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The news !

URCLIM newsletter | Issue 1| May 2018

Edito

The ERA4CS-ERANET project URCLIM brings together 7 partners across Europe, and who belong to different sectors: national meteorological services, mapping agency, and a laboratory of geomaticians. This newsletter is for internal communication but also external communication to disseminate the project's results and reach a wide audience. URCLIM partners are welcome to contribute to the next issue of the newsletter which will be released in July 2018.

Yours sincerely,

The coordination team

Upcoming Deliverables

D4.3: Repository for case study data (KNMI)

Publications

Van de Vyver, H. (2018) A multiscaling–based intensity–duration–frequency model for extreme precipitation. *Hydrological Processes,* in press.

https://doi.org/10.1002/hyp.11516

ERA4CS Kick-off meeting and Climate services event, 29-30/11/2017, Bruxelles

Two important meetings took place in Brussels at the end of november 2017. First, the JPI Climate had organized a networking event which aimed at facilitating contacts between actors of the climate sector. Many PIs were indeed presenting their projects during a speed-networking (like Valéry Masson and Adriaan Perrels on the picture). This event was a perfect opportunity to introduce URCLIM, but also to meet relevant persons for future collaborations. Second, ERA4CS kick-of fmeeting took place. Rafiq Hamdi, Valéry Masson and Shirley Le Corre met the coordination team and the JPI Secretariat and gathered practical information on how to manage ERA4CS projects.

URCLIM presentation in Hong Kong

Météo-France travelled far in Hong Kong in January 2018. It was the perfect opportunity to introduce the audience to the URCLIM project.

Upcoming project event(s)

URCLIM 2nd General Assembly will take place in Toulouse from 25-26 September 2018. This 2-days event is the perfect opportunity for all partners to meet and make a point on the work accomplished and have an overview of the next steps.

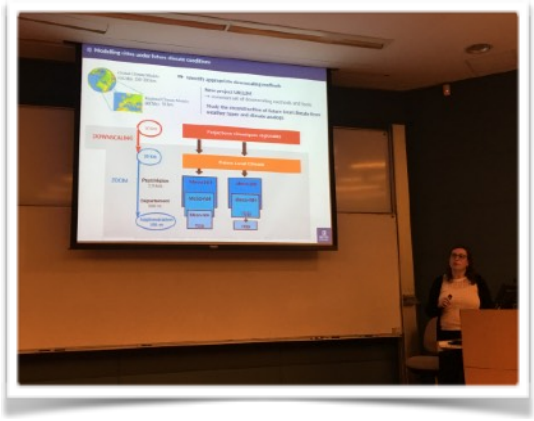
Upcoming events and seminar

- ESOF 2018 (Euro Science Open Forum): 9-14 July 2018 Toulouse, France.
- ICUC 10: 6-10 August 2018, New York, NY, USA
- EMS 2018:3-7 september 2018, Budapest, Hungary

Latest project work sessions

Paris meeting between Labsticc, KNMI & IGN, 8 February 2018

Ben Wicheurs Schreur (KNMI), Bénédicte Bucher (IGN) and Erwan Bocher (CNRS-Labsticc) met in Paris last February to determine the construction of URCLIM repository. They concluded that the repository would be built in a simple way, with a repository combined to a catalog. It was also mentioned that metadata were important, but their definition was blurry, since the need to define « standardized » keywords for metadata relevant to URCLIM.



Cécile de Munck presenting URCLIM in Hong Kong during a workshop on Urban Climate on January,15,2018.

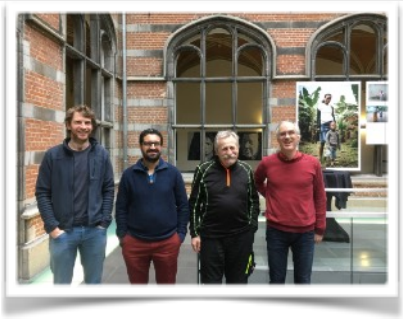
EGU, April 2018, Vienna

Valéry Masson went to EGU meeting in Vienna on april,18 to present URCLIM. Were also there Rafiq Hamdi and Hans Van De Vyver (RMI).

Valéry introduced the project's objectives, and insisted on the different case studies URCLIM is working on, on the need of urban maps for climatic studies, on partners' downscaling approaches, on the evaluation of the model applied to Urban Heat Island (UHI), extreme precipitation, air quality, ice and snow. Valéry concluded on URCLIM future work, namely the evaluation of impacts triggered by climate change and cities, the co-construction of Urban Climate Services with stakeholders, and the development of these services.

Antwerp meeting, 22 March 2018

Valéry Masson (Météo-France), Ben Wicheurs Schreur (KNMI), Bert Van Schaeybrock anf Rafiq Hamdi (RMI) met on March, 22 in Antwerp to attend the PhD thesis of Julie Berckmans, who worked on the effects of climate change in the near future in Western Europe and especially in cities. This very topic was relevant for URCLIM, especially regarding of WP3.1 « Urban Heat island and heat waves and its uncertainties ». On the afternoon, partners exchanged on WP3 and WP4. It is important to note that Urban meteorological networks are being set in all case studies cities and the next step is to confirm the availability of observations in the repository. Partners also made a point on all the different tasks of WP3 on uncertainties, downscaling methods, extreme precipitations and air quality. Concerning WP4, it was brought up that stakeholders are looking for data of high quality, which would also be decision-ready data, i.e translated into actions. Came the idea to shift the deliverable D4.1.2 « composition of the stakeholders committee » into a list of urban actors interacting with URCLIM partners for each case study.



Identifying data sources of potential interest

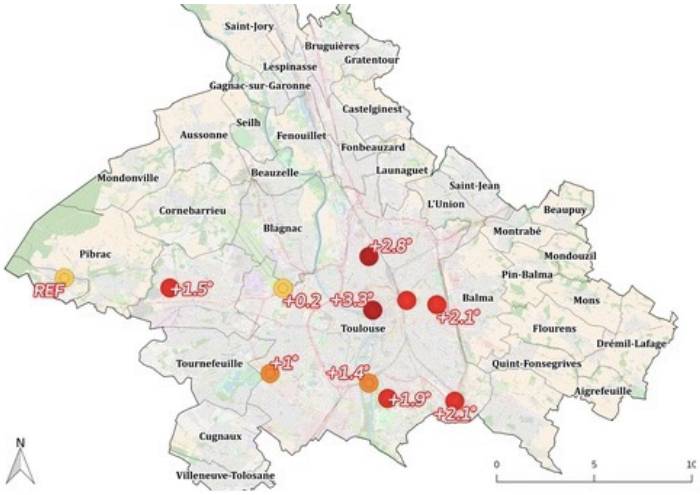
By Bénédicte Bucher, IGN.

One objective of URCLIM is to improve the identification and reuse of data sources of potential interest for climate change studies by the users themselves. The approach to do is to set up an info lab. A first version of URCLIM requirements for geographical and located data has been expressed on the info lab (http://geometadatalabs.eu/URCLIMInfoRequirements). General requirements concern spatial extent, temporal extent, reproducibility (the capacity to get similar data on other cities), licence. More specific requirements are expressed concerning the high resolution urban map: spatial resolution (50m), themes (topography) and structure (grid). These requirements are currently been used by IGN-F to search existing portals and catalogues for data of potential interest for URCLIM scientists, either manually or, preferably, through queries that can be run against existing catalogues. IGN standardization team had the task of referencing a first set of existing data relevant for the URCLIM project in the GeoMetadataLabs Platform. As metadata is often available through a CSW (Catalogue Web Service), a tool has been developed in PHP using XPATH to be able to retrieve the relevant metadata fields from the CSW responses, like the type of product, the abstract, the bounding box, and so on. This tool has collected 59 metadata from a prototype European catalogue for large scale topographic products, http://locationframework.eu/, and from the IGN INSPIRE Geoportal after a manual selection of the relevant metadata (e.g. all metadata about web services has been discarded). The results will be little by little referenced on the info lab: http://geometadatalabs.eu/Category:Geosources. So far, they need to be looked up one after another. Besides, more detailed requirements have been elicited concerning the TEB model input. These more detailed and specific information are likely not to be available as «Off the shelves » products but rather to be derived. Contributors are welcome to suggest such derivation methods and describe software they use to do so. Some software already have been referenced: MapUce and MicMac. Next steps are to organize a webinar about using the info lab, so that every participant can experiment it and contribute to improve its structure after this first milestone. To participate please get back to benedicite.bucher@ign.fr.

Issue #1 article: Urban meteorological networks in case study cities

Toulouse - by Valéry Masson (Météo-France)

An urban network of meteorological stations is being developed in close collaboration with the Toulouse agglomeration administration. 20 stations are already operational, covering a wide range of Local Climate Zones (one LCZ is a neighborhood of similar urban structure with relatively homogeneous air temperature), from dense mid-raise buildings of the middle-age city center to the suburbs and countryside. Approximately 60 stations in total will be installed within the next year. The meteorological stations are Davis vintage pro, measuring air temperature, humidity, pressure, wind and rainfall, and they are located on lampposts at around 4m of height. (figure 1)



On figure 2 is presented the Urban Heat Island (UIH) on Toulouse agglomeration measured during a heat wave, the 22nd of June 2017, during which 9 stations were in operation. As no purely rural station was available at that time, the UHI is computed using a suburban village as a reference.

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In order to determine the most adequate placement of the additional meteorological stations that will be installed, and experimental campaign with an instrumented car is being performed this spring. The first measurements showed a strong variation between even villages and nearby crops or rivers. Furthermore, the intensity of the UHI varies in the same type of LCZ depending of its distance to the agglomeration center.

Measuring the local climate in Ghent - by Bert Van Schaeybrock (RMI)

Although Belgium is highly urbanized and densely populated, high-density meteorological measurements in cities are scarce. Such observations are nevertheless very valuable for providing key information for end-users, decision-makers, stakeholders and the public. The MOCCA (MOnitoring in the City's Climate and Atmosphere) project aims to change this for the city of Ghent. Ghent is a small to middle size city with a diameter of 10kms and a population of about 250.000 inhabitants and is located in the north of Belgium. Ghent's topography is flat and at the outskirts features suburban neighborhoods with detached houses and green spaces. The MOCCA measurement stations are placed on six locations that sample the diversity in urban characteristics in Ghent. The location determination was based on an RMI analysis of the urban heat island in Ghent undertaken with the ALARO model with SURFEX. Locations Provinciehuis and St Bavo are close to one another in the density built in the center, the Plantentuin is situated in a small park, Honda is situated in the port and Wondelgem represents a typical suburban neighborhood. Finally, the station of Melle is situated southeast of Ghent in a rural environment. In 2016 the stations were first calibrated and installed and were fully operational since July 2016. The 6 automatic weather stations are of the same type and measure precipitation, temperature, relative humidity and wind speed at 2 meter height. All measurements are collected by the cataloguer every 5 minutes and allow to show real-time data on the website (www.observatory.ugent.be/observatory/index.html).

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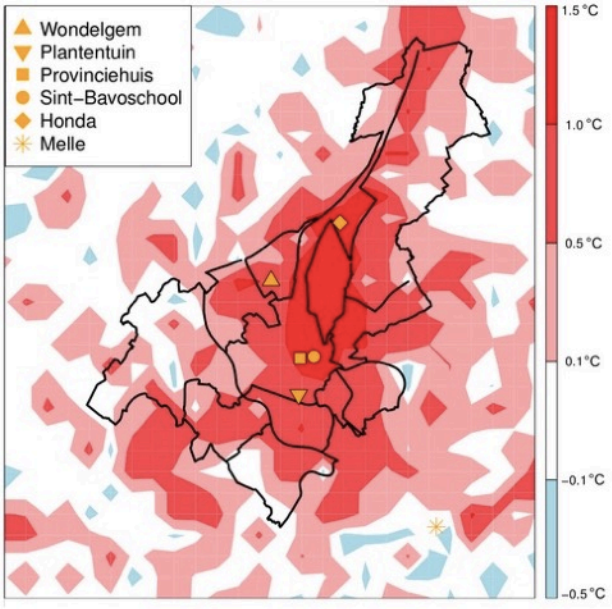
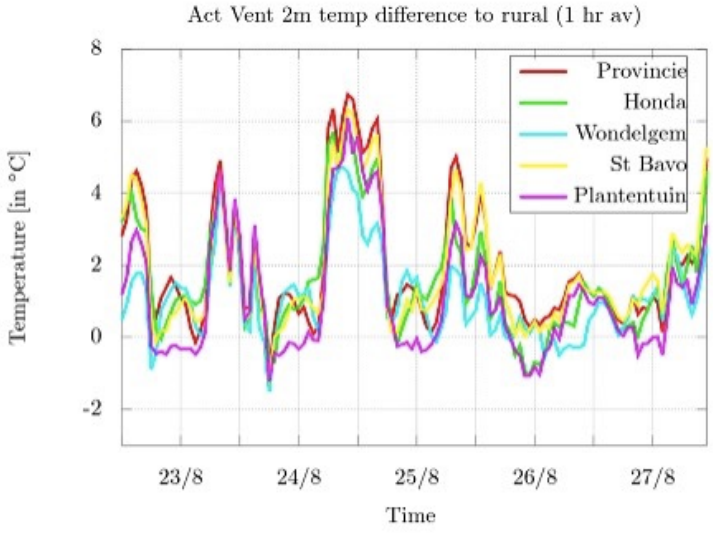


Map of the difference in summer minimal temperatures with respect to the rural average minimum temperature. Also shown are the six station locations.

Detailed view on the sensors of one of the weather stations: actively ventilated radiation shield (1) with temperature sensor, rain gauge (2), passively ventilated shield (3) with temperature, and relative humidity measurement and ultrasonic anemometer.



Temperature difference between different stations with respect to the rural station in Melle in Augustus 2016 during a heat wave.

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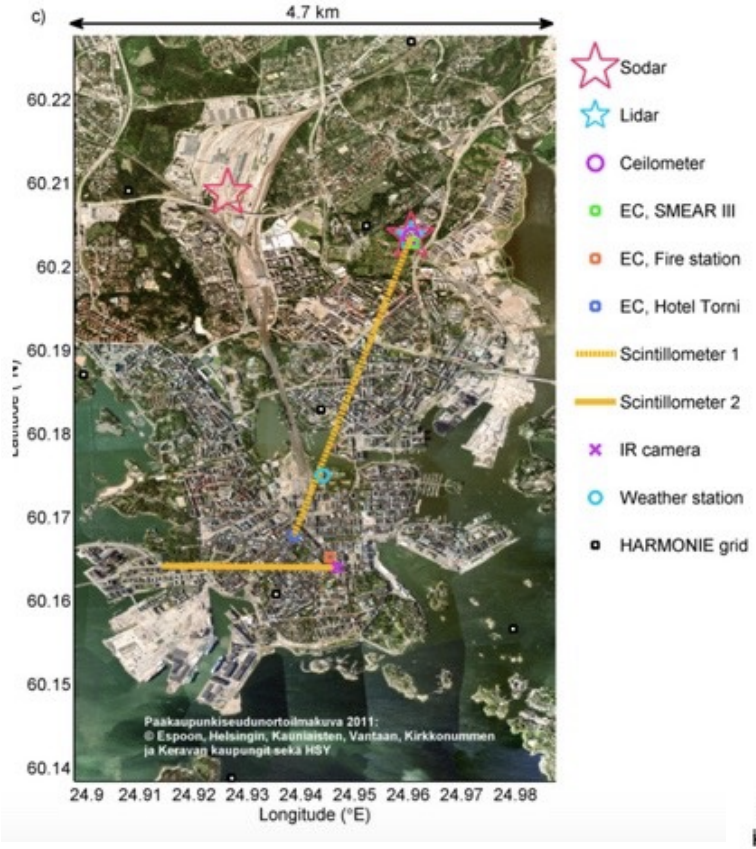
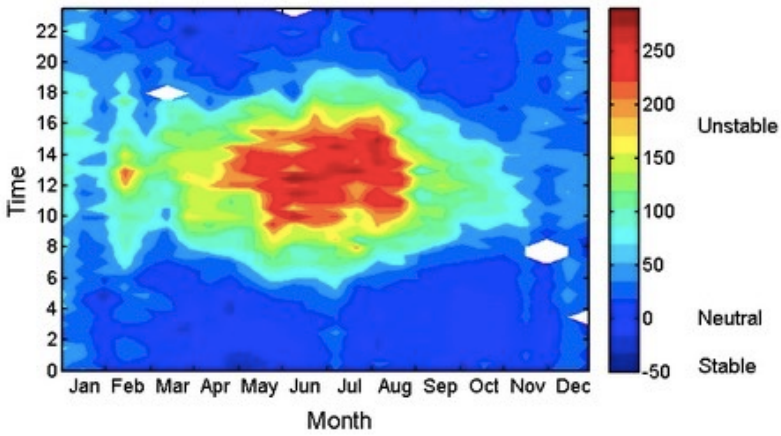
Helsinki UrBAN - by Carl Fortelius (FMI)

Helsinki UrBAN (http://urban.fmi.fi/index.html) is a research network who study the physics of the urban micro-climate: Helsinki's lower atmosphere. We are a collaboration primarily between the Finnish Meteorological Institute and the University of Helsinki. Our key tools are instrumentation that observe the atmosphere (eddy-covariance flux stations, liar, solar, kilometers, scintillometers, infra-red cameras). The purpose of the network is to provide data about atmospheric boundary-layer (ABL) dynamics: including ABL depth, vertical profiles of mean and turbulence variables, about the surface-atmosphere exchange of energy and gases (e.g. carbon dioxide and water vapor). Helsinki UrBAN will provide better experimental data for development and evaluation of numerical weather prediction (NWP) and air quality (AQ) models: and eventually data could also be used operationally in future (e.g for NWP/ data assimilation / AQ models).



Map of Helsinki with equipment locations marked. SMEAR-III is the Station for Measuring Ecosystem-Atmosphere Relations at the Kampala campus near the buildings of the Finnish Meteorological Institute (FMI) and the University of Helsinki's Department of Physics. Weather station is at Kaisaniemi park.



Average (mean) sensible heat flux for each 30-min period in the day, and for each month of the year (color scale, W m-2). Measured during 2011 at Hotel Torni in downtown Helsinki using the eddy-covariance method. The red colors relate to strongly unstable atmospheric conditions, and the dark blue to stable atmospheric conditions.

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Bucharest - by Simona Tascu (Meteo-Ro)

Within the National Meteorological Administration, there are six urban automatic stations, Campbell Scientific model 109. The sensors of these stations are locates at a height of 3m (figure 1). The observational meteorological data recorded at these stations are necessary for the monitoring of the specific microclimate in Bucharest and they were purchased within UCLIMESA project (Urban Heat Island Monitoring under Present and Future Climate). Starting from November 2014, continuous measurements of 10 minutes air temperature are recorded. Table 1 and Table 2 summarize the urban network and WMO stations by specifying their characteristics; Figure 2 shows how these stations are distributed over Bucharest area. In figure 3, it can be noticed the Urban Heat Island (UHI) measured over summer (June-Auguest) during night averaged over three years (2015-2017).

Figure 1. Urban sensors: Campbell Scientific Inc., METER Group, Inc.

Station Name	Liceul « Mihai Bravu »	Gradinita « Paradis Verde »	Liceul « Cervantes »	Scoala Gimnaziala Nr.30	Scoala Speciala « Sf. Nicolae »	Teatrul Masca
Height	90m	90m	90m	90m	90m	90m
Latitude	44°25'09 ''	44°23' 45''	44°26'14''	44°27'49''	44°22'46''	44°26'19''
Longitude	26°08'09''	26°03'44''	26°01'02''	26°07'44''	26°08'28''	26°01'48''
Last updated	01.04.2015	01.04.2015	01.04.2015	01.04.2015	01.04.2015	01.04.2015
Soil type	Molik Chernozem	Molik Chernozem/ Podzol	Red-brown preluvisol	Red-brown preluvisol	Molik Chernozem/ Podzol	Red-brown preluvisol
Vegetation type / Land cover	Grass	Grass	Stone pavements pressed	Grass	Grass	Grass

Table 1. The list of urban network stations in Bucharest

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Station name	Bucuresti-Afumati	Bucuresti-Baneasa	Bucuresti -Filaret
Height	90m	90m	82m
Latitude	44°30'1''	44°30'39''	44°24'44''
Longitude	26°12'51''	26°4'47''	26°5'43''
Available from	1949	1929	1896
Temporal frequency	6h(1949-August 2006); 1h (August 2006-present)	6h (1929 - August 2006); 1h (August 2006-present)	6h (1896-August 2006); 1h (August 2006-present)

Table 2. The list of WMO stations in Bucharest

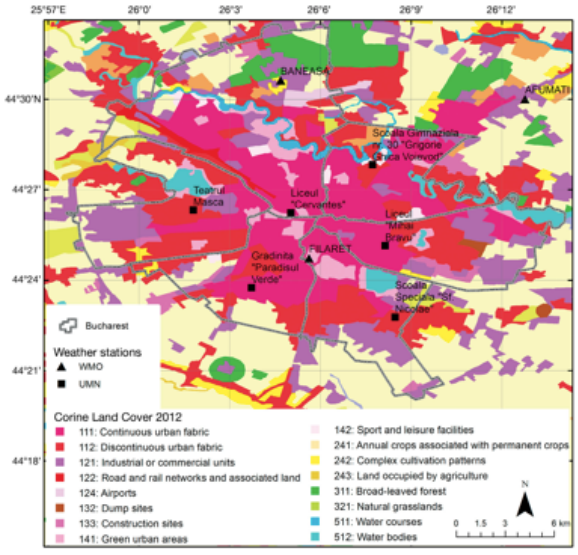

Figure 2. Location of the urban (square bullet) and WMO (triangle bullet) stations in Bucharest (from Cheval and Dumitrescu, 2017)

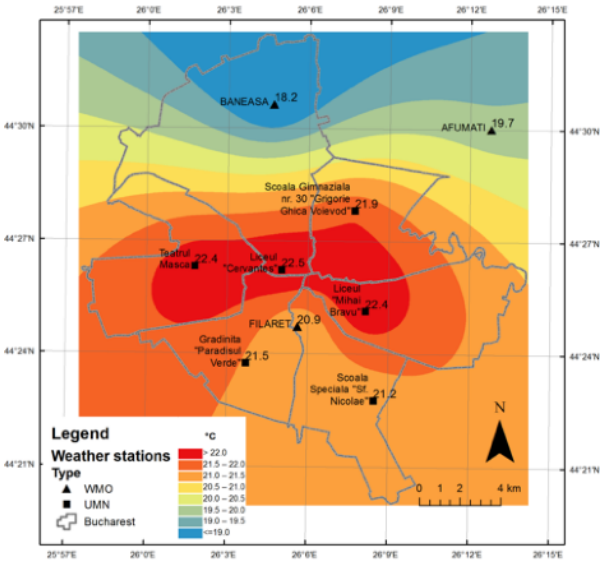

Figure 3. Urban Heat Island (UHI) for Bucharest measured over summer during night averaged over 2015-2017.

References:

1. Cheval, Sorin & Dumitrescu, Alexandru. (2017). Rapid daily and sub-daily temperature variations in an urban environment. Climate Research. 73.233-246. 10.3354/cr01484.

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