# Weather and Air Pollution

**Introduction**

Weather is one of the key factors in determining the pollution levels from day to day. It is a well known fact that different weather will lead to higher or lower pollution levels. For example pollution is generally higher on colder days, but lower on rainy days. In order to establish a prediction for pollution, forecasted weather must be taken into account.

**Temperature**

Cooler weather leads to higher levels of pollution for two reasons. Firstly cooler temperatures mean that more electricity is required to heat buildings, which means more fuel has to be burnt (except where clean power generation is used, which in the UK is approximately X%). In addition to this, cooler air means the many nitrate particles, as well as volatile carbon molecules remain in the air, whereas under hotter conditions they would simple rise and evaporate.{the guardian}

In addition to the above, certain weather systems can lead to pollutants being trapped in the lower atmosphere. In particular, an inversion layer, where a layer of hot air remains between two layers of cold air, can lead to large problems as the pollutants remain below this layer and are therefore able to build up, where usually they would simply continue to move upwards and evaporate. Following this, and low winds, pollution often builds up and leads to massively dangerous levels. It is suggested the inversion layer is like “a saucepan with the lid on” {bbc article, picture}

**Wind**

It follows common sense that higher wind speeds would lead to the dispersion of pollutants after they have risen{BBC article}. Therefore it is easy to see that low wind speeds can result in a build up and saturation of pillutants in the lower atmosphere. As a result of this, weather systems with high levels of pressure, or anticyclones, which often bring with them relatively low wind speeds, are something to be looked out for.

Wind is not just a factor for reduction of pollution levels. Sometimes wind direction can lead to an increase in pollutant levels. For example if the wind direction conspired such that pollutants from a large factory were slowly drifting towards a populated area, this would mean higher pollution levels there. In addition to this, there are many cases of distant forest fires causing poor air quality hundreds of miles away. For example the high levels of pollution in much of south-east Asia, but particularly Malaysia, recently have been caused by fires in Sumatra, Indonesia. {guardian (2), bbc picture}

**Rainfall**

The other key weather factor which affects pollution levels is rainfall. Rain is good at washing out water soluble pollutants,as well as particulate matter. {waikatoregion}This means the pollution is washed away from the air and into the water system where it is much less of a threat to health. This means that on days when it rains, the pollution levels will be vastly lower than an equivalent day without rain. This is therefore probably the most important factor when predicting air quality. In addition to this the time of rainfall will have an effect on pollution at different times. For example if rain were forecast at midday, the morning should have higher pollution prediction than the evening. This means that the time of precipitation is important for being able to predict the levels of pollutants.

**Conclusion**

To be able to predict the level of pollution for the next day, a number of different factors need to be taken into account. Firstly the day of the week is likely to be the highest factor in this, since a weekday will have much higher level of pollution than a weekend simply due to the lack of people driving around to work. Next to this, the time of year is well known to have a large effect on the levels too. However the other key factor is the weather forecast for the day, as this will give a sign of what the pollution levels will be. Therefore by combining historical levels of pollution for a time of year with historical weather details matching those days, a more accurate prediction of pollution levels can be made.