



CORDEX Flagship Pilot Study URB-RCC: Urban Environments and Regional Climate Change – Where We Are and Where We Are Going

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Cities play a fundamental role in climate at local to regional scales through modification of heat and moisture fluxes, as well as affecting local atmospheric chemistry and composition, alongside air-pollution dispersion. Vice versa, regional climate change impacts urban areas and is expected to increasingly affect cities and their citizens in the upcoming decades. Simultaneously, the share of the population living in urban areas is growing and is projected to reach about 70 % of the world population by 2050. This is especially critical in connection to extreme events, for instance, heat waves with extremely high temperatures exacerbated by the urban heat island effect, in particular during night-time, with significant consequences for human health. Thus, cities are becoming one of the most vulnerable environments under climate change.

Additionally, from the perspective of recent regional climate model development with increasing resolution down to the city scale within convection permitting RCMs, proper parameterization of urban processes plays an important role to understand local/regional climate change. The inclusion of the individual urban processes affecting energy balance and transport (i.e. heat, humidity, momentum fluxes, emissions) via special urban land-surface interaction parameterization of local processes becomes vital to simulate the urban effects properly. This will enable improved assessment of climate change impacts in cities and inform adaptation and/or mitigation options, as well as adequately prepare for climate-related risks (e.g. heat waves, smog conditions, etc.). Actually, IPCC is preparing the Special Report on Cities and Climate Change in 7th assessment cycle, where these aspects will be considered.

We introduced this topic to the CORDEX platform, within the framework of so-called flagship pilot studies on challenging issues and gaps in regional climate change knowledge. The main aims and progress of this activity will be presented, especially an analysis of Stage-0 experiments using case studies of heat wave and convection episode within ensemble simulations for City of Paris with convection permitting RCMs from different groups over the world. Further outlook with preliminary results will be presented as well for long term (10 years) climate simulation with these models, in common strategy to IMPETUS4CHANGE Horizon Europe Project.

