Air Quality Monitoring Strategies for Urban Areas – A Data Base on New Monitoring Technologies, New Metrics and Proxies

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Urban air quality monitoring networks are requested to provide accurate and relevant data on air pollution levels which serve as basis to assess limit value compliance and the need of mitigation actions. Scientific and technological progress as well as new epidemiological and toxicological research results trigger a continuous demand to re-adjust the monitoring strategies and instrumentation.
On this background one major task of the EU FP7 project AirMonTech is to collect and evaluate information on recently developed and future monitoring technologies for regulated and potential future pollutants and proxy metrics. Metrics and available measurement technologies being reviewed are listed in Table 1.

Particulate Matter	**Gaseous pollutants**
Total number concentration	NO
Number size distribution	NO_2
Surface concentration	NO_x
Shape, morphology	SO_2
Mass concentration	O_3
Elemental composition	NH_3
Molecular composition	VOCs
Sulphate	HCl
Nitrate	HNO_3
Ammonium	HNO_2
Elemental carbon	
Organic carbon	
Light absorbing aerosols	
Reactive oxygen species	
Macrophage mobility decrease	
Polycyclic aromatic hydrocarbons	
Primary biological aerosol particles	

The information is obtained from scientific literature, manufacturer's files and researchers in the field of measurement technology development. It subsequently is processed in a standardised way to make it accessible via the AirMonTech database. The content of the database is based on hands-on experience and will be publicly available. It will facilitate the decision which metric to measure and which technique to use for a given situation and will also build on information coming from all stakeholders.

Although this process has not yet been accomplished, some general trends in monitoring instrumentation and regarding new metrics and proxies are already apparent. On the one hand, multi-component monitoring instruments increasingly gain attraction, on the other hand the development of miniaturised and mobile instruments offer new monitoring approaches which might be more suitable for exposure assessment than current approaches. The difficulties to translate the well-established health effects of particulate matter into toxicological mechanisms further motivates the development of monitoring technologies for specific physico-chemical particle proxies which are thought to better reflect the health relevant fraction of the ambient aerosol than its total mass. While some of these more advanced multi-component are already marketed and used in air pollution research, others still have to be further developed to make them usable within AQ monitoring networks.

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