



## **Evolution of the distribution of tropospheric chemical species during the past decade**

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Megacities, with a population exceeding ten million inhabitants, represent hot spots of emissions that need to be correctly quantified in order to evaluate their effects at the local, regional and global scale. Within the 7th Framework European project CityZen (Megacity – Zoom for the Environment), the impact of changes in emissions on the global distributions of chemical compounds is being assessed, with a focus on the impact of megacities in Europe, Northern Africa and China. The goal of the project is to comprehend the feedbacks between climate change and air quality from the largest world cities at the global and regional scales.

In order to simulate the changes in the distribution of gaseous compounds as well as aerosols we have used the MOZART (Model for Ozone And Related chemical Tracers) global chemistry transport model. This model is driven by offline meteorological fields: for the present study we have used the meteorological fields provided by the National Center for Environmental Prediction (NCEP). The focus of the study is the 1996-2007 period, during which the changes in the distribution of the chemical compounds related to changes in emissions during that period will be discussed. The global emissions used in the present study are derived from the new dataset developed in support of the next IPCC (Intergovernmental Panel on Climate Change) AR5 report under discussion. We will discuss the methodology we have used to update the IPCC anthropogenic emissions up to year 2007. The new emissions inventory for Europe developed within CityZen for the 1996-2007 period will be discussed and compared with the emissions provided by other inventories. Furthermore, we will discuss the biomass burning inventory used in this work, which provides monthly averaged emissions for the full period of the study. Emissions of biogenic volatile organic compounds are derived from the most recent version of the MEGAN (Model of Emissions of Gases and Aerosols from Nature) model.

Simulations covering the considered period will be performed using different combinations of the emissions of the datasets being performed. We will discuss the results of the simulations, focusing more particularly on the simulations using either IPCC dataset or a combined IPCC / European emissions dataset, or different Biogenic Volatile Organic Compounds emissions. We will discuss the changes in the distribution of tropospheric chemical species from the different simulations, considering both gaseous compounds and different types of aerosols.