

Carbon Dioxide and the Greenhouse Effect

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The presence of carbon dioxide is a prerequisite for life in the biosphere, as photosynthesis would not be possible without CO₂. Natural and anthropogenic sources of CO₂ are: volcanic processes, living organisms, oxidation of biomass, oceans, degassing of the mantle, combustion of fuels (coal, natural gas, oil), etc[1]. By absorbing infrared wavelengths of various wavelengths, CO₂ prevents heat from escaping from the Earth into space, resulting in higher air temperatures near the Earth's surface. Water vapour, methane, ozone and other gases have the same ability[2-6]. The heating of the air near the Earth's surface caused by the absorption of Earth's infrared radiation by gases in the atmosphere is called the greenhouse effect and these gases are called greenhouse gases. Although studies have shown that water vapour is the main cause of the greenhouse effect on Earth, CO₂ is still considered the 'main culprit' for the rise in global temperatures. Some of the projects proposed to remove CO₂ from the atmosphere and prevent global warming are absurd, some are ineffective, and some are harmful to the environment[7-9]. Indirect signs of the greenhouse effect are melting of glaciers, 30-40% reduction of the thickness of the Arctic ice sheet, sea level rise and increase an average air temperature, which can cause many global problems. There are opinions that the greenhouse effect is a normal natural stage of the Earth's evolutionary development.

References

- [1] G.Makharadze, Ecochemistry (Short course of lectures),2023.
- [2] <https://www.climate.gov/news-features/understanding-climate/climate-change-atmospheric-carbon-dioxide>.
- [3] <https://www.whoi.edu/know-your-ocean/ocean-topics/how-the-ocean-works/ocean-chemistry/ocean-acidification/>.
- [4] <https://www.bgs.ac.uk/discovering-geology/climate-change/how-does-the-greenhouse-effect-work/>.
- [5] <https://www.epa.gov/ghgemissions/overview-greenhouse-gases#overview>.
- [6] <https://gml.noaa.gov/>.
- [7] <https://unfccc.int/process-and-meetings/the-paris-agreement>.
- [8] <https://mepa.gov.ge/ge/PublicInformation/25717>.
- [9] <https://www.eiec.gov.ge/Ge/AnnualReports>.