

# Science for Environment Policy

## East Asian air pollution to have bigger global impact under climate change

**Greater amounts of air pollutants** emitted in East Asia will move around the globe under climate change, a recent study predicts. Changes to wind speeds and air pressure will mean that movement of pollution from this region is enhanced under a changing climate. These results highlight the need for globally coordinated efforts to tackle air pollution and climate change.

**Long-range transport of air pollution** between continents means pollutants can have negative effects on human [health](#) and ecosystems far from their sources. For example, an earlier study<sup>1</sup> estimated that intercontinental transport of fine aerosols was responsible for 90 000 premature deaths around the world in 2000.

This study focused on the transport of [pollution](#) from East Asia, the most significant source of intercontinental pollution in the Northern Hemisphere. Its location, at lower latitudes, means that pollution emitted here can move more easily around the globe, compared with North American and European emissions.

The researchers estimated changes in intercontinental transport of a large range of pollutants from East Asia between 2001 and 2050. They were interested in how climate change would affect atmospheric processes and thus the contribution of East Asian emissions to air pollution in other regions.

The model used combines meteorological processes and atmospheric chemistry and allows simulation of the trends of climate change every 10 years throughout the 50 year period. Simulations under different emission and climate scenarios for spring 2001 and 2050 were performed to characterise changes in intercontinental transport of emissions in a changing climate. They assumed that [climate change](#) would progress as per the [IPCC's A1B scenario](#), which assumes rapid economic and population growth up until the mid 21<sup>st</sup> century.

Key results include projected rises in global average levels of tropospheric ozone and PM<sub>2.5</sub>. Ozone from East Asia will add an additional 0.8 parts per billion (ppb) to global average levels, going from 1.2 ppb in 2001 to 2.0 ppb in 2050, the model suggests. Average PM<sub>2.5</sub> concentrations could also increase from 0.32 micrograms per cubic metre (µg/m<sup>3</sup>) in 2001, to 0.39 µg/m<sup>3</sup> in 2050.

Other pollutants from East Asia that are also predicted to rise around the world include carbon monoxide, sulphur dioxide and peroxyacetyl nitrate. More mercury and black carbon from the region could also be deposited in other parts of the world.

There are two major atmospheric pathways for pollution from East Asia. One transports emissions up to the Arctic, and the other takes them west to North America. As a result, these two regions are particularly affected by East Asian pollution, and climate change will increase these flows, according to the study.

A North Pacific area of low pressure, known as the Aleutian Low, is expected to become stronger by 2050. This will lead to greater circulation of air that transports more pollution from East Asia to the Arctic. In addition, wind speeds over East Asia will become quicker, taking pollution towards North America more quickly.

The study's authors say these results demonstrate the need for governments around the world to collaborate in developing integrated, collaborative emission control strategies. These should consider the complex relationship between air pollutants and climate change.



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[www.atmos-chem-phys.net/14/9379/2014/acp-14-9379-2014.html](http://www.atmos-chem-phys.net/14/9379/2014/acp-14-9379-2014.html)

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1.Liu, J., Mauzerall, D.L., & Horowitz, L.W. (2009). Evaluating inter-continental transport of fine aerosols:(2) Global health impact. *Atmospheric Environment* 43(28): 4339–4347. DOI:10.1016/j.atmosenv.2009.05.032.