

# More winter-time haze in Beijing with global warming

March 20 2017, by Marlowe Hood

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The number of days with "severe haze" in northern China has jumped in recent years

Global warming has boosted the frequency and severity of deadly air pollution peaks in northern China, scientists said Monday.

Toxic particles in the air cause nearly a million premature deaths in the country every year, according to earlier research.

"Climate change increases occurrences of weather conditions conducive to Beijing winter severe haze," a team reported in the journal *Nature Climate Change*.

In Beijing and other major northern cities, the number of days each year with weather tailor-made for extreme smog rose from 45 to 50 in the period 1982-2015 compared to the previous three decades, a ten-percent jump, the study found.

The trend is set to worsen if warming continues unabated.

Persistent episodes of health-wrecking haze would become another 50 percent more frequent—and last nearly twice as long—during the second half of this century, the scientists found.

The main danger, experts agree, is particle pollution, especially toxic, microscopic flecks smaller than 2.5 micrometres in diameter—about 40 times thinner than a human hair.

The burning of coal, along with vehicle emissions and dust, are the main sources of these ultra-fine specks, which can cause severe respiratory problems and increase the risk of heart disease.



A report by China's environment ministry last year showed hundreds of the country's biggest cities failed to meet health standards for small-particle pollution

Small enough to enter human cells, they can also affect the immune and nervous systems.

## **Number One concern**

In major cities across northern China, the number of days with "severe haze" jumped from 12 to 18 to 25 during the winters of 2014, 2015 and 2016 respectively.

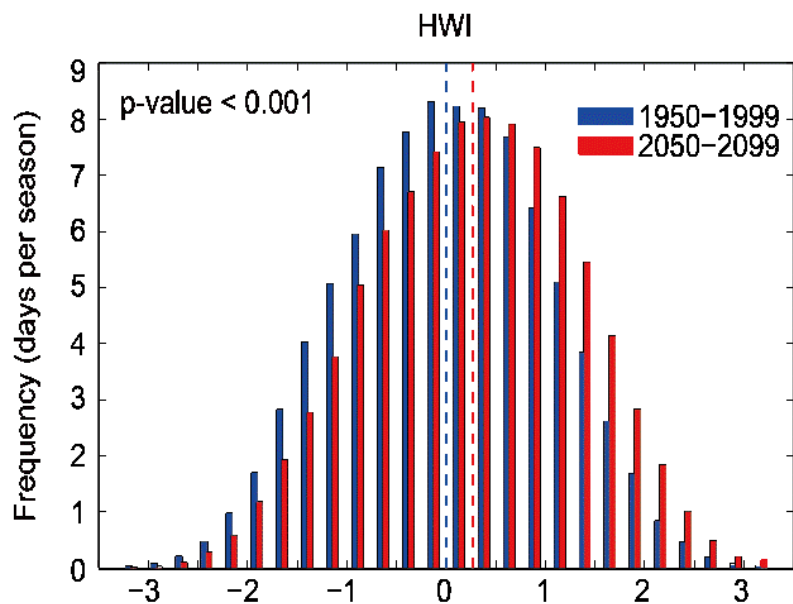
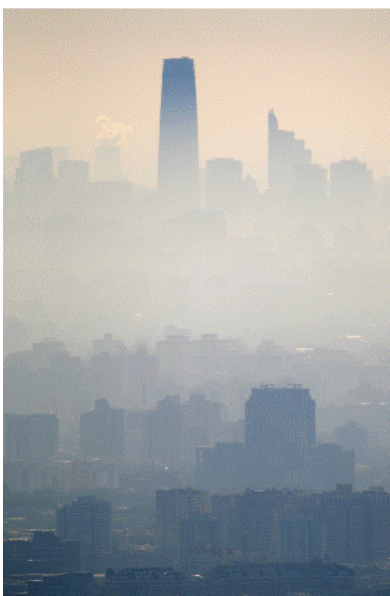
Severe haze days happen when the concentration of small particles exceeds 150 micrograms per cubic metre of air.

In January this year, a thick blanket of sun-dimming haze settled over the Beijing-Tianjin basin—home to more than 100 million people—for eight consecutive days, causing tens of thousands to flee cities and vent their anger on social networks such as Weibo and WeChat.

For several days running, the density of particles 2.5 micrometres or less was higher than 500 micrograms per cubic metre, more than three times the danger threshold set by the World Health Organization.

"I would rank air pollution as the number one or number two concern of ordinary people in northern cities in China," co-author Hong Liao, a researcher at Nanjing University's School of Environmental Science and Engineering, told AFP.

A report by China's environment ministry last year showed that 265 of the country's 338 biggest cities failed to meet new health standards for small-particle pollution in 2015.



The left image shows atmospheric visibility dropped sharply during a severe haze event in Beijing. The right image shows an increase in the frequency of conducive weather conditions (represented by the HWI) under future high greenhouse emission scenario (RCP8.5)(2050-2099) relative to the historical climate (1950-1999). Special thanks to Prof. ZHU Jiang for providing the left photo which is featured as the cover of *Nature Climate Change* April 2017 issue. Credit: IAP

The perfect storm of geographic and [weather conditions](#) that favour lung-searing smog include sharp temperature differences between the lower and upper atmosphere, faint winds, and certain patterns of atmospheric flow.

The researchers, led by Wenju Cai of the Qingdao National Laboratory for Marine Science and Technology, combined these elements to create a "haze weather index", which they matched against 60 years of weather records.

Averaging across 15 climate models, they also calculated a sharp increase in the number of smog-inducing days from 2050 to 2100.

After a particularly bad episode in January 2013—which sparked protests and caused \$3.4 billion (3.2 billion euros) in health and production losses—the Chinese government took sharp measures to reduce air pollution, but with limited success.

"In spite of stringent emission controls, severe [haze](#) days in Beijing have continued to increase, as clearly seen over the past three winters," Renhe Zhang, a researcher at Fudan University, said in a commentary also published in *Nature Climate Change*.

"A global effort to slow down [global warming](#) is also urgently needed to

decrease the risk of heavy air [pollution](#) in Beijing," he added.

The problem is not confined to China. In 2013, nearly a million untimely deaths in India were also attributed to fouled air, not including so-called household [air pollution](#), mainly from primitive cook stoves.

**More information:** *Nature Climate Change*,  
[nature.com/articles/doi:10.1038/nclimate3249](https://doi.org/10.1038/nclimate3249)

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