How fossil fuels contribute to global warming

Fossil fuels are the main source of energy in the world today. The word "fuels" means they are burned to create energy. Fossil fuels happen to be long-chain hydrocarbons. When the fuel is oxidized, the bonds break and release a lot of energy. The energy does things like move our cars and generate electricity. Sometimes it's just the energy itself we want. When hydrocarbons get burned, the hydrogen atoms join with oxygen to form H2O, which is water, and the carbons join with oxygen to form CO2, which is carbon dioxide. Both the water and the carbon dioxide get released into the air.

The "fossil" indicates that they come from deep within the Earth, where they arrived after millions of years of geological transformations. Back in the day, fossil fuels were actually atmospheric carbon that got slurped up by plants in photosynthesis, and then possibly eaten by animals and so on.

So- in the present day, we pull these fossil fuels out of the ground, where they've been for millions of years. We burn them, which releases their carbon into the atmosphere. When this happens on a large scale, as it does in the present day, the effect is releasing a tremendous quantity of CO2 and H2O into the air. The quantity really is massive, on the order of 100 million tons of CO2 a day.

Now, the atmosphere is a really big place. But if you emit 100 million tons of something into it, day after day, year after year, for 10 or 50 or 100 years, it starts to add up. Geophysical processes on the planet will adjust for some of this-- for instance, the oceans soak up a lot of carbon dioxide from the air. When plants grow, they slurp up CO2 into their plant matter, just as those prehistoric plants did millions of years ago. But the planetary systems can't adjust for all of it, and over time, emissions of CO2 from fossil fuel combustion have dramatically changed the amount of CO2 in the air.

The historic level of atmospheric CO2 was around 280 parts per million for most of human history (meaning for every 1 million atoms you choose out of the atmosphere, about 280 of them will be CO2). But, starting in the mid 19th century, when people started burning coal and then oil for power on a large scale, that proportion has gone up, and now it is closer to 400 parts per million.

As it happens, one of the things CO2 does in the atmosphere is absorb heat from the sun. When there is 40% more of it, it absorbs 40% more heat. That causes the planet to heat up.

And that's not the only thing-- those geophysical coping mechanisms, like the uptake of CO2 by the oceans, also have ill effects. CO2 in the ocean causes the creation of carbonic acid, which (at a very large scale) has the effect of making the ocean slightly more acidic. This means that the shells created by ocean life, such as coral, is more fragile, putting coral colonies (coral reefs) at risk. Coral reefs are already at risk from human activities harvesting food from the ocean; now that risk is compounded.

There's nothing particularly special about 280 parts per million of carbon in the atmosphere- in the ancient past it was much higher- or at times, lower-- except that 280 ppm is what the planet's ecosystems are "used to" (including human agriculture). As that number changes, as the temperature of the planet changes, then we see stable, established ecosystems get disrupted. And that has the tendency to cause a lot of things in nature to die. And that, in turn, makes the planet harder to live on and less pleasant besides.