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 is driving 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 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

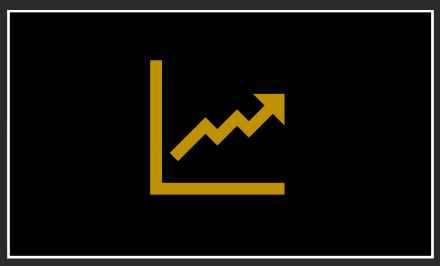
Tropospheric ozone results in damage to essential crops. Wheat, rice and maize yield reduction has previously exceeded 70 Mt.

What does our latest research show?

High uncertainty in emissions

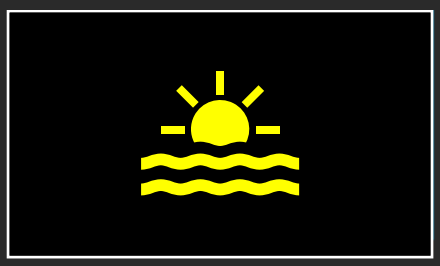
CMIP6 Scenario-MIP study shows large uncertainty in emissions and hence future climate, due to unknowns across future social, economic, and political landscapes.

Large-scale atmospheric patterns



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

Aerosol trapping



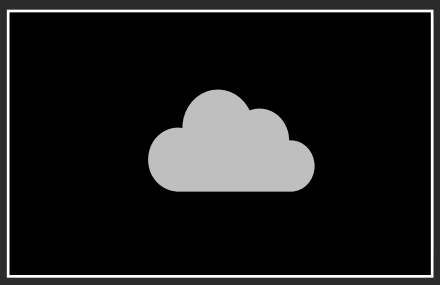
However, the overall projected reduction in aerosols will mean less pollutants to be trapped in extreme winter haze events, leading to reduced incidence of very poor air quality days.

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 and contact us.

If you're interested in receiving tailored information on future air quality over Beijing, please contact the Met Office.