

At that time, researchers performed aerosol measurements on the roof of a Tsinghua University building in Beijing and analyzed data throughout the surrounding regions.

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They identified a reaction pathway that could account for the missing source of sulfate, discovering that fine water particles in the air acted as a reactor, trapping sulfur dioxide (SO₂) molecules and interacting with nitrogen dioxide (NO₂) to form sulfate.

??SO₂????????????NO₂????????????

The reaction rate was further facilitated by stagnant weather in the 2013 haze event, which trapped NO₂ near the Earth's surface, resulting in NO₂ concentrations that were three fold higher than clean conditions.

2013??

This process, according to the researchers, was "self-amplifying," as increasing aerosol mass concentrations led to higher aerosol water content -- accelerating the accumulation of sulfate and causing more severe haze pollution.

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"This study unfolds the unique sulfate formation mechanism in NCP (North China Plain) haze events, which differs from traditional scenarios," study author Guangjie Zheng of Tsinghua University said in an email to Xinhua.

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"In cleaner environments such as the US or Europe, sulfate is mainly formed through the traditional OH (hydroxide) reaction pathways in atmospheric gas phase, or the H₂O₂ (hydrogen peroxide) and O₃ (Ozone) reaction pathways in cloud chemistry. In NCP haze events, however, the dominant sulfate formation pathway shifts into the NO₂ reaction pathway in aerosol water."

"????????????????????????????????????OH????????????????H₂O????????O₃?Ozone????????????????????????????????????NO?????"

Zheng said results in this research reveal "the complex nature" of haze pollution events in China.

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"The SO₂ comes mainly from power plants, NO_x is from power plants and mobile vehicles, while the NH₃ (ammonia) and mineral dusts, which serve as the neutralizing substances, are from both natural and anthropogenic emissions such as industry and fugitive dusts," she said.

???“SO2????????NOx????????????????????NH3????????????????????”

"These pollutants from various sources were emitted in high intensity at the same time, resulting in the unique heavy haze conditions, and thus the shifting in the dominant sulfate formation pathway. The complexity of haze pollutions in NCP further illustrated the importance of scientific emission-reduction strategies."

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