Atmospheric processes likely caused puzzling haze over China during COVID-19 shutdown

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New research indicates that significant enhancement of secondary aerosol formed in the atmosphere via gas-to-particle conversion, together with long-lasting regional transport, may be the cause of severe haze

over China despite a dramatic reduction in emissions during the COVID-19 shutdown. The findings are published in *Geophysical Research Letters*.

During the Chinese Lunar New Year holiday between January 24 and February 10, 2020, China was in an unprecedented state of shutdown because of COVID-19, with mobility, energy demands, and industrial pollution emissions remaining far below their normal levels. Nevertheless, high and widespread haze pollution was observed over Eastern China.

To investigate this puzzling occurrence, Yunhua Chang, Professor, of the Nanjing University of Information Science & Technology, Ru-Jin Huang, Professor, of the Chinese Academy of Sciences, and their colleagues analyzed the chemical components of the air in and out of Shanghai before, during, and after the Chinese New Year holidays in 2019 and 2020, and they performed atmospheric transport modeling, a method to track particles and trace gases that are dispersed by atmospheric winds.

The team found that secondary aerosol formation that interacts with long-range transport likely caused the long-lasting haze during the COVID-19 pandemic.

The results highlight the need for joint management efforts and control strategies across large areas to effectively clear China's air.

"We hope our findings can inform future regulatory policies to mitigate China's haze-associated problems," said Dr. Chang.

"Additional studies are needed to pinpoint the role of atmospheric oxidation capacity—which is affected by emission reductions of air pollutants—in the formation of secondary aerosols," added Dr. Huang.

This paper is part of an ongoing special collection of research in AGU journals related to the current pandemic.

More information: Yunhua Chang et al, Puzzling Haze Events in China During the Coronavirus (COVID-19) Shutdown, *Geophysical Research Letters* (2020). DOI: 10.1029/2020GL088533