

Carbon Dioxide Concentration

Hi, this is Bill Putman. I am a climate scientist at NASA's Goddard Space Flight Center. What you are looking at is a supercomputer model of carbon dioxide levels in the Earth's atmosphere. The visualization comprises one year of data into a few minutes. Carbon dioxide is the most important greenhouse gas affected by human activity. About half of the carbon dioxide emitted from fossil fuel combustion remain in the atmosphere, while the other half is absorbed by natural land and ocean reservoirs. In the northern hemisphere, we see the highest concentrations are focussed on major emission sources over North America, Europe, and Asia. Notice how the gas does not stay in one place. The dispersion of carbon dioxide is controlled by the large-scale weather patterns within the global circulation.

During spring and summer in the northern hemisphere, plants absorb a substantial amount of carbon dioxide through photosynthesis, thus removing some of the gas from the atmosphere. We see this change in the model as the red and purple colours start to fade.

Meanwhile, in the southern hemisphere we see the release of another pollutant: Carbon monoxide. This is a gas that is both harmful to the environment and to humans. During the summer months plumes of carbon monoxide stream from fires in Africa, South America, and Australia, contributing to high concentrations in the atmosphere. Notice how these emissions are also transported by winds to other parts of the world.

As summer transitions to fall and plant photosynthesis decreases, carbon dioxide begins to accumulate in the atmosphere. Although this change is expected, we are seeing higher concentrations of carbon dioxide accumulate in the atmosphere each year. This is contributing to the long-term trend of rising global temperatures. The orbiting carbon observatory 2, or OCO-2, will be the first NASA satellite mission to provide a global view of carbon dioxide. OCO-2 observations and atmospheric models like GEOS-5, will work closely together to better understand both human emissions and natural fluxes of carbon dioxide. This will help guide climate models toward more reliable predictions of future conditions across the globe.