

Anthropogenic-source nitrogen dominates in precipitation nitrate

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Since the Industrial Revolution, human activities have increased the emission of nitrogen oxides (NO_x). NO_x can promote the generation of ozone and particle matters, and increase nitrogen deposition in the

atmosphere.

In order to curb [air pollution](#), China has implemented the "Clean Air Action Plan" since 2013 to reduce SO₂, NO_x and other industrial source emissions to improve air quality. However, to what extent the "Clean Air Action Plan" reduces atmospheric nitrate [deposition](#) remains to be evaluated.

Researchers from the Institute of Applied Ecology (IAE) of the Chinese Academy of Sciences (CAS), in cooperation with Prof. Fu Shenglei of Henan University, investigated the amount of [nitrogen](#) deposition and the natural abundance of ¹⁵N in nitrate at the Qingyuan Forest Ecosystem Observation and Research Station of the CAS.

The researchers collected precipitation samples from 2014 to 2017, and found that the average nitrate-N deposition at Qingyuan Station during the study period was 7.0 kg N ha⁻¹ yr⁻¹, accounting for one-third of the inorganic N deposition.

The NO_x emissions in Liaoning dropped from 0.83 million tons to 0.61 million tons, a decrease of 26% from 2015 to 2017. However, the atmospheric nitrate deposition at Qingyuan Station only dropped by 6% during the same period. It shows that anthropogenic source N is still the main source (57%) of atmospheric nitrate-N at Qingyuan Station.

In addition, neither the natural abundance of ¹⁵N in atmospheric nitrate, nor the contribution of anthropogenic source N to atmospheric [nitrate](#)-N, is much different between different years, suggesting that there is no downward trend over time. "The cause and mechanism of this phenomenon needs to be further studied," the researchers said.

These findings are helpful for the control of regional nitrogen pollution.

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More information: Shaonan Huang et al, Multiyear measurements on ^{15}N natural abundance of precipitation nitrate at a rural forested site, *Atmospheric Environment* (2021). [DOI: 10.1016/j.atmosenv.2021.118353](https://doi.org/10.1016/j.atmosenv.2021.118353)

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