

Summer Heat Will Cause Deadly Ozone

Thousands of Britons may be forced to wear charcoal masks and stay indoors this summer to avoid deadly fogs of ozone that will pollute the country during heatwaves, scientists have warned.

They have discovered that last August's heatwave caused plants and trees to release waves of a chemical called isoprene, which contributes to the production of ozone in the air. Scientists now believe ozone killed up to 600 people last summer.

'Temperatures topped 100F (37.7C) last summer for the first time since UK records began, and similarly intense heatwaves will become increasingly frequent as global warming intensifies. Current projections suggest they could happen ten times more often,' said Professor Alan Thorpe, of the Centres of Atmospheric Science. 'Among all our other problems, we are going to deal with severe ozone pollution.'

Ozone, which is particularly dangerous for children, old people and asthmatics, is produced when strong sunlight breaks up the nitrogen oxides released by car exhausts. In recent years Britain has made major improvements in reducing these oxide levels in the air, and hopes rose that the problem was under control.

But the latest ozone study, carried out by a team led by Alastair Lewis, of York University and funded by the Natural Environment Research Council, has discovered that a dangerous new factor arises when temperatures soar into the high 30s.

'We went to Chelmsford to study ozone and isoprene levels last year,' said Lewis. 'By chance, we picked the two weeks of the heatwave. What we discovered was startling. When the temperature reached the high 90s and topped 100, plants and trees ... start to produce greatly increased amounts.'

It is thought that isoprene acts as a kind of heat-shock molecule, protecting leaves from damage when temperatures rise above 35C. When plants are short of water, they produce even more.

However, in the atmosphere isoprene acts as a catalyst driving the rate at which sunlight breaks down nitrogen oxide and turns it into ozone. The more isoprene there is, the more ozone is generated, effectively wiping out the moderate success the government has had in reducing levels.

Britain's new midsummer heatwaves are therefore likely to have severe consequences. European law states that governments must inform the public when hourly concentrations of ozone rise above 180 microgrammes per cubic metre. On 6 August last year, ozone levels over London peaked at 300 microgrammes. Other high spots were found in East Anglia and the Midlands.

The impact on the public was dramatic. One study by the Office of National Statistics indicated that 2,000 more people died in August 2003 compared with the same month in previous years. But calculations by John Stedman, at the National Environmental Technology Centre, indicate that these deaths were not all caused by heat stress and dehydration, as was initially supposed.

Between 225 and 593 were caused by ozone, Stedman estimated. Many thousands of others suffered extreme distress, such as museum clerk Alison Bottomley, of Nottingham, who suffers from asthma. 'I had to stay indoors last summer to get away from the ozone. It was awful. I could hardly breathe. I tried a charcoal mask but it restricted my breathing. I had to lie or sit down till the heatwave went away.'

While most advice for dealing with the heat involves staying in the shade and drinking plenty of water, the response to pollution by ozone, which irritates the lining of the lung, is more draconian. Vulnerable individuals are told to avoid major road junctions (where car exhaust levels are high), stay indoors and wear masks.

The team's discovery will intensify calls for Britain to introduce even tougher new regulations to reduce emissions of car exhaust gases, the basic ingredient that fuels ozone production.

Robin McKie, science editor
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