

COMMITTEE ON THE MEDICAL EFFECTS OF AIR POLLUTANTS**UK LEVELS OF OZONE**

1. The Committee has previously commented that, rather than discussing a single number threshold, it was more appropriate to consider whether there was evidence for health effects in a particular range of low ozone concentrations. The range of interest is the range across which ozone levels have been rising in urban areas. This is described in the attached paper.
2. Since a general picture was required, results have been averaged across all monitoring sites in a particular category and medians, 25th and 75th percentiles have been given. It can be seen that 8 hour average ozone levels in urban areas are rising although they are still low compared with rural areas. In London, levels have risen by about 10% a year since 1992, from 15 to 30 $\mu\text{g}/\text{m}^3$ median 8 hour average ozone. The rise is more gradual in large agglomerations but starts from a higher baseline. In addition, the population living in large agglomerations is about 10.8 million compared with 7.7 million in London. So, potentially, the public health implications could be just as important as in London. In summary, COMEAP is being asked to consider the evidence for health effects of ozone in the ranges:
 - 15-30 $\mu\text{g}/\text{m}^3$ (median, London)
 - 28-48 $\mu\text{g}/\text{m}^3$ (75th percentile, London)
 - 29-35 $\mu\text{g}/\text{m}^3$ (median, large agglomerations)
 - 40-50 $\mu\text{g}/\text{m}^3$ (75th percentile, large agglomerations).
3. NO_x emissions, which have been suppressing ozone in urban areas have dropped since the early 1990s. Levels are predicted to continue to drop further but then flatten off, so a rise in ozone in urban areas is likely to continue but not necessarily at the same rate.

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ANALYSIS OF TRENDS IN RUNNING 8-HOUR MEAN OZONE CONCENTRATIONS

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Figure 1 to 6 show the trends in the concentrations of ozone are reported as running 8-hour means in $\mu\text{g m}^{-3}$. The graphs show the 25th, 50th and 75th percentiles of running 8-hour mean ozone concentrations averaged across the monitoring sites in each of six categories. The maximum 75th percentile and the minimum 25th percentile in each category are also shown. Figure 7 shows the number of sites in each category for each year.

The six categories have been defined in terms of the agglomerations and zones in which the sites are located (as defined for reporting under the EU Air Quality Daughter Directives:

1. Greater London Urban Area.
2. Large agglomerations (population greater than 0.5 million): West Midlands Urban Area, Greater Manchester Urban Area, West Yorkshire Urban Area, Liverpool Urban Area, Tyneside, Sheffield Urban Area, Nottingham Urban Area, Bristol Urban Area, Glasgow Urban Area.
3. Small agglomerations (population less than 0.5 million but greater than 0.25 million). These cover agglomerations not listed above. These include places such as Belfast, Edinburgh, Southampton, Leicester, Kingston upon Hull etc.
4. Urban sites in non-agglomeration zones.
5. Rural sites in the south east. These are sites in Eastern, South East, South West and East Midlands zones.
6. Rural and remote sites in all other zones.

Table 1 summarises the results for 2002 and the trends since about 1990.

Table 1. Running 8-hour mean ozone concentrations ($\mu\text{g m}^{-3}$) 2002 averaged by category

Category	25 th %ile	50 th %ile	75 th %ile	Trend
London	13	30	48	Going up
Large Agglomerations	19	35	51	Going up
Small Agglomerations	25	42	59	Going up
Small Towns	27	44	61	Going up
Rural (South East)	37	54	68	Flat
Rural (Elsewhere)	43	58	70	Flat

The ranking of the different categories is the same for all three percentiles analysed. The biggest different in concentrations is between the urban and rural sites. The concentrations in the small agglomerations and small towns are very similar. Rural concentrations in the south east are somewhat lower than for elsewhere. The ranking is determined by the magnitude of local NO_x emissions.

The analysis of trends is complicated by the increase in site numbers, particularly because early urban sites tended to be located in city centres. The trend of increasing urban concentrations is most likely to be due to reductions in the local emissions of NO_x since the early 1990s. There is no evidence of any trend, either upwards or downwards, in the rural concentrations analysed. Peak concentrations have certainly declined since the 1970s but there is little change in concentrations in the middle of the frequency distribution of measured concentrations.

Figure 1 Running 8-hour mean ozone concentrations in London

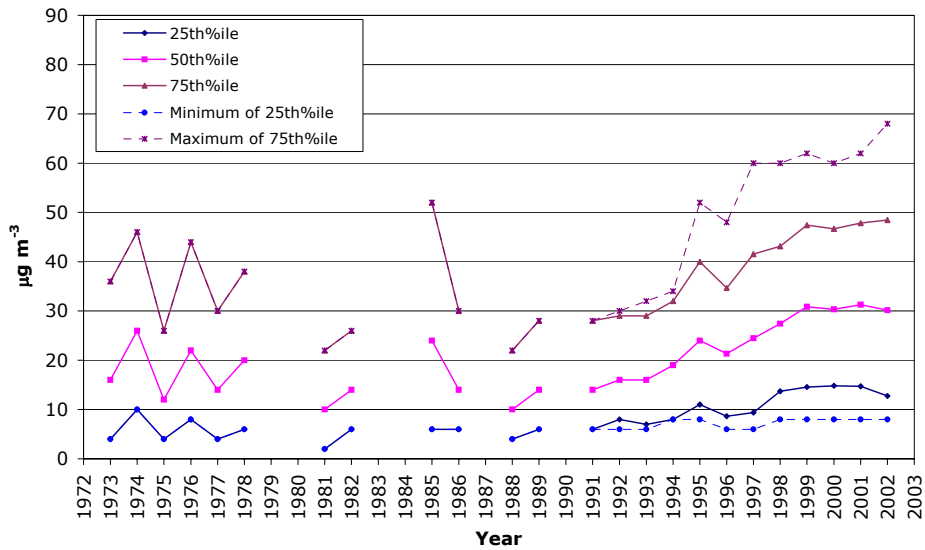


Figure 2 Running 8-hour mean ozone concentrations in large agglomerations

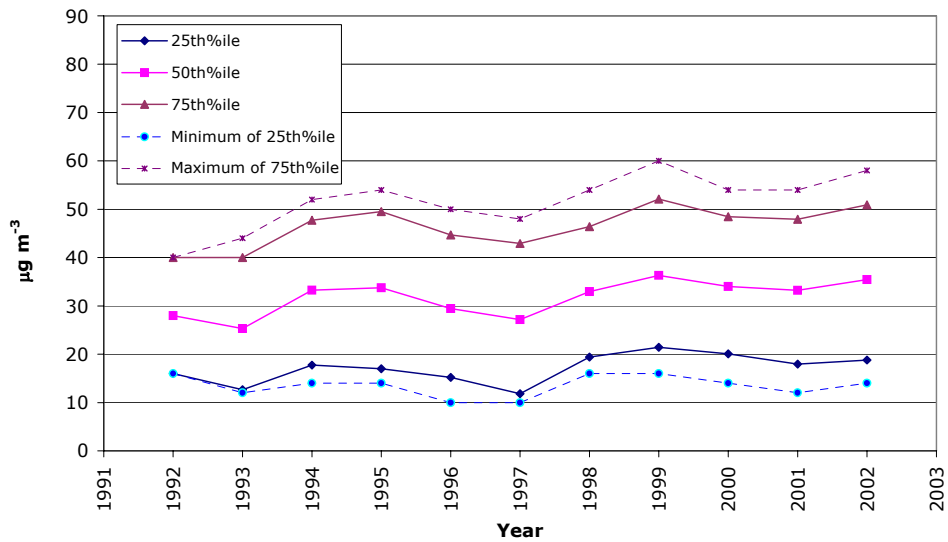


Figure 3 Running 8-hour mean ozone concentrations in small agglomerations

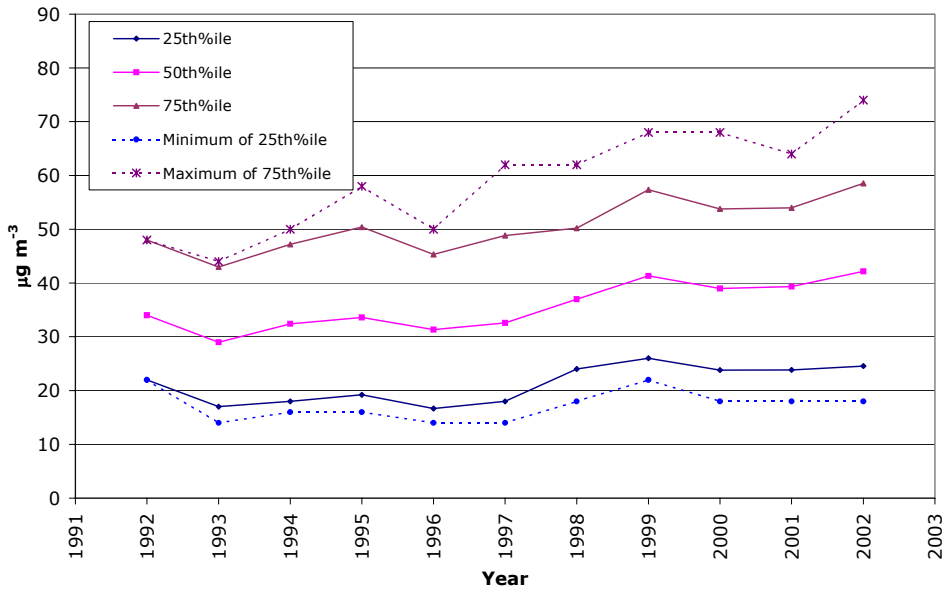


Figure 4 Running 8-hour mean ozone concentrations in small towns

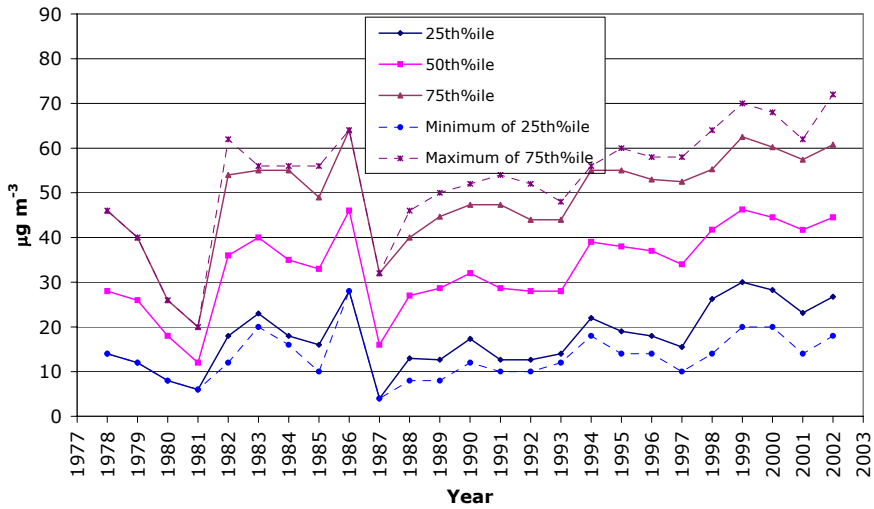


Figure 5 Running 8-hour mean ozone concentrations in rural (South East) locations

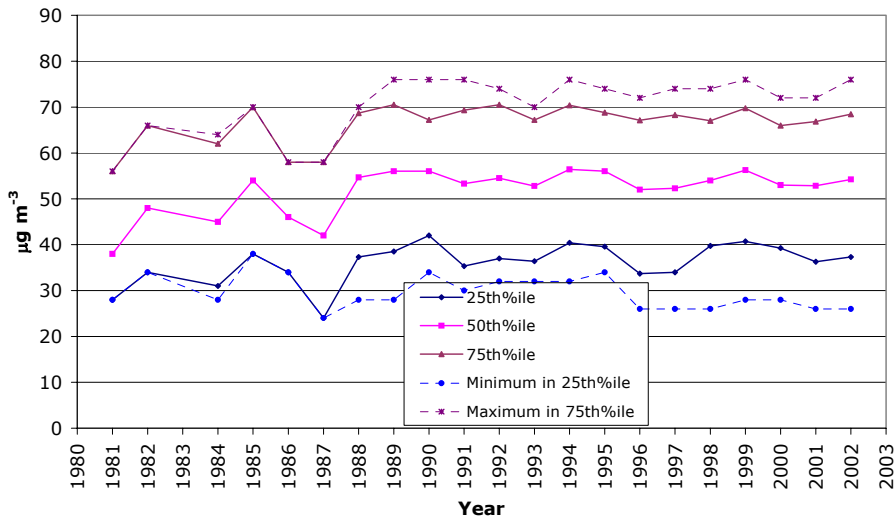


Figure 6 Running 8-hour mean ozone concentrations in rural (elsewhere) locations

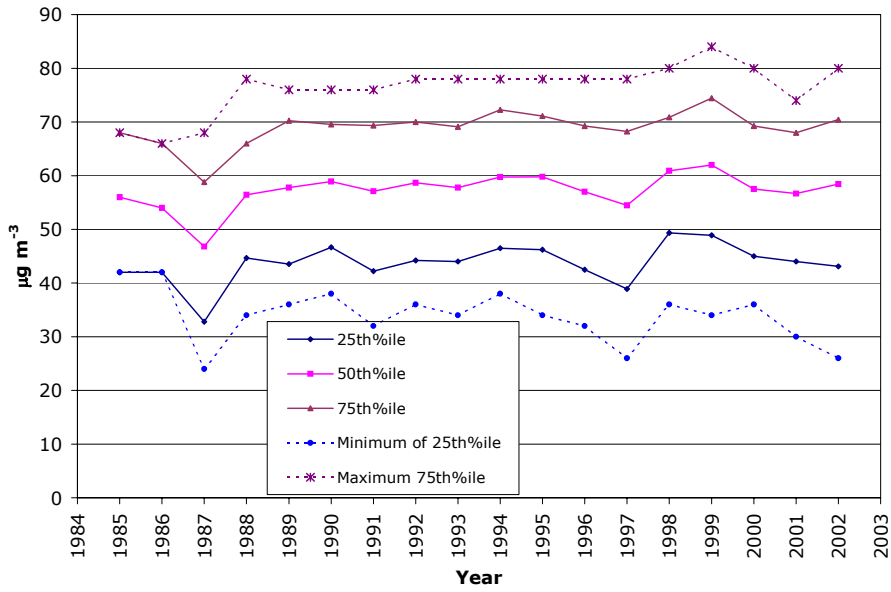


Figure 7 Numbers of ozone monitoring sites

