REanalysis of the TROpospheric chemical composition during the last 40 years
EU project EVK2-CT-2002-00170

Introduction
In order to better understand the reasons behind the observed concentration trends of tropospheric ozone, NOx, CO, and other air pollutants, we have undertaken a 40-year reanalysis using a set of global models driven by reanalysed meteorological data from ECMWF.

The project has generated new data sets of anthropogenic and wildland fire emissions. Simulations performed in RETRO contributed to multi-model assessment studies, and policy scenarios may help to elucidate the effectiveness of emission control regulations.

The project has ended in the summer of 2006. A final report is under preparation.

Trend Analysis
The figures below show the simulated evolution of the surface ozone mixing ratio and the tropospheric ozone column in one of the five RETRO models. The trends and the inter-annual variability are driven by changes in precursor emissions and by various weather patterns.

Emissions
Long-term global model simulations require accurate estimates of precursor emissions from anthropogenic and natural sources. New inventories with unprecedented resolution were generated and are made available to the community. As an example, the figure below shows the annual total direct carbon emissions from forest and savanna fires and their variability.

Policy Scenarios
The RETRO models were used to estimate the effects of different policy options. Here, we show the impacts on surface NOx and ozone concentrations over Europe from a scenario where all cars in the OECD countries adhere to EURO V standards.