

Earth Can't heat itself with its own Radiation

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Back Radiation to the Earth does not warm the Earth

Some say that the back radiation referred to above heats the Earth's surface. That can't happen. The Earth can't heat itself from its own radiation.¹

But no body of matter can be warmed in any way by absorbing its own radiation. This is not physically possible. If that were possible, bodies of matter could spontaneously heat up. Something we all know does not happen.

Imagine two bodies of matter next to each other. Each at the same temperature. [This is the equivalent of the Earth heating itself from its own radiation.] Each potentially absorbing radiation from the other. Neither can get hotter. Neither will get hotter, no matter how long you wait. Both bodies can lose heat to cooler surroundings, but neither can absorb heat from the other body as long as both bodies are at the same temperature. Heat is what a body of matter must absorb to get hotter. Heat is well-observed to flow by radiation or by conduction only from a body at a higher temperature to a body at a lower temperature. The smaller the temperature difference, the slower the flow of heat—the smaller the flux. Zero difference in temperature means zero flow of heat, which means zero increase in temperature of the absorbing body. Earth cannot physically be warmed by its own radiation.

Back radiation from the atmosphere is the Earth's own radiation coming back on itself. The Earth radiated it upwards, it was absorbed by Radiatively Active Gases or RAGs and re-emitted back down to the Earth. If the RAG molecules did not absorb IR EMR from the surface, they would not have radiated IR back to the surface. What came back was a diminished amount of the incident radiation from the Sun and a diminished amount of what was radiated up from the Earth.

For the Earth to heat itself, that is the same as putting two bodies at the same temperature beside each other as described above. Heat can only flow from hot to cold. That's the 2nd Law of Thermodynamics. The Earth is at the same temperature as itself and hence can't heat itself.

Heat can travel from one place to another in three ways: Conduction, Convection and Radiation. Both conduction and convection require matter to transfer heat.²

Conduction requires the bodies to be in physical contact with each other. But the same principal applies, no matter by Conduction, Convection or Radiation, the Earth can't heat itself by any of those methods. If you placed the two bodies at the same

temperature one on top of the other but not in contact, convection from the lower body can't heat the upper body. Radiation is merely another form of conduction.

Back radiation is the Earth's own radiation and hence can't heat itself. For the Earth to heat itself it requires another heat source other than itself.

The Earth is at the same temperature as itself and hence cannot heat itself.

References

¹ *Greenhouse gases cannot physically cause observed global warming*

Published on January 21, 2019

Written by Dr Peter L Ward

<https://whyclimatechanges.com/impossible/>

² *If there is a temperature difference between two systems heat will always find a way to transfer from the higher to lower system.*

How is heat transferred?

https://www.edinformatics.com/math_science/how-is-heat-transferred.html