CORDEX FPS on Urbanization - URBan environments and Regional Climate Change (URB-RCC)

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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. Simultaneously, 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. 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.

Cities are becoming one of the most vulnerable environments under climate change. In 2013, the CORDEX community identified cities to be one of the prime scientific challenges. Therefore, we proposed this topic to become an activity at CORDEX platform, within the framework of so called flagship pilot studies, which was accepted and the FPS URB-RCC activity has been started in May this year.

Indeed, from the perspective of recent regional climate model developments with increasing resolution down to the city scale, proper parameterization of urban processes is starting to play 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) via special urban land-use 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.).

The main goal of this FPS is to understand the effect of urban areas on the regional climate, as well as the impact of regional climate change on cities, with the help of coordinated experiments with urbanized RCMs. While the urban climate with all the complex processes has been studied for decades, there is a significant gap to incorporate this knowledge into RCMs. This FPS aims to bridge this gap, leading the way to include urban parameterization schemes as a standard component in RCM simulations, especially at high resolutions.