

Elevated Particulate Matter levels on Bonfire Night 2014

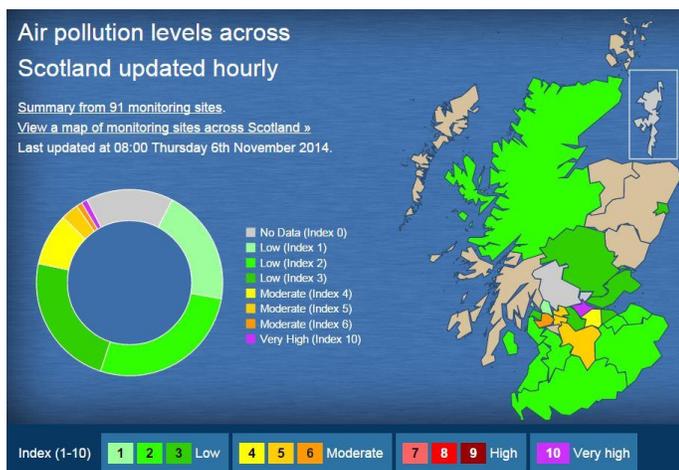
RICARDO-AEA

By Susannah Telfer

7th November 2014

Elevated PM Levels Measured in Scotland

Across Scotland elevated levels of Particulate Matter (PM) were measured overnight from 5th to 6th of November. Our conclusion is that these elevated air pollution levels were caused by the many bonfire and firework displays hosted across the country.



Cold, dry weather and slow moving air flow from the North Sea (as shown in Figure 1 air mass back-trajectories), reduced the potential to disperse any pollution created as a result of the celebrations. As a result, elevated levels of particulate matter were observed overnight.

Particulate Matter (PM₁₀ and PM_{2.5}) measured across the Scottish air quality monitoring network is displayed in Figures 2 and 3. Each shows a sharp rise

in particulate matter compared with the previous days. The bold red line on each plot is an average of the data measured across these sites.

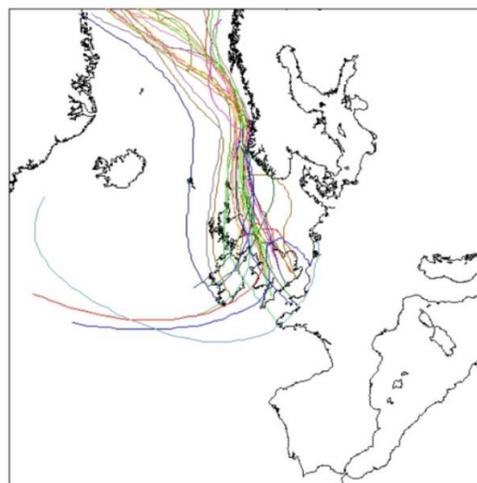


Figure 1 – Slow Moving Air from the North Sea

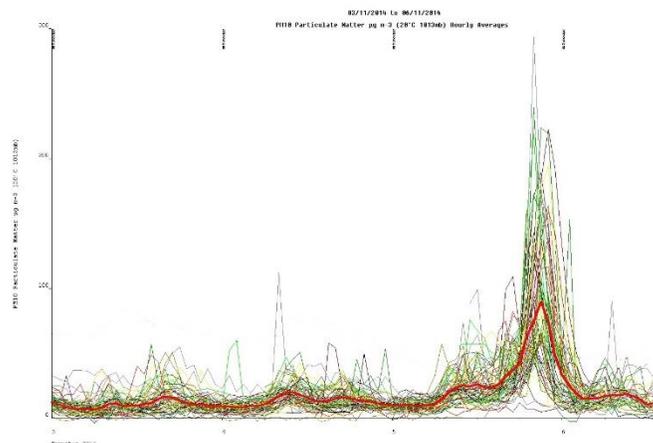


Figure 2 – Hourly Averages of PM₁₀ Measured At Scottish Monitoring Sites

Health Effects

Particles are measured in a number of different size fractions according to their mean aerodynamic diameter. Most monitoring is currently focussed on PM₁₀, but the finer fractions such as PM_{2.5} and PM₁ are becoming of increasing interest in terms of health effects. Fine particles can be carried deep into the lungs where they can cause inflammation and a worsening of the condition of people with heart and lung diseases. In addition, they may carry surface-absorbed carcinogenic compounds into the lungs. Short-term exposure even to Very High levels is unlikely to cause health impacts for normal healthy individuals.

Those with a diagnosed condition likely to be affected by air pollution should take care under High or Very High pollution conditions and seek appropriate medical advice.

The [Know & Respond – Scotland](#) service provides early warning alerts which may be useful to groups susceptible to increased air pollution.

Air pollution warnings for 5th November 2014

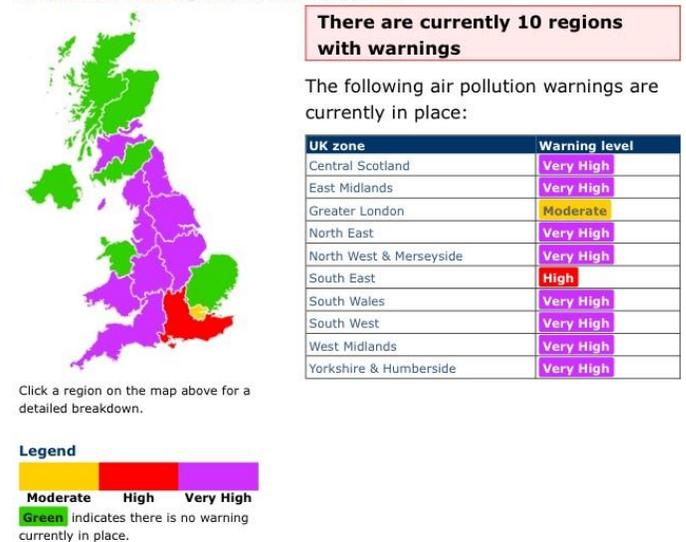


Figure 5 – Areas of the UK with Air Pollution Warnings

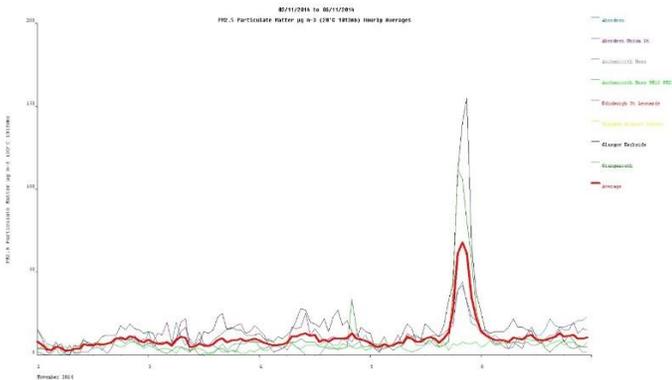


Figure 3 – Hourly Averages of PM_{2.5} Measured At Scottish Monitoring Sites

Elevated PM Levels Measured Around the UK

Elevated levels of PM₁₀ and PM_{2.5} were also measured across the rest of the UK during bonfire night. Figure 4 shows PM_{2.5} measured at the UK's Automatic Urban and Rural Network (AURN) monitoring sites. As with the Scottish plot, a sharp rise in PM_{2.5} is apparent when compared to the data measured previously at the monitoring sites.

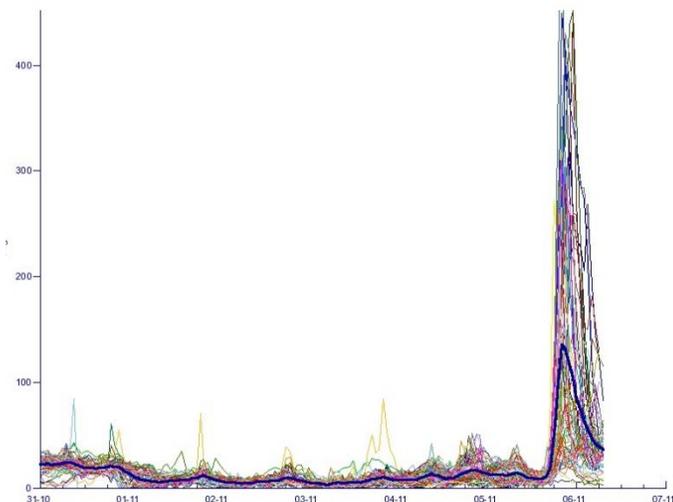


Figure 4 – PM_{2.5} Measured at AURN Monitoring Sites

As a result air pollution warnings were issued for 10 regions across the UK, these regions are shown in Figure 5.