**(1) True or false**: When humans add CO2 to the atmosphere, the CO2 absorbs more LWIR radiation emitted by the earth's surface (warming the atmosphere) and reduces the amount escaping to space.

(A) True (B) * False

- Best answer. Almost all of the LWIR radiation emitted by the surface that passes through the atmosphere and escapes to space is at wavelengths within the atmospheric window, where CO2 doesn't absorb anything to speak of. Wavelengths absorbed by CO2 are already almost completely absorbed by CO2 already in the atmosphere, so adding more CO2 will therefore affect the flux of LWIR emitted by the surface directly to space only a little. Additional CO2 that mixes into the middle and upper troposphere and stratosphere does absorb more LWIR emitted to space by CO2 and H2O vapor in the lower and middle troposphere, reducing the LWIR emitted to space by the planet temporarily and warming the middle troposphere, which then emits more, both upward and downward. This additional LWIR absorbed by the surface then warms the surface, which then emits more to space, compensating for the reduced flux of LWIR emitted to space by the atmosphere, since some of that is now emitted by CO2 at higher altitudes, which are colder and hence emit less than what CO2 and H2O vapor lower in the atmosphere used to emit to space.