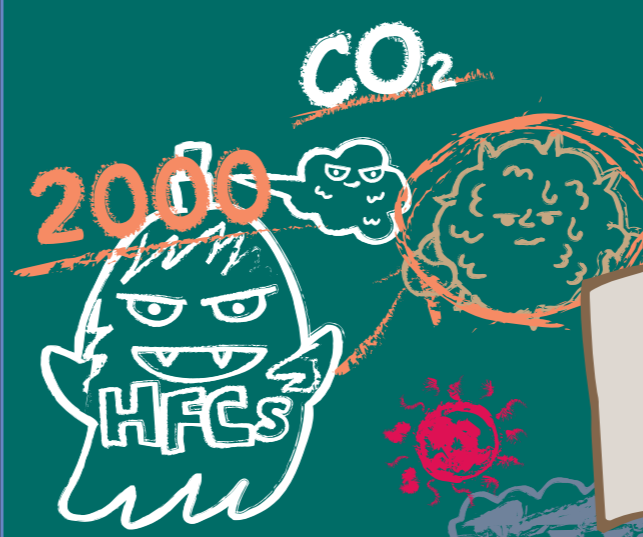


Isn't carbon dioxide the only cause of global warming?

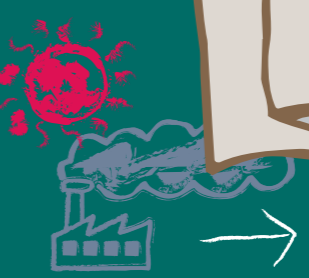
Prof. Ramanathan's Fun School

12th issue, December 2022

2000
CO₂
HFCs



Hydrofluorocarbons
about 10 years



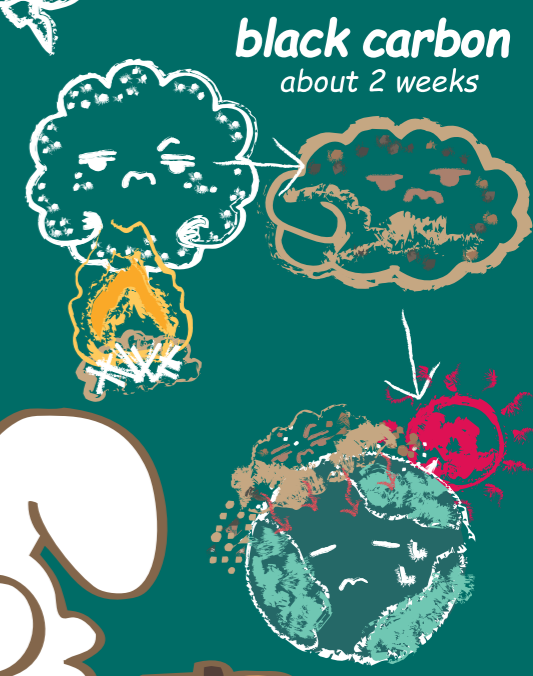
O₃
ozone
A few months



CH₄
methane
about 10 years



black carbon
about 2 weeks



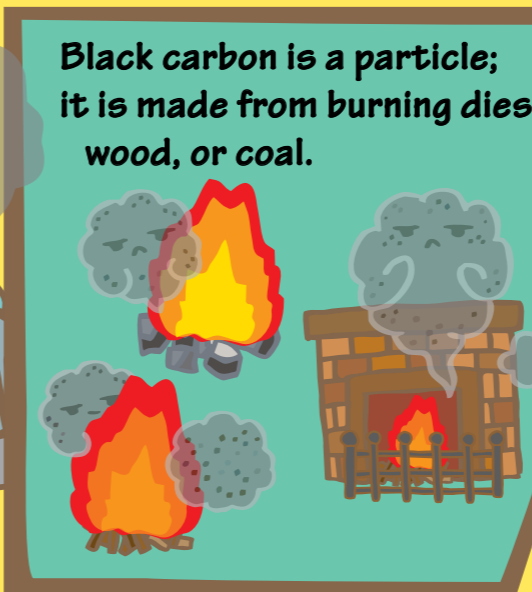


One day, when Gring and Wooden were walking along the street, ...



Wow!

Vrooom!



Black carbon is a particle; it is made from burning diesel, wood, or coal.



The car is gradually drifting away.

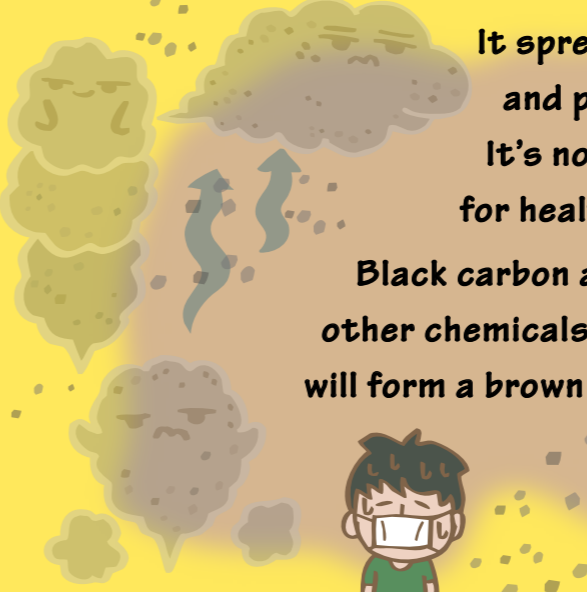
But the black carbon isn't gone.



Cough, cough! That's terrible smoke.



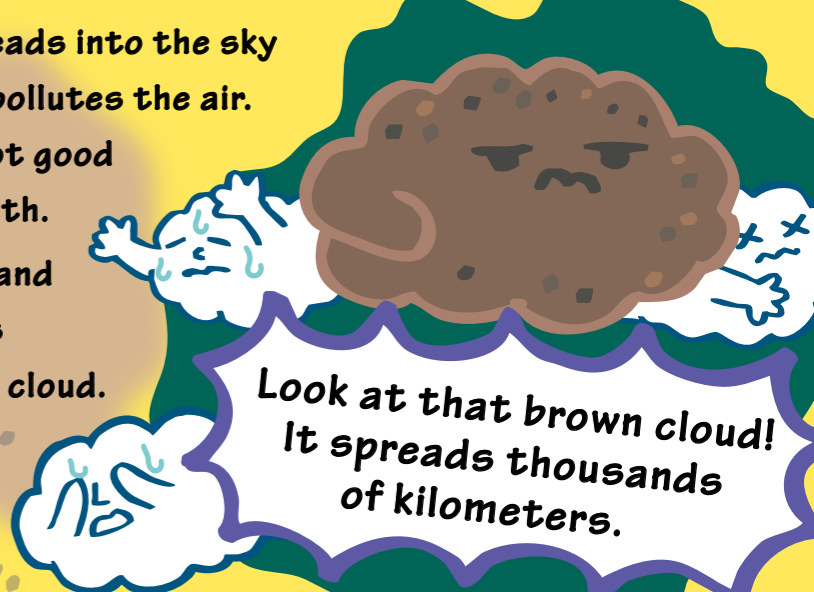
Are you OK? If you have a mask, put it on.



It spreads into the sky and pollutes the air.

It's not good for health.

Black carbon and other chemicals will form a brown cloud.



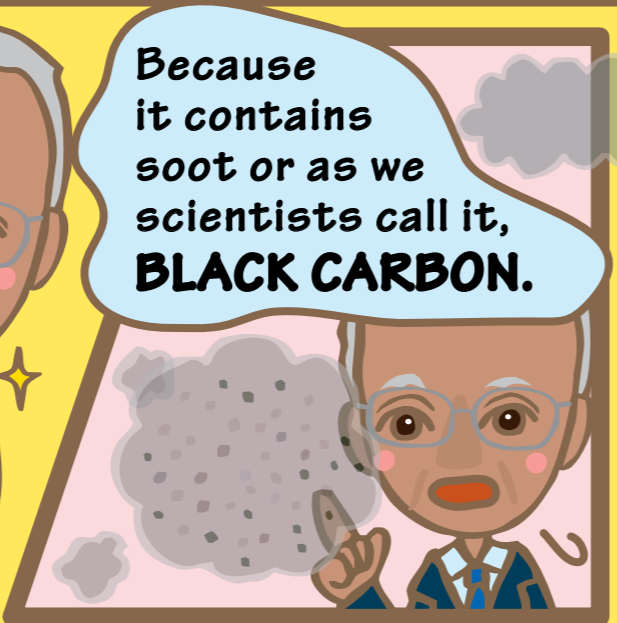
Look at that brown cloud! It spreads thousands of kilometers.



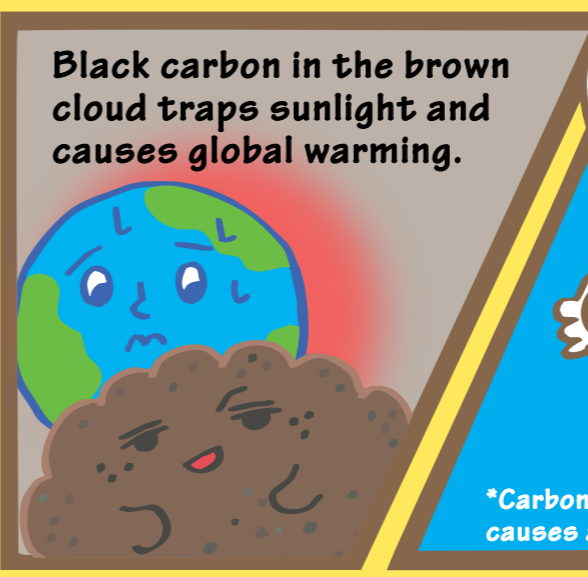
Professor Ramanathan!

2021 Winner of the Blue Planet Prize

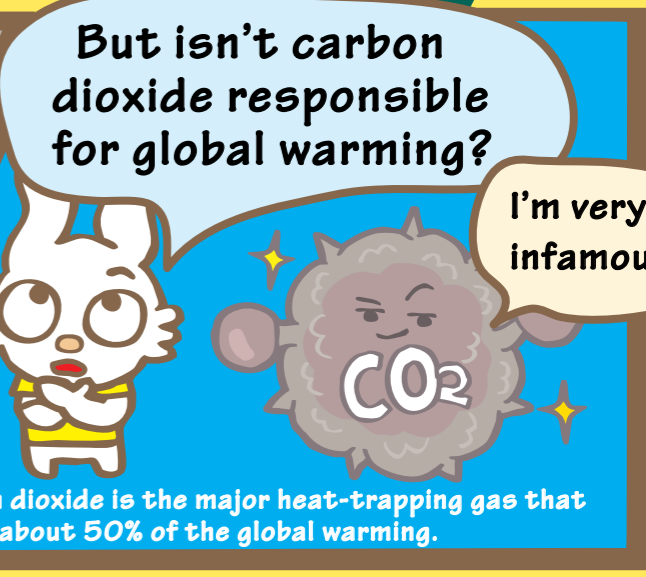
This smoke is brownish.



Because it contains soot or as we scientists call it, **BLACK CARBON.**



Black carbon in the brown cloud traps sunlight and causes global warming.

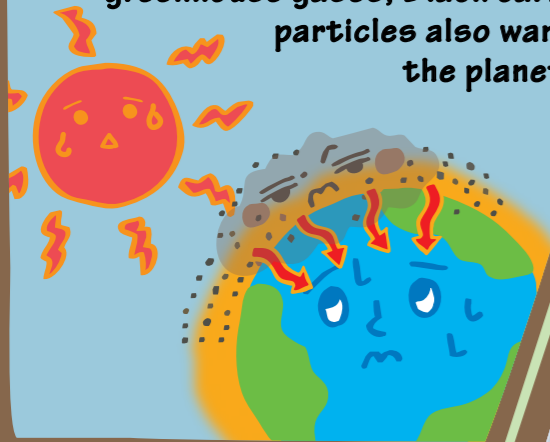


But isn't carbon dioxide responsible for global warming?

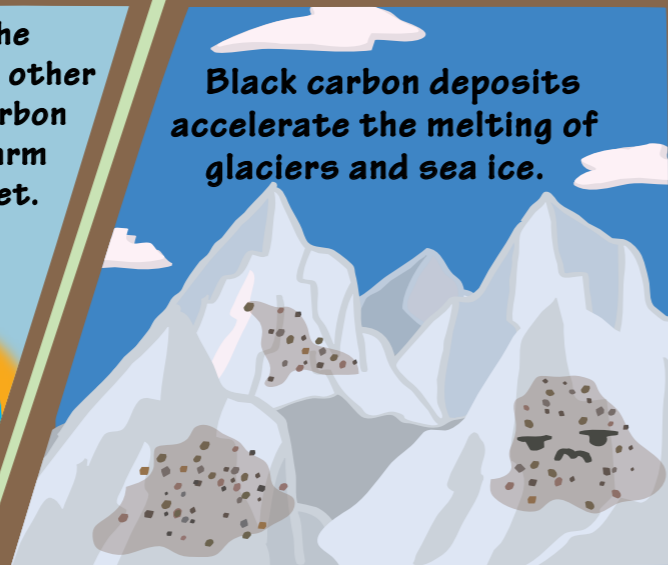
I'm very infamous!

*Carbon dioxide is the major heat-trapping gas that causes about 50% of the global warming.

Actually, carbon dioxide isn't the only greenhouse gas. There are other greenhouse gases; Black carbon particles also warm the planet.



Black carbon deposits accelerate the melting of glaciers and sea ice.



Besides carbon dioxide, there are other greenhouse gasses. Greenhouse gasses cover the earth like a blanket, trapping heat from the ground.

sleeping peacefully



You need a blanket, but it's too hot if you put too many on.

cannot rest



A bit of greenhouse gas is necessary, but not too much.



What are the other greenhouse gasses?



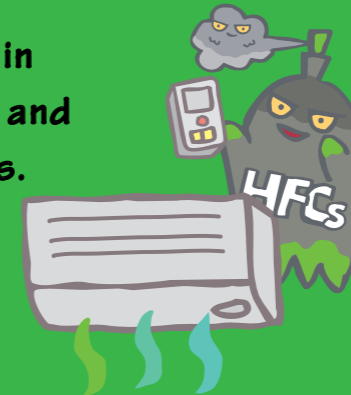
Firstly, **METHANE**.

Methane is emitted from food waste in landfills and leaky pipes carrying natural gas; it is also contained in burps from cows.



The next one is **HYDROFLUOROCARBONS** or **HFCs**.

They are used in refrigerators and air conditioners. HFCs are emitted when you use a spray can.



Lastly, **OZONE**.

Ozone is produced in reactions involving pollutants in waste gas from factories and cars.



HFCs, methane, ozone, and black carbon have much greater global warming potential than carbon dioxide.



HFCs are

2000

times more potent.
Diesel Black carbon is 1000 times more.

Boom!
HFCs

But these ones have shorter lifetimes than carbon dioxide.



Black carbon
about 2 weeks



Ozone
a few months



Methane
about 10 years



HFCs
about 10 years

If all diesel vehicles in the world were fitted with filters, black carbon would not be released into the air.



Then, black carbon would soon disappear from air pollution. Millions of lives lost to air pollution would have been saved.

One more thing. Carbon dioxide lingers on in the air for 100-1000 years; it does not decrease quickly.



By reducing potent but short-lived pollutants in the air, we can slow down the rate of global warming quickly within the next 20 years.



Can I do anything to help solve global warming?

For instance, methane is produced when food goes bad. So, you can reduce methane emission by reducing food waste and converting it to compost instead of throwing it into the landfill.

Because air circulates around the world greenhouse gasses emitted in your country could affect the climate of other countries far away.

The sooner we act, the better. Cutting emissions of these pollutants would quickly reduce warming and save millions of lives.

Environmental Doomsday Clock

Prof. Ramanathan's Fun School
December 2022

af THE ASAHI GLASS FOUNDATION
www.af-info.or.jp