



## **A study with a regional CTM during the 2002 FORMAT campaign**

**L. Liu** (1), F. Flatoey (2) and G. Braathen (1)

(1) Norwegian Institute for Air Research, (2) University of Bergen (geir@nilu.no)

FORMAT (Formaldehyde as a tracer of oxidation in the Troposphere) is a 3-year EU project aiming at increasing our understanding of the distribution of formaldehyde on global and regional scales. Formaldehyde is an intermediate in the oxidation of hydrocarbons to CO and is a good indicator for photochemical smog.

The Milan metropolitan area is the most industrialized and populated area in northern Italy with a population of 3.8 million. The summer is characterized by long-lasting fair weather periods with high insolation, which is favourable for ozone production and accumulation. The highest ozone values are typically found 4-5 hours downwind of Milan, up to 185 ppb (POLLUMET, 1992-1993); 200ppb (PIPAP0, 1998).

A measurement campaign was carried out in the Milan area during July/August of 2002 as the first campaign of FORMAT. Three stations were selected for observing the chemical species and meteorological conditions. One station was located south of Milan (Pavia, upwind site), another station in the northern outskirts of the city of Milan (Bresso, downwind urban site) and a third site about 35 km north of Milan near the Swiss border (Alzate, downwind semi-remote site).

A regional model (15 km x 15 km horizontal resolution, 30 vertical layers up to 10 hPa) was run during the campaign as a tool for campaign planning. The model is driven by meteorological data from a NWP (numerical weather prediction) model using ECMWF data as boundary and initial conditions, and the model is self-nesting. Surface emissions are specified for NO<sub>x</sub>, SO<sub>2</sub>, CO and VOC, based on the CITY\_DELTA 10km and EMEP 50km emission data. The chemistry scheme includes more than 40 chemical species and more than 120 chemical reactions.

The performance of the model is assessed in light of the observations made at these

two sites: Bresso and Alzate. Bresso is influenced by the pollution from Milan city, and Alzate is expected to experience episodes of the Milan plume when the wind blows from the south combined with long-lasting fair weather. One of the important aims of FORMAT is to compare the different technologies for taking formaldehyde measurements. The data measured by different methods are used for comparison with model results. The differences between in-situ data and DOAS data for O<sub>3</sub> and HCHO are obvious, and model results have been compared with both the data types. The budget study is important in order to understand the behaviour of HCHO in photochemical processes in the Milan area.