

Cross-cutting Urban Focus

WCRP Joint Steering Committee, April 2016

Background:

During the breakout session on urban climate at the 36th JSC meeting (2015), the JSC discussed the need for reliable research-based climate information for cities. In order to address key climate attributes for cities (energy, water, weather and climate extremes, etc.), the JSC explored ways to:

- share climate knowledge from WCRP to suit the needs of cities
- develop climate information not only for an adaptation context but also for mitigation (“climate-sensitive urban design”) and management context
- promote regional approaches for research on urban climate issues

The JSC proposed to organize a half-day session prior to the JSC-37 in 2016 to continue the deliberation. However, it has proven challenging to find available time amidst a busy agenda. Instead, this paper is presented to consolidate various inputs prior to the JSC-37 session and to propose a cross-cutting approach toward urban climate ensuring high-quality, science-based integrated urban services.

Emerging interest and related activities to be coordinated

The 17th World Meteorological Congress (2015), noting the current rapid urbanization and recognized the need for an integrated approach providing weather, climate, water and related environmental services tailored to the urban needs, adopted Resolution 68 (Cg-17) – *Establishing a WMO Cross-Cutting Urban Focus*. This Resolution included a call for WCRP’s contribution to the collaborative effort to a cross-cutting urban information service.

The 3rd UN-HABITAT Conference, a key milestone once every ten years, will take place in October 2016. It plans to develop a fresh urban agenda for the coming decade. The United Nations (UN) is in preparation of the Global Sustainable Development Report 2016 (GSDR-2016) in time for this Conference, with the key theme of sustainable urban development. WCRP/JPS is working closely with WMO in participating in the development of this Report.

Future Earth in its recently released “2025 Vision” identified eight societal challenges, one of which addresses “Build healthy, resilient and productive cities by identifying and shaping innovations that combine better urban environments and lives with declining resource footprints, and provide efficient services and infrastructures that are robust to disasters’. Many of Future Earth’s other challenges also intersect with urban issues, reflecting the high interest across a broad community.

The governing body of Global Framework for Climate Services (GFCS), Intergovernmental Board on Climate Services (IBCS), agreed at its 2nd session (2014) to include urban activities related to climate as a specific cross-cutting element within the priority areas of the GFCS. The implementation and influence to the climate research and service communities are yet to be carried out.

After the European Union adopted a Climate and Energy Package in 2008, the European Commission launched the Covenant of Mayors (CoM) to support efforts to implement sustainable energy policies. The CoM now represents the main European movement supporting local and regional authorities who voluntarily commit to the European Union’s objective of 20% GHG emission reduction by 2020¹.

¹ Covenant of Mayors, 2009. Covenant official text:
http://www.covenantofmayors.eu/IMG/pdf/covenantofmayors_text_en.pdf

(Example) Scientific questions for urban areas, imbedded in on-going WCRP activities

Within the larger effort of ensuring high-quality, consistent and relevant knowledge for urban communities an immediate challenge is associated with the weather and climate forecasting community. Under initiatives developing “weather-smart” systems, weather services are exploring how to produce and provide added information on possible impacts of the forecasted extreme weather/climate events (e.g. floods, heat- cold waves). Although these impact forecasts require a clear baseline from reliable climate projections, most global climate models operate on spatial and temporal scales unsuitable for urban environments. To enable effective and efficient city planning and adaptation measures, advancements in regional downscaling, seasonal to sub-seasonal predictions and decadal forecasts are imperative. Such an approach to integrate event forecasts and impact assessment naturally leads to close collaboration among WCRP, the World Weather Research Programme (WWRP), the Global Atmospheric Watch (GAW), and operational weather communities.

Many groups have outlined societal requirements in assessing future climate risks in major cities. Using the reference of New York City in the Working Group II of the IPCC AR5 (Revi et al. 2014) as a guiding example, key science questions corresponding to the WCRP Grand Challenges are listed as follows:

1. *How can sea level science and improved predictability of regional sea level change support coastal zone management in New York City?*
2. *What factors have contributed to the risks associated with e.g. Hurricane Sandy?*
3. *Are changes in the frequency and intensity of extremes predictable at seasonal to decadal scale and if so, how can we best realize that potential, and how can New York’s urban stakeholders use such forecasts?*
4. *How do changes in the land surface and hydrology influence future changes in water availability and security in and around New York City?*
5. *What do we understand about the interactions between large-scale drivers and regional-scale land-surface feedbacks affecting weather and climate extremes? How can these processes be improved in models and deliver the information required for urban planning and disaster risk reduction strategies for New York City?*

Proposed direction of WCRP’s urban climate activities:

Considering the complexity of urban issues, and in view of already well-established communities addressing urban climate and information for urban communities, WCRP’s goal in this domain should involve encouraging and supporting credible research leading toward reliable climate and environmental services for urban community. WCRP’s strength lies in connecting to and coordinating across a breadth of climate topics and research communities and in its direct linkage with other urban-focussed activities in the UN system. As it recognizes both the breadth and merit of city’s needs that arise from multiple and combined impacts of various climate factors, **WCRP should serve as a preferred and helpful research information resource for urban issues.** WCRP should promote integrated approaches to address the range of scientific challenges mapped upon urban issues, in order to:

- provide helpful access to first-class research and research products;
- promote effective use of information in regional and local contexts; and
- advocate strongly for the need for climate research on global and urban scales.

To take these approaches forward and to establish positive connections with various facets of the urban meteorology and climate community, WCRP should:

- raise the profile of climate research generally and WCRP specifically in various events and settings;
- encourage recognition and consideration of urban issues within the climate research community;
- promulgate WCRP’s experience with and expectations for reliable information and products; and

- identify and stimulate opportunities for inclusion of climate issues and climate research within various urban-focussed initiatives.

In an effort to re-vitalize WCRP regional activities, a new framework is proposed; WCRP Regional Advisory Council (WRAC; see the JSC document on this issue). The JSC should charge **the WRAC to serve as the home for WCRP urban climate attention and activities**, particularly with consideration of coastal megacities, based on connections to the many relevant activities within WCRP.

Points for JSC decisions:

WCRP urban efforts will require close partnerships with the UN system, urban decision makers (e.g. C40, EU Covenant of Mayors), climate information/service providers (e.g. Copernicus) and multiple research communities. In close coordination with the JPS, the WRAC should take an active role in promoting WCRP in high-level discussions and cultivating partnerships particularly across the urban research and planning spectrum. In this context, the WRAC should coordinate with the JPS to support the UN GSDR process and UN-HABITAT conference. The WRAC should encourage and support the development of the Frontiers of Climate Information (FoCI) framework and projects as a prominent means to implement urban activities.

WCRP recognizes a shared need with WMO's research programmes (WWRP, GAW, etc.) to provide the science-based integrated urban services supporting the safe, healthy and resilient cities of the future. Cooperation with the WMO programmes would also provide an exemplary area (i.e. warning on extremes) to demonstrate reduced distance from research to operation. JSC is invited to recommend a primary activity under the WMO urban umbrella that identifies scientific information requirements for service providers (e.g. developing a WMO guide for urban climate service delivery). WCRP input to such efforts could span the areas of climate data, data processing, regional climate modelling, and seamless predictions.

JSC should encourage the WRAC to further develop an outreach agenda for WCRP urban efforts, using major events within the WCRP calendar as well as within those of close partners' as clear set of milestones, such as:

- UN-HABITAT III Conference in Quito (October 2016)
 - Adaptation Futures in Rotterdam (May 2016)
 - International Conference on Regional Climate ICRC –CORDEX in Stockholm (May 2016)
 - High-impact weather workshop at Colombia University (2016)
 - Sea-level conference in NYC (2017)
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