CORDEX Flagship Pilot Study URB-RCC – Case Studies on Urban Environment Implementation

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Cities play a fundamental role on 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. Indeed, the share of the population living in urban areas is growing, and is projected to reach about 70 % of the world population up to 2050. Urban impact is especially critical in connection to extreme events, for instance heat waves with extremely high temperature exacerbated by the urban heat island effect, in particular during night-time, with significant consequences for human health. Additionally, from the perspective of recent regional climate model development with increasing resolution down to the city scale, 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 distinct local processes becomes vital to simulate the urban effects properly. This will enable improved assessment of climate change impacts in the cities and inform adaptation and/or mitigation options by urban decision-makers, as well as adequately prepare for climate related risks (e.g. heat waves, smog conditions etc.). Cities are becoming one of the most vulnerable environments under climate change. Similarly as WCRP, CORDEX community identified cities to be a prime scientific challenge. Therefore, we introduced this topic to the CORDEX platform, within the framework of so-called flagship pilot studies. Main aims of this activity will be presented together with a call for participation in ensemble experiment for selected city following adopted coordinated simulations protocol.

Preliminary results from the analysis of first experiments covering specific case studies, i.e. strong heat wave as an important factor in the urban effects, and strong convective episode to study the convection permitting RCMs performance in urban environment, will be presented. The ensemble of participated teams for selected city – Paris - will be analysed and the first results based on this ensemble will be shown.