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INTEGRATION OF MEASUREMENTS AND MODELLING IN THE DANISH AIR QUALITY MONITORING PROGRAM

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ABSTRACT

In the mid 1990ties air quality models were introduced as an integrated part of the Danish air quality monitoring program; a program that covers monitoring in relation to the impact of air pollution on environment and human health. Today, the measurement program consists of 16 stations covering Danish aquatic and terrestrial environments as well as the major Danish cities. The measurements provide information on the current status and long term trends of air quality and atmospheric deposition. However, the measurements provide data only for a few specific locations, and air quality models are therefore applied to spatially cover the Danish land and aquatic areas. Examples are model calculations of nitrogen depositions with a high spatial resolution and local scale model calculations of air quality at scales down to address level. The measurements of the chemical composition of gases and particles provide direct information about the sources, and in combination with model calculations it is possible to separate Danish and international contributions to the air pollution and atmospheric depositions in Denmark. Moreover, a combination of measurements and model calculations is a strong tool for understanding episodes or unexpected changes in pollutant concentrations. This has e.g. been illustrated in the work carried out for explaining an observed 15 % increase in the concentration of nitrogen dioxide at one of the busiest streets in Copenhagen; an analysis that led to the conclusion that this increase resulted from a change of the traffic lanes at the specific street segment where the monitoring station is located. Finally, both measurements and model calculated air quality forecasts are used to effectively warn the public about ozone episodes. By use of examples, this presentation illustrates that a combination of measurements and model calculations creates a synergy that results in improved monitoring of air quality.

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