

Fireworks are fun but can reduce visibility

November 2 2015

Scientists at the University of Birmingham have discovered that there is a sharp reduction in visibility caused by fireworks and bonfires on Guy Fawkes' night. They found that visibility was further decreased when the relative humidity was high.

Using [data](#) taken over 13 years between 2000 and 2012 from 34 meteorological stations throughout the UK the [scientists](#) noted an average 25% reduction in visibility caused by atmospheric particulate matter from fireworks and bonfires. If the conditions are unfavourable then the visibility reduction can be much more severe; for example, visibility reductions of 64% were seen in Nottingham.

Fireworks celebrations usually involve both bonfires and ground and air detonating fireworks. The particulate matter that is scattered after detonation is hygroscopic - its water content is dependent on the local [relative humidity](#). As the humidity increases so does the water content of the particulate matter, changing the average size and composition of each particle, which leads to the particle being able to scatter light more effectively and hence reduce visibility.

The effects, which were especially pronounced when humidity was high, raise concerns regarding motorist and pedestrian safety. Dr Francis Pope, lead author from the University of Birmingham's School of Geography, Earth and Environmental Sciences, said: 'Guy Fawkes' Night, and fireworks in general, are attended and much enjoyed by me and many others. Unfortunately, these events can affect short term air quality and lead to significant reductions in visibility. We hope that our

work will lead to improved forecasting of visibility degradation.

'If forecasts suggest that planned displays will coincide with conditions likely to exacerbate poor visibility then organisers and local authorities should be prepared to issue poor visibility warnings in advance. This precautionary measure could prevent unnecessary accidents.'

The visibility reducing effect of the extra [particulate matter](#) loading in the atmosphere can last up to two days after the [fireworks](#) event.

More information: 'Remember, remember the 5th November: gunpowder, particles and smog' [onlinelibrary.wiley.com/doi/10 ... 02/wea.2587/abstract](https://onlinelibrary.wiley.com/doi/10.1002/wea.2587/abstract)

Provided by University of Birmingham

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