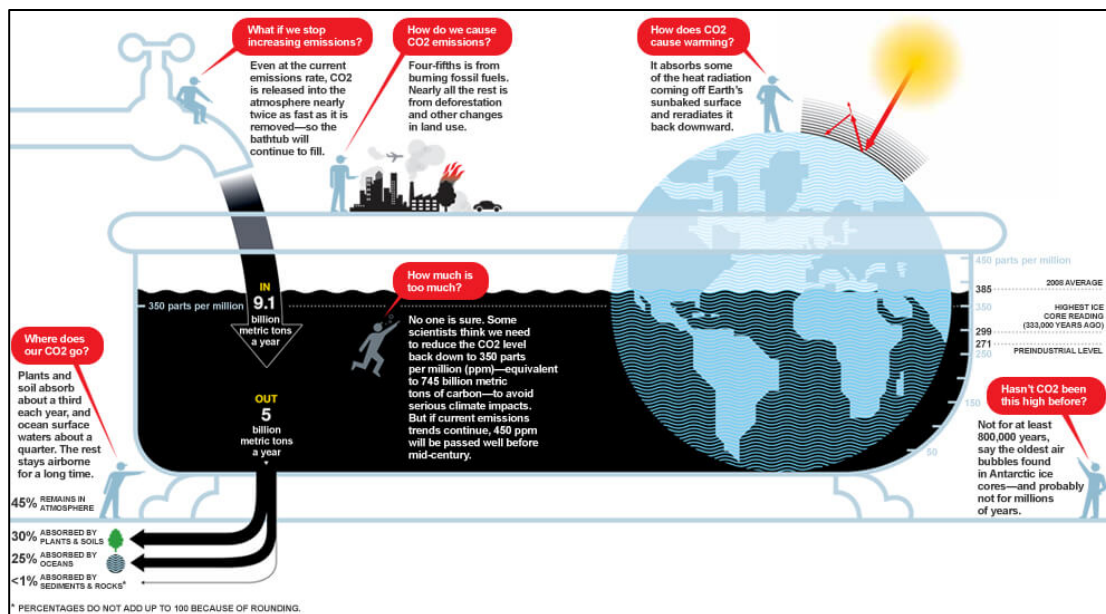


Human disruptions of the Carbon cycle

- A Very, Very Simple Climate Model that lets you explore how the rate of carbon emissions affects the level of CO₂ in the atmosphere and Earth's climate (~10:00): <https://scied.ucar.edu/simple-climate-model>

Clearing land. Growing populations over the last few hundred years have cleared away natural habitats faster and faster. We cut forests for construction material and firewood. We clear space for farming and cities. This has had two results.

First, deforestation from fires released the carbon trapped in the trees and in wood or brush left to rot. Second, land clearing reduces the natural world's capacity to absorb CO₂ by reducing the number of healthy ecosystems and plants that could do so. In addition, these changes in land use have changed the albedo, or reflectivity, of Earth's surface. For example, city surfaces such as tarmac roads and dark roofs reflect far less solar radiation than natural landscapes do. This means more heat is added to the atmosphere in urban areas.



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See <http://ngm.nationalgeographic.com/big-idea/05/carbon-bath>

Burning fossil fuels. Burning fossil fuels disrupts the carbon cycle in a much more serious way. It moves carbon from the natural reservoir of oil and gas into another reservoir, the atmosphere. We currently emit more than two million pounds of CO₂ per second. This means that we've tipped the carbon cycle out of equilibrium, or balance. CO₂ can remain in the atmosphere for hundreds of years before being removed by natural processes. Therefore, it will continue to contribute to global warming into the next century.

Global warming has caused many changes in physical and biological systems. Some of these changes have decreased biodiversity, and the ability of ecosystems to bounce back after being disturbed.



The rise in global average temperature due to greenhouse gases will result in feedback loops like melting of arctic permafrost, and melting of semi-solid methane deposits in the seafloor. These will cause the release of more CO₂ and methane, in turn.

Although this is a depressing topic, the fact is that the primary cause of global climate change is human. The good news is that this means that solutions are within our control also.

More information

- A complex simulation that shows how human industry affects the carbon cycle (scroll down to “The carbon cycle and climate change”) (~10:00)
<http://mare.lawrencehallofscience.org/curriculum/ocean-science-sequence/oss68-overview/oss68-simulation-activities - carboncycle>