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Megacities, Air Quality and Climate Interactions: Answers on MEGAPOLI Scientific Questions

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The EC FP7 Project MEGAPOLI (http://megapoli.info) brought together leading European research groups, state-of-the-art scientific tools and key players from non-European countries to study the interactions among megacities, air quality and climate. MEGAPOLI included both basic and applied research, and bridged spatial and temporal scales connecting local emissions, air quality and weather with global atmospheric chemistry and climate.
The main MEGAPOLI objectives were: (i) to assess impacts of megacities and large air-pollution hot-spots on local, regional and global air quality, (ii) to quantify feedbacks among megacity air quality, local and regional climate, and global climate change, (iii) to develop improved integrated tools for prediction of air pollution in megacities.
In order to fulfil the project objectives the following scientific questions had been addressed:
Q1: What is the change of exposure of the overall population to the major air pollutants as people move into megacities?
Q2: How do megacities affect air quality on regional and global scales? What is the range of influence for major air pollutants (ozone, particulate matter, etc.)?
Q3: What are the major physical and chemical transformations of air pollutants as they are moving away from megacities? What happens to the organic particulate matter, volatile organic compounds, etc?
Q4: How accurate are the current emission inventories for megacities in Europe and around the world? What are the major gaps?
Q5: How large is the current impact of megacities on regional and global climate?
Q6: How will the growth of megacities affect future climate at global and regional scales?
Q7: What is the impact of large-scale dynamic processes on air pollution from megacities?
Q8: What are the key feedbacks between air quality, local climate and global climate change relevant to megacities? For example, how will climate change affect air quality in megacities?
Q9: How should megacities (emissions, processing inside megacities, meteorology) be parameterised in regional and global models?
Q10: What type of modelling tools should be used for the simulation of multi-scale megacity air quality - climate interactions?
Q11: Which policy options are available to influence the emissions of air pollutants and greenhouse gases in megacities and how can these options be assessed?
The main scientific results achieved by the MEGAPOLI project and answers on the main MEGAPOLI scientific questions are briefly presented here.