The Urban Air Quality Forecast System for Norway

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Abstract

For the past 6 years the Norwegian Institute for Air Research, the Norwegian Meteorological Institute and the Norwegian Public Road Administration have been producing air quality forecasts for a number of Norwegian cities. An operational Urban Air Quality Information and Forecasting System (UAQIFS) has been developed, the system is shown in Figure 1. Today this UAQIFS is applied in six Norwegian cities including Oslo, Bergen, Trondheim Drammen, Stavanger, and Grenland during the winter season (The "Better City Air" project).

Background

High levels of PM_{10}, $PM_{2.5}$, and NO_2 occur every winter in Norwegian cities during temperature inversions and weak winds. High levels of PM_{10} also occur during dry weather conditions, in particular during spring conditions when particulate matter accumulated along the roads due to traffic and usage of studded tyres is released. These pollutants may cause health effects to people, especially to asthmatics, allergy sufferers and those who live close to hotspots. Local authorities require a forecast system to help deal with these public health issues.

Results

In Figure 2 the forecast for PM_{10} daily average is shown for a dry January day in the city of Oslo. A comparison between the forecast and measured values of particulates at a measurement station Løren in Oslo for a period during the winter of 2005 is shown in Figure 3.

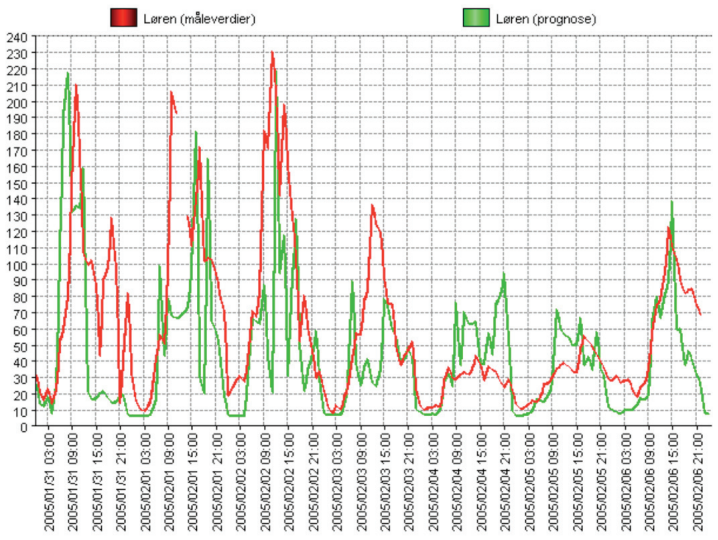

Figure 3. PM_{10}, 31 January - 6 February 2005.

Forecast index for the public

Each day the results from UAQIFS are published on password protected web pages. The results of the forecasts are split into 4 different classes described as 'little', 'some', 'high' and 'very high' pollution. Each city forecast is based on concentration levels and how many people who are exposed to this concentration. The local authorities use this information to give their recommendations to the public. This index is made publicly available through www.luftkvalitet.info is displayed for the coming day for every 4 hours, Figure 4. The recommendations for the poppulation are also published in local newspapers. A service has also been developed for the distribution of the forecast via SMS. In addition to the forecast information, monitoring data from all stations for up to 30 days can be accessed and viewed. The forecasts are used for health warnings and may be used to plan immediate measures, such as reduction of speed limits, when episodes are predicted.

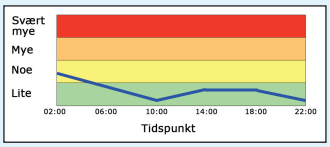

Figure 4. Example of the 24 hour forecast displayed on the public web page for Oslo from 5 February 2005. Forecasts are only available in Norwegian.

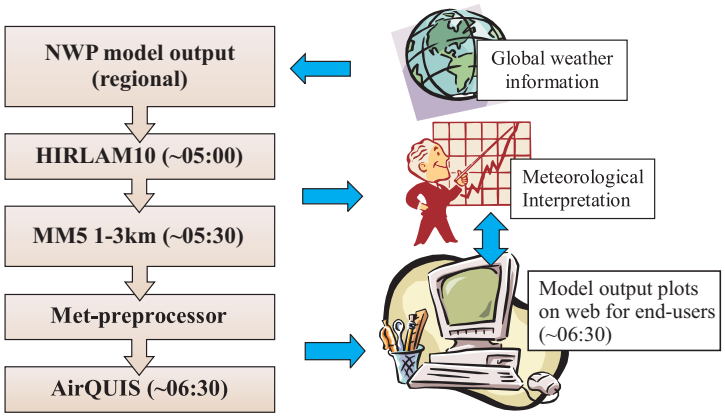

Figure 1. The operational Urban Air Quality Information and Forecasting System (UAQIFS).

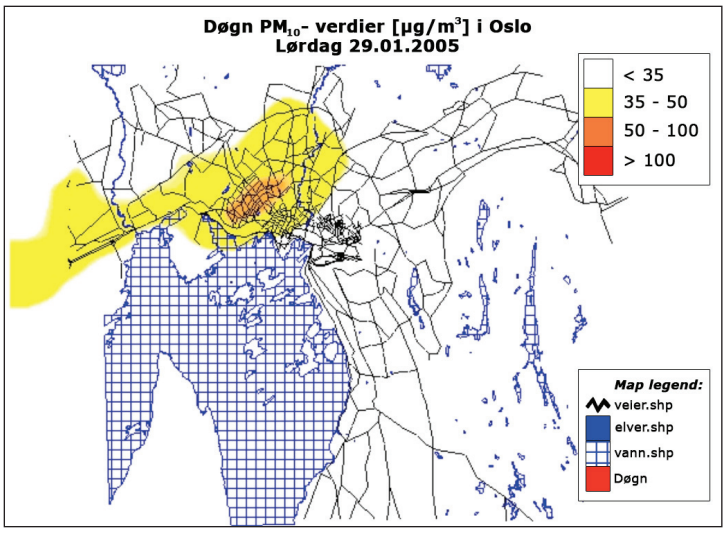

Figure 2. PM_{10} daily averages in Oslo January 29 2005.

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