



Citizen Science
Urban Microclimate
Project Report
March 2021



Citizen Science

Urban Microclimate Project



Sustainable Building
Innovation Laboratory



Built Environment
High Performance Architecture

citizenscienceproject.org.au

Foreword

In a collaboration between RMIT and the University of New South Wales, the Citizen Science Project mobilised a league of enthusiastic citizen scientists to assist scientists from Australia's leading universities.

This project, administered by RMIT University in collaboration with University of New South Wales, is one of the successful grants announced in 2017 under the Citizen Science Grants Round 1. The project started in May 2017 and completed in February 2021.

Prof. Priya Rajagopalan

Contact

For all correspondence please contact Prof Priya Rajagopalan via email: priyadarsini.rajagopalan@rmit.edu.au

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Cover Image: Mary Myla Andamon.



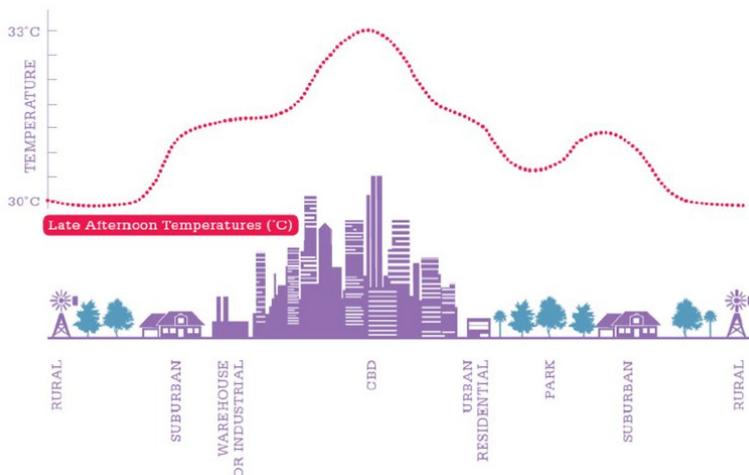
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About the Project

The number of extreme hot days is predicted to increase significantly over the next few decades in all Australian cities with detrimental impacts on public health, mortality rates, energy demand and economy.

The urban heat island effect is an extensively documented climate phenomenon, and is prevalent in many Australian cities. Cities of concrete and stone, and roads paved with asphalt create heat islands that can be significantly hotter than temperatures in the surrounding suburban and rural areas.



The Urban Heat Island Effect Source: Climate Commission (2011)

Urban heat island effects create real problems for cities and for the people who live and work in them.

- They make life uncomfortable;
- Can lead to health problems such as heat stroke;
- Exaggerate airborne pollution by preventing pollution dispersing;
- Increase the energy use and air conditioning costs needed to keep our buildings cool inside;
- and intensify global warming.

Project aim

This project aimed to engage local councils and residents across Australia in the research process thereby increasing scientific literacy and understanding of scientific methods in urban climate research. The project also aimed to educate citizens about the factors influencing outdoor microclimate and assisted them in understanding, mitigating and adapting to extreme heat and local climate change. Through working with a number of citizens from five states and two territories, the project aimed to collect urban microclimate data across large temporal and spatial scales and also create public value with community participation in scientific research.



Research Team

RMIT University Sustainable Building Innovation Lab

SBi Lab focusses on the development of building systems, design methods, regulations and policies, and the effect of human behaviour on the performance of buildings and the surrounding environment.



**Professor Priya
Rajagopalan**

Priya is the Director of the Sustainable Building Innovation Lab (SBi Lab). She is a building scientist with extensive experience in energy and indoor environmental quality of buildings, urban climatology and urban thermal balance.



**Dr Mary Myla
Andamon**

Myla practiced as an architect. She is Senior Lecturer in Construction Management at the School of Property, Construction and Project Management, RMIT University. She teaches in the areas of construction, planning and design and building physics and specialises in thermal comfort, indoor environmental quality and urban climatology research.

UNSW Built Environment High Performance Architecture

The High Performance Architecture Research Cluster aims to deliver research innovation in design, planning and management of high performance buildings and cities.



**Professor Mat
Santamouris**

Mat Santamouris is the Anita Lawrence Professor of High Performance Architecture in the University of New South Wales in Australia. He is a past professor at the University of Athens, Greece and visiting Professor at the Cyprus Institute, Metropolitan University of London, Tokyo Polytechnic University, Bolzano University, Brunel University and National University of Singapore. Past President of the National Center of Renewable and Energy Savings of Greece.



**Dr Riccardo
Paolini**

Riccardo by training is a building engineer and he received a Ph.D. in Building Systems Engineering from Politecnico di Milano, Italy, in 2011. He joined UNSW Built Environment in February 2017. He is Senior Lecturer in the High Performance Architecture research cluster.



Andrew Carre

Andrew is Lecturer in the School of Property, Construction and Project Management. He teaches in the construction management and project management undergraduate and postgraduate programs.



Dr Ruwini Edirisinghe

Ruwini specialises in digital innovation (BIM), information and communication technologies (ICT) and smart technologies in building and construction field.



Dr Shamila Haddad

Shamila is an architect by training and holds a PhD in Architectural Sciences from the University of New South Wales (Australia). Her research expertise and interest relate to Building Performance, Environmentally Sustainable Design, Indoor Environmental Quality (IEQ), Indoor Air Quality (IAQ), Thermal Comfort, Healthy, Effective and Innovative Learning Environments, Post Occupancy Evaluation of School Buildings, and Urban Heat Island mitigation technologies.

Community Collaboration

Australian Capital Territory



New South Wales



Northern Territory



Queensland



South Australia



Victoria



Western Australia



Citizen Science

The term “citizen science” broadly describes public engagement in scientific research in collaboration with professional scientists. The citizens are volunteers who participate in data gathering to assist with a large scale research. This interaction of scientists with citizens allows for public education and engagement in science and research to increase the awareness of problems that affect communities. It also provides assistance for the researchers to collect more data and meaningful observations than they could on their own.

Citizen science has the ability to provide public with practical and real-life opportunities to learn and implement the scientific method to solve problems facing their communities. Studies have shown the positive impact of citizen science on the public’s scientific literacy.

Method

The project aim of engaging communities to measure heat island effect in Australia was achieved through:

- Development of low-cost sensors and measurement instrumentation that are easy to handle by citizen scientists.
- Development of training materials and measurement protocols and their deployment in public workshops.
- Engagement of 1200 citizen scientists from 21 local councils across Australia to aid in data collection process.
- Dissemination of data to the citizen scientists and to the general public via an open source database.

Project Outputs

1. Measurement kits used by citizen scientists in 55 outdoor microclimate field experiments conducted in January to March 2019 and November 2020 to February 2021.
2. Low-cost sensors and mobile app for citizen scientists to collect data through self directed experiments
3. Development of Citizen Science Urban Microclimate Project website which is the repository of collected data and where tools for analysis are available for citizen scientists. Webpage: citizenscienceproject.org.au
4. A Thermal Comfort Tool.
5. A UHI Mitigation Tool.

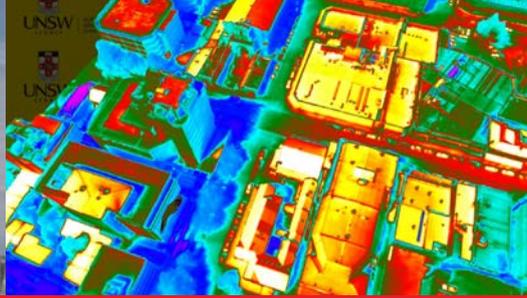
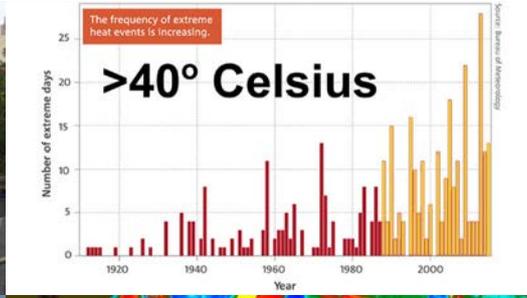
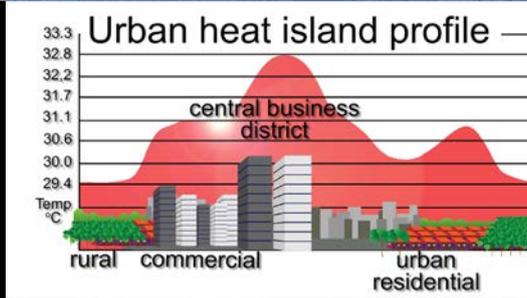
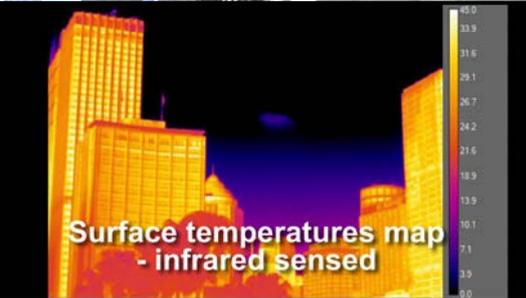


Resources

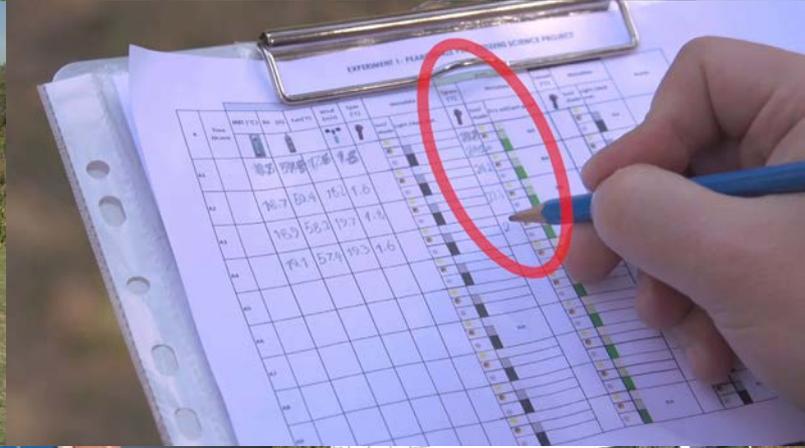
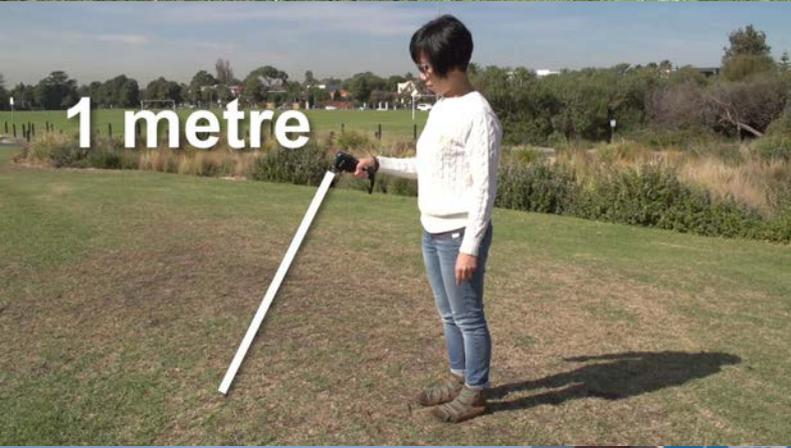
For Citizens

Resources were developed for citizens participating in the project, including instructional videos, tools, and guides.





Urban Heat Islands: An Introduction

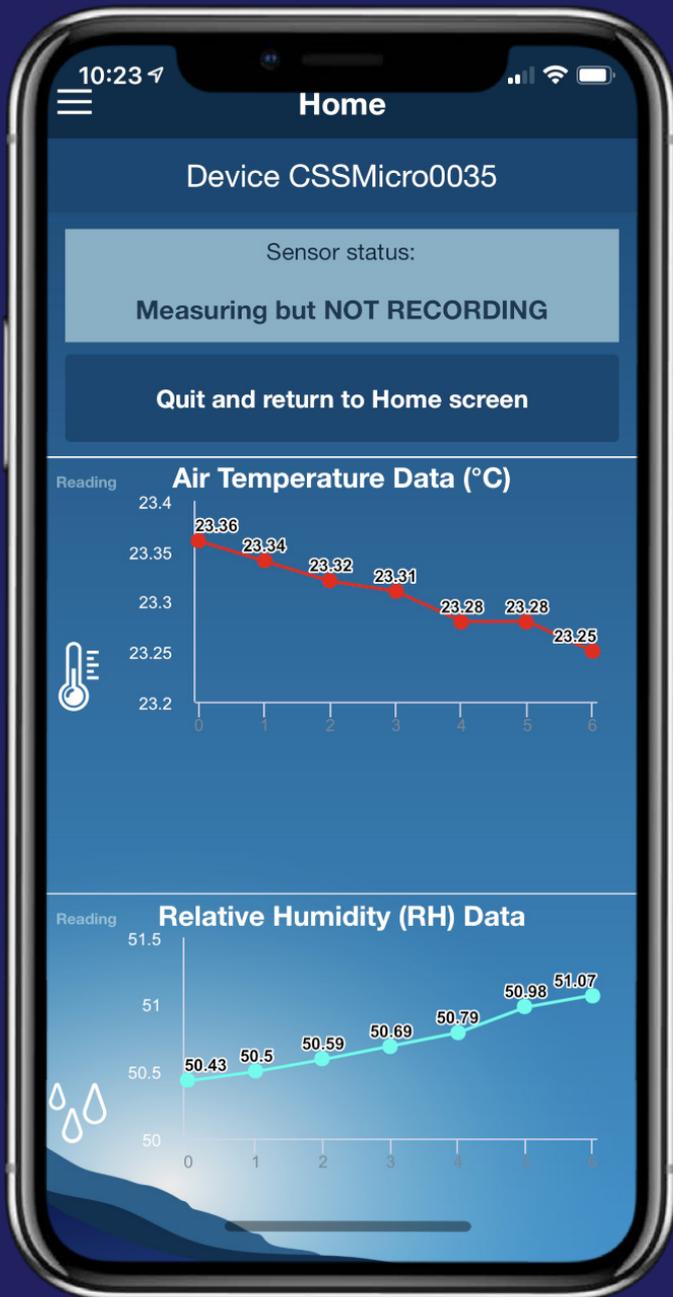


Field Measurement: Instructions

Mobile App

A mobile application (app) was developed to record temperature-humidity data continuously for few days. Citizens can use the app by connecting to the sensor and perform microclimate experiments in locations of their choice. The location can range from their own backyard, in a park or on a concrete surface in their garden. The sensors are protected by a solar radiation shield.

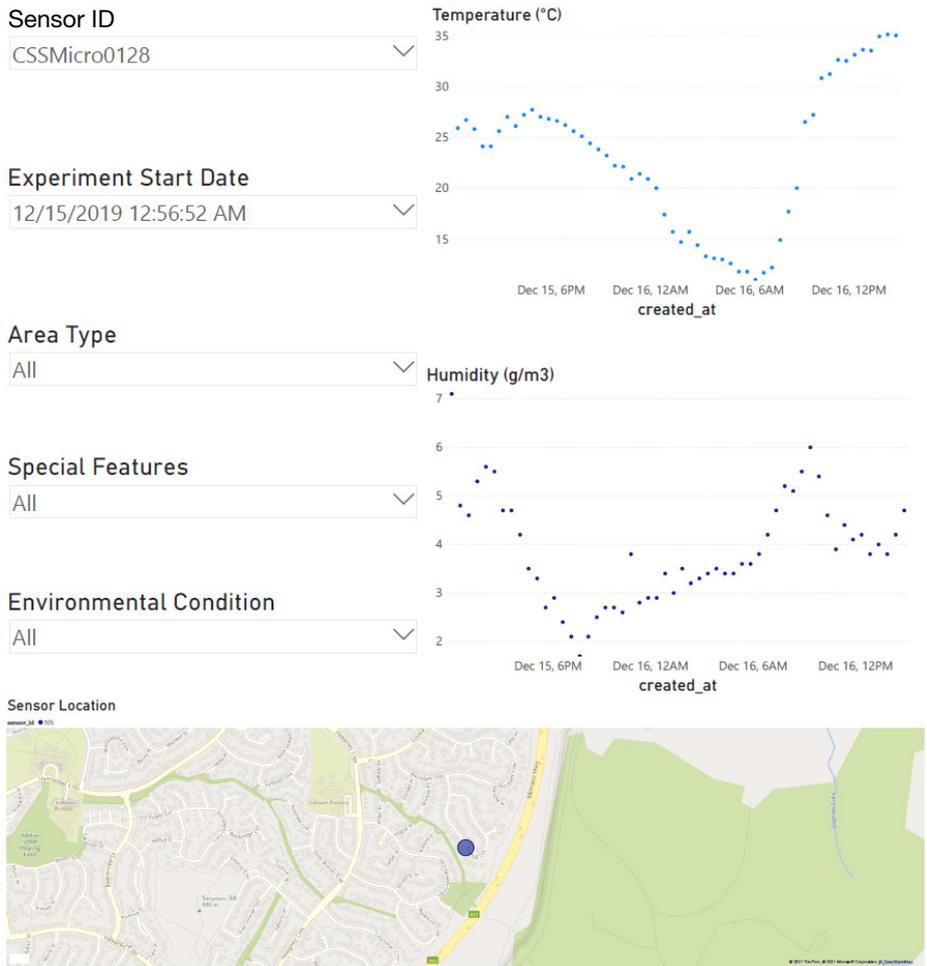
Download the app for iPhones and Android phones here: citizenscienceproject.org.au/mobile-app



Screenshots from the "Device Set Up Instructions" video.

Sensor Data

The wide-scale and longitudinal microclimate data collected from citizen scientists' sensor and app recordings are collated on the project website. The data is displayed as time series temperature-humidity graphs and is available at: citizenscienceproject.org.au/mobile-app/local-climate. Participants can compare the data that they've collected with participants from other areas in the country, as well as with several of the reference stations set up by the project team and the Bureau of Meteorology. The data can be further tuned with various filters. The information provides insights about the microclimate around participants' neighbourhoods.



Reference station and reference data (link)

Four reference weather stations were installed in Victoria and NSW to record the local weather data. The weather stations record air temperature, relative humidity, wind speed, wind direction, air pressure, rain and hail amounts at five minutes interval. Citizen scientists can select these stations for comparing their data, while doing experiments using the sensor and mobile app.



Outdoor Thermal

Comfort Tool

A thermal comfort tool is developed using Universal Thermal Climate Index (UTCI). The UTCI is a thermal comfort indicator which can assess outdoor thermal conditions and provide good predictions of thermal sensation votes depending on outdoor meteorological conditions.

Citizens can calculate the UTCI of any location using the actual values of air temperature (T_a), mean radiant temperature (MRT), wind speed (v_a) and relative humidity (%RH). MRT can be estimated using the values of air temperature, globe temperature and wind speed using the Excel tool available at: citizenscienceproject.org.au/resources-for-citizens/thermal-comfort-tool.

INPUTS for MRT value		
Ext T_a	33.5	external air temperature, (°C)
Ext T_g	33.9	external globe temperature, (°C)
v_a	3.35	wind speed, m/s
		(average of min and max wind speed measure)
OUTPUT		
MRT	37.9	mean radiant temperature, (°C)

Calculating MRT using Global Temperature

UTCI Calculator

Using the air temperature, wind speed, MRT, relative humidity as inputs in the Excel UTCI -Tool Ver2 calculator, the calculated UTCI equivalent temperatures can be expressed in terms of thermal stress using the stress categories as shown on accompanying table:

UTCI-(°C)-range	Stress-Category
above +46	extreme heat stress
+38 to +46	very strong heat stress
+32 to +38	strong heat stress
+26 to +32	moderate heat stress
+9 to +26	no thermal stress
+9 to 0	slight cold stress
0 to -13	moderate cold stress
-13 to -27	strong cold stress
-27 to -40	very strong cold stress
below -40	extreme cold stress

UTCI		
INPUTS		
T_a	30.1	air temperature, (°C)
v_a	0.7	wind speed 10 m above ground level, m/s
T_{mrt}	31.4	mean radiant temperature, (°C)
RH	29.7	relative humidity (%RH)
OUTPUT		
UTCI	29.3	UTCI temperature, (°C)
		refer to UTCI temperature range for stress categories

UTCI Tool

The UTCI - Tool Ver2 Excel tool is available for download: citizenscienceproject.org.au/resources-for-citizens/thermal-comfort-tool.



Mitigation Tool

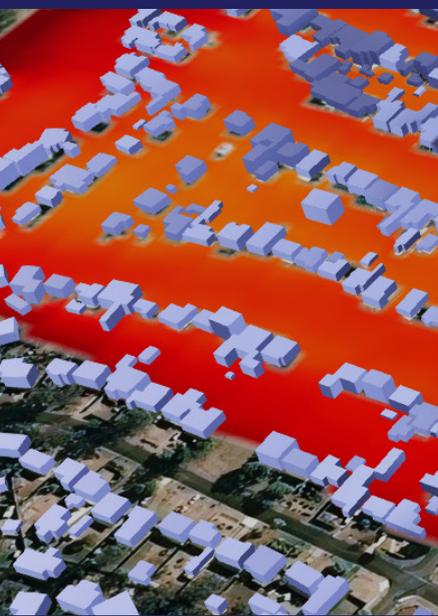
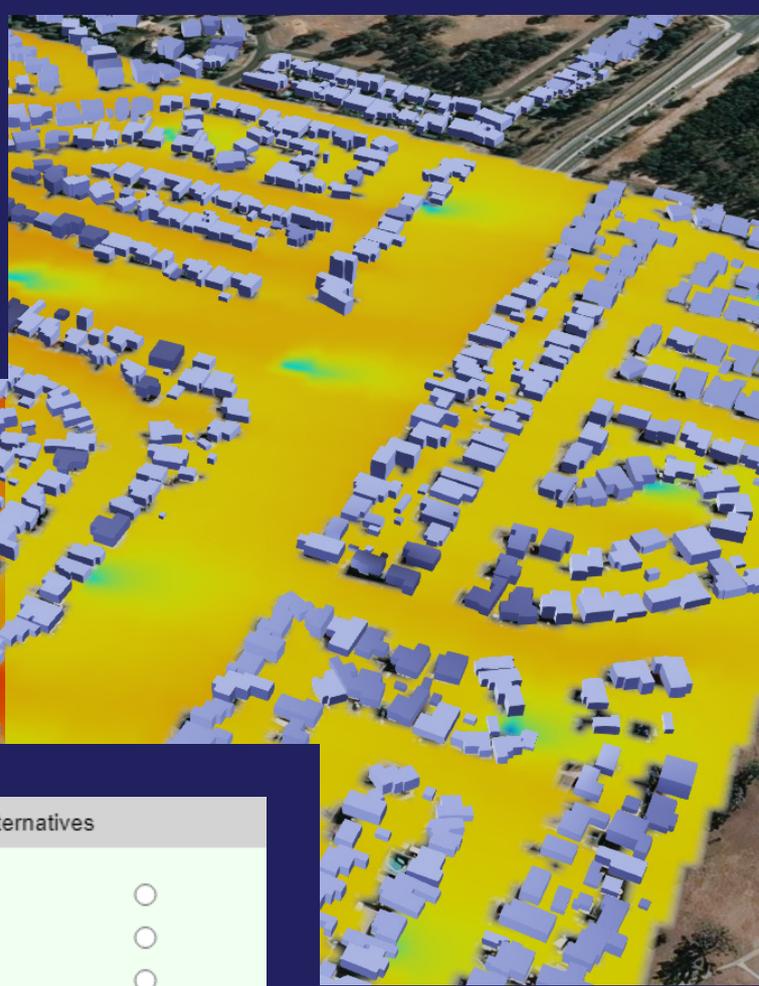
The Urban Heat Island Mitigation Tool provides visualisation of the mitigation strategies.

Citizens/councils can use the tool to identify the mitigation measures that can be applied to selected areas. This can be in the form of shading, introducing greenery, water bodies, wind break, etc.

The Mitigation Tool is available at: citizenscienceproject.org.au/mitigation-tool

Photo Credit: Mary Myla Andamon.

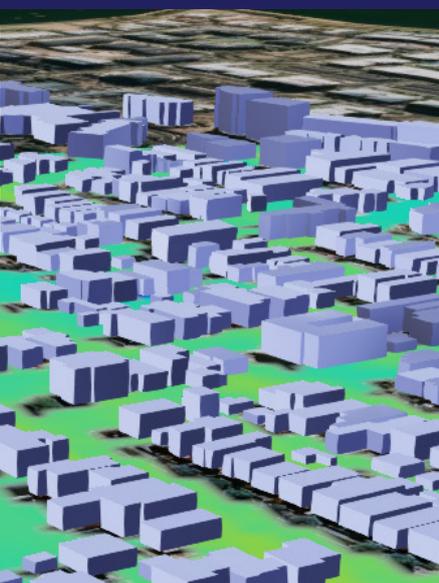
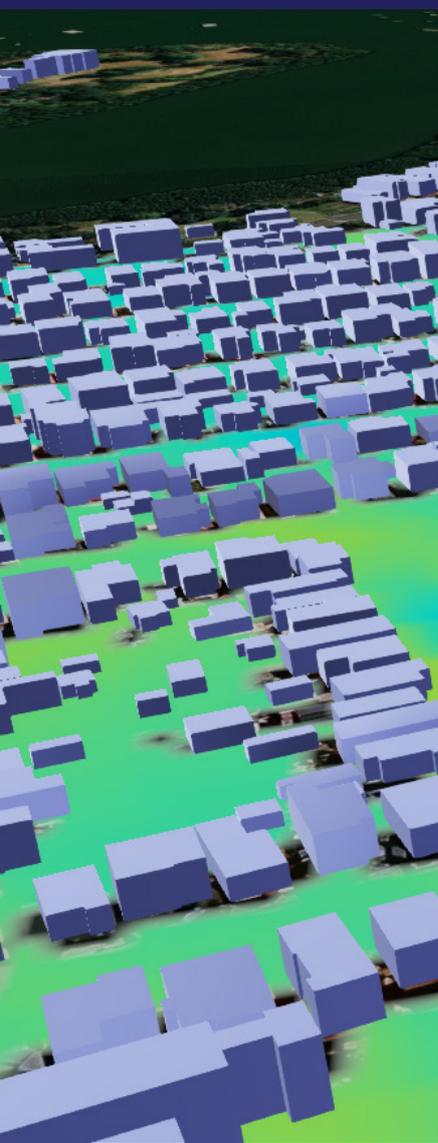
	Alice Springs, NT	 RMIT UNIVERSITY Sustainable Building Innovation Laboratory
	Olympic Park, NSW	 RMIT UNIVERSITY Sustainable Building Innovation Laboratory
	Richmond, NSW	 RMIT UNIVERSITY Sustainable Building Innovation Laboratory
	Penrith, NSW	 RMIT UNIVERSITY Sustainable Building Innovation Laboratory
	Coburg, VIC	 RMIT UNIVERSITY Sustainable Building Innovation Laboratory
	Darwin, NT	 RMIT UNIVERSITY Sustainable Building Innovation Laboratory



Development Alternatives

- Basecase
- Wind Break
- Shading
- Water
- Cool Materials
- All Interventions

20  45



UHI Mitigation Indicators

Air Temperature Summary

Average Precinct Temperature	39.02°C
Min. Localised Temperature	19.85°C
Max. Localised Temperature	42.96°C

Max. Air Temperature Reduction

Max. Average Precinct Temperature Reduction	0.00°C
Max. Localised Temperature Reduction	0.00°C

Potential air temperature reduction of chosen development alternative.

Location Inspector

Air Temperature

Click a tile from the temperature overlay to see the specific temperature value.





Completed

Experiments

More than 1,100 citizens participated in the 55 events conducted across Australia, contributing to 6,000 data points. Measurement locations were selected in each area depending on heat vulnerability characteristics such as demography, urban geometry, surface materials, presence of vegetation and exposure conditions. These measurements assisted citizens to have a thorough understanding of the parameters influencing the temperature, humidity, wind speed and surface temperature of an area. For example, the participation in this study helped citizens to understand how various materials behave in heat, such as, how hot artificial grass surfaces can become compared to natural grass surfaces; how hot rubber surfaces in children's playgrounds can become on a hot day etc. In addition, the interactions with citizens provided scientists with valuable insights into how lay people would respond to scientific experiments. The measured data at each precinct is presented as local climate maps as shown in the next pages.

Australian Capital Territory

Below are the results and some images of citizen scientists performing experiments at ACT locations.

Tuggeranong Community Centre 8 February 2019

URBAN HEAT ISLAND PROFILE
Date: 8 February 2019, Time: 1:00-3:00pm



www.citizen-scienceproject.org.au
Email: cs.ecosol@rmit.edu.au | Twitter: @CSProject_AU

Tuggeranong Community Centre | 245 Cowlishaw Street, Greenway ACT 2900

Reference meteorological (BoM) station: Tuggeranong, Station ID 070339 [air temperature at 2:00pm - 28.3°C]

The map illustrates the urban heat island (UHI) profile of the precinct. The colour represents UHI intensity, calculated by subtracting the air temperature of the reference meteorological station from the air temperature measured by the citizens at each location (black dot in the map) on the day and time specified above.

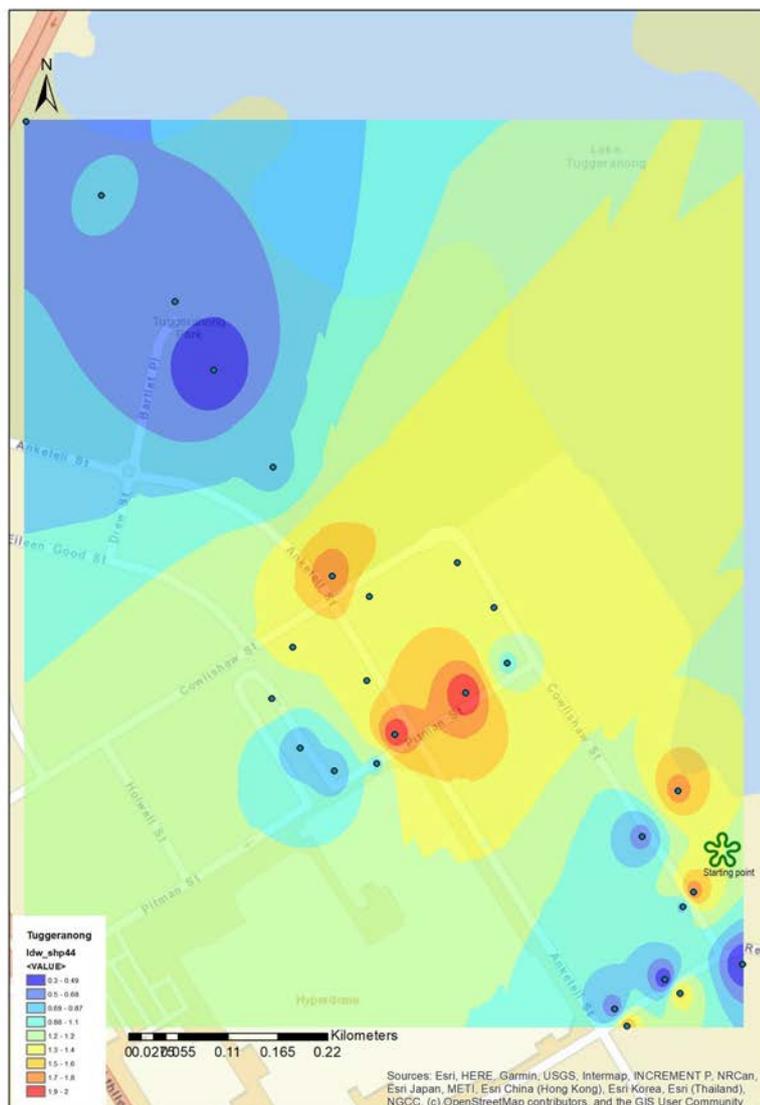




Photo by Linda Xu on Unsplash

Canberra College Woden Campus

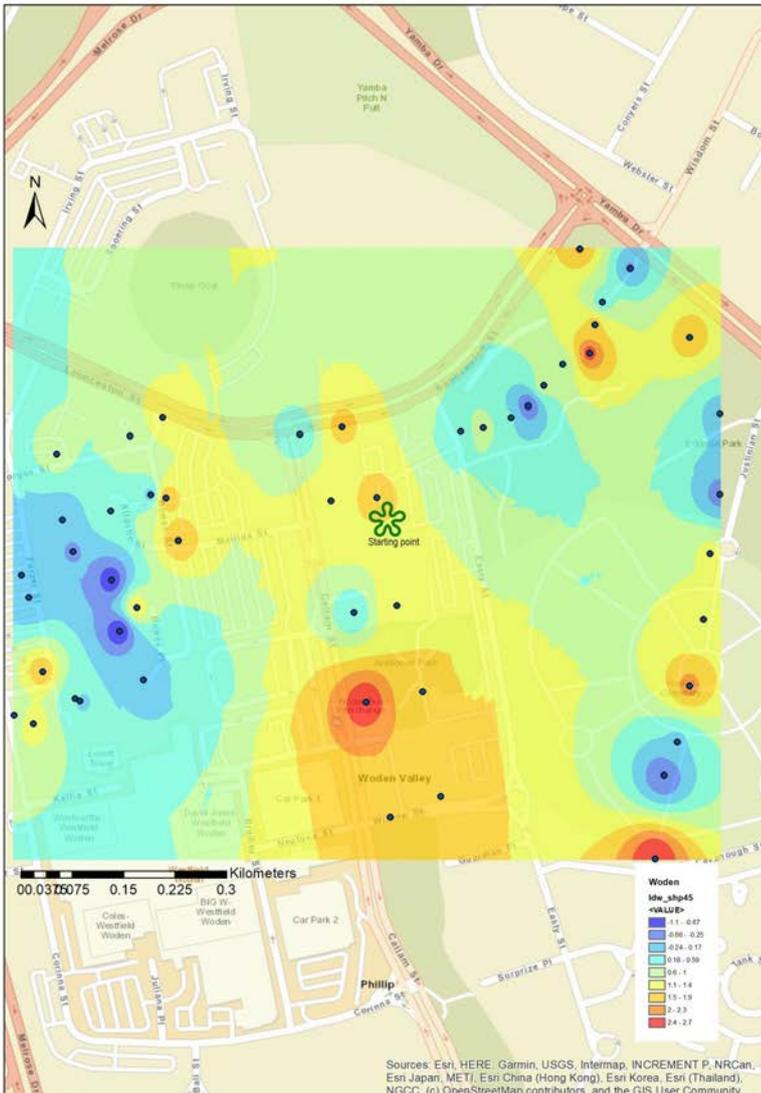
9 February 2019
Launceston Street, Phillip, ACT

URBAN HEAT ISLAND PROFILE
Date: 9 February 2019, Time: 1:00-3:00pm



Performing Arts Centre | Canberra College, Woden Campus, Phillip ACT 2606
Reference meteorological (BoM) station: Canberra Airport ID 094926 [air temperature at 2:00pm - 23.4°C]

The map illustrates the urban heat island (UHI) profile of the precinct. The colour represents UHI intensity, calculated by subtracting the air temperature of the reference meteorological station from the air temperature measured by the citizens at each location (black dot in the map) on the day and time specified above.



Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community







New South Wales

Below are the results and some images of citizen scientists performing experiments at NSW locations.

Blacktown Leisure Centre Stanhope

16 February 2019

Stanhope Pkwy & Sentry Dr, Stanhope Gardens
NSW 2768

Local climate map
Date: 16 February 2019, Time: 2:00-3:00pm



www.citizenscienceproject.org.au
Email: ca.microclimate@rmit.edu.au Twitter: @CSProject_AU

Blacktown Leisure Centre Stanhope | Stanhope Pkwy & Sentry Drive, Stanhope Gardens NSW 2768

Reference meteorological (BoM) station: Horsley Park, Station ID 067119 [air temperature at 2:30pm - 27.8°C]

The map illustrates the local climate in the precinct. The colour scale displays the differences in dry-bulb air temperature between the reference point (start of the measurements) and the other points of data collection. The temperature from the reference BoM station provides the boundary conditions at the time of the measurements

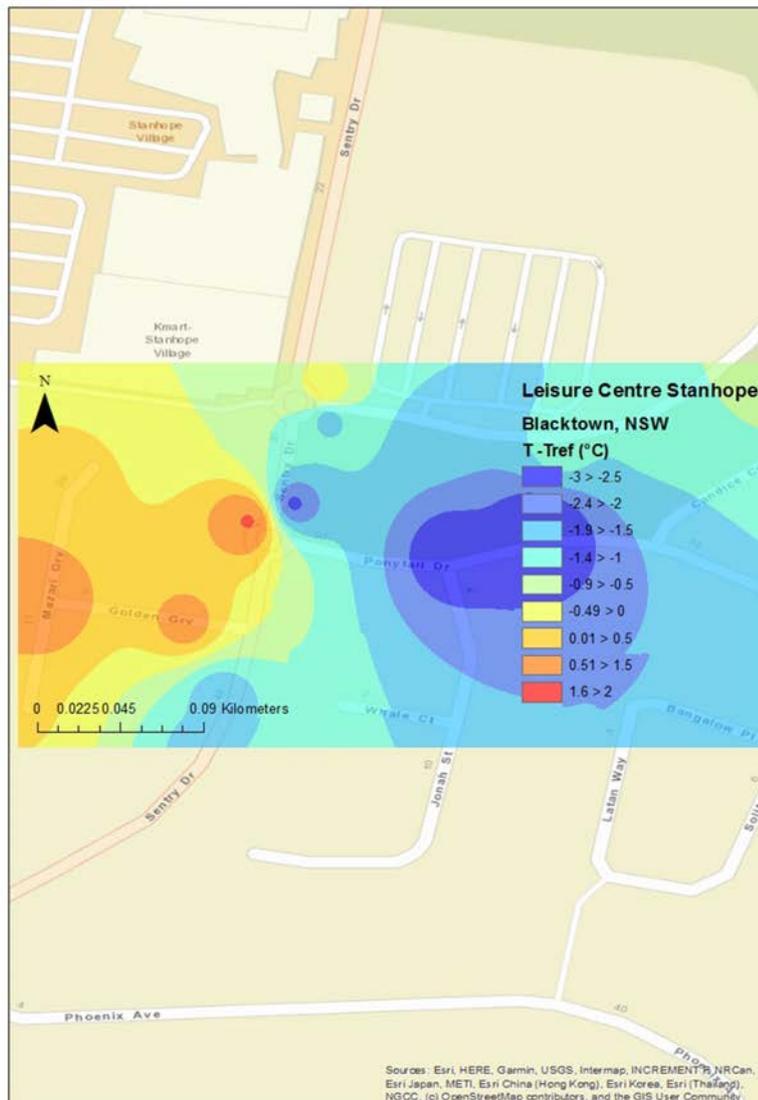




Photo by Dan Freeman on Unsplash

Canterbury - Bankstown - Wiley Park

1 March 2019
 Canterbury Road, Wiley Park NSW 2195

Local climate map

Date: 1 March 2019, Time: 2:00-4:00pm

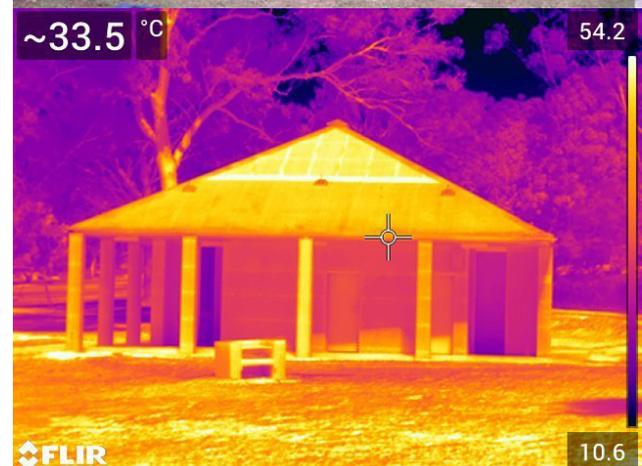
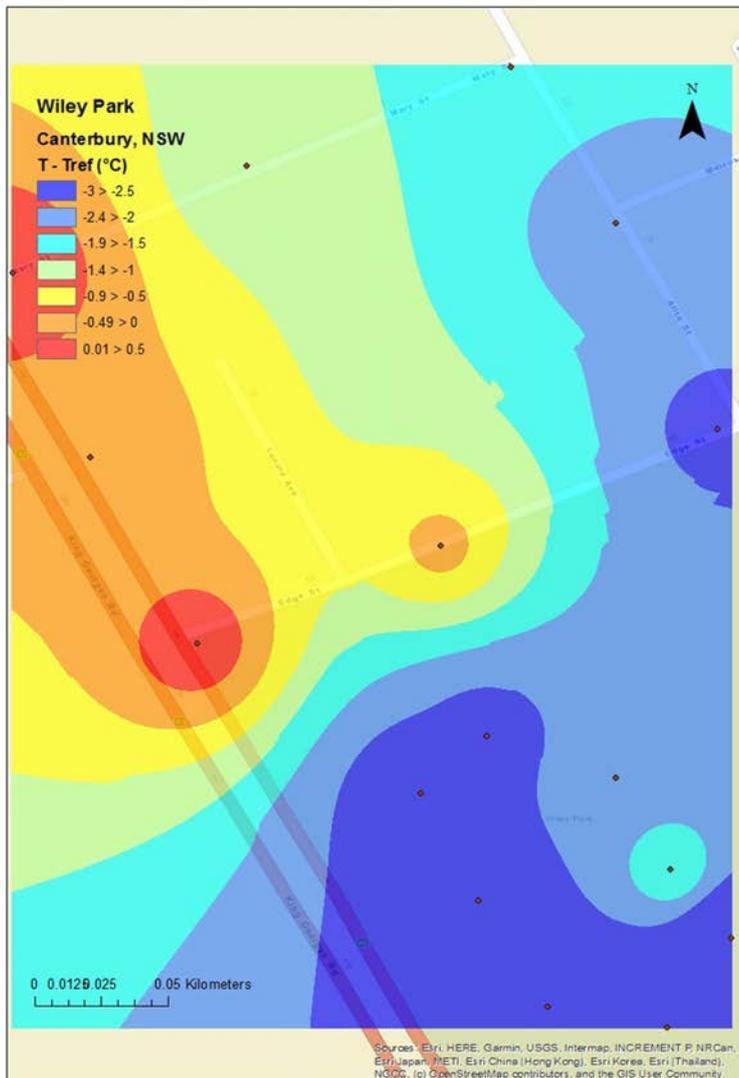


www.citizen-scienceproject.org.au
 Email: cs.microclimate@rmit.edu.au Twitter: @CSProject_AU

Canterbury- Bankstown- Wiley Park | Canterbury Rd, Wiley Park NSW 2195

Reference meteorological (BoM) station: Canterbury Racecourse, Station ID 066194 [air temperature at 3:00pm - 27.9°C]

The map illustrates the local climate in the precinct. The colour scale displays the differences in dry-bulb air temperature between the reference point (start of the measurements) and the other points of data collection. The temperature from the reference BoM station provides the boundary conditions at the time of the measurements



Ryde - Epping High School

27 February 2019
213 Vimiera Road, Eastwood NSW 2122

Local climate map

Date: 27 February 2019, Time: 12:00- 1:00 pm

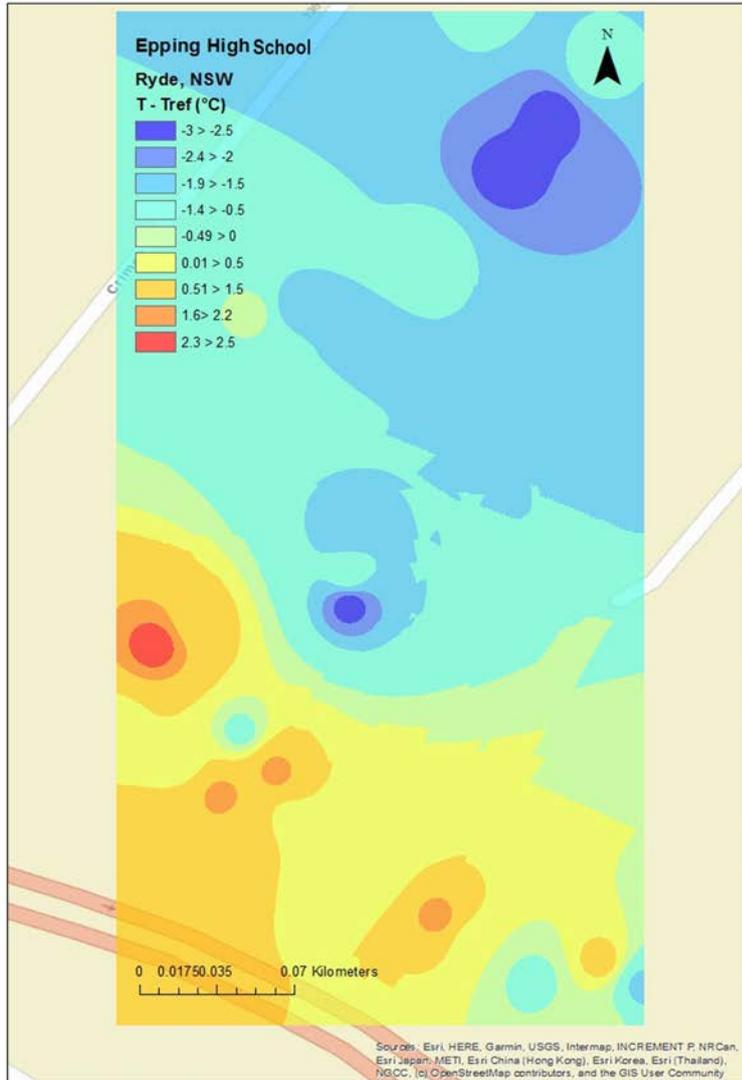


www.citizenscienceproject.org.au
eMail: cs.microclimate@rmit.edu.au; Twitter: @CSProject_AU

Ryde- Epping High School| 213 Vimiera Rd, Eastwood NSW 2122

Reference meteorological (BoM) station: Sydney Olympic Park, Station ID 066212 [air temperature at 12:30pm - 25.7°C]

The map illustrates the local climate in the precinct. The colour scale displays the differences in dry-bulb air temperature between the reference point (start of the measurements) and the other points of data collection. The temperature from the reference BoM station provides the boundary conditions at the time of the measurements.





Northern Territory

Below are the results and some images of citizen scientists performing experiments at NT locations.

Darwin Waterfront

22 February 2021

Kitchener Drive, Darwin City NT 0800

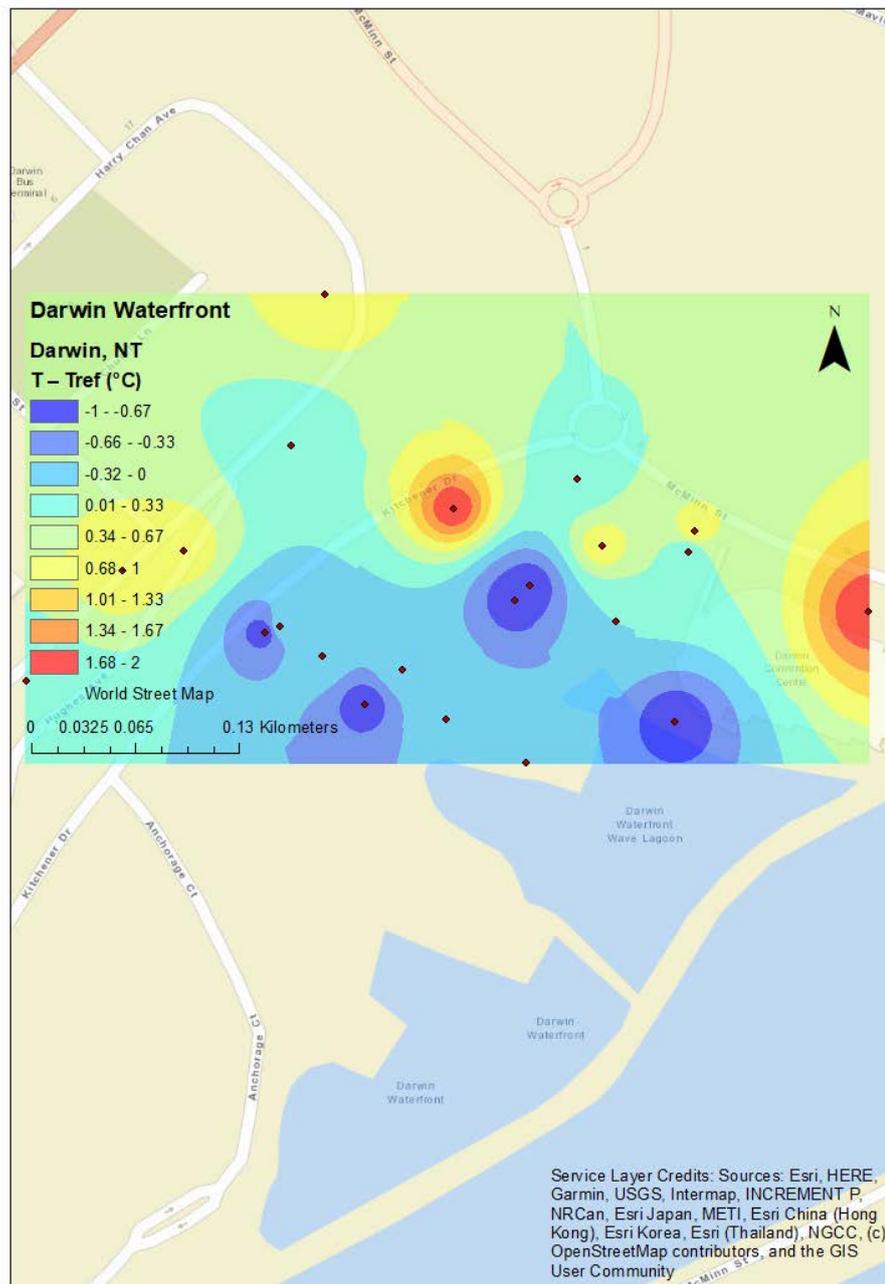




Photo by Harry Down on Unsplash

Darwin Waterfront

23 February 2021

Kitchener Drive, Darwin City NT 0800

Local climate map

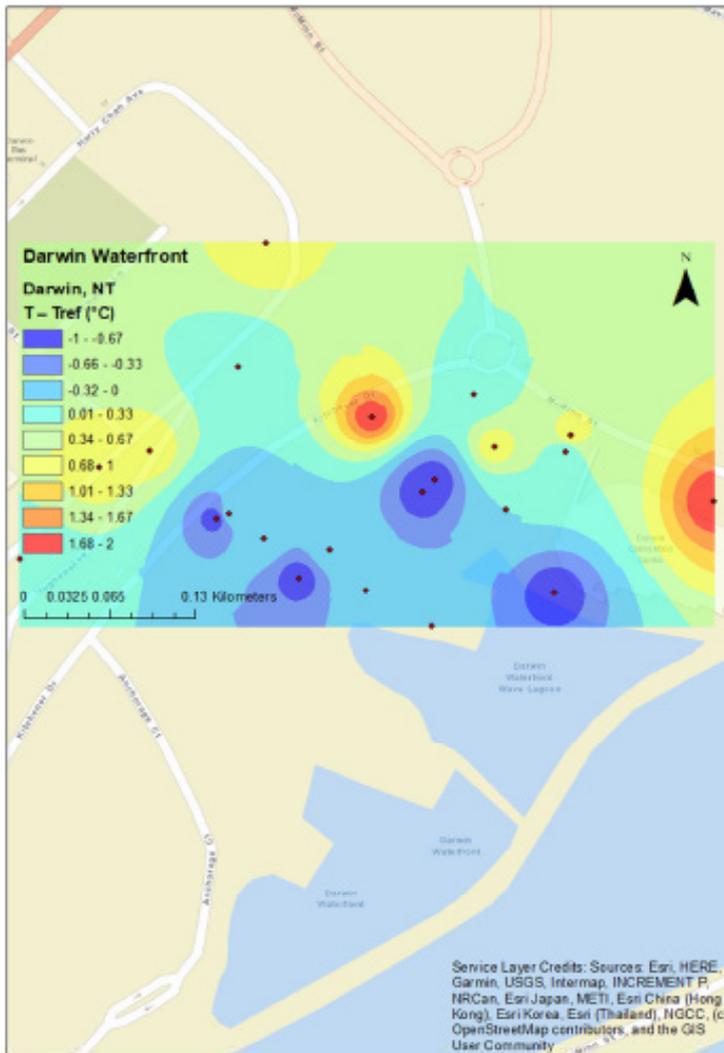
Date: 23/02/2021, Time: 9:20am - 2:50pm



Darwin Waterfront | 19B Kitchener Dr, Darwin City NT 0800

Reference meteorological (BoM) station: Darwin NTC, Station ID 014072 [air temperature at 12:30pm - 30.2°C]

The map illustrates the local climate in the precinct. The colour scale displays the differences in dry-bulb air temperature between the reference point (start of the measurements) and the other points of data collection. The temperature from the reference BoM station provides the boundary conditions at the time of the measurements



Queensland

Below are the results and some images of citizen scientists performing experiments at Queensland locations.

Brisbane Square Library 11 March 2019 Brisbane City QLD 4000

Local climate map
Date: 11 March 2019, Time: 2:00-4:00pm



www.citizen-scienceproject.org.au
Email: cs.microclimate@rmit.edu.au Twitter: @CSProject_AU

Brisbane Square Library | Brisbane City QLD 4000
Reference meteorological (BoM) station: Brisbane, Station ID 040913 [air temperature at 3:00pm - 29.3°C]

The map illustrates the local climate in the precinct. The colour scale displays the differences in dry-bulb air temperature between the reference point (start of the measurements) and the other points of data collection. The temperature from the reference BoM station provides the boundary conditions at the time of the measurements.

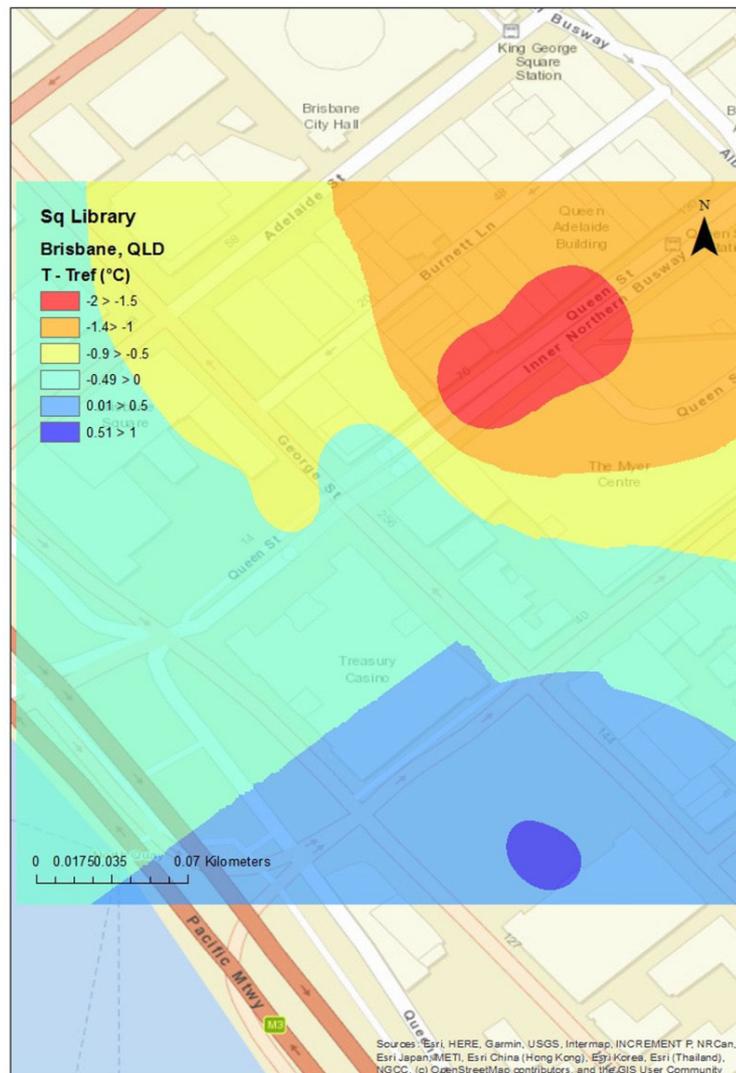




Photo by Alice Duffield on Unsplash

Brisbane - Eight Mile Plains

10 March 2019

Kaosiung Park, Eight Mile Plains QLD 4113

Local climate map

Date: 10 March 2019, Time: 9:00-11:00am

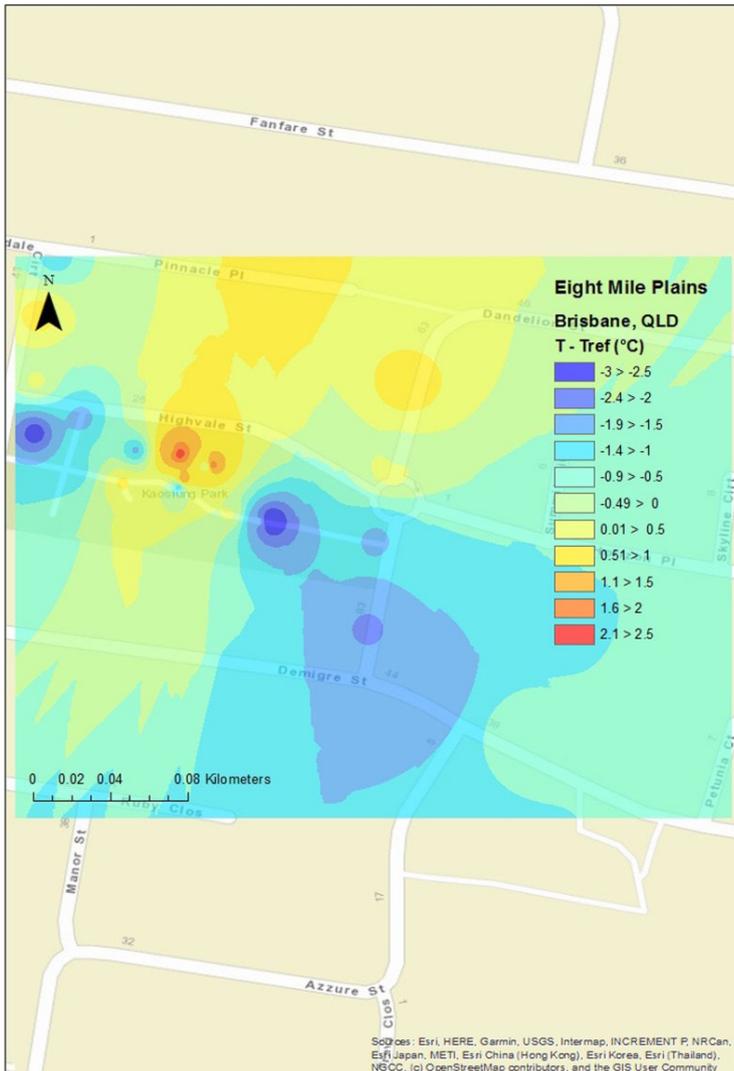


www.citizenscienceproject.org.au
 eMail: cs.microclimate@rmit.edu.au Twitter: @CSPProject_AU

Brisbane- Eight Mile Plains | Kaosiung Park, Eight Mile Plains QLD 4113

Reference meteorological (BoM) station: Brisbane, Station ID 040913 [air temperature at 10:00am - 29.5°C]

The map illustrates the local climate in the precinct. The colour scale displays the differences in dry-bulb air temperature between the reference point (start of the measurements) and the other points of data collection. The temperature from the reference BoM station provides the boundary conditions at the time of the measurements.



South Australia

Below are the results and some images of citizen scientists performing experiments at South Australian locations.

Unley Swimming Centre 16 February 2019 Ethel Street, Forestville, SA 5035

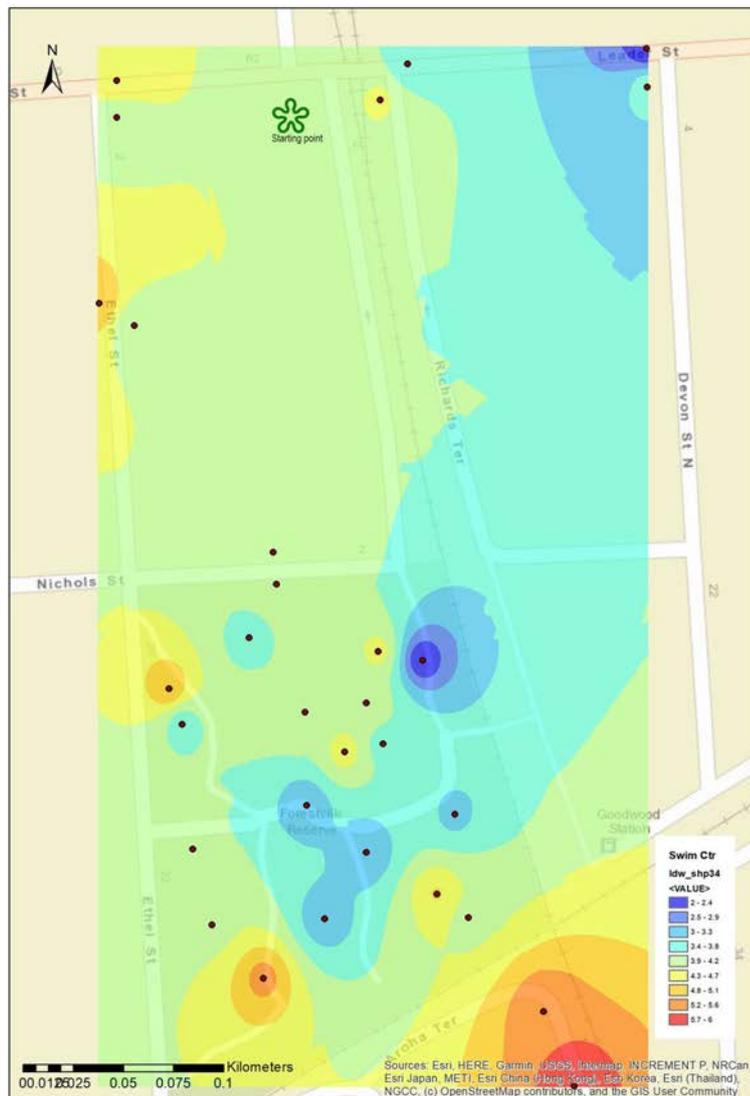
URBAN HEAT ISLAND PROFILE
Date: 16 February 2019, Time: 2:00-4:00pm



www.citizenscienceproject.org.au
Email: cs.sciencemaps@rmit.edu.au Twitter: @CSProject_AU

Unley Swimming Centre | Ethel Street, Forestville SA 5035
Reference meteorological (BoM) station: Adelaide Airport ID 094672 [air temperature at 3:00pm - 26.1°C]

The map illustrates the urban heat island (UHI) profile of the precinct. The colour represents UHI intensity, calculated by subtracting the air temperature of the reference meteorological station from the air temperature measured by the citizens at each location (black dot in the map) on the day and time specified above.





The Joinery
 17 February 2019
 111 Franklin Street, Adelaide SA 5000

URBAN HEAT ISLAND PROFILE
 Date: 17 February 2019, Time: 2:00-4:00pm



www.citizen-scienceproject.org.au
 Email: cs.microclimate@rmit.edu.au Twitter: @CSProject_AU

The Joinery | 111 Franklin Street, Adelaide SA 5000
 Reference meteorological (BoM) station: Adelaide Airport ID 094672 [air temperature at 3:00pm - 31.5°C]

The map illustrates the urban heat island (UHI) profile of the precinct. The colour represents UHI intensity, calculated by subtracting the air temperature of the reference meteorological station from the air temperature measured by the citizens at each location (black dot in the map) on the day and time specified above.



Adelaide City Library

18 February 2019

77 - 91 Rundle Mall, Adelaide SA 5000

URBAN HEAT ISLAND PROFILE

Date: 18 February 2019, Time: 2:00-4:00pm

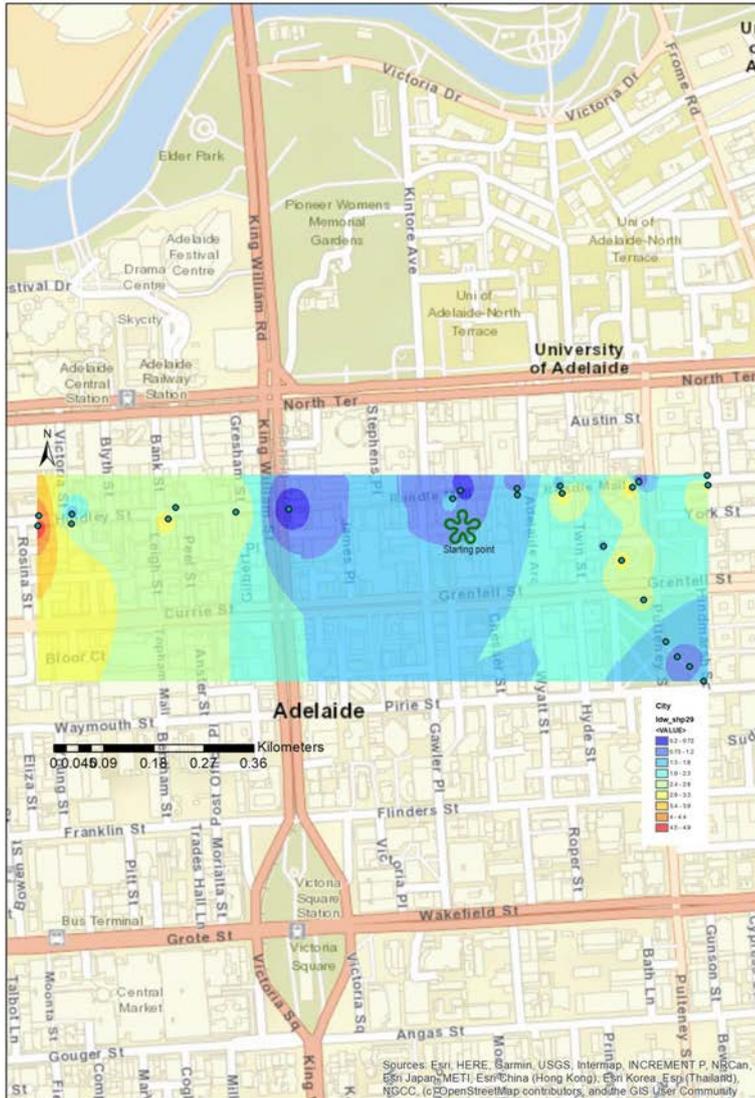


www.citizenscienceproject.org.au
 Email: citizenscience@rmit.edu.au | Twitter: @CSProject_AU

Adelaide City Library | 77-91, Rundle Mall, Adelaide SA 5000

Reference meteorological (BoM) station: Adelaide Airport ID 094672 [air temperature at 3:00pm - 22°C]

The map illustrates the urban heat island (UHI) profile of the precinct. The colour represents UHI intensity, calculated by subtracting the air temperature of the reference meteorological station from the air temperature measured by the citizens at each location (black dot in the map) on the day and time specified above.





Western Australia

Below are the results and some images of citizen scientists performing experiments at Western Australian locations.

Environment House

26 February 2019

125 King William Street, Bayswater WA 6053

URBAN HEAT ISLAND PROFILE
Date: 26 February 2019, Time: 1:00-3:00pm



www.citizen-scienceproject.org.au
email: cs.microclimate@rmit.edu.au Twitter: @CSProject_AU

Environment House | 125 King William Street, Bayswater WA 6053

Reference meteorological (BoM) station: Perth Airport ID 094610 [air temperature at 3:00pm - 33.4°C]

The map illustrates the urban heat island (UHI) profile of the precinct. The colour represents UHI intensity, calculated by subtracting the air temperature of the reference meteorological station from the air temperature measured by the citizens at each location (black dot in the map) on the day and time specified above.

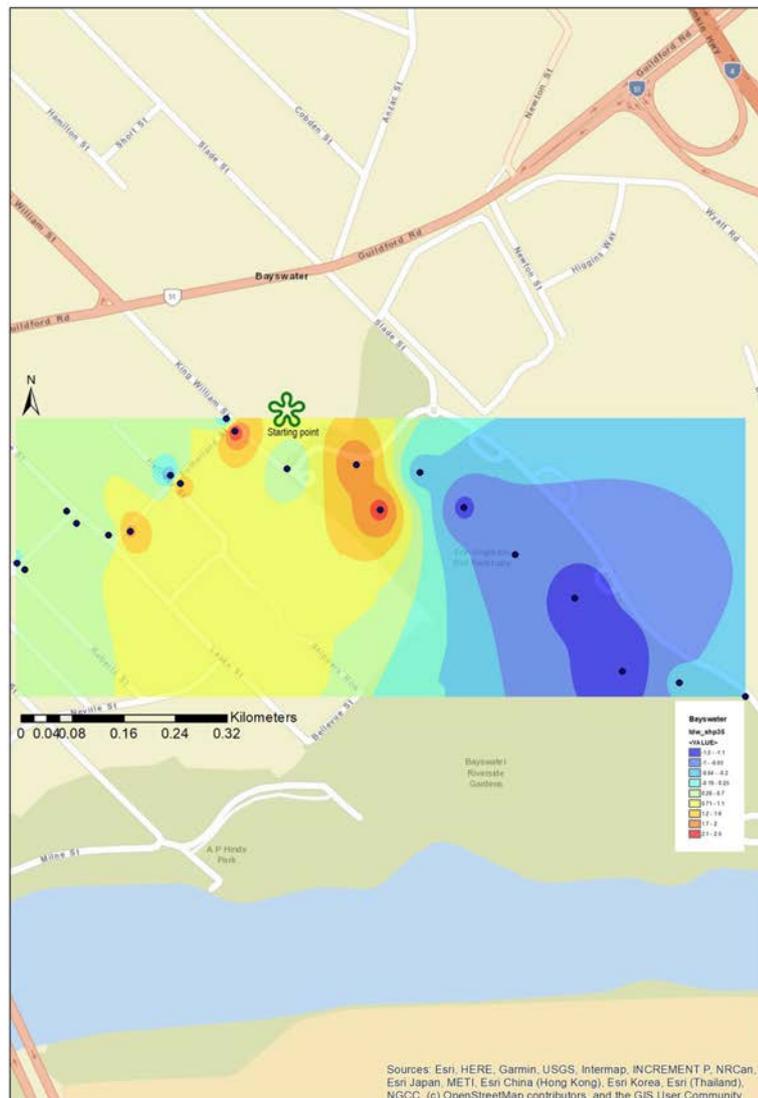




Photo by Nathan Hurst on Unsplash

Council Civic Centre

27 February 2019
Broun Avenue, Morley WA 6062

URBAN HEAT ISLAND PROFILE

Date: 27 February 2019, Time: 1:00 - 3:00pm

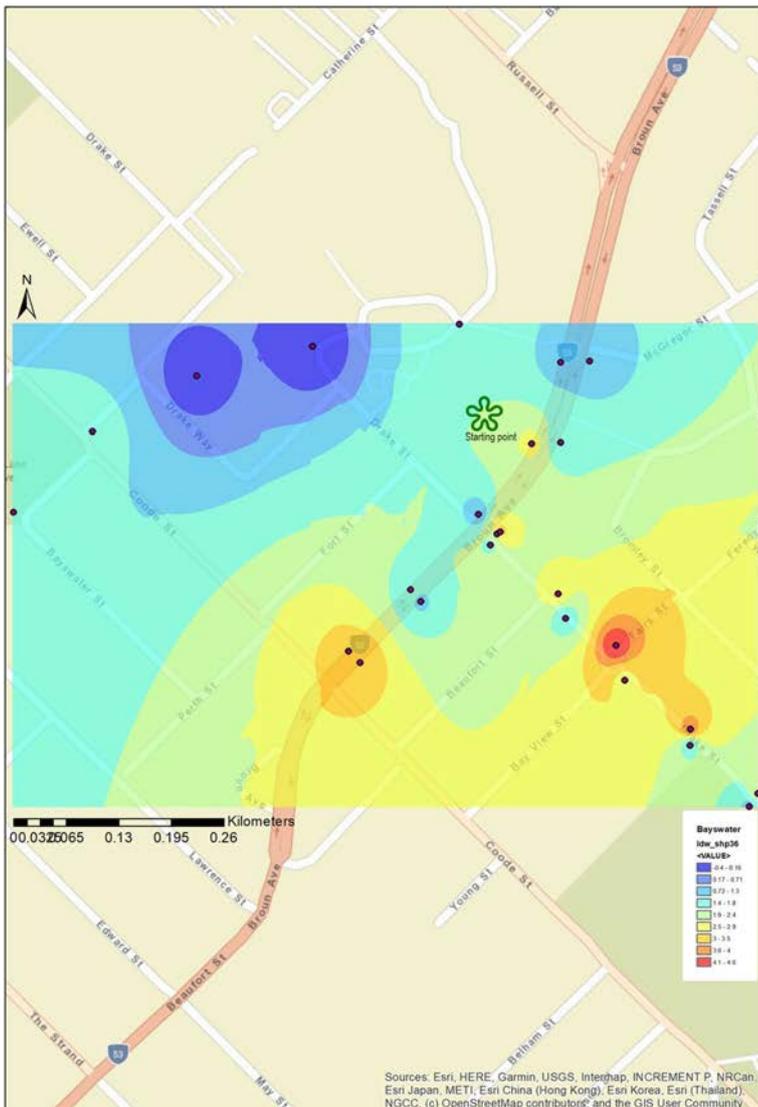


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Council Civic Centre| Broun Avenue, Morley WA 6062

Reference meteorological (BoM) station: Perth Airport ID 094610 [air temperature at 3:00pm - 32°C]

The map illustrates the urban heat island (UHI) profile of the precinct. The colour represents UHI intensity, calculated by subtracting the air temperature of the reference meteorological station from the air temperature measured by the citizens at each location (black dot in the map) on the day and time specified above.



Victoria

Below are the results and some images of citizen scientists performing experiments at Victorian locations.

Melbourne - Melbourne Cricket Ground (Gate 2)

21 January 2019

Brunton Avenue, Richmond VIC 3002

URBAN HEAT ISLAND PROFILE
Date: 21 January 2019, Time: 1:00 - 3:00pm



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MCG - Outside Gate 2] Brunton Avenue, Richmond VIC 3002

Reference meteorological (BoM) station: Olympic park ID 095936 [air temperature at 3:00pm - 24.8°C]

The map illustrates the urban heat island (UHI) profile of the precinct. The colour represents UHI intensity, calculated by subtracting the air temperature of the reference meteorological station from the air temperature measured by the citizens at each location (black dot in the map) on the day and time specified above.

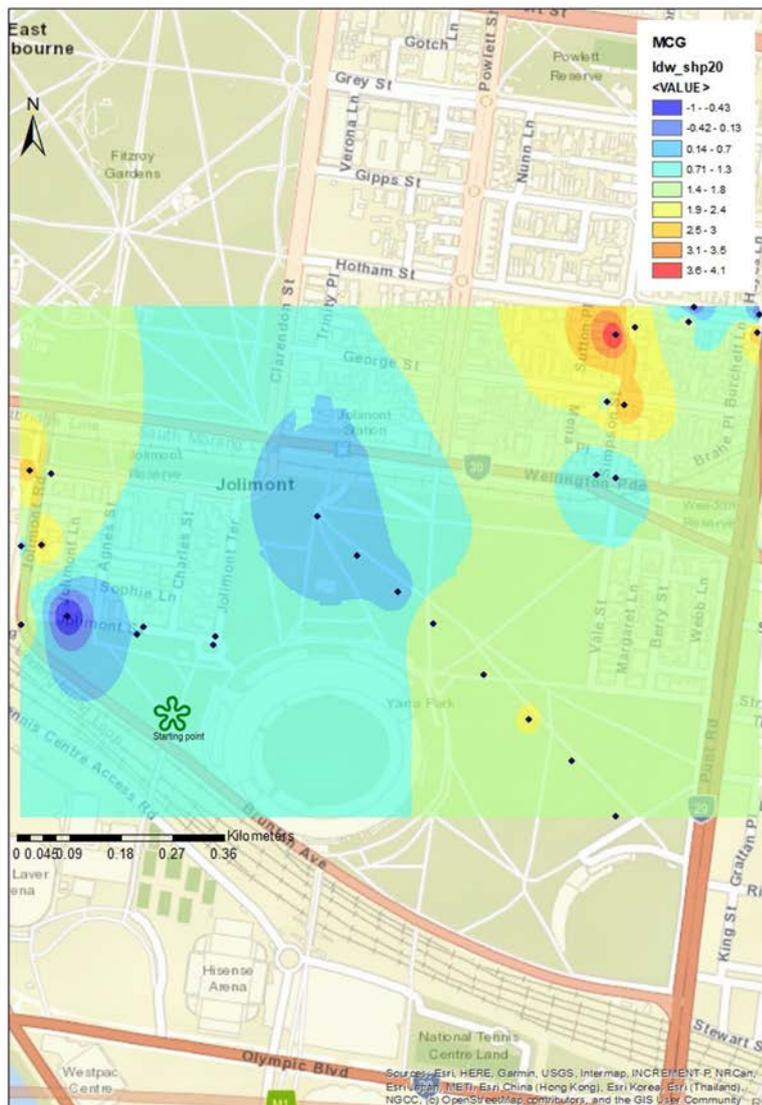




Photo by Linda Xu on Unsplash

Moreland - Trinity Regional College

4 February 2019

33 Saxon Street, Brunswick VIC 3056

URBAN HEAT ISLAND PROFILE

Date: 4 February 2019, Time: 1:00-3:00pm

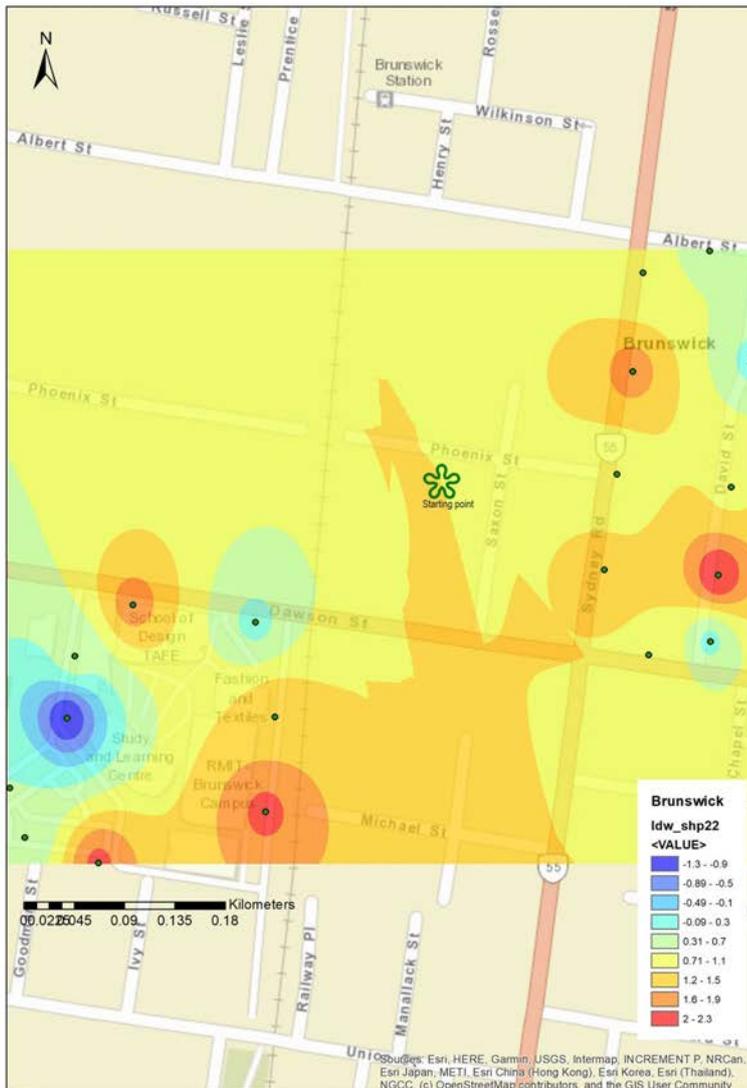


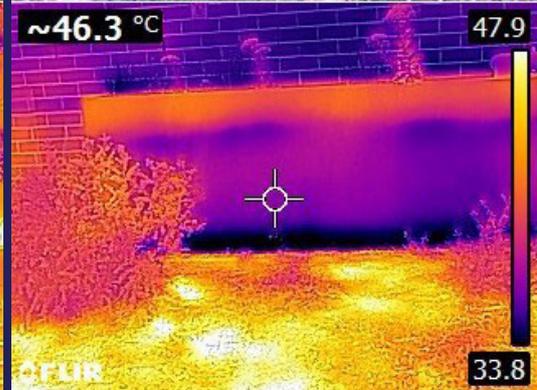
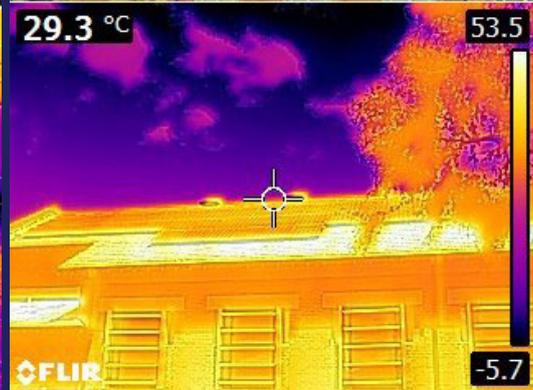
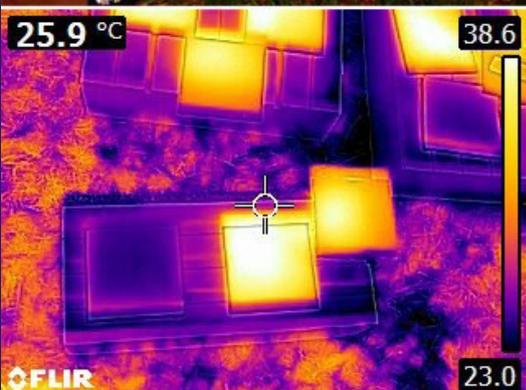
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Trinity Regional College | 33 Saxon Street, Brunswick VIC 3056

Reference meteorological (BoM) station: Essendon Airport ID 095866 [air temperature at 2:00pm - 22°C]

The map illustrates the urban heat island (UHI) profile of the precinct. The colour represents UHI intensity, calculated by subtracting the air temperature of the reference meteorological station from the air temperature measured by the citizens at each location (black dot in the map) on the day and time specified above.





Port Phillip - Community Centre

23 February 2019

1 Ferrars Place, South Melbourne VIC 3205

URBAN HEAT ISLAND PROFILE

Date: 23 February 2019, Time: 1:00-3:00pm

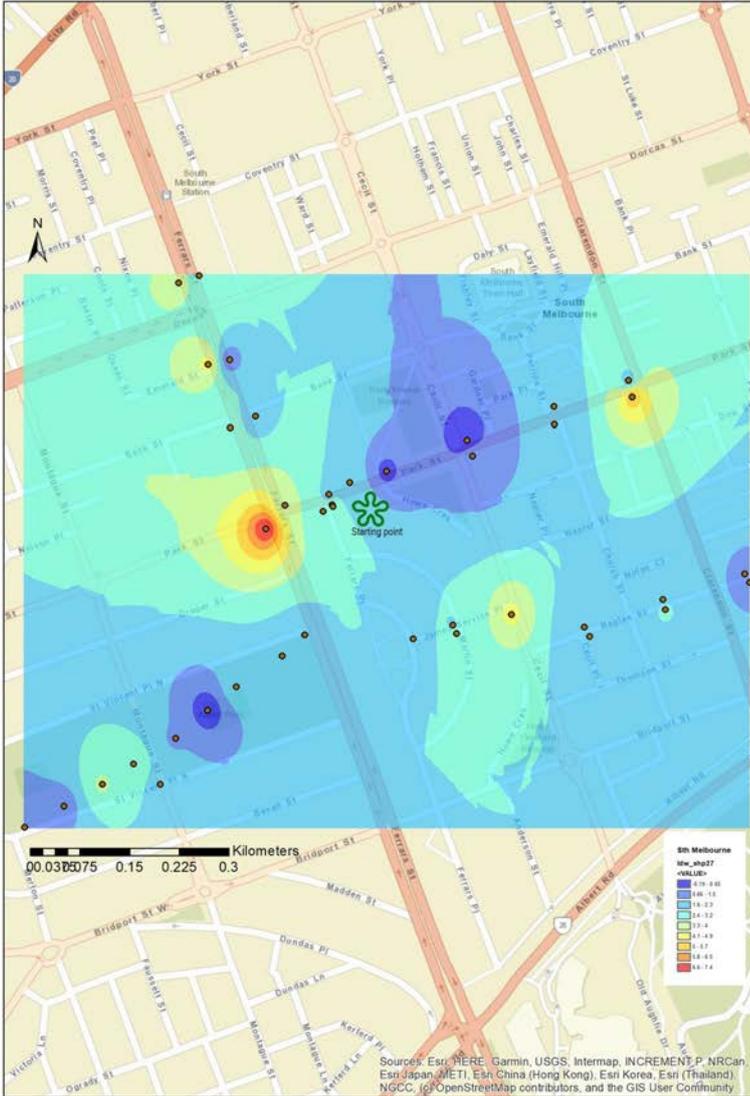


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Community Centre | 1, Ferrars Place, South Melbourne VIC 3205

Reference meteorological (BoM) station: Olympic Park ID 095936 [air temperature at 2:00pm - 20.5°C]

The map illustrates the urban heat island (UHI) profile of the precinct. The colour represents UHI intensity, calculated by subtracting the air temperature of the reference meteorological station from the air temperature measured by the citizens at each location (black dot in the map) on the day and time specified above.



Port Phillip - Neighbourhood Centre

24 February 2019

Liardet Street, Port Melbourne VIC 3183

URBAN HEAT ISLAND PROFILE

Date: 24 February 2019, Time: 1:00-3:00pm

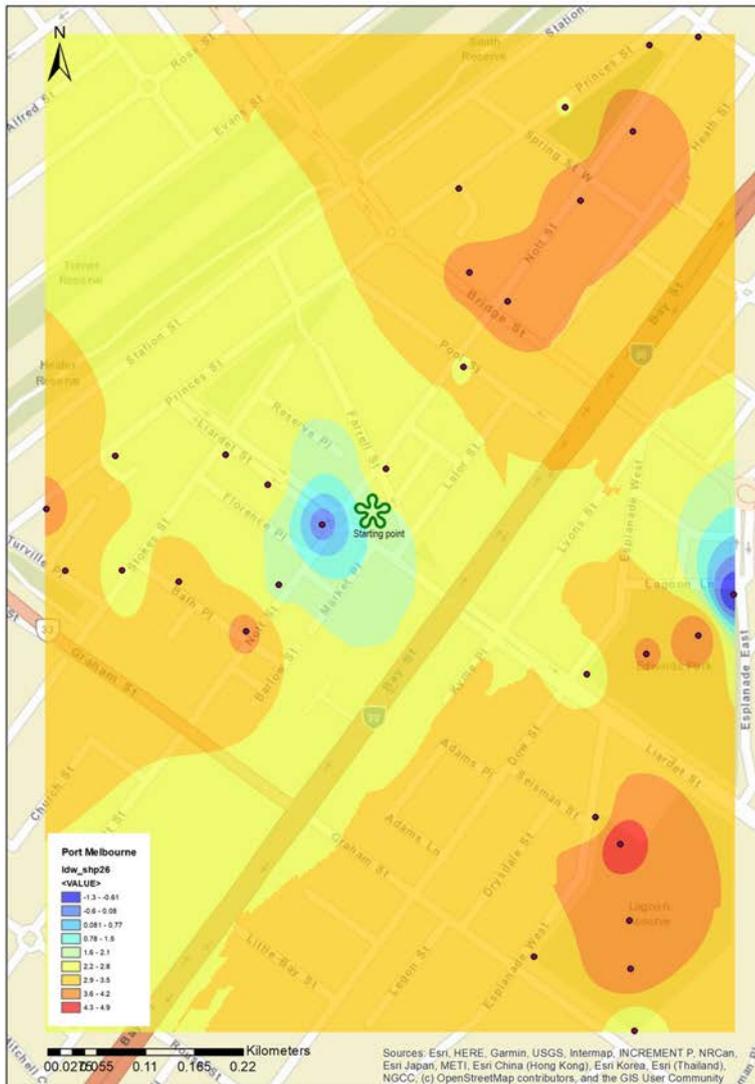


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Neighbourhood Centre, | Liardet Street, Port Melbourne VIC 3183

Reference meteorological (BoM) station: Olympic Park ID 095936 [air temperature at 2:30pm - 31.1°C]

The map illustrates the urban heat island (UHI) profile of the precinct. The colour represents UHI intensity, calculated by subtracting the air temperature of the reference meteorological station from the air temperature measured by the citizens at each location (black dot in the map) on the day and time specified above.





Yarra - Mark Street Hall

30 January 2019

1 Mark Street, Fitzroy North VIC 3068

URBAN HEAT ISLAND PROFILE

Date: 30 January 2019, Time: 1:00 - 3:00pm

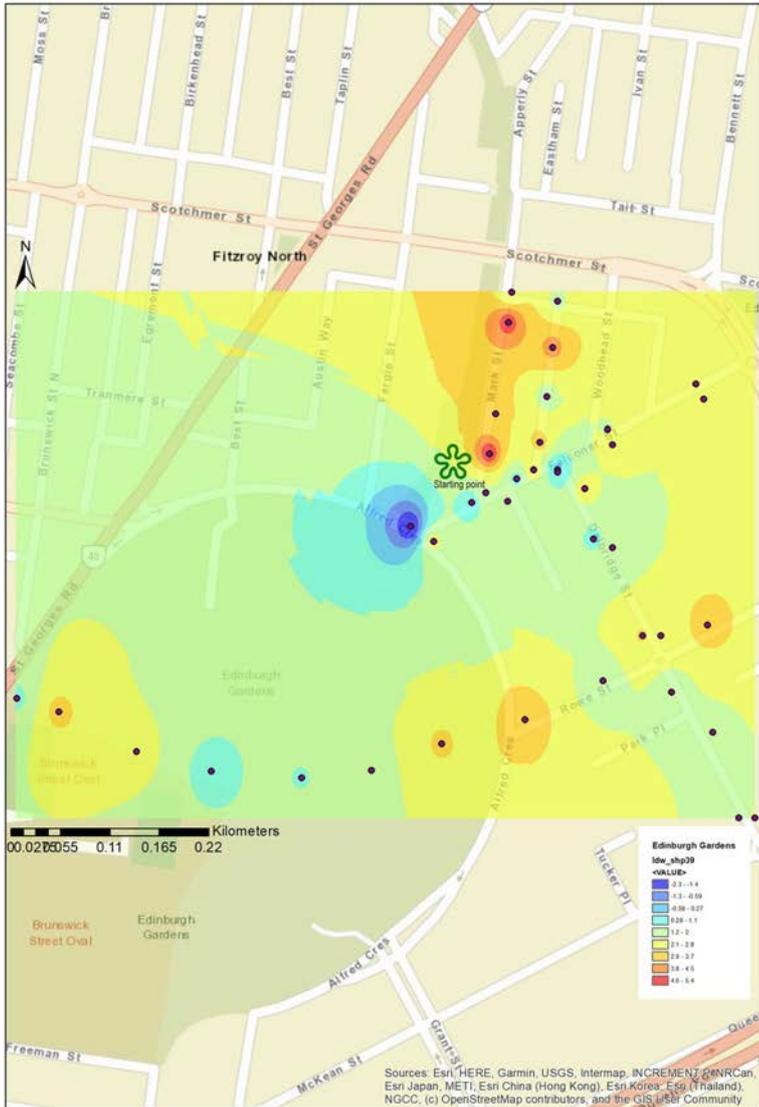


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Mark Street Hall | 1, Mark Street, Fitzroy North, VIC 3068

Reference meteorological (BoM) station: Olympic Park ID 095936 [air temperature at 2:00pm - 37°C]

The map illustrates the urban heat island (UHI) profile of the precinct. The colour represents UHI intensity, calculated by subtracting the air temperature of the reference meteorological station from the air temperature measured by the citizens at each location (black dot in the map) on the day and time specified above.



Yarra - Fitzroy Learning Network Inc.

31 January 2019

198 Napier Street, Fitzroy VIC 3065

URBAN HEAT ISLAND PROFILE

Date: 31 January 2019, Time: 1:00 - 3:00pm

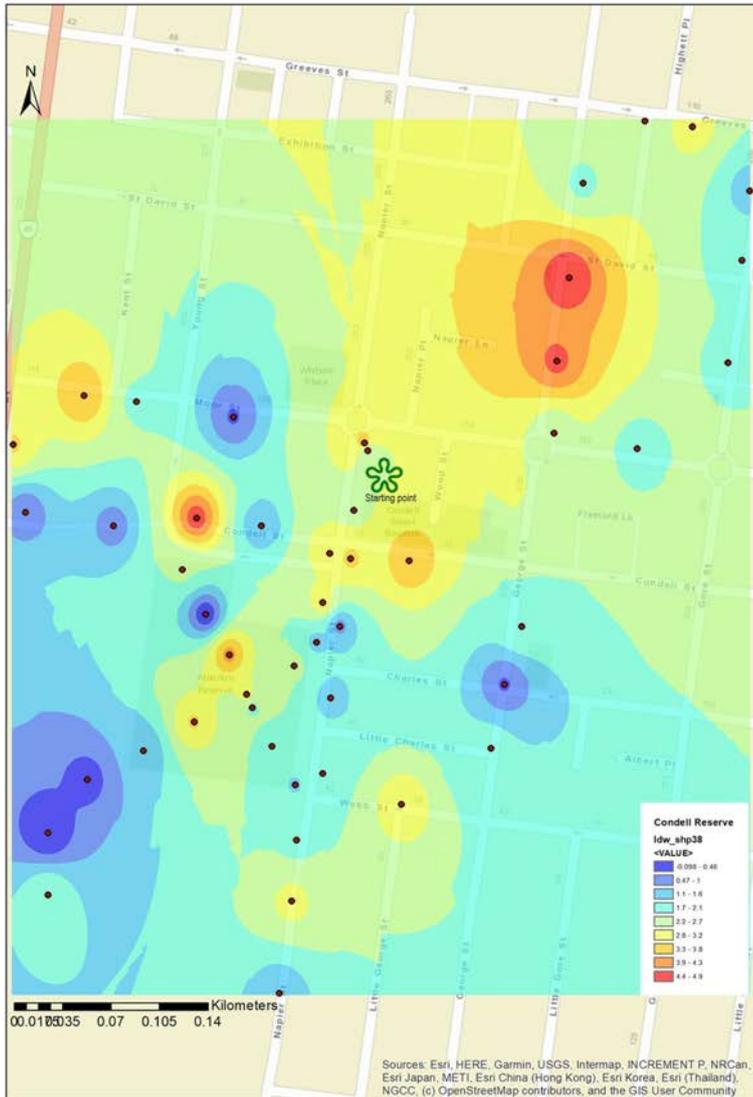


www.citizenscienceproject.org.au
Email: cs@microclimate@rmit.edu.au Twitter: @CSProject_AU

Fitzroy Learning Network Inc. | 198, Napier Street, Fitzroy VIC 3065

Reference meteorological (BoM) station: Olympic Park ID 095936 [air temperature at 2:00pm - 20.1°C]

The map illustrates the urban heat island (UHI) profile of the precinct. The colour represents UHI intensity, calculated by subtracting the air temperature of the reference meteorological station from the air temperature measured by the citizens at each location (black dot in the map) on the day and time specified above.



Yarra - Burnley Backyard

1 February 2019

49 Tudor Street, Richmond VIC 3121

URBAN HEAT ISLAND PROFILE

Date: 1 February 2019, Time: 1:00-3:00pm

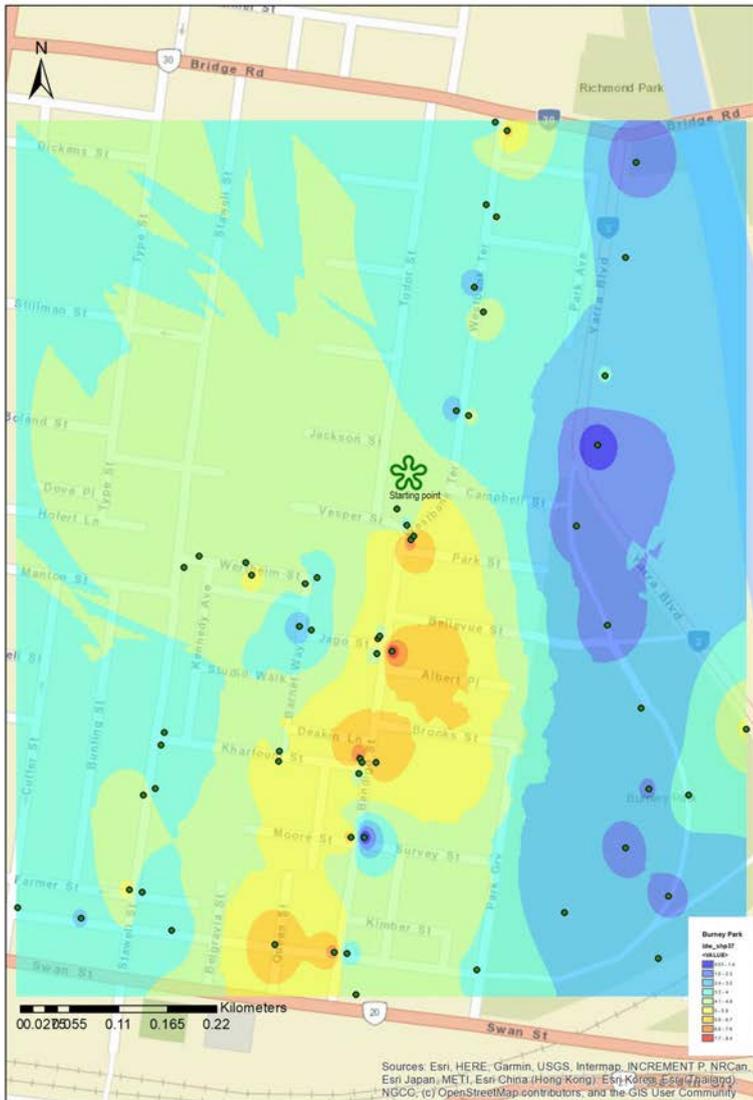


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Burnley Backyard | 49 Tudor Street, Richmond VIC 3121

Reference meteorological (BoM) station: Olympic Park ID 095936 [air temperature at 2:00pm - 22.2°C]

The map illustrates the urban heat island (UHI) profile of the precinct. The colour represents UHI intensity, calculated by subtracting the air temperature of the reference meteorological station from the air temperature measured by the citizens at each location (black dot in the map) on the day and time specified above.



Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Japan), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



Conclusion and the Way Forward

Citizen science has the potential to provide extensive and useful data required to understand, mitigate and adapt to extreme heat, and create a more scientifically literate society who can make informed choices. This approach will help to transfer knowledge about the climate mitigation technologies to the participating citizens and promote their active participation in the implementation of mitigation techniques in their homes and neighbourhood. In addition, local governments can identify areas having adverse effects due to lack of vegetation and inappropriate surface materials and can allocate resources for mitigation actions.

A key challenge is the collection of usable microclimate data by citizens who are laypersons. In addition to making the measurements engaging for the citizens to form an appreciation of the data, ensuring scientific rigour, accuracy and validity of the data collected is also important.

This can be addressed by designing the activities carefully and employing strategies for improving the data quality such as developing a standardised protocol and instrumentation to ensure consistency in the measurement across the sites in various states.

citizenscienceproject.org.au



Citizen Science

Urban Microclimate Project



Sustainable Building
Innovation Laboratory



Built Environment
High Performance Architecture