Geophysical Research Abstracts
Vol. 12, EGU2010-10650, 2010
EGU General Assembly 2010

Effects of Paris on regional meteorological and chemical weather in the context of the EC-project MEGAPOLI

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A megacity is characterized by large emissions of primary and secondary pollutants such as NOx, O3, organic compounds as well as particles. However, the direct influence of the emissions is not the only way the city affects air quality. In particular, the interaction between soluble particles radiation and clouds may be of importance. Particles may be transported downwind in the urban plume into cloudy environments where they activate and contribute to an increase in cloud droplet number concentration. Such an increase leads to enhanced cloud-top reflectance through the first aerosol indirect effect and modification of precipitation development through the second aerosol indirect effect. Using the online coupled chemical weather model Enviro-HIRLAM (Environmental High Resolution Limited Area Model) we have investigated the interaction between urban effects, anthropogenic aerosols and regional weather by comparing runs with and without urban roughness, anthropogenic heat fluxes, and albedo as well as aerosol indirect effects.