

# Do the climate effects of air pollution impact the global economy?

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Aerosol emissions from burning coal and wood are dangerous to human health, but it turns out that by cooling the Earth they also diminish global economic inequality, according to a new study by Carnegie's Yixuan

Zheng, Geeta Persad, and Ken Caldeira, along with UC Irvine's Steven Davis. Their findings are published by *Nature Climate Change*.

Tiny particles spewed into the atmosphere by [human activity](#), called "[anthropogenic aerosols](#)," interact with clouds and reflect some of the Sun's energy back into space. They have a short-term cooling effect that's similar to how particles from major volcanic eruptions can cause global temperatures to drop. This masks some of the warming caused by much-longer-lived greenhouse gases, which trap the Sun's heat in the planet's atmosphere.

"Estimates indicate that [aerosol pollution](#) emitted by humans is offsetting about 0.7 degrees Celsius, or about 1.3 degrees Fahrenheit, of the warming due to greenhouse gas emissions," said lead author Zheng. "This translates to a 40-year delay in the effects of climate change. Without cooling caused by [aerosol emissions](#), we would have achieved 2010-level global mean temperatures in 1970."

Previous research has shown that climate change provides some [economic benefits](#) to countries in cool regions—which would be warmed to temperatures that are ideal for agricultural productivity and human labor—and economic harm to countries in already hot regions.

Does aerosol-related cooling have a similar distribution of economic impacts?

The four researchers set out to investigate the economic effects of cooling caused by aerosol emissions in different parts of the world. They found that, opposite to [greenhouse gases](#), the cooling effect of aerosols benefited the economies of tropical, developing countries and harmed the economies of high latitude, developed countries.

"Although aerosols have many negative impacts, our simulations

demonstrated that aerosol-induced cooling, in particular, could actually diminish global economic inequality," Persad said.

"However, when you look at the whole world at once, rather than region by region, the net economic effect of this cooling is likely to be small due to these effects between latitudes," added Davis.

Despite this, the team noted that aerosols are dangerous and that the public health benefits of cleaning them up would far outweigh the economic benefits of continuing to release them.

"We need to understand how human activities affect our planet so we can make informed decisions that can protect the environment while giving everyone a high quality of life," Caldeira concluded. "Aerosol pollution might appear to have some upsides, but at the end of the day their profound harm far outweighs their meager benefits."

**More information:** Yixuan Zheng et al. Climate effects of aerosols reduce economic inequality, *Nature Climate Change* (2020). [DOI: 10.1038/s41558-020-0699-y](https://doi.org/10.1038/s41558-020-0699-y)

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