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# Quantifying feedbacks between pollution, radiation and boundary layer dynamics in Beijing

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Atmospheric aerosol concentrations globally have increased due to anthropogenic activities, such as industry, heating, transport and cooking. Increased aerosol concentrations can result in severe pollution events, particularly in urban mega-cities. The severity of pollution events is often characterised by concentrations of $PM_{2.5}$ (particulate matter with a diameter of 2.5 $\mu$m or less), which are believed to have an impact on human health, through their ability to enter into the lungs, alveoli and blood stream. Beijing, is a megacity which is well-known for poor air quality, often subjected to heavy pollution events termed 'haze'. A major UK-China field campaign took place over 2016/2017 with the aim of furthering understanding of the pollution processes in Beijing and potential impacts on human health. An aerosol-radiation-meteorology feedback loop is likely to be a strong factor in the formation and longevity of these heavy pollution episodes.

Large Eddy Simulations (LES) are a type of small scale model which can explicitly model turbulence, specifically large eddies while ignoring very small scale processes. A novel LES model with an additional aerosol module, UCLALES-SALSA, will be used to assess characteristics, growth and lifetime of heavy pollution episodes. Particularly with the aim of quantifying interactions between aerosols, radiation and meteorological variables, such as boundary layer height. Measurements taken during the campaign in Beijing, including aerosol and tower measurements are used to initialise a vertical profile for the model as well as for model-observation comparisons.