Long term simulation of ozone and PM10 and emission control scenarios in the Po Valley

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The Po Valley is an aerological basin, surrounded by the Alps in the North, the Apennine mountains in the South and bordered by Adriatic Sea in the East. It is characterized by frequently stagnation of air masses over a densely urbanized and heavily industrialized region. With a large number of exceedences of air quality limits as well as very strong air pollution episodes, the Po Valley is one of the most polluted areas in Europe. As more than 35% of italian population lives in this area, there is a obviously need for effective emission reduction policies, not only to achieve the target values for European air quality directive, but above all to protect public health. To assist local authorities in air quality evaluation and management the Emilia Romagna Environmental Agency (ARPA) has implemented an operational modelling system, called NINFA, based on the chemical transport model Chimere. The meteorological input comes from the limited area model which is operational at ARPA-SIM (Lokal Modell - LAMI). Since predicted concentrations are very sensitive to anthropogenic emission input values, a sensitivity study is performed to simulate the impact of different emission scenarios on ozone, PM10 and NO2. The reference annual run is based on a complete data set provided by CTN-ACE (Italian National Topic Center on Atmosphere, Climate and Emissions) including emission inventory, boundary conditions, meteorological data and air quality observations. Three different emission reductions scenarios are analyzed. The first scenario consists of a homogeneous emission reduction over the domain, according to the european planned legislation (CLE); the second scenario includes emission reduction over a sub-area of the full domain; finally the third scenario takes into account measures concerning a decrease of traffic or industry emission.