Notes for the "ICRC-CORDEX 2019 International Conference On Regional Climate"

Session: D4
Theme: Urban Environment and Regional Climate Change
Day and time: Thursday 17 October 2019, 14:00 – 16:00
Chair(s): Tomas Halenka
Co-chairs: Gaby Langendijk, Bert Van Schaeybroeck, Peter Hoffmann and Michal Belda
Rapporteur: Shailendra K. Mandal, National Institute of Technology Patna, India

Top Highlights

1. As cities are becoming one of the most vulnerable environments under climate change, increasing effort dedicated to these aspects is becoming highly relevant to the CORDEX community, and to enhance the discussion on climate change interaction with urban environment within the wider CORDEX community in a more coordinated fashion is necessary, especially when aiming higher resolution in up-to-date CORDEX simulations. (Halenka, Lemonsu, Van Schaeybroeck, Giorgi)
2. A clear option, consistent with the CORDEX structure, is to develop an FPS on urbanization, which is expected going across the CORDEX domains considering a few selected big cities (even megacities) in interested CORDEX domains to make coordinated effort on the assessment of urban effects in interaction of climate change and urban environment with emphasis on the impacts on humans and the environment. (Final discussion)
3. There are urban effects parameterizations available in many RCMs used across the CORDEX experiments (CORDEX CORE) to be analyzed in first step (Halenka, Lemonsu, Van Schaeybroeck, Langendijk, Han)

Additional Notes and Takeaways

Tomas Halenka

- *Urban heat island of City of Prague during night time over 5°C under heat wave episodes, model WRF and ReGCM with urban parameterization well capturing the effect as shown in 10 years ERA Interim reanalysis driven simulations with 10 km resolution.*
- *Project URBI PRAGENSI – urbanization both in weather prediction and regional climate simulations of climate change scenarios in very high resolution (CP), coupling of air quality model.*

Aude Lemonsu

- *Urban parameterization via TEB (Town Energy Balance) Model of physical processes which includes radiative and energetic exchange, water and snow and T, HU, U inside the canyon in SURFEX land surface modeling system in CNRM-AROME modeling applied to Paris Urban Area in high Resolution of 2.5 km*

- *Comparison of long term observation with short scenario RCP 8.5 run, comparison of rural and urban temperature, strong effect of heat storage during summer and effect of anthropogenic heat fluxes in winter*

Bert Van Schaeybroeck

- *Statistical downscaling approach to the CORDEX outputs for the cities based on single very high resolution simulation for the city*
- *used for Brussels: 30 years runs, ERA-driven with and without Town Energy Balance, Regional Climate simulation using ALARO-SURFEX-TEB,the results then used to downscale the ensemble of CORDEX simulations*
- *computationally cheap method, the question of consistency of the characteristics*

Bin Liu

- *Anthropogenic heat release as important factor in urban environment, especially in winter*
- *Analysis of the heat flux in Beijing metropolitan area and its effect on urban temperature and boundary layer structure*

Jayakrishnan Pandiyattilillam Rajan

- *Daily temperature range as a significant characteristics affected by urban environment, mainly through the temperature minimum increase due to urban heat island*
- *Study based on CRU data, significant effect seen for selected urban areas in china, India, Canada*

Filippo Giorgi

- *Climate change effects shown using the shift of the selected cities in the climate characteristics space, presented in terms of geographical shift*
- *Possible options to consider other parameters like sea level rise, economy, population etc. under development*

General Discussion

- *Common interest in FPS on urbanization in regional climate simulations and its effect in interactions with climate change at regional scale, emphasis on impacts on humans (health, sea level rise in heavily populated regions, etc.)*
- *Interest in investigating and comparing urban responses in high resolution ensemble, especially for other simulations performed with convection permitted models*
- *Selection of the cities for coordinated experiments following the set of criteria: size of the city, city landscape (plain, sea shore, complex terrain), observational data for models validation, number of potential RCMs in the ensemble, etc.*