OH Sub No. 60

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Note On Data Normalisation

Gases such as NO and NO_2 are generally measured by scientific instruments as volumes in units of parts per billion (ppb). However the Ambient Air Quality Standards are generally expressed in terms of mass concentrations such as $\mu g/m^3$.

The sum of NO and NO_2, when expressed in terms of volume can be added directly such as:

NO (ppb) + NO_2 (ppb) = NO_X (ppb)

However, the sum of NO and NO_2 when expressed in terms of mass concentration ($\mu g/m^3$), will depend on the relative amounts of each gas. Because of this a convention has been put in place that conservatively assumes that all gases are in the form of NO_2, which because it has a higher mass than NO, will give a higher mass concentration of NO_X.

The second consideration in terms of converting data from ppb to $\mu g/m^3$ is the standard reference conditions for the mass concentration. Three common temperatures are used as reference temperatures. IUPAC is standardised to 273K, the EU to 293K and the WHO to 298K. Each standard condition will derive a slightly different mass concentration when converting a gas from ppb to $\mu g/m^3$.

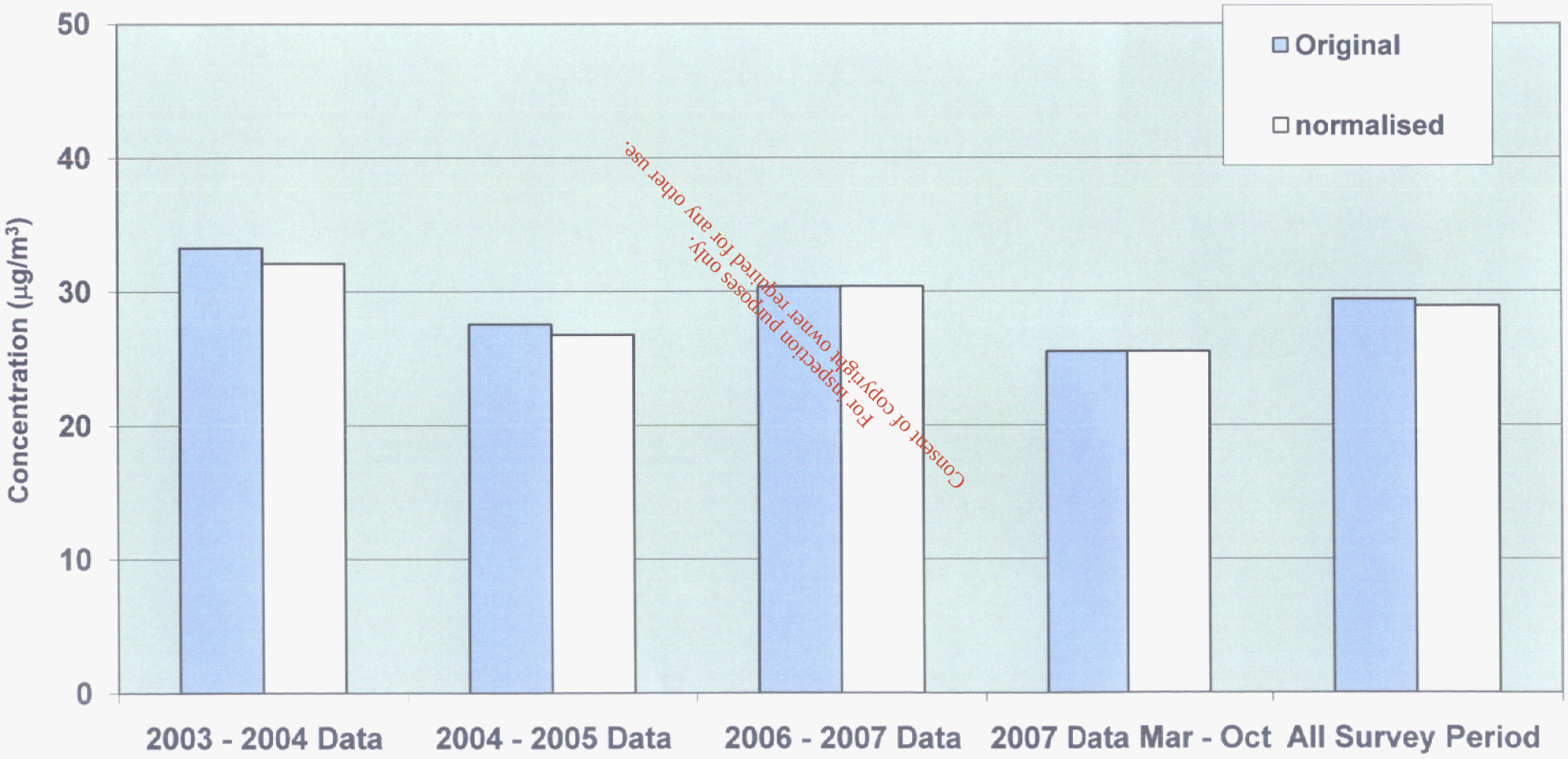
The current data has been updated to ensure that the EU standard conditions (normalised to 293K) are used consistently and that NO_X ($\mu g/m^3$) is expressed in terms of NO_2 throughout:

NO ($\mu g/m^3$) = (NO ppb)*MW (NO = 30) / 24.066
= 1.25*(NO ppb)

NO_2 ($\mu g/m^3$) = (NO_2 ppb)*MW (NO_2 = 46) / 24.066
= 1.91*(NO_2 ppb)

NO_2 ($\mu g/m^3$) = 1.91*[(NO ppb) + (NO_2 ppb)]

Comparison Between NO_2 Annual Average (Original) and NO_2 Annual Average (Updated)



Comparison Between NO_x Annual Average (Original) and NO_x Annual Average (Updated)