



Refinement of pollutant gas emissions in the state of Rio de Janeiro for applications in modeling air quality on a local scale

Angel Domínguez Chovert (1), Marcelo Félix Alonso (2), Ariane Frassoni (1), Valter José Ferreira (1), Denis Eiras (1), Karla Longo (3), and Saulo Freitas (3)

(1) National Institute for Space Research, Center for Weather Forecasts and Climate Studies, Cachoeira Paulista, Brazil (chovert89@gmail.com), (2) Federal University of Pelotas, Pelotas, Brazil., (3) NASA, Goddard Space Flight Center, Global Modeling and Assimilation Office, Greenbelt, MD, EUA.

Numerical modeling is a fundamental tool for studying the earth system components along with weather and climate forecast. In fact, the development of on-line models allows to simulate conditions of the atmosphere, for example, to evaluate certain chemicals in weather events with the purpose of improving a region's quality of air. For this determined purpose, the on-line models employ information from a broad range of sources in order to generate its variables forecasts. But beyond vast information sources, for a region's quality of air study, the data concerning the amount and distribution of emissions of polluting gases must be representative, as well as, it's required complete georeferenced emissions for simulations made with high resolution. Consequently, the modifications made in this work to the PREP-CHEM-SRC (Preprocessor of trace gas and aerosol emission fields for regional and a global atmospheric chemistry models) tool are presented to meliorate the initialization files for BRAMS models, 5.2 version (Brazilian Developments on the Regional Atmospheric Modeling System) and WRF (Weather Research and Forecasting Model) with vehicle emissions in the state of Rio de Janeiro, Brazil. It was determined the annual vehicle emission, until the year 2030, of the nitrogen oxides species (NO_x) and carbon monoxide (CO) for each city and using different scenarios. For Rio de Janeiro city, a process of distribution by emissions of the main pollutant gases was implemented. In total, five different types of routes were used and the emission percentage for each one was calculated using the most current traffic information in them. For to check the industrial contributions to the emissions were used the global datasets RETRO (REanalysis of TROpospheric chemical composition) and EDGAR-HTAP (Emission Database for Global Atmospheric Research). On the other hand, for the biogenic contributions was used information from the MEGAN model (Model of Emissions of Gases and Aerosols from Nature). For all the analyzed species it was possible to observe the strong influence of the vehicular activity on the emission distribution.