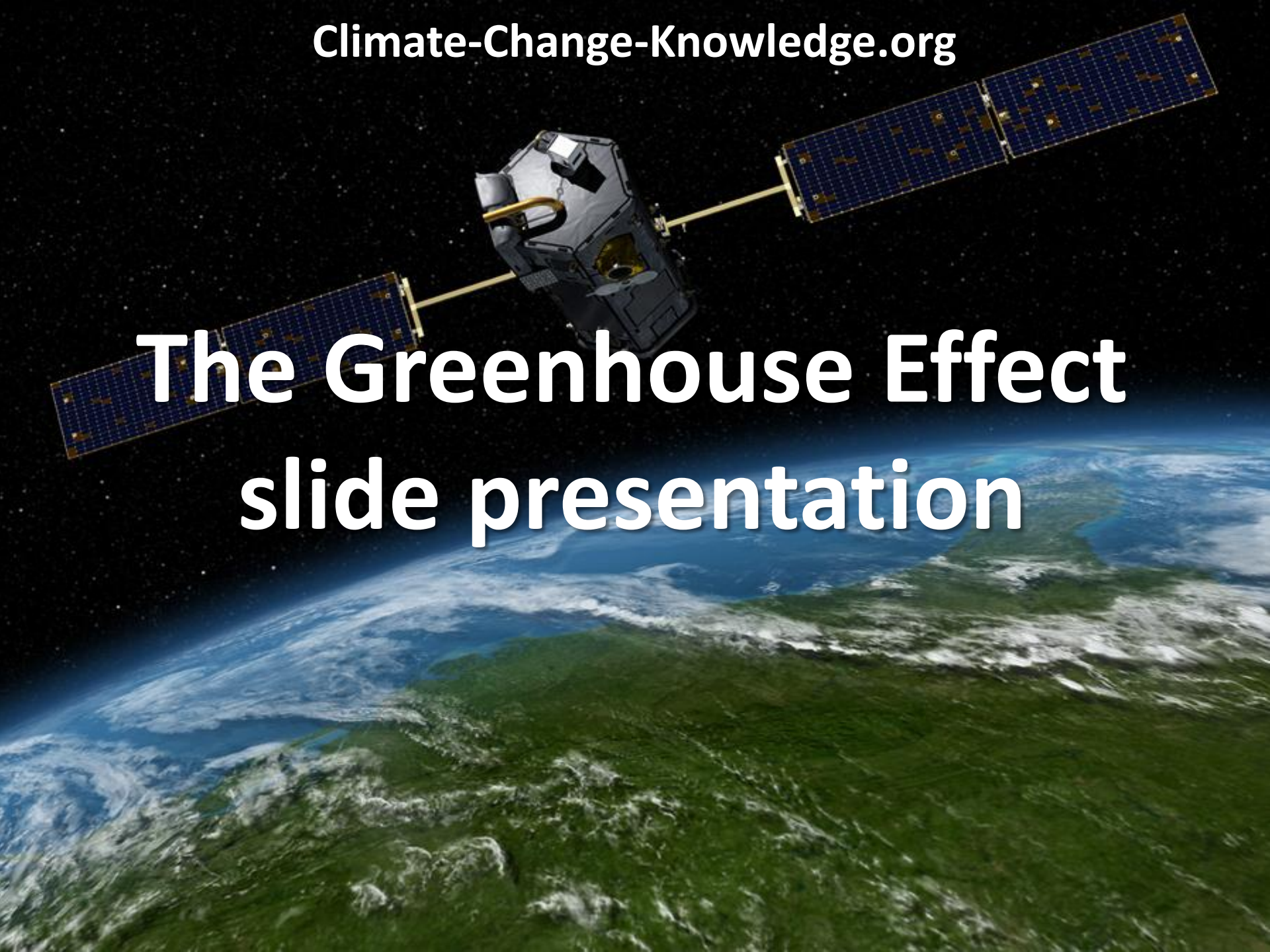
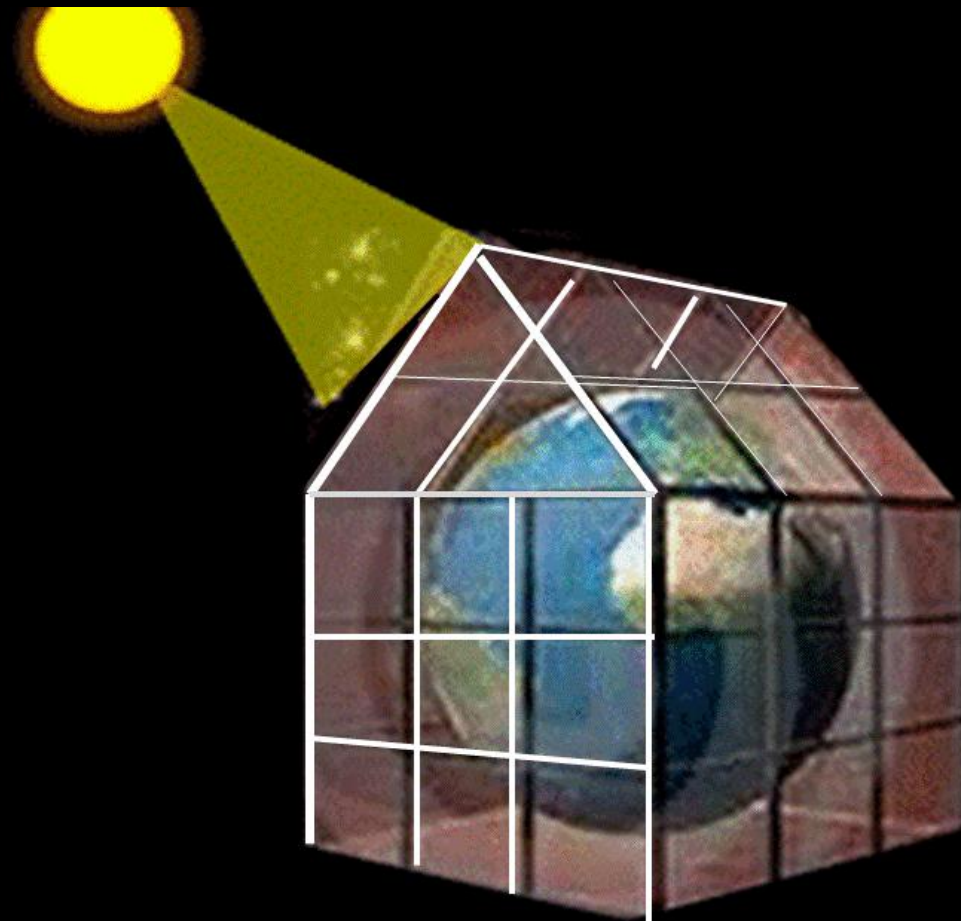


# The Greenhouse Effect slide presentation



**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.**

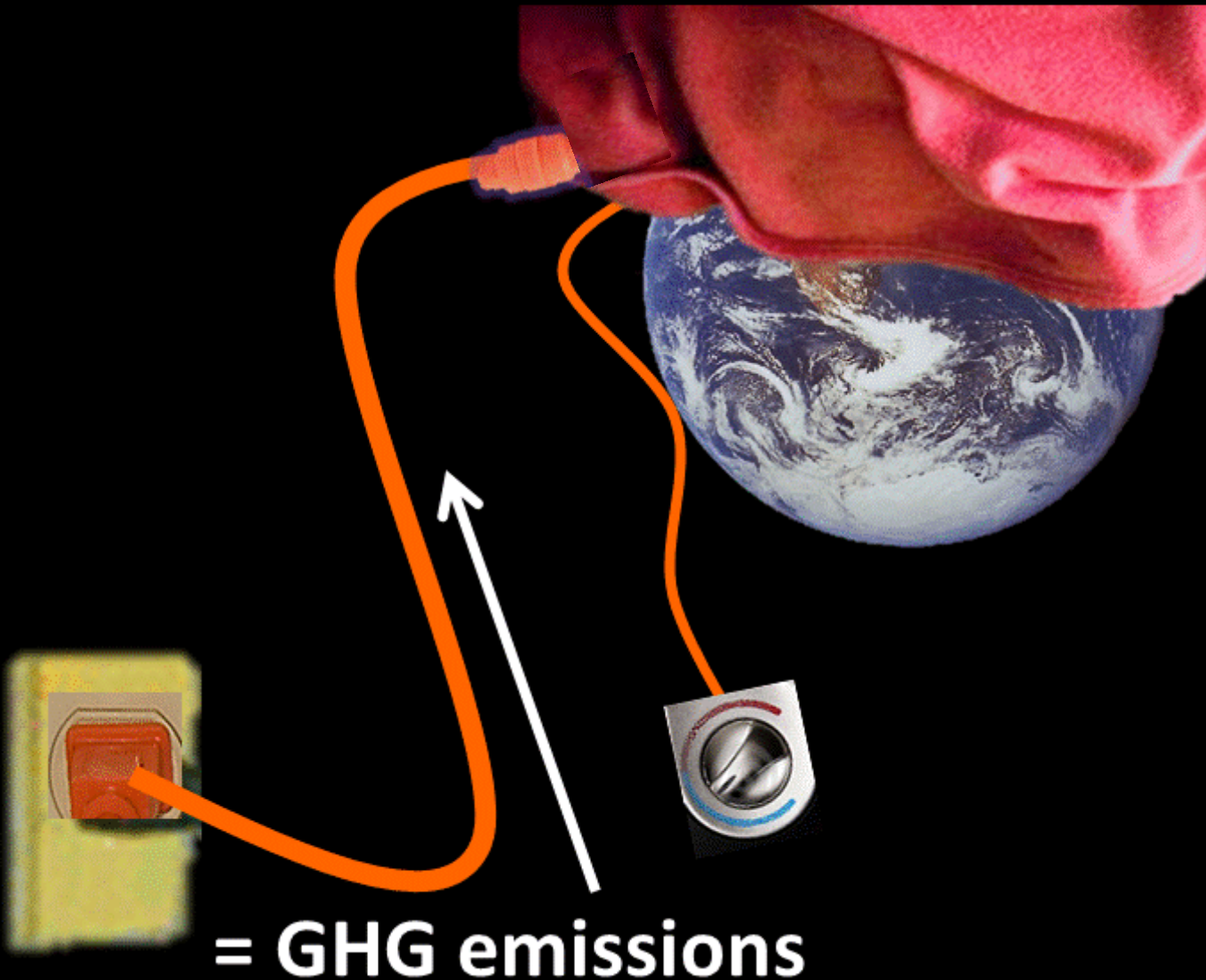


# Insulating scarf effect



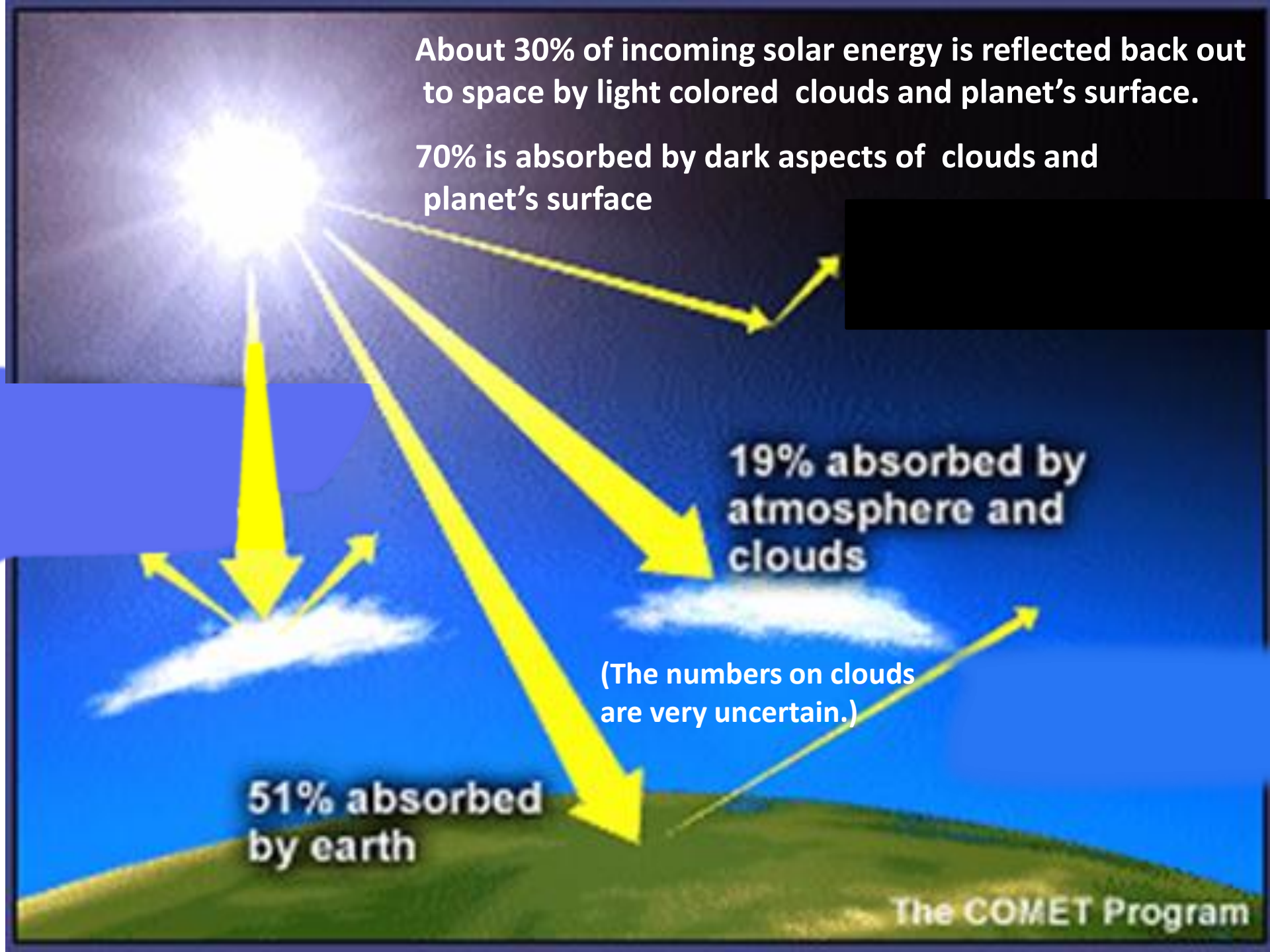


# Electric blanket effect



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



The diagram illustrates the Earth's energy balance. A bright sun in the upper left corner emits several yellow arrows representing solar radiation. One arrow points towards a black rectangular area in the upper right, representing reflection to space. Another arrow points towards a cloud in the middle right, labeled '19% absorbed by atmosphere and clouds'. A third arrow points towards the Earth's surface, labeled '51% absorbed by earth'. A fourth arrow points away from the cloud towards the upper left, representing reflection. The Earth is depicted as a green hill at the bottom. The sky is blue, and the sun is bright white.

19% absorbed by atmosphere and clouds

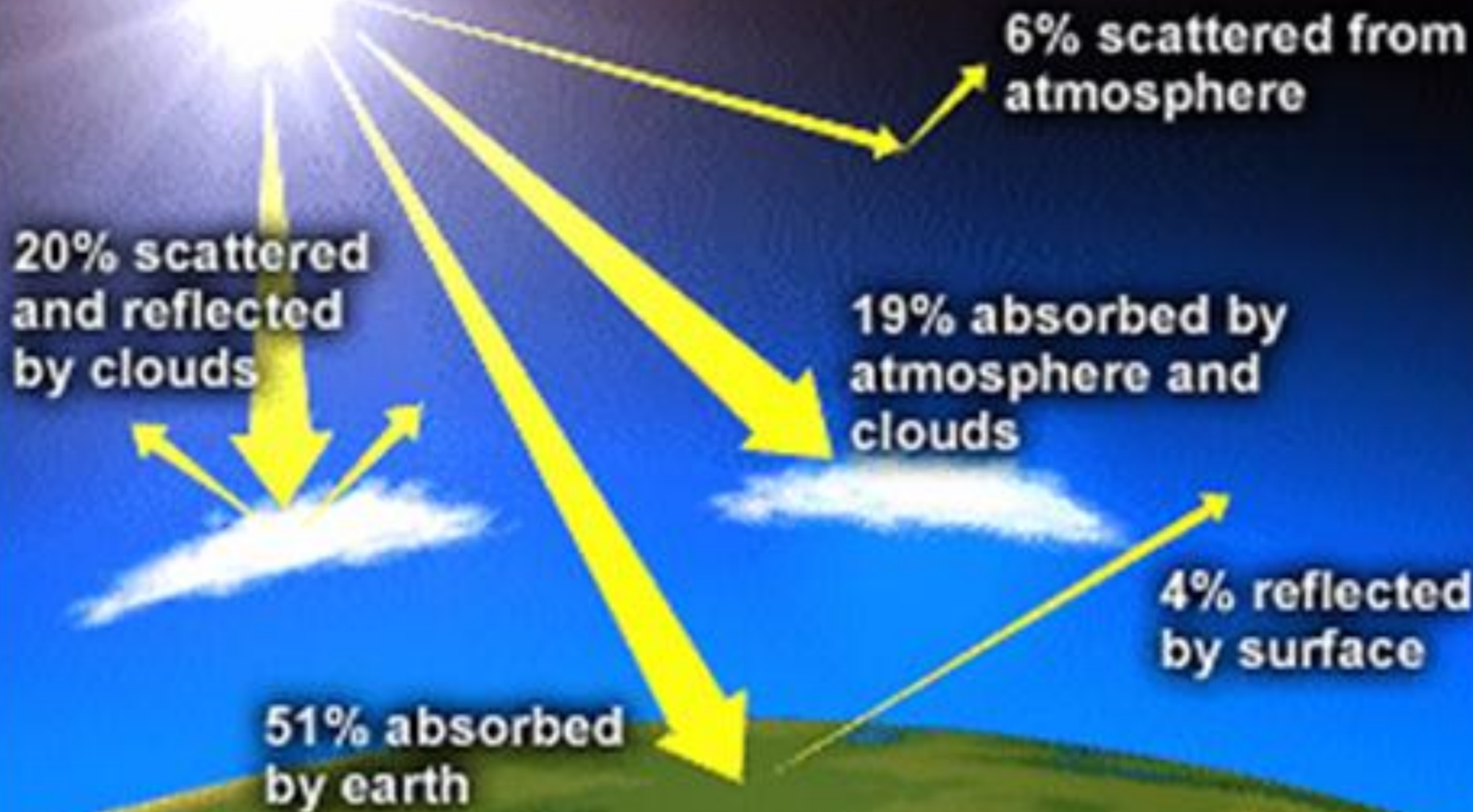
(The numbers on clouds are very uncertain.)

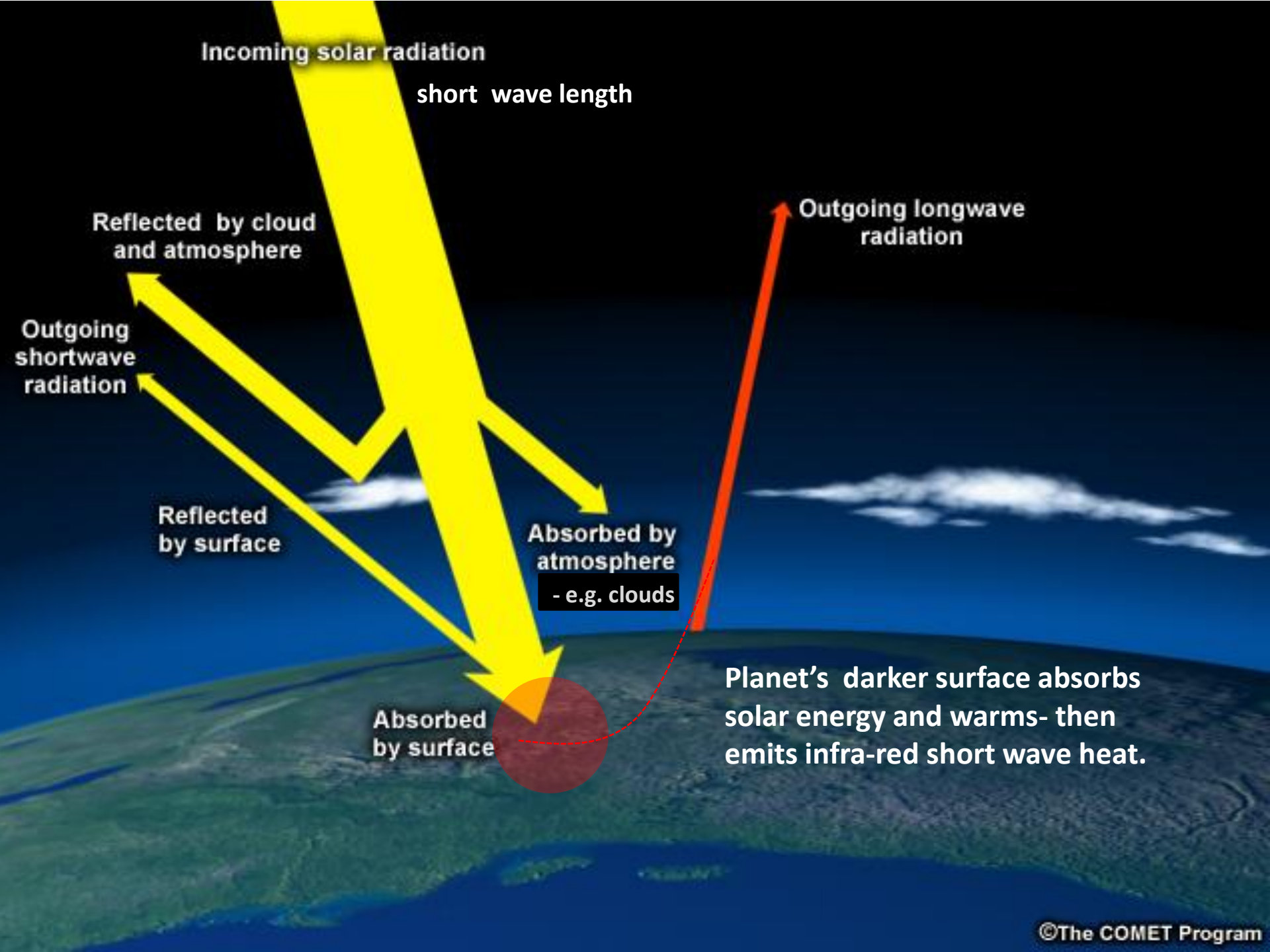
51% absorbed by earth

The COMET Program

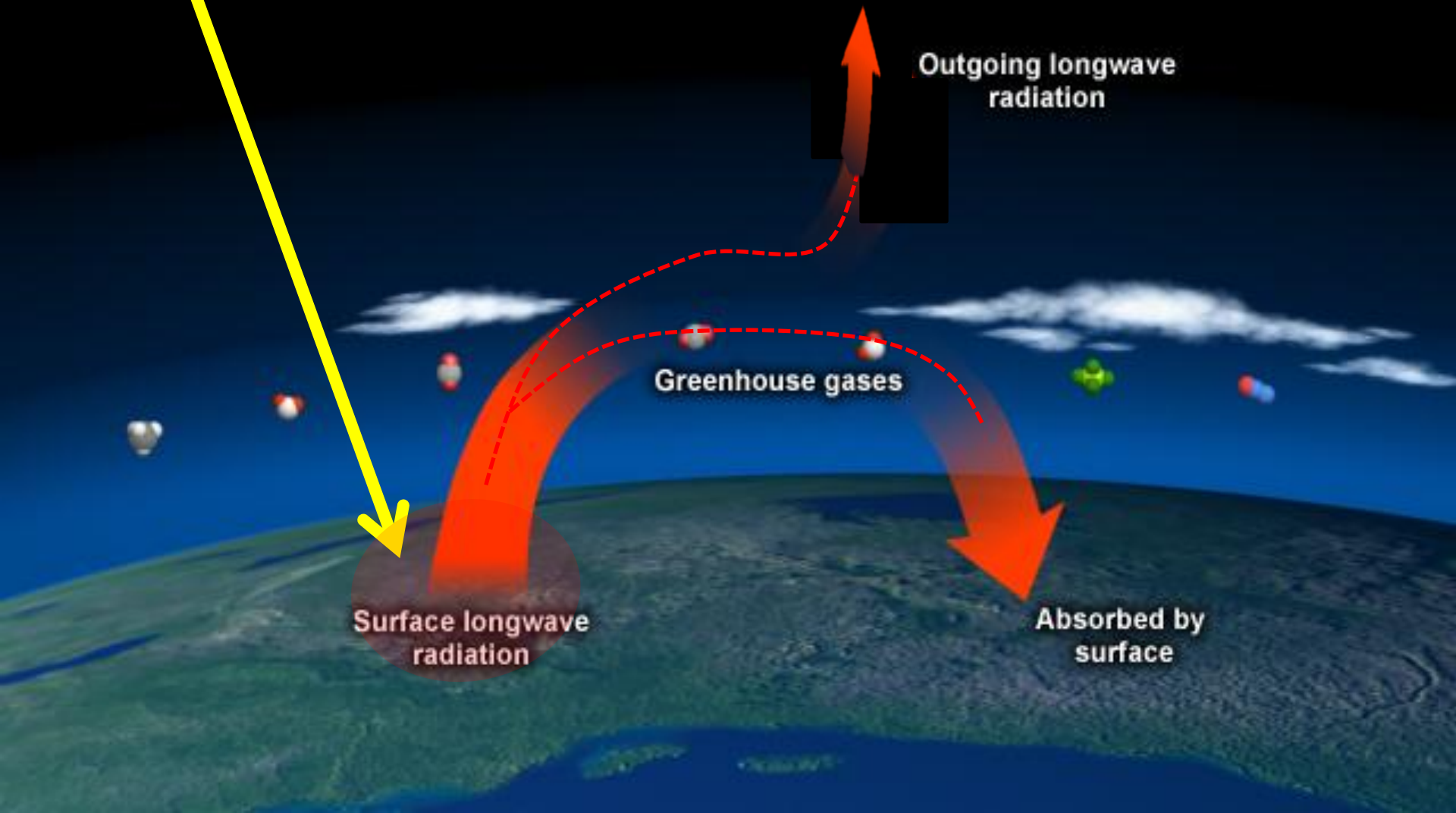


(The numbers on clouds  
are very uncertain.)





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

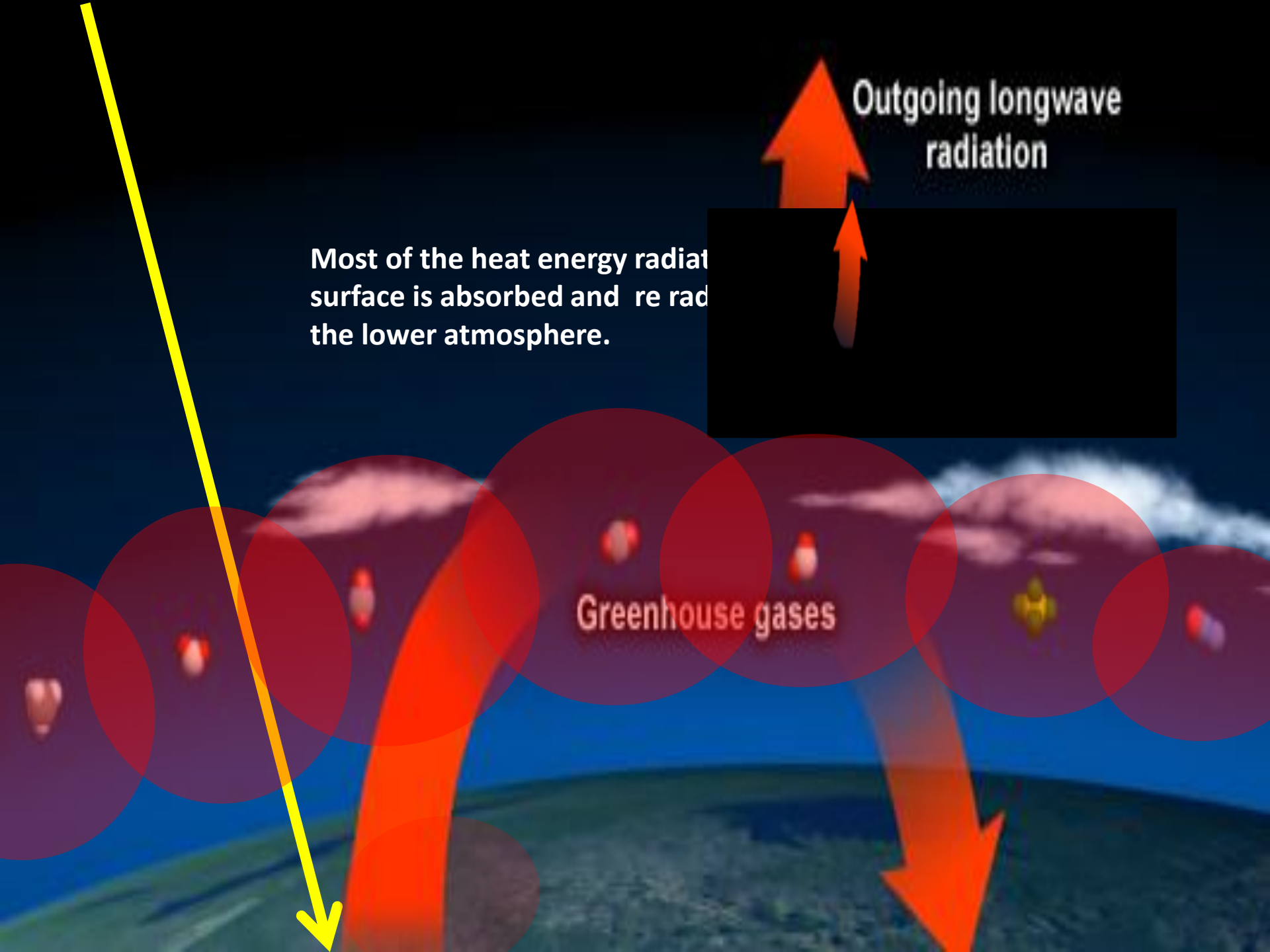


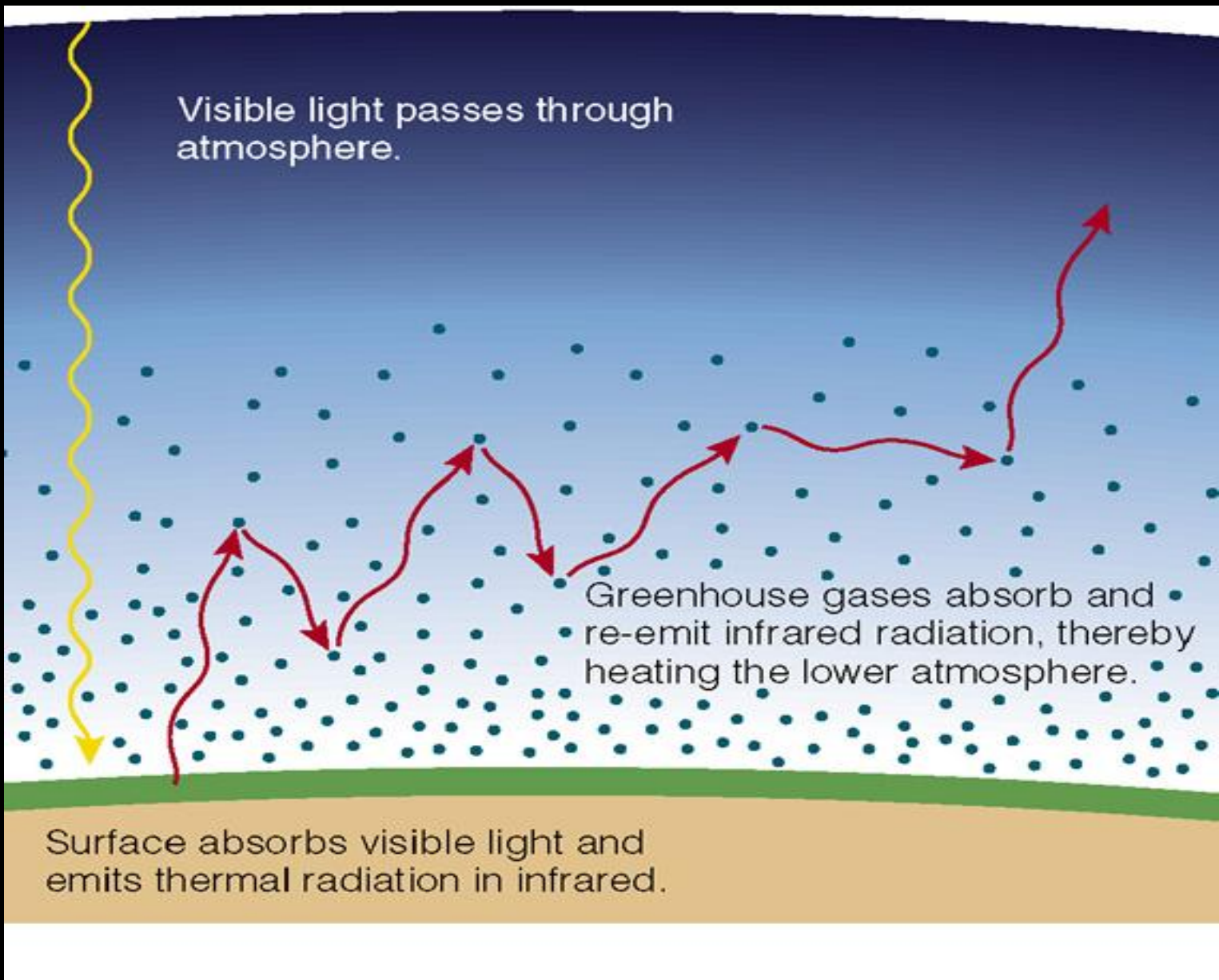


Most of the heat energy radiated from the surface is absorbed and re radiated by the lower atmosphere.

Outgoing longwave radiation

Greenhouse gases







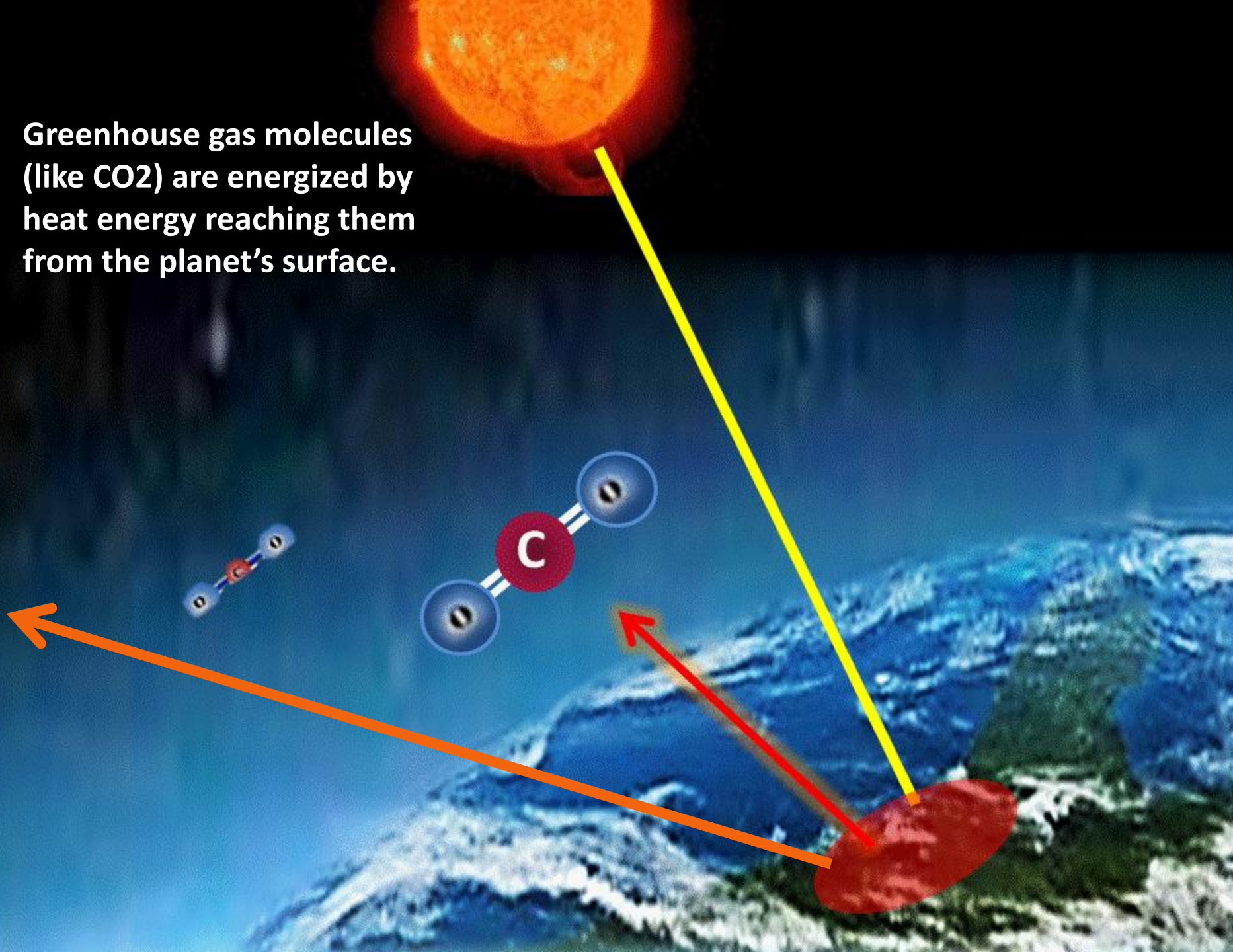
Short wave light energy from the sun passes through GHGs in the atmosphere not affecting them

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

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

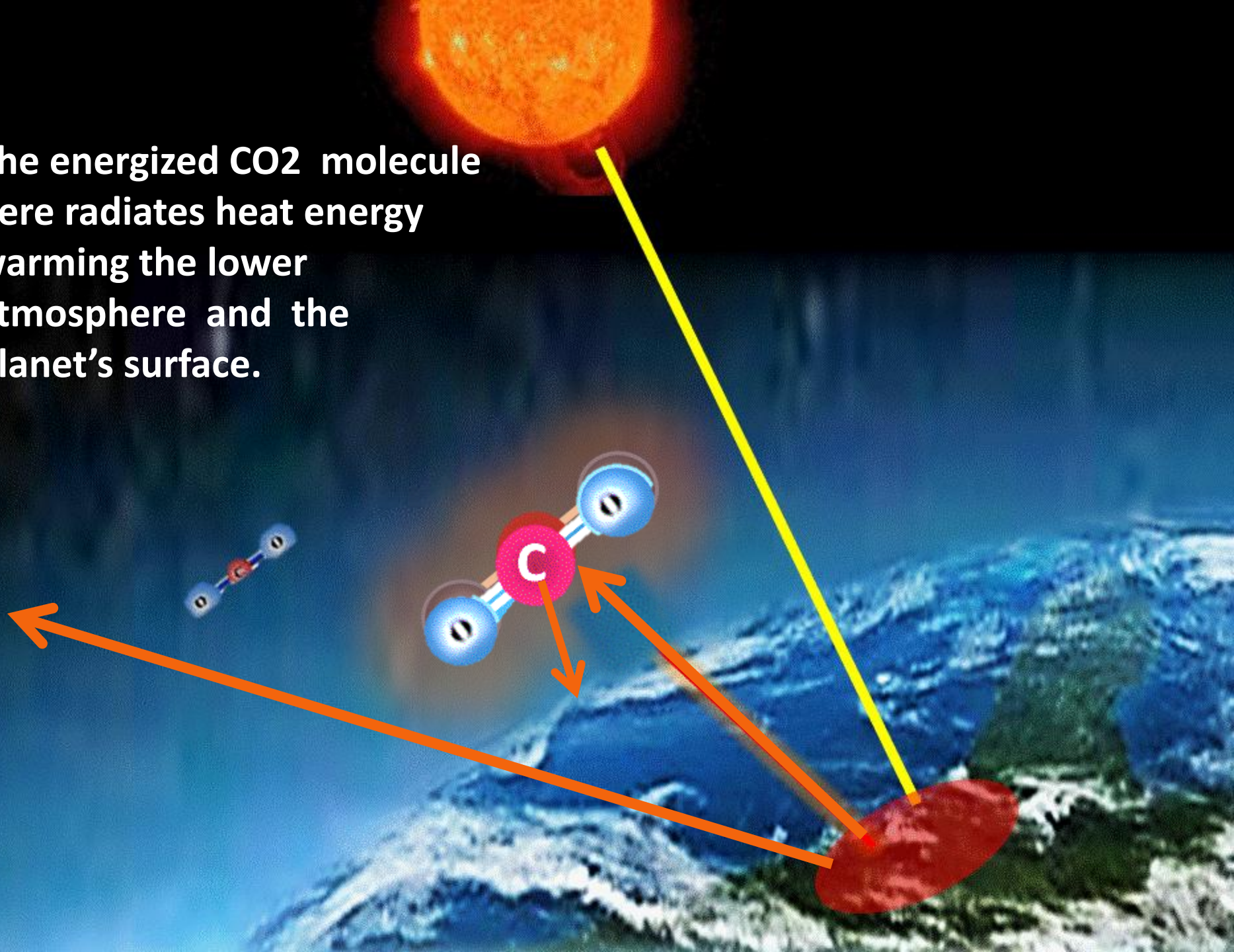


Greenhouse gas molecules (like CO<sub>2</sub>) are energized by heat energy reaching them from the planet's surface.

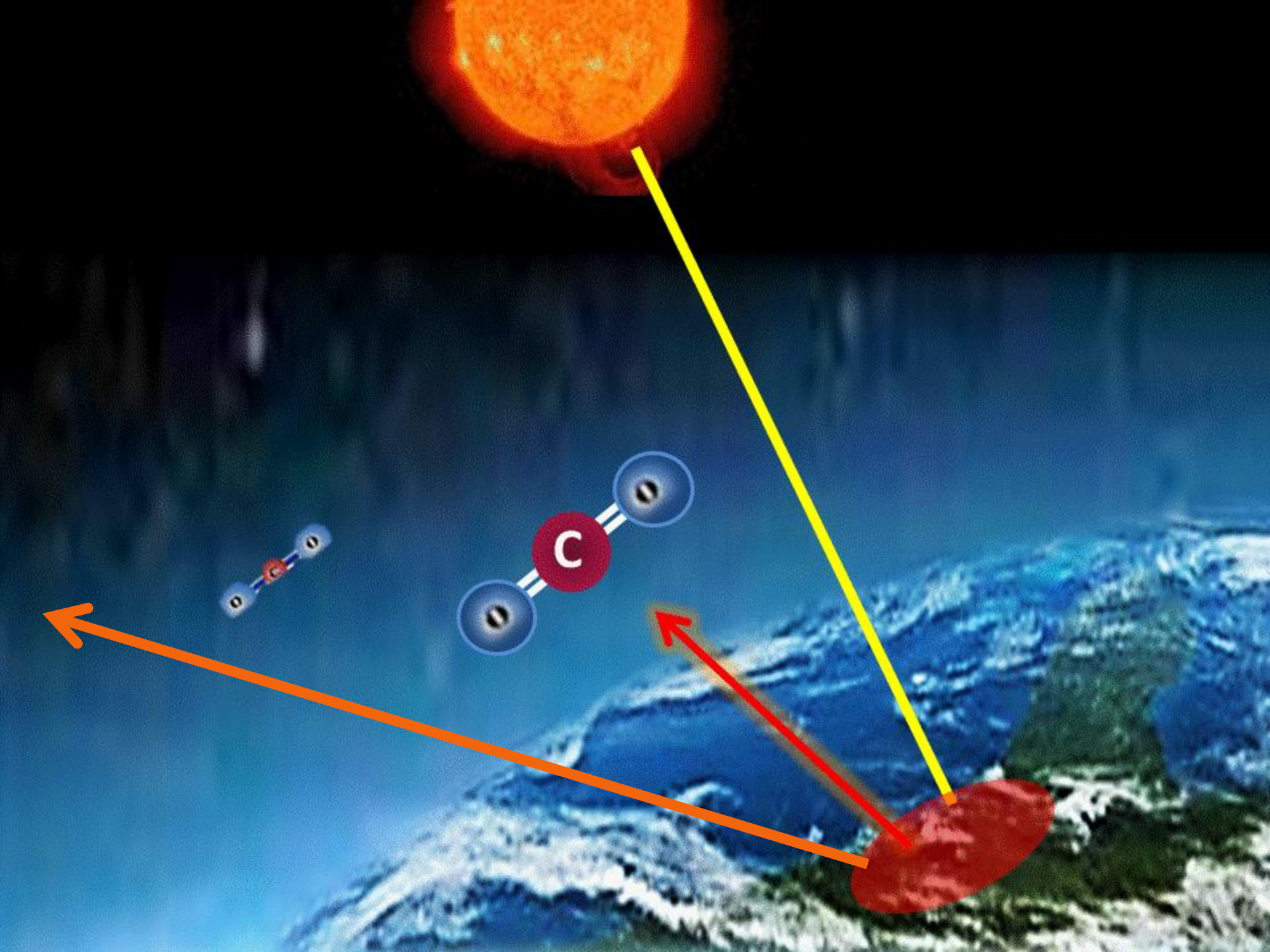




The energized CO<sub>2</sub> molecule here radiates heat energy warming the lower atmosphere and the planet's surface.

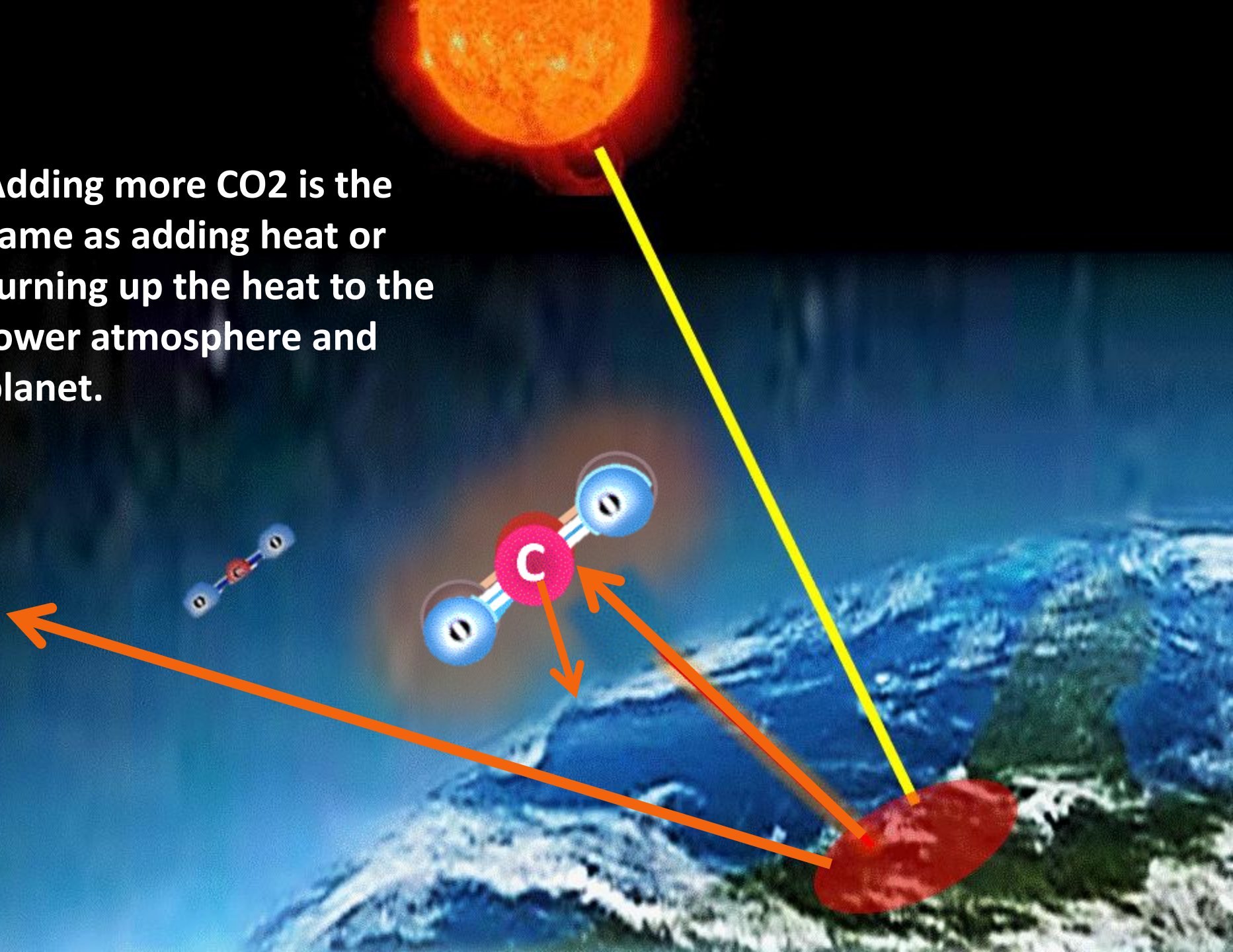








**Adding more CO<sub>2</sub> is the same as adding heat or turning up the heat to the lower atmosphere and planet.**



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



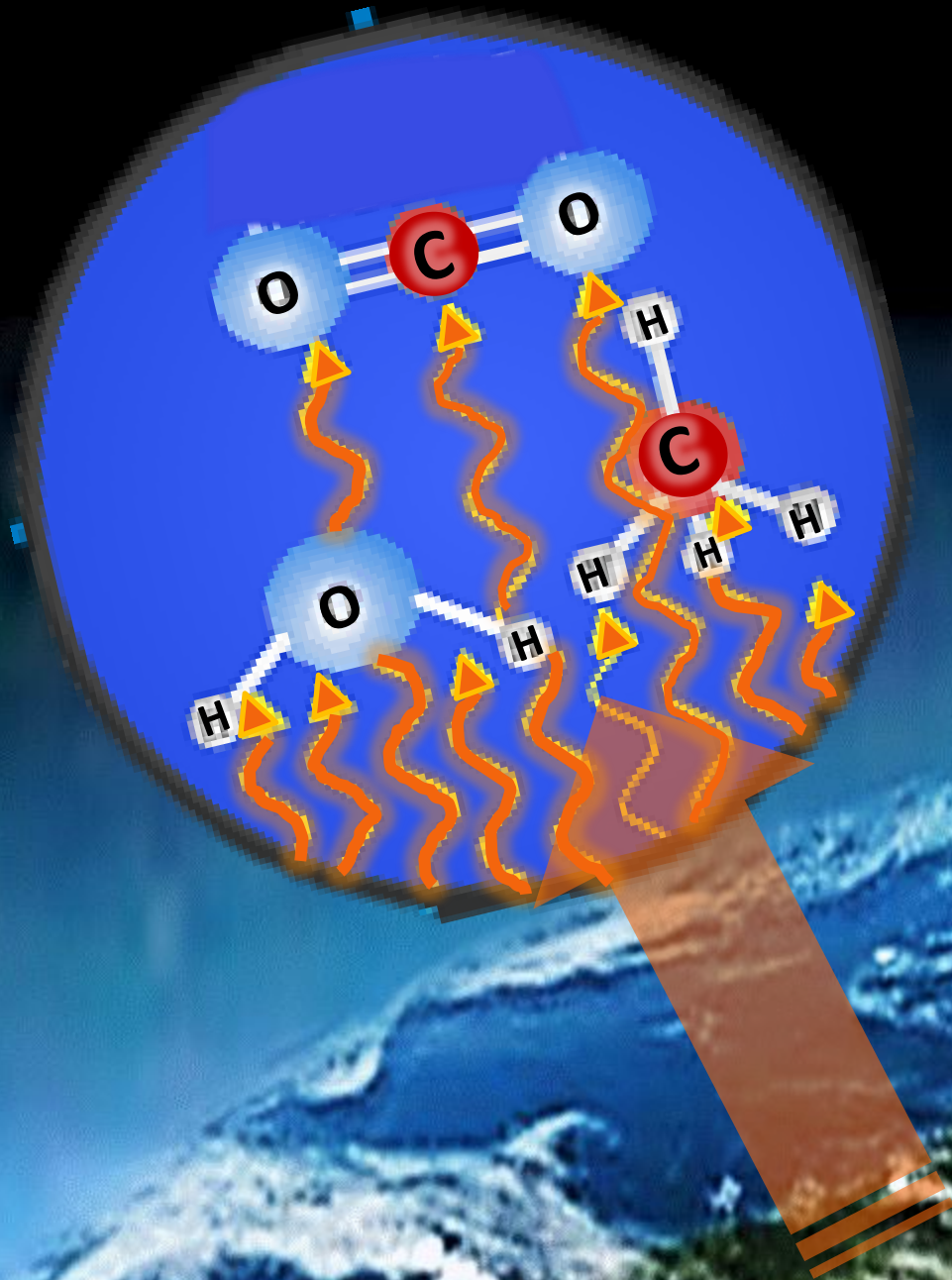
lower  
atmosphere



Earth

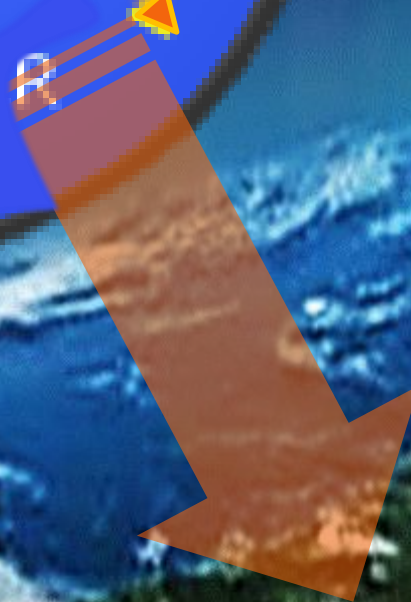
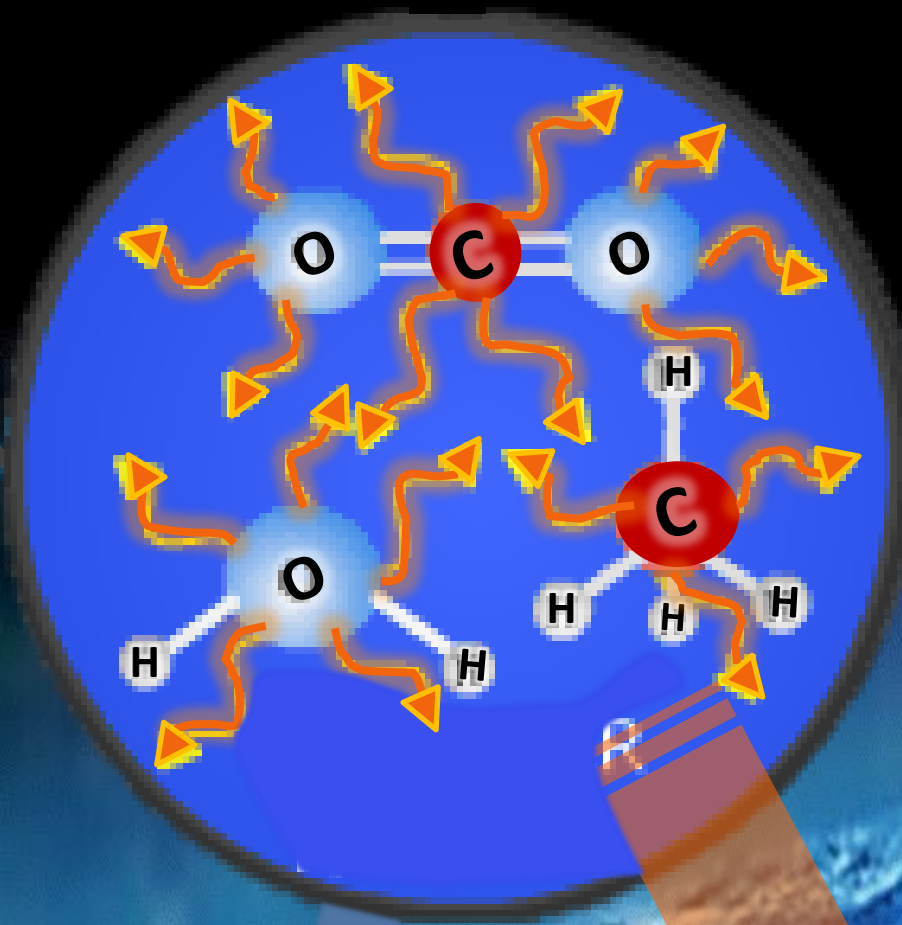


Here GHG  
molecules of ,  
CO<sub>2</sub> , methane  
and water  
molecules  
absorb infra-red  
heat energy.

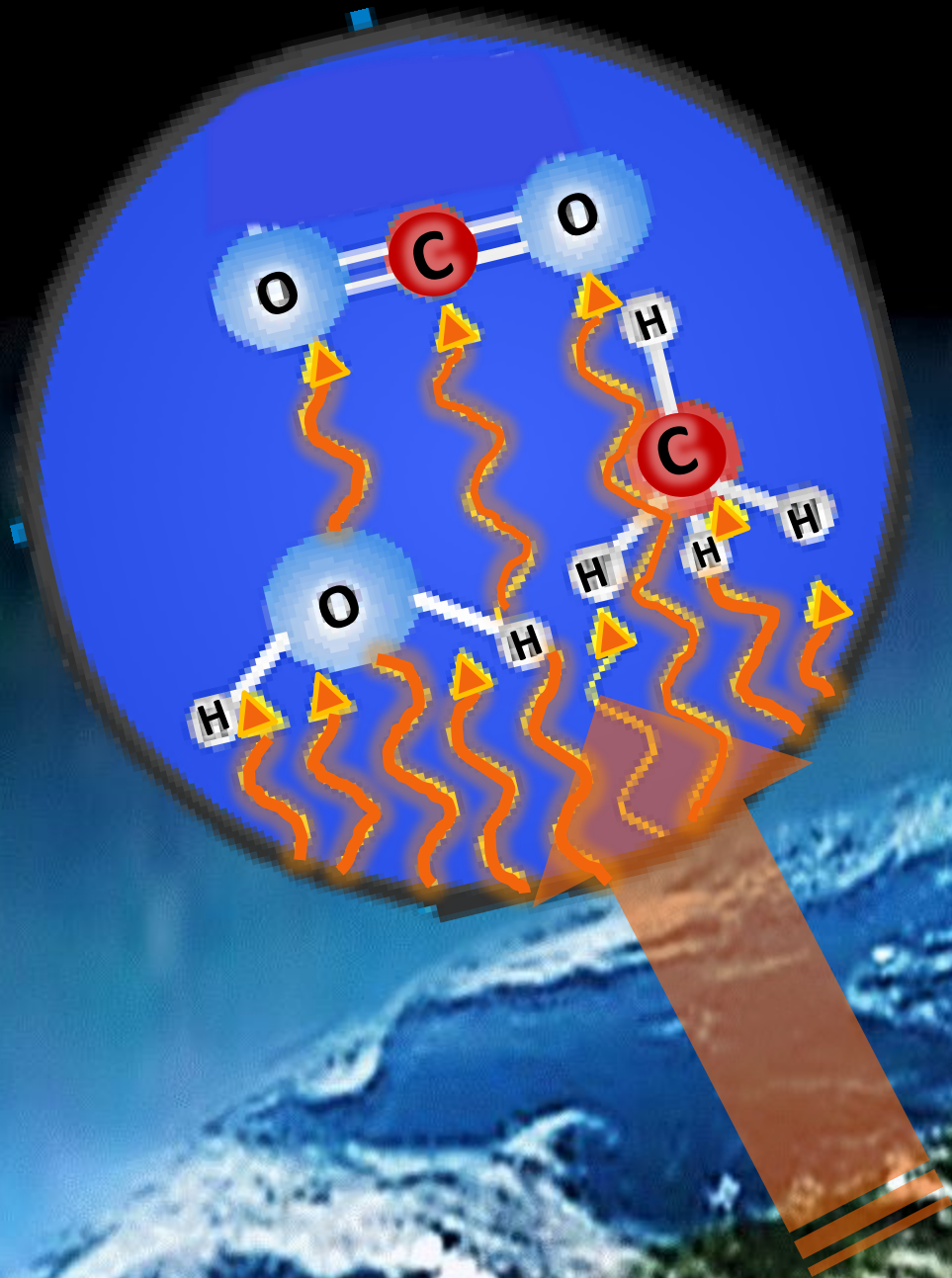




Here the  
molecules are  
energized  
and radiate /emit  
emit heat energy.

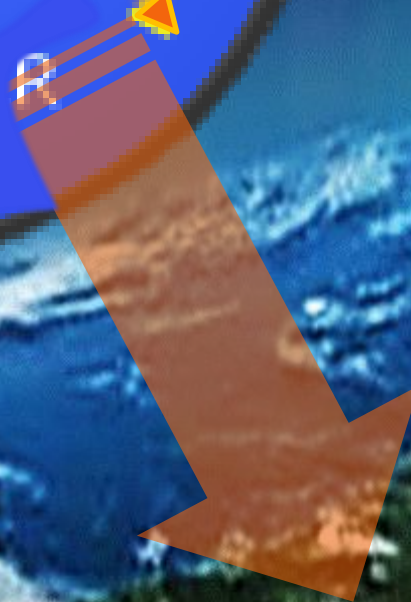
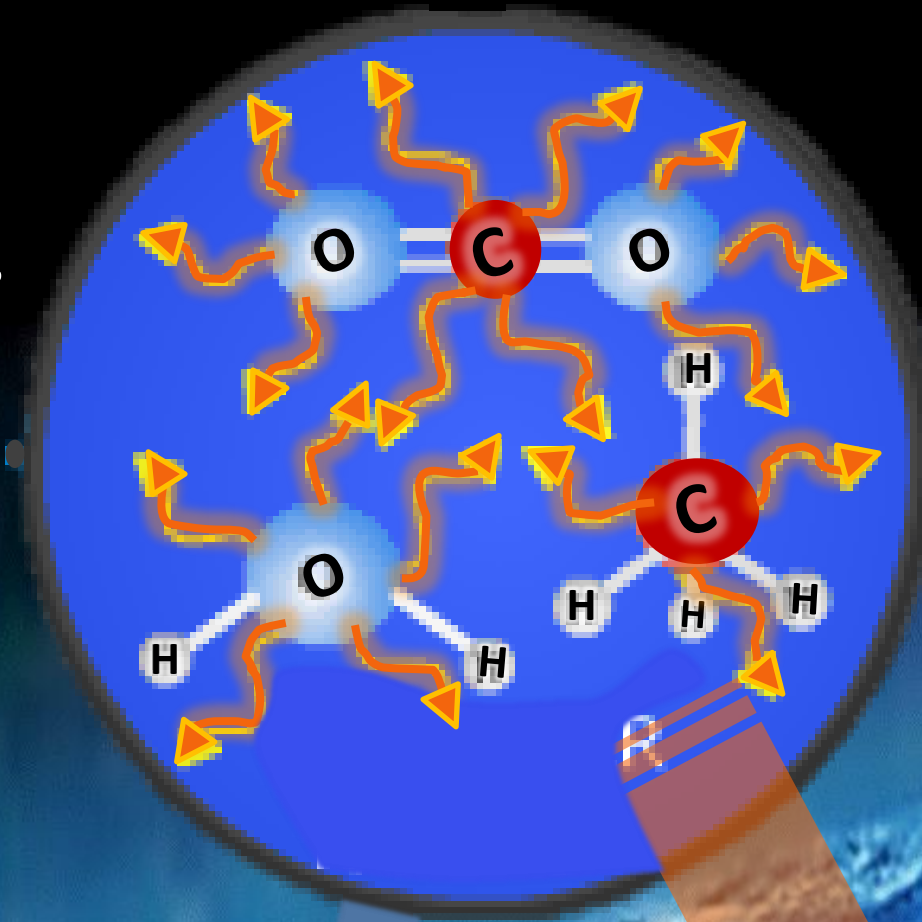


absorb infra-red  
heat energy.



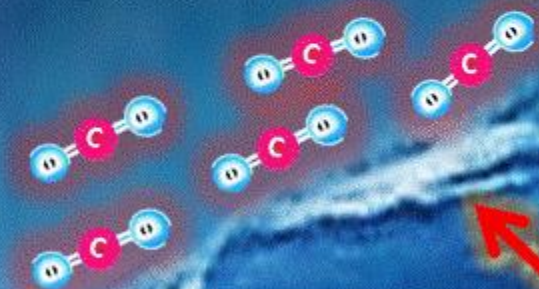
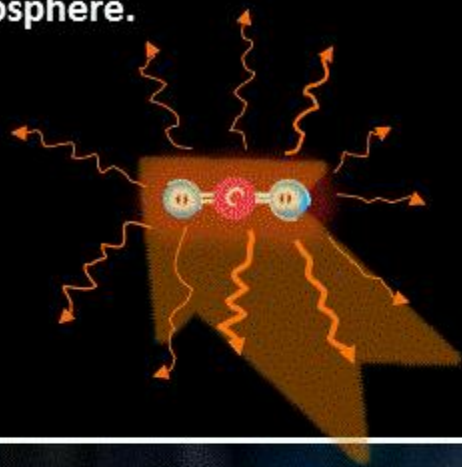


radiate /emit  
emit heat energy.



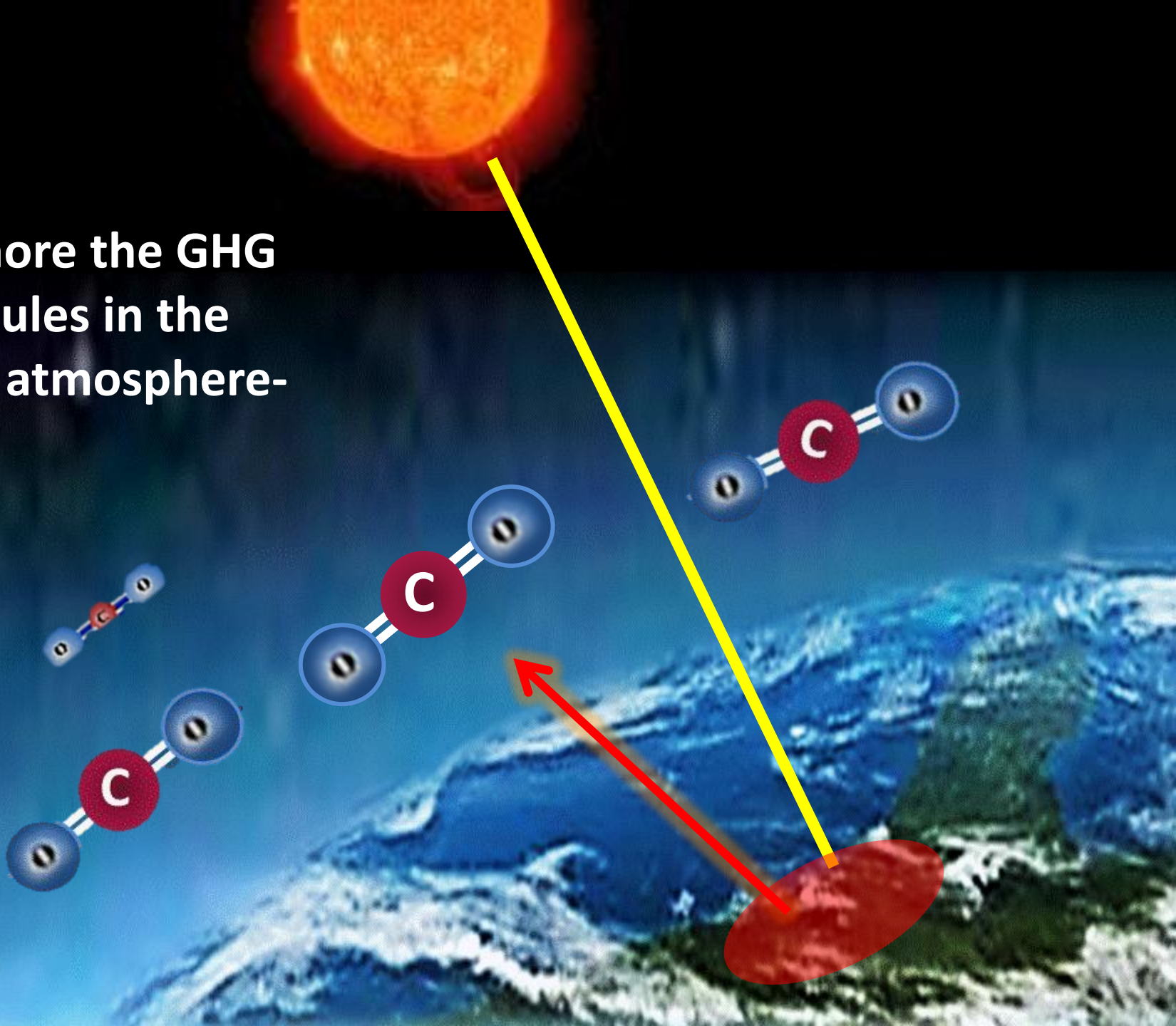


The energized GHG molecule radiates heat energy in all directions warming the lower atmosphere.





The more the GHG  
molecules in the  
lower atmosphere-



The more the heat  
energy in the  
lower atmosphere-

