

Researchers estimate over two million deaths annually from air pollution

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Over two million deaths occur each year as a direct result of human-caused outdoor air pollution, a new study has found.

In addition, while it has been suggested that a [changing climate](#) can exacerbate the effects of air pollution and increase [death rates](#), the study shows that this has a minimal effect and only accounts for a small proportion of current deaths related to air pollution.

The study, which has been published today, 12 July, in IOP Publishing's journal *Environmental Research Letters*, estimates that around 470,000 people die each year because of human-caused increases in ozone.

It also estimates that around 2.1 million deaths are caused each year by human-caused increases in [fine particulate matter](#) (PM2.5) – [tiny particles](#) suspended in the air that can penetrate deep into the lungs, causing cancer and other respiratory disease.

Co-author of the study, Jason West, from the University of North Carolina, said: "Our estimates make outdoor air pollution among the most important [environmental risk factors](#) for health. Many of these deaths are estimated to occur in East Asia and South Asia, where population is high and air pollution is severe."

According to the study, the number of these deaths that can be attributed to changes in the climate since the industrial era is, however, relatively small. It estimates that a changing climate results in 1500 deaths due to

ozone and 2200 deaths related to PM2.5 each year.

Climate change affects air pollution in many ways, possibly leading to local increases or decreases in air pollution. For instance, temperature and humidity can change the reaction rates which determine the formation or lifetime of a pollutant, and rainfall can determine the time that pollutants can accumulate.

Higher temperatures can also increase the emissions of [organic compounds](#) from trees, which can then react in the atmosphere to form ozone and particulate matter.

"Very few studies have attempted to estimate the effects of past climate change on air quality and health. We found that the effects of past [climate change](#) are likely to be a very small component of the overall effect of air pollution," continued West.

In their study, the researchers used an ensemble of climate models to simulate the concentrations of ozone and PM2.5 in the years 2000 and 1850. A total of 14 models simulated levels of ozone and six models simulated levels of PM2.5.

Previous epidemiological studies were then used to assess how the specific concentrations of air pollution from the climate models related to current global mortality rates.

The researchers' results were comparable to previous studies that have analysed air pollution and mortality; however, there was some variation depending on which climate model was used.

"We have also found that there is significant uncertainty based on the spread among different atmospheric models. This would caution against using a single model in the future, as some studies have done," continued

West.

More information: 'Global premature mortality due to anthropogenic outdoor air pollution and the contribution of past climate change' Raquel A Silva et al 2013 *Environ. Res. Lett.* 8 034005
iopscience.iop.org/1748-9326/8/3/034005/article

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