

# Urban China Decadal Air Quality Service

Poor air quality and the prevalence of winter haze events across Chinese urban centres, particularly Beijing, is a well-known problem for a wide array of people and businesses. Air quality has significant impacts on key sectors (e.g. health, transport, agriculture) that translates into both personal and economic costs. Research carried out under CSSP China<sup>†</sup> is leading to the development of a prototype haze service on multi-decadal timescales (2020 – 2099) that aims to disseminate bespoke air quality projections and potential impacts to targeted end users and policy makers, enhancing resilience through knowledge.

## What are the impacts from poor air quality?

### Morbidity increase



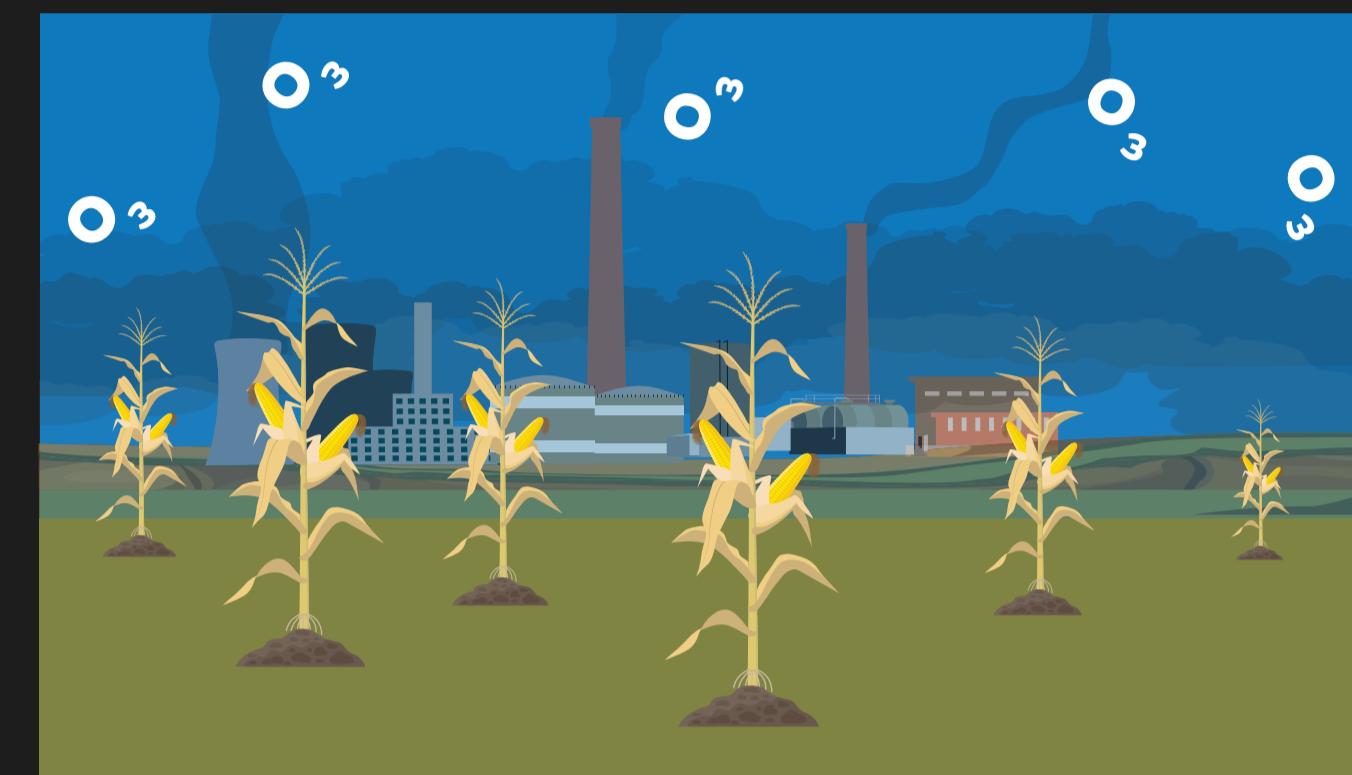
Small particulate haze is related to an increase in strokes, lung cancer and Chronic Obstructive Pulmonary Disease (COPD); the associated economic cost previously exceeding 3% of GDP.

### Transport delays



Haze reduces visibility that results in delays and cancellations in the aviation sector, plus enforced city-wide road closures.

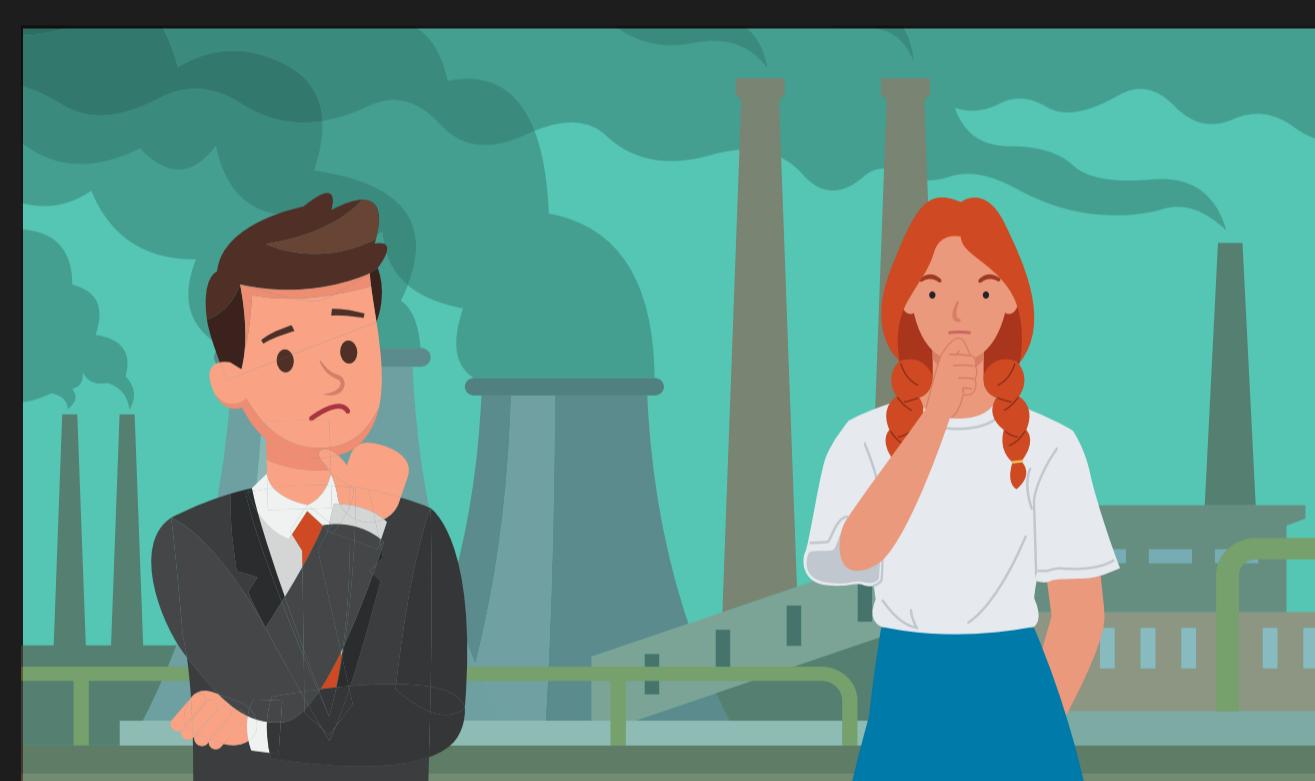
### Crop yield reduction



Ozone in the lower atmosphere results in damage to essential crops. Wheat, rice and maize yield reduction has previously exceeded 70 million tons.

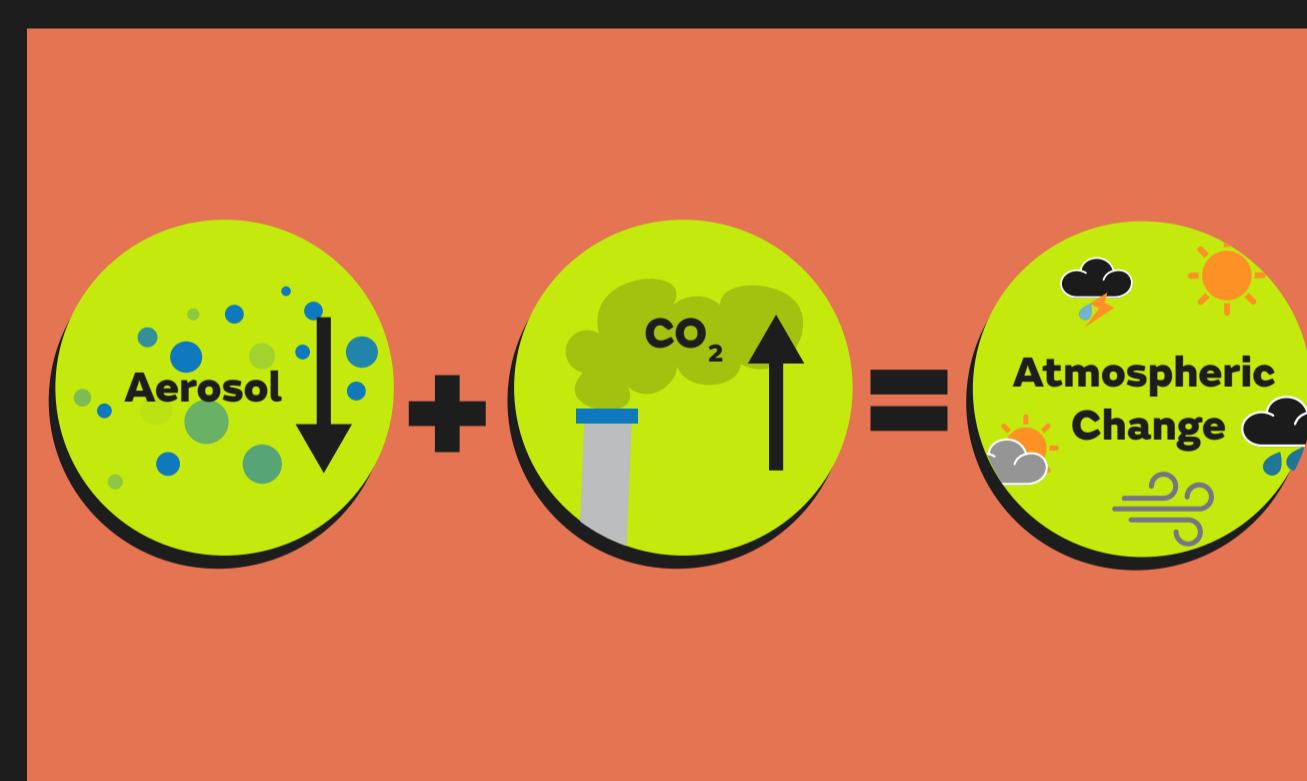
## What does our latest research show?\*

### High uncertainty in emissions



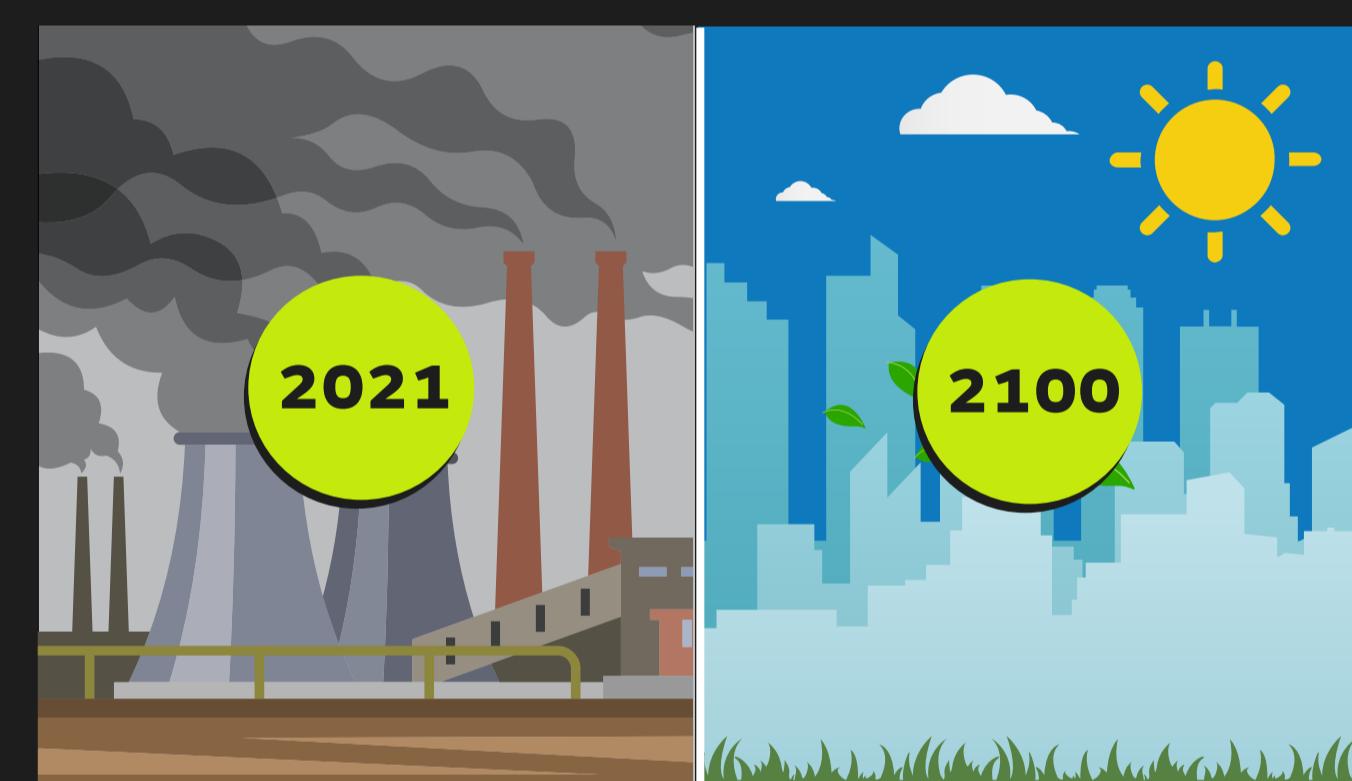
CMIP6 Scenario-MIP study shows large uncertainty in emissions and hence future climate, due to unknowns across future social, economic, and political landscapes.

### Large-scale atmospheric patterns



A reduction in aerosol emissions and increase in Greenhouse Gases modify large-scale atmospheric dynamics to drive conditions more conducive to trapping haze and hence have the potential to reduce air quality.

### Aerosol trapping



However, the overall projected reduction in aerosols will mean less pollutants to be trapped in extreme winter haze events, leading to reduced incidence of very poor air quality days.

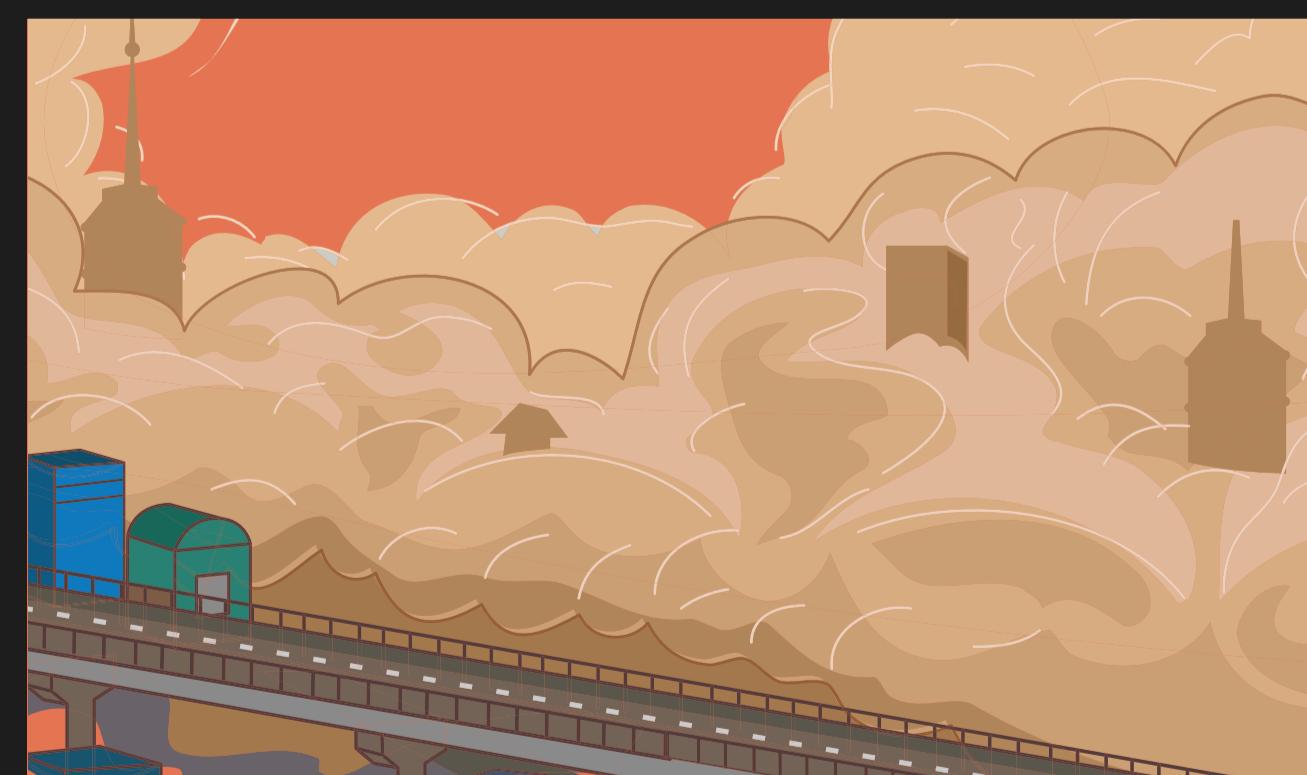
## What further investigations are planned?

### Regional studies



Future research may explore the role of locally resolved processes on haze drivers. We aim to exploit existing dynamically downscaled climate simulations to investigate regional effects.

### Role of dust



Dust can be an important component of haze. The DAHLIA project will help to investigate how atmospheric dust may contribute towards future haze events.

### Bespoke data for your sector



Would you or your business benefit from bespoke haze projections? We aim to produce user-tailored brochures for use in policy and mitigation / adaptation plans.

## Find out more

<sup>†</sup> CSSP China is part of the Weather and Climate Science for Service Partnership Programme, supported by the UK-China Research and Innovation Partnership Fund as part of the Newton Fund. For more information, see <https://www.metoffice.gov.uk/research/approach/collaboration/newton/cssp-china/index>

\* The research contributing to this service can be found in Guo et al. (submitted) 'Aerosol reductions outweigh circulation changes for future improvements in Beijing Haze'.