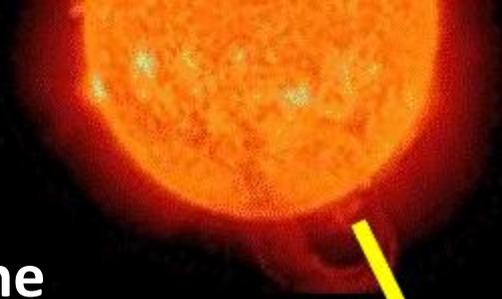


The energized CO₂ molecule here radiates heat energy warming the lower atmosphere and the planet's surface.

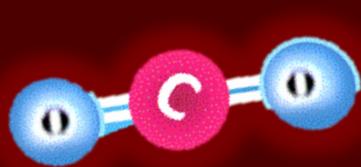




Adding more CO2 is the same as adding heat or turning up the heat to the lower atmosphere and planet.



The energized GHG molecules warm the lower atmosphere and so warm the planet's surface.

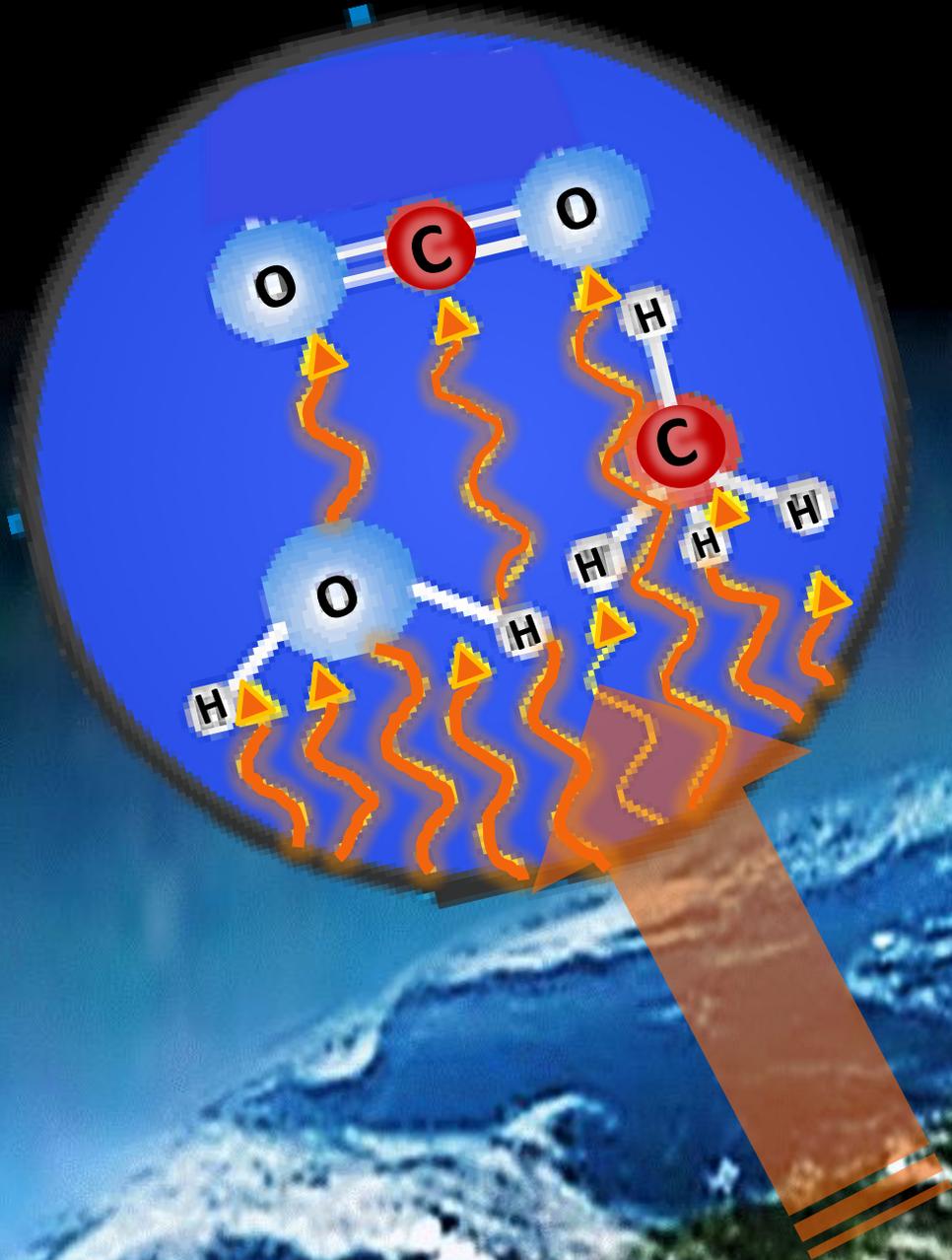


lower
atmosphere

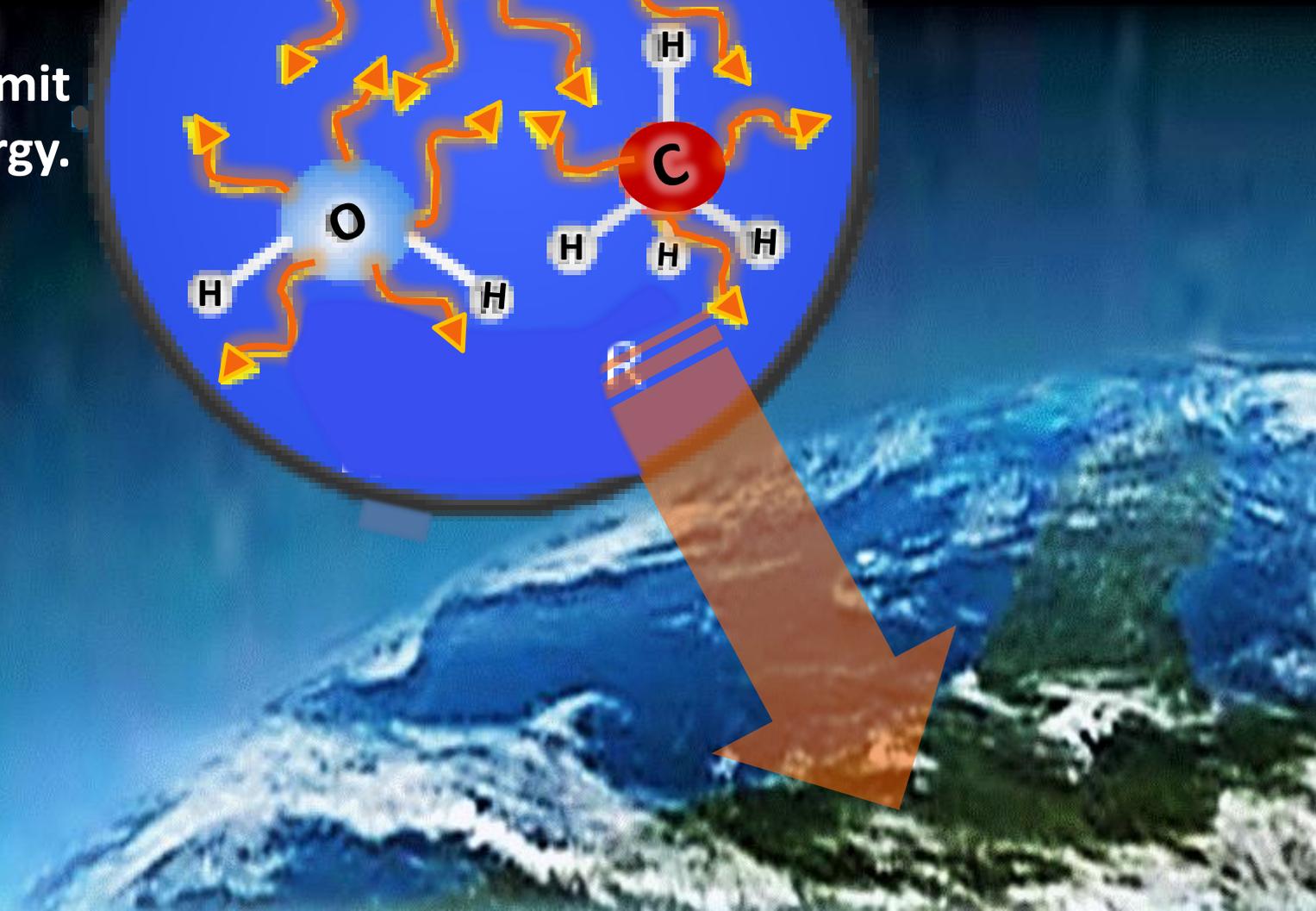
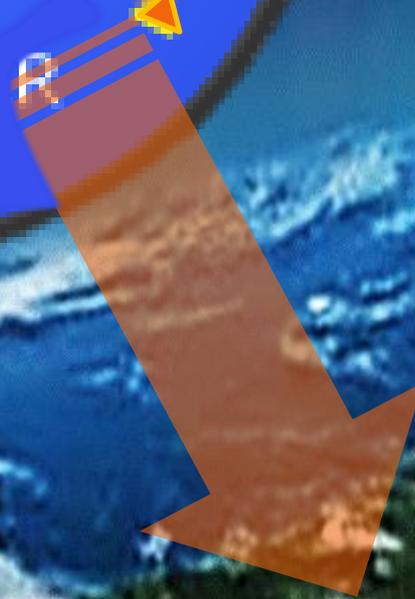
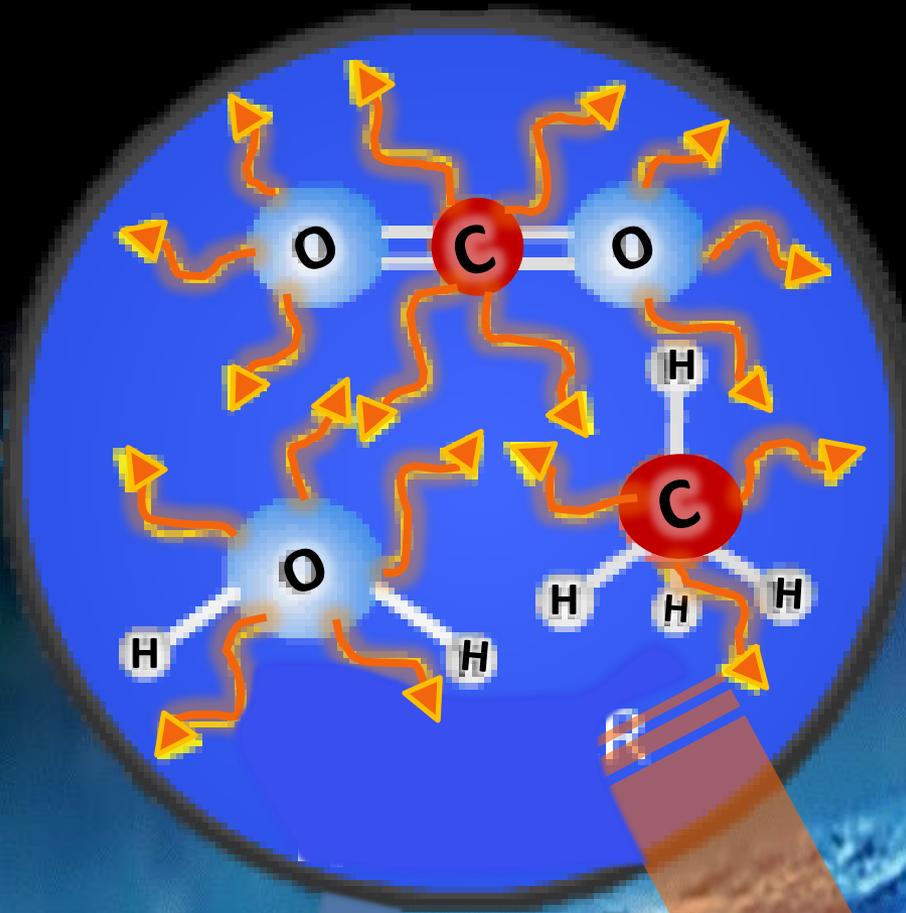


Earth

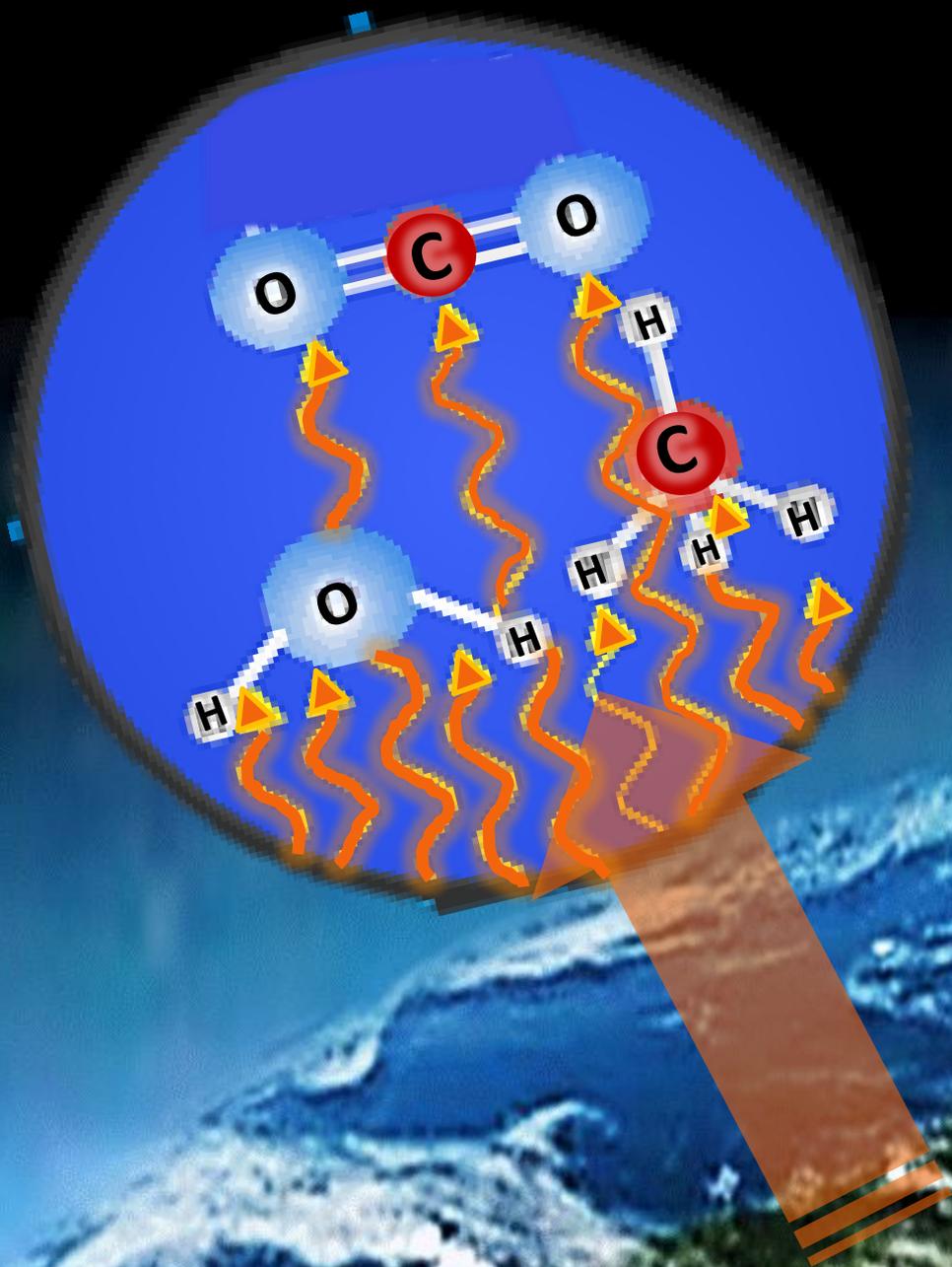
Here GHG molecules of, CO₂, methane and water absorb infra-red heat energy.



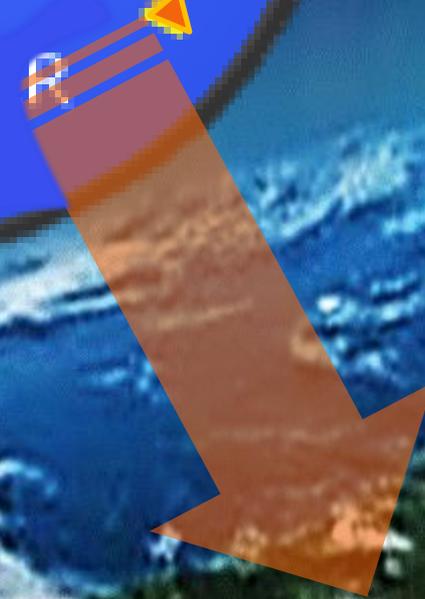
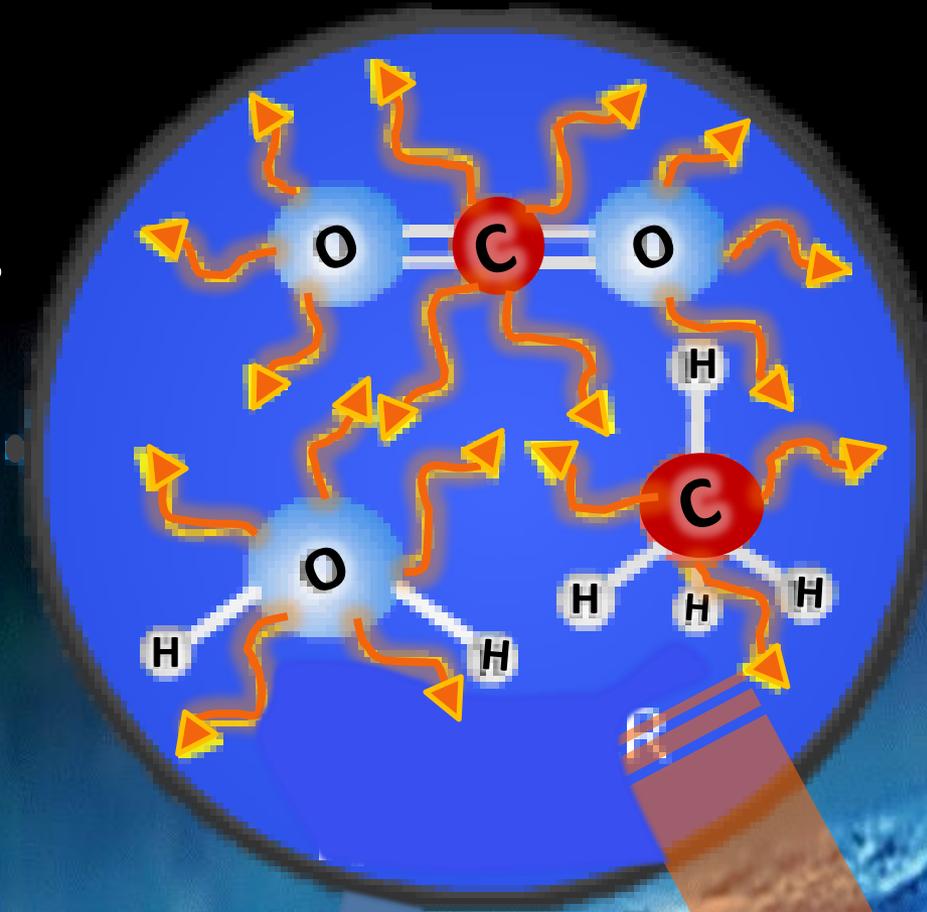
Here the molecules are energized and radiate /emit emit heat energy.



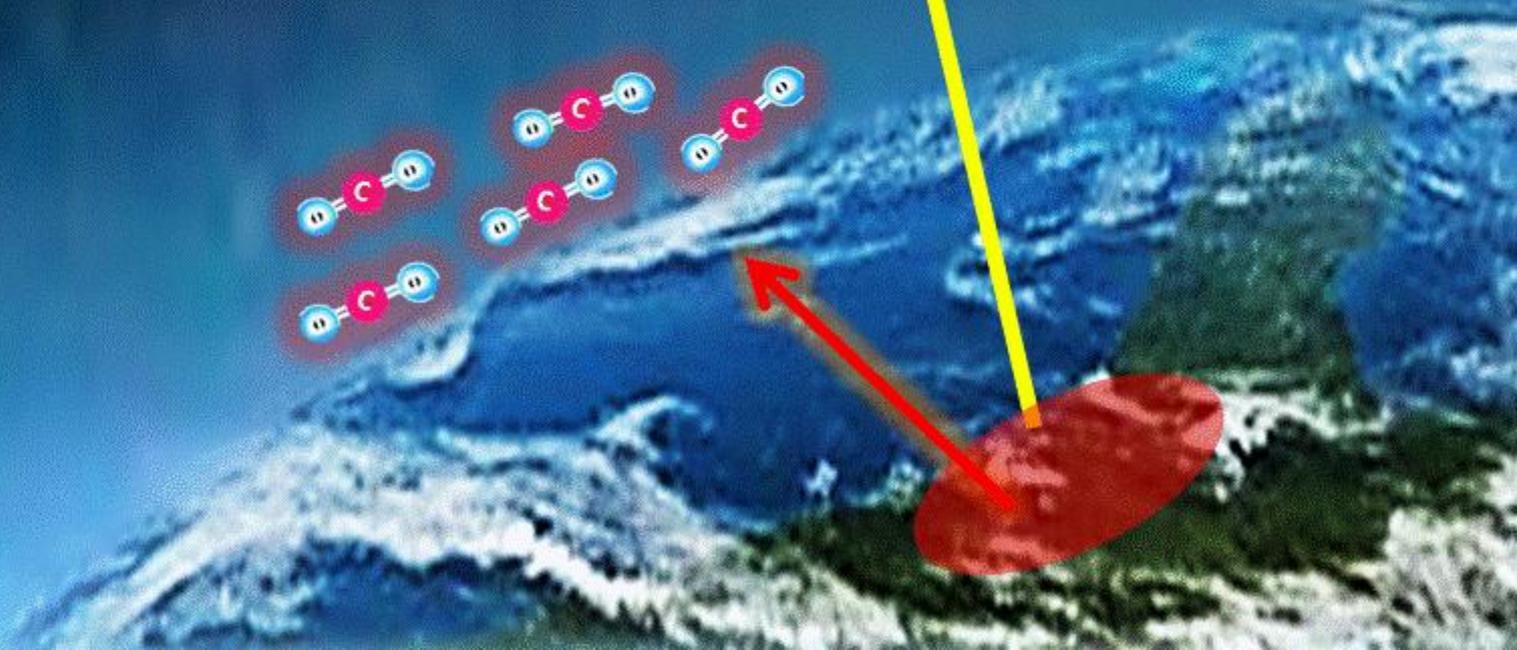
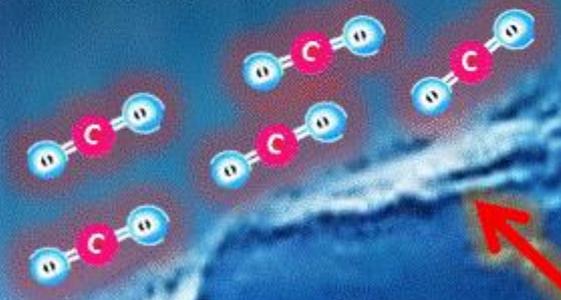
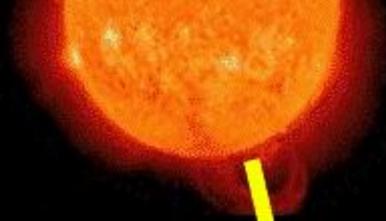
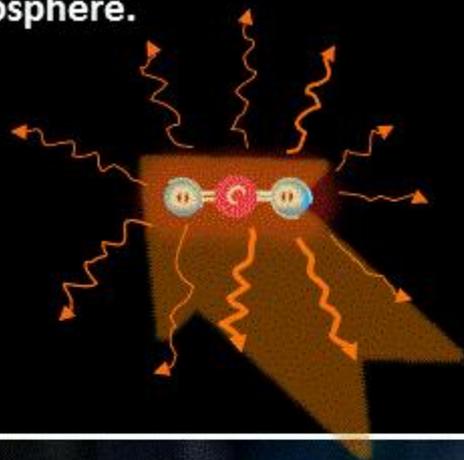
absorb infra-red
heat energy.



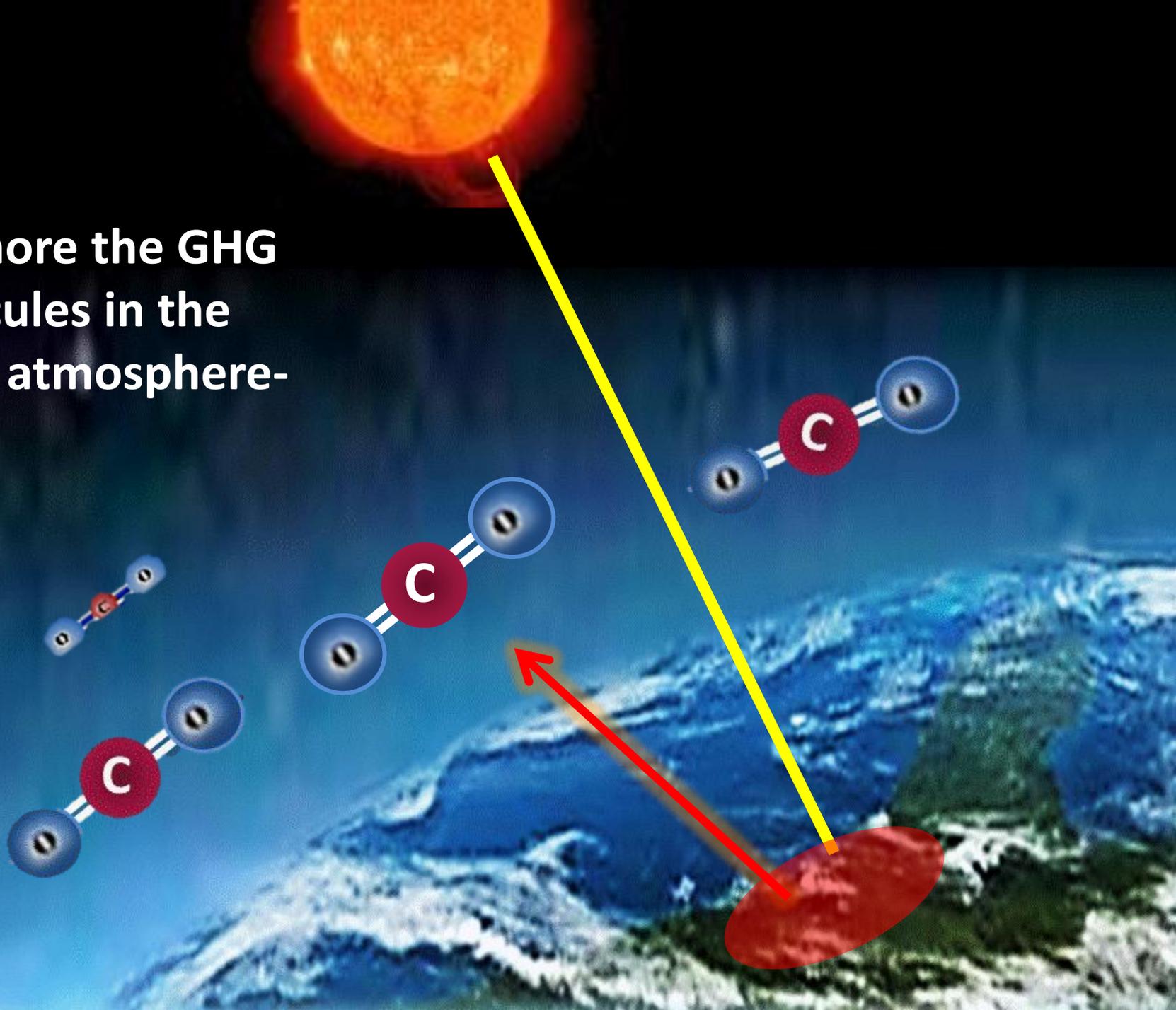
radiate /emit
emit heat energy.



The energized GHG molecule radiates heat energy in all directions warming the lower atmosphere.



The more the GHG molecules in the lower atmosphere-



The more the heat energy in the lower atmosphere-

