



Climate and air pollution modelling in South America with emphasis on megacities

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Natural as well as anthropogenic emissions determine the aerosol and chemical composition of the atmosphere. This has a major impact on cloud formation, on the hydrological cycle and on air quality. In many South American regions the effects of megacities - such as Buenos Aires, Rio de Janeiro, etc. - are crucial and have an impact on a regional scale. In other regions the emissions are dominated by natural sources as well as by land-use change and biomass burning. The goal of the study is to estimate the impacts of different emission sources.

In South America the Andes have a significant influence on the atmospheric circulation and on the transport of chemical species, because of the pronounced orographic features. An adequate representation of the Andes within a climate model is only possible with the relatively high horizontal resolution of a regional climate model.

For this study the newest version of the regional climate model REMO has been extended by an on-line chemistry module. The REMO model includes an improved surface model and several technical improvements, while the chemistry module is based on the Regional Acid Deposition Model (RADM2) and tracer transport (included in REMO 5.0 with Tracer Extension).

The model calculates the meteorological processes directly together with photochemistry and tracer transport. The advantage over off-line chemistry-transport models - which are using the, e.g., hourly output from another model - is the direct coupling of meteorological and chemical fields, which both are available for each model timestep.

A first run includes natural as well as anthropogenic emissions, while in a second run

emissions from megacities are reduced. Using this approach a first guess of the impact of megacities is gained.

First results of simulated tracer concentrations covering the domain of South America will be shown.