Global Reanalysis of Reactive Gases in the Monitoring Atmospheric Composition and Climate (MACC) Project: Validation with *in Situ* and Satellite Observations

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The EU F7 MACC Project is the current pre-operational Copernicus Atmosphere Service. One of the main objectives of this project is to develop an operational system for analysis and monitoring the global atmospheric composition. Within MACC, the chemistry transport model MOZART is coupled to the Integrated Forecasting System of the European Centre for Medium-range Weather Forecasts in order to provide data records on atmospheric composition for recent years. The MACC global reanalysis service consists of a long-term (2003-2012) reanalysis of trace gas and aerosol concentrations in both the troposphere and the stratosphere at a resolution of about 80km. The global reanalysis benefits from the multi-sensor approach for data assimilation of O_3, CO and NO_2: total and tropospheric columns from different satellite sensors and platforms are assimilated. Validation of O_3, CO and NO_2 is carried out regularly using various independent *in situ* and satellite observational data sets. Here we discuss the performance of the MACC reanaylsis based on comparison with Measurements of Pollution in the Troposphere and Infrared Atmospheric Sounding Interferometer observations and surface measurements from the NOAA/GMD and World Data Centre for GreenHouse Gases networks. We will present the ability of the reanalysis to capture the pollutant concentrations and seasonal variability over selected regions and stations. The impact of assimilation of satellite data on the performance of the reanalysis will be addressed through comparison with MOZART off-line simulations.

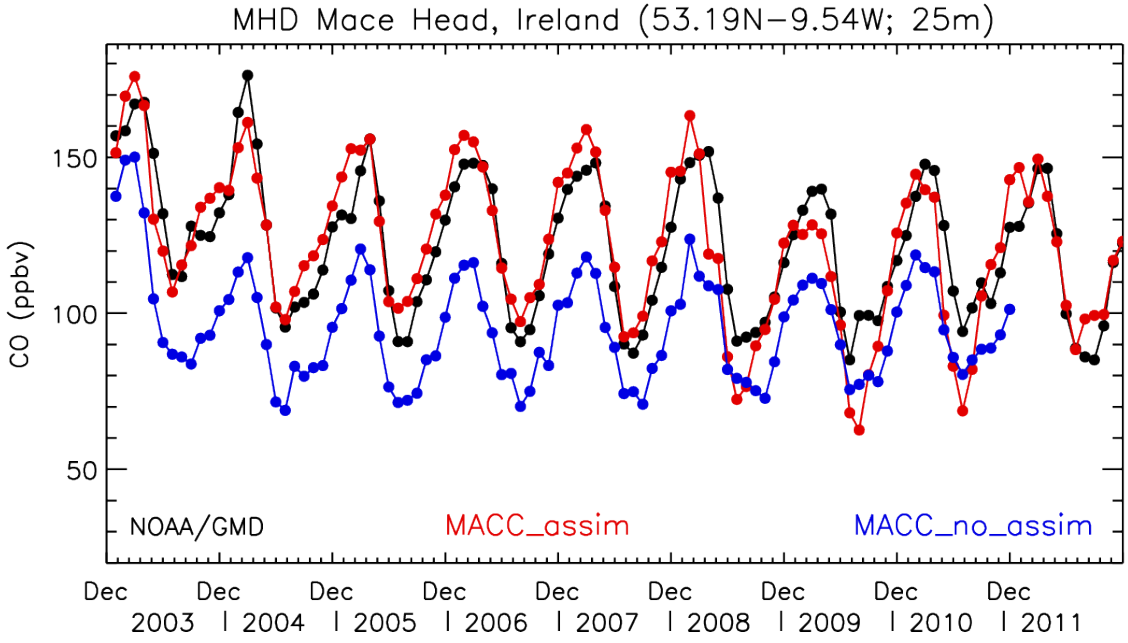

Figure 1. (No caption provided)