

NM VOC, NO_x, O₃, and the EU Thematic Strategy on Air Pollution

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Since the adoption of the Thematic Strategy on Air Pollution (TSAP) in 2005, the European Union has developed an extensive body of legislation that is defined in the Air Quality Directives. Here, Directive 2008/50/EC merged the Air Quality Framework Directive and its first three Daughter Directives to set limit values for airborne particulate matter, nitrogen dioxide, and other pollutants which are not to be exceeded throughout the EU territory. The fourth Daughter Directive 2004/107/EC remains as a separate legislation and enforces obligations for some heavy metals and persistent organic pollutants. Another legislative pillar of the TSAP is the National Emission Ceilings Directive 2001/81/EC establishing emission ceilings for sulphur dioxide, nitrogen oxides, ammonia, and non-methane volatile organic compounds (NMVOCs) to limit the trans-boundary transport of air pollutants and thus to mitigate the acidification, the eutrophication, and the ozone impacts. Ozone, which is known to exhibit adverse effects on the human health and the environment, is not emitted directly but is formed through the photochemical degradation of volatile organic compounds in the presence of nitrogen oxides. Many volatile organic compounds and their oxygenated degradation products present in ambient air are toxic or carcinogenic and might cause respiratory and cardiovascular diseases. To assess the effects of air pollution by NMVOCs and to derive mitigation strategies, a detailed understanding and mechanistic representation of the physico-chemical atmospheric degradation processes is required. Recently, the European Commission carried out a thorough review of the TSAP to shape a new strategy for improving air quality in the EU. The comprehensive review revealed that a significant percentage of European citizens is living in zones that are not complying with limit values and target values. It has been estimated that air pollution caused 420.000 people to die prematurely in the EU in 2010. At the end of 2013 a Clean Air Policy Package has been adopted comprising a new Clean Air Programme for Europe with measures to ensure that existing targets are met in the short term and with new air quality objectives for the period up to 2030. The package also includes support measures to help cut air pollution, with a focus on improving air quality in cities, supporting research and innovation, and promoting international cooperation. This expert forum is focused on the atmospheric gas phase processes of NMVOCs, nitrogen oxides, and ozone as well as on the dedicated atmospheric measurement techniques. The presentations will: (i) Summarise the recent advances in atmospheric measurement techniques for NMVOCs and nitrogen oxides, (ii) Provide an overview of problems in assessing non-compliance with the TSAP, (iii) their potential causes like, e.g.: Measurement interferences, uncertainties of chemical transport models and emission inventories, and Insufficient implementation of abatement strategies, and (iv) Identify future needs for harmonisation and standardisation with special regard to measurement methods for NO, NO₂, and volatile organic compounds.

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