Developing a Climate Risk and Vulnerability Assessment for Birmingham

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18th October 2023

WM-AIR
CLEAN AIR SCIENCE FOR
THE WEST MIDLANDS

Presentation overview

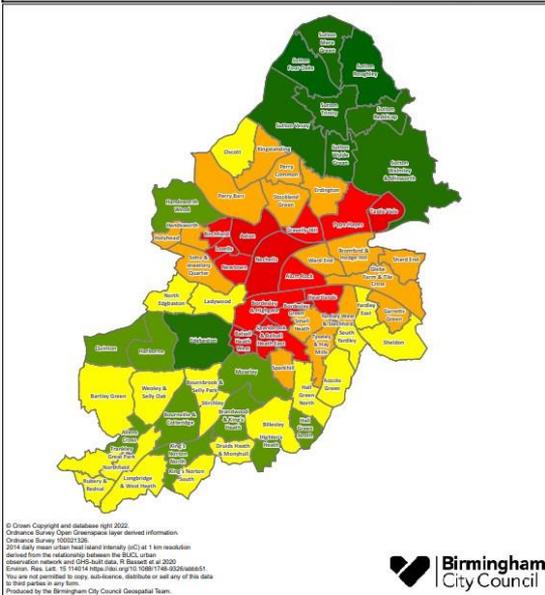# **C**limate **R**isk and **V**ulnerability **A**ssessment

1. Background: Bringing together research and work programmes

2. CRVA aims and objectives

3. Approach: Creating and building a CRVA map for Birmingham

4. Application: What are BCC using it for?

5. Next steps: Regional upscaling, further application and outputs

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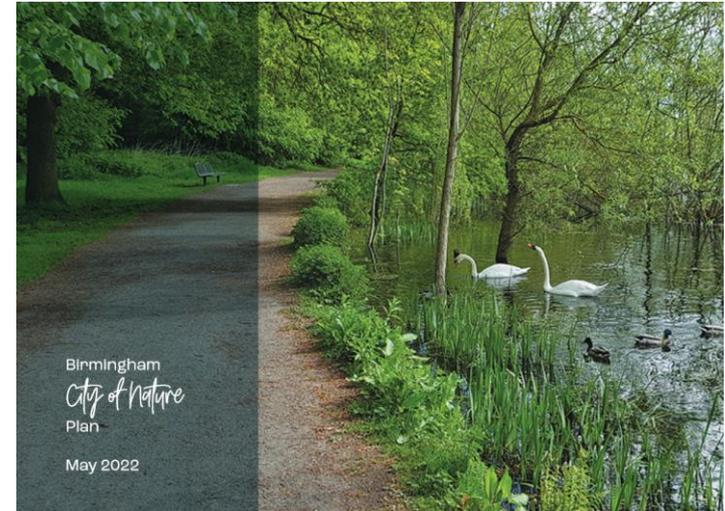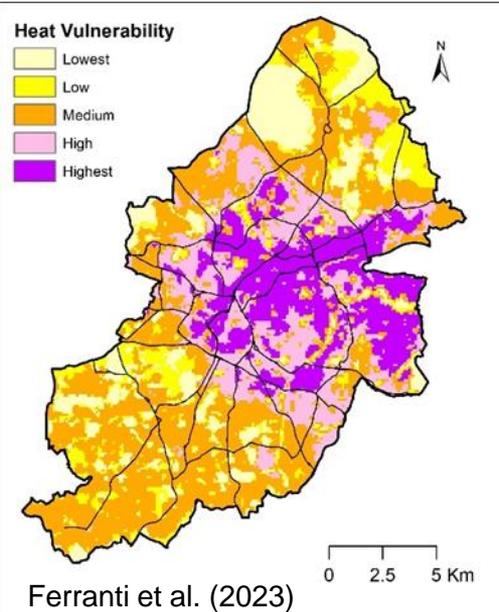# Bringing together research and work programmes

Combined Index by Ward - Mean Value

sustainability — MDPI

Article

Incorporating Heat Vulnerability into Local Authority Decision Making: An Open Access Approach

Emma Ferranti [1,*], Samuel Cook [1], Sarah Victoria Greenham [2,*], Nick Grayson [3], Julie Futcher [4] and Kat Salter [2]

Heat Vulnerability

- Lowest
- Low
- Medium
- High
- Highest

Ferranti et al. (2023)

Birmingham
City of Nature
Plan
May 2022

BUCCANEER

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CRVA aim and objectives

Aim: To develop a prototype toolkit that enables practitioners to evaluate the effects of climate change on new or existing developments

Objectives:

Submitting as part of the CDP on transparency and bold climate action

Co-develop with BCC to meet council needs e.g., design codes, policies and strategies

Using public data; taking an open-access approach for anyone to replicate
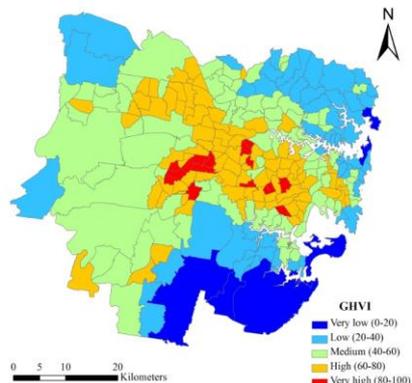
Disseminating methodology and results with a transparent and open approach

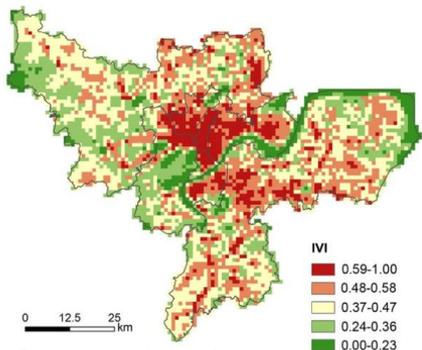Uptake continuity in the council via handover of updating CRVA map to BCC

Air Quality will form a central part of the city climate risk assessment process, to serve as a national exemplar

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CRVA approach

CRVA examples

(Anticlockwise from top-left)
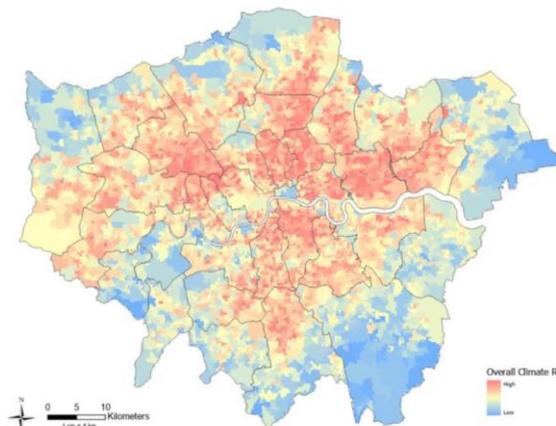
Sydney (Australia)

Hangzhou (China)

Austria

London (UK)

Iran
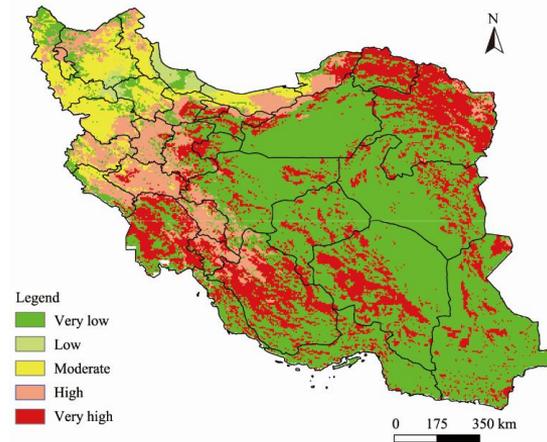
Heydari Alamdarloo et al. (2020)

Zhang et al. (2018)

Sun et al. (2022)

Leis & Kienberger (2022)

Bloomberg & GLA (2022)

CRVA approach

Choosing the fillings, making the burger 🍔
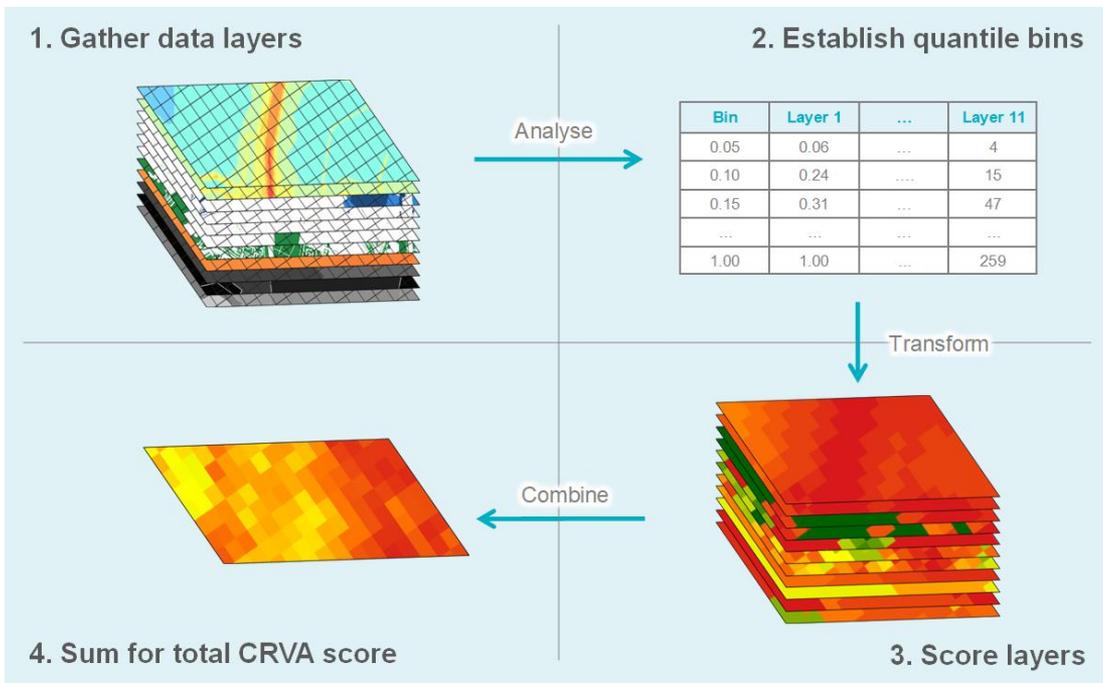
1. Gather data layers

Analyse →

2. Establish quantile bins

Bin	Layer 1	...	Layer 11
0.05	0.06	...	4
0.10	0.24	....	15
0.15	0.31	...	47
...	...	...	...
1.00	1.00	...	259

Transform ↓

Combine ←

3. Score layers

4. Sum for total CRVA score

MAPPING CLIMATE RISK AND VULNERABILITY WITH PUBLICLY AVAILABLE DATA

Several factors affect climate risk. What these are and the extent of their influence varies from place to place. Therefore, climate action is needed on all fronts: "everything, everywhere, all at once."[1]
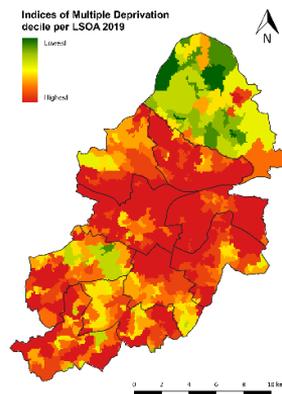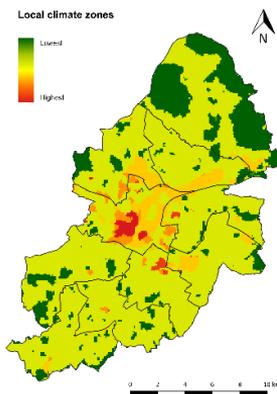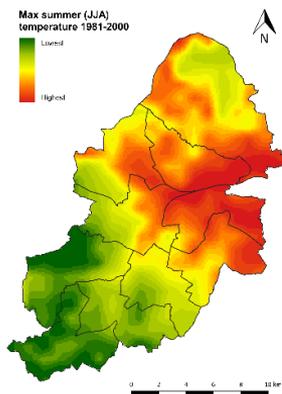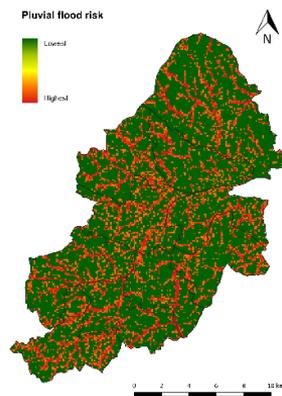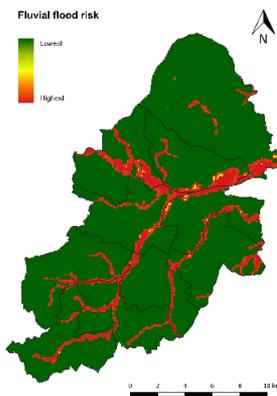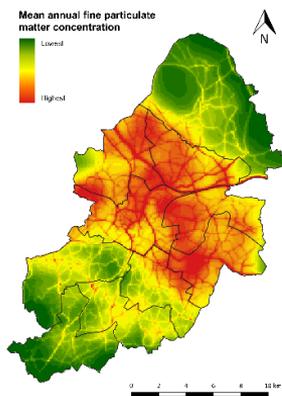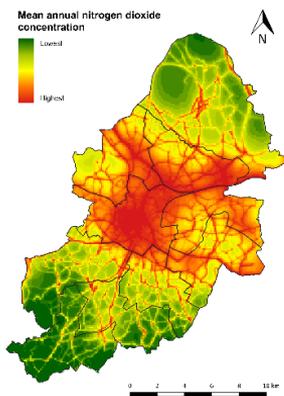
A guidance document from the WM-Air project

Version 1.1 October 2023

Scan me for burger recipe 🍔
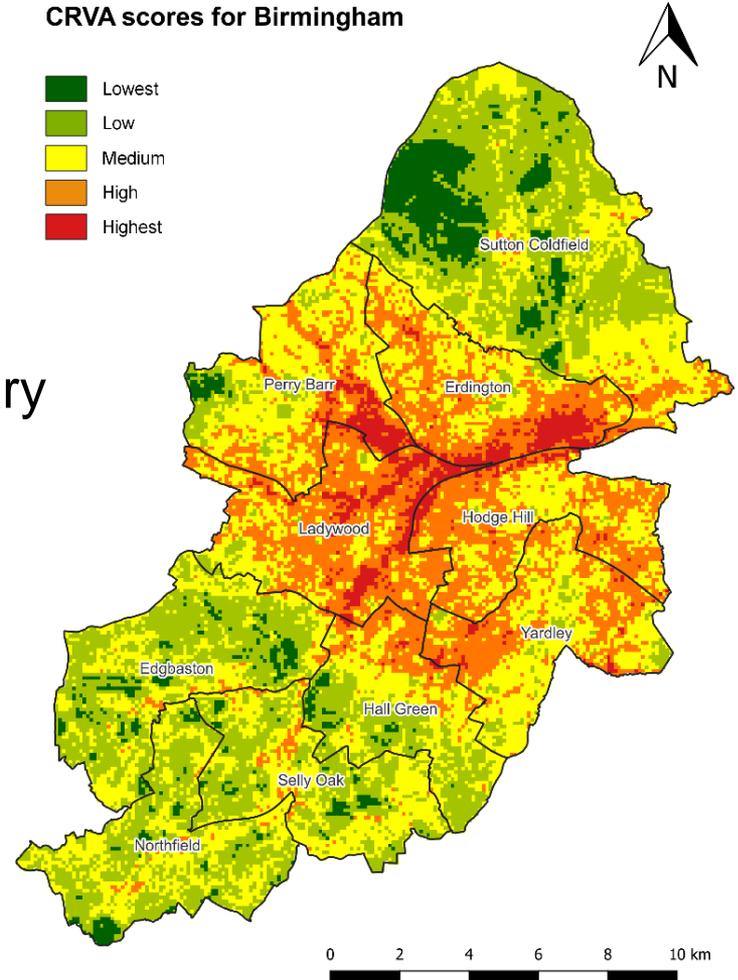
CRVA approach
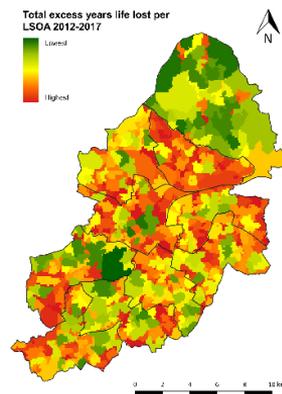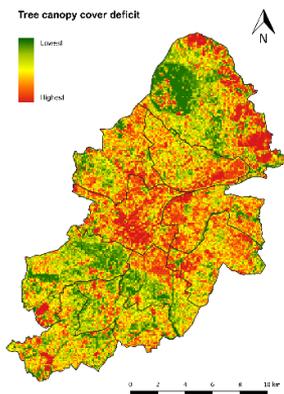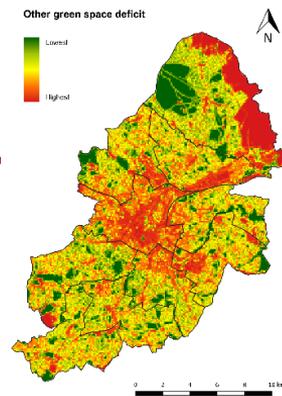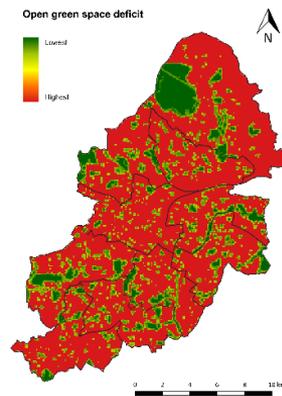
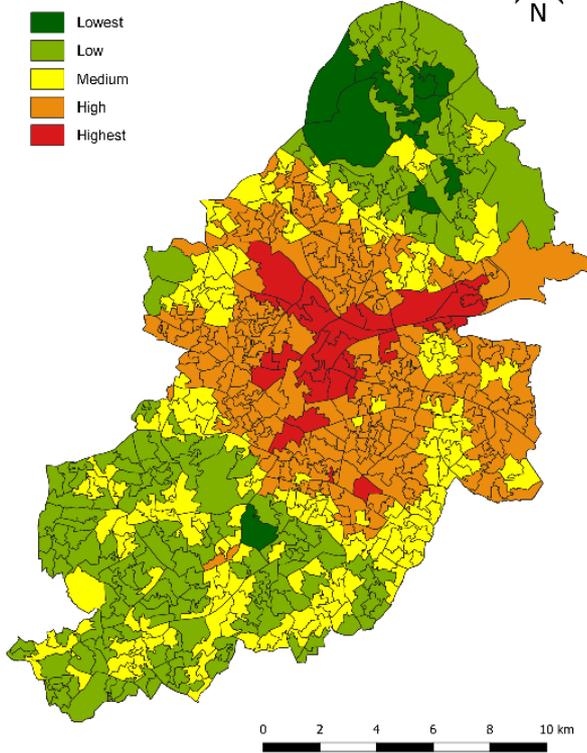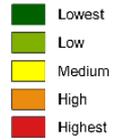# CRVA map

Notes:

100m resolution

Relative scores within Birmingham boundary

Sum of layers are weighted equally

CRVA scores for Birmingham
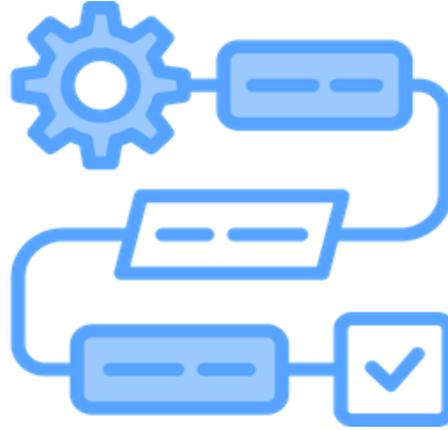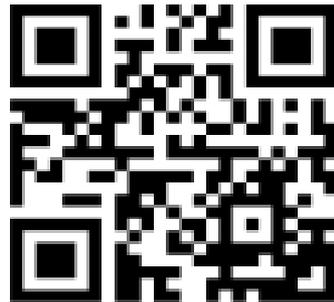
Lowest
Low
Medium
High
Highest
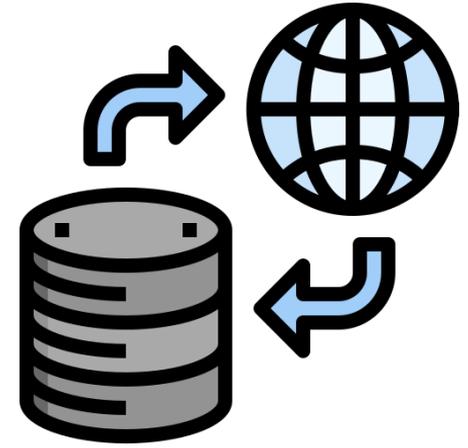
CRVA map
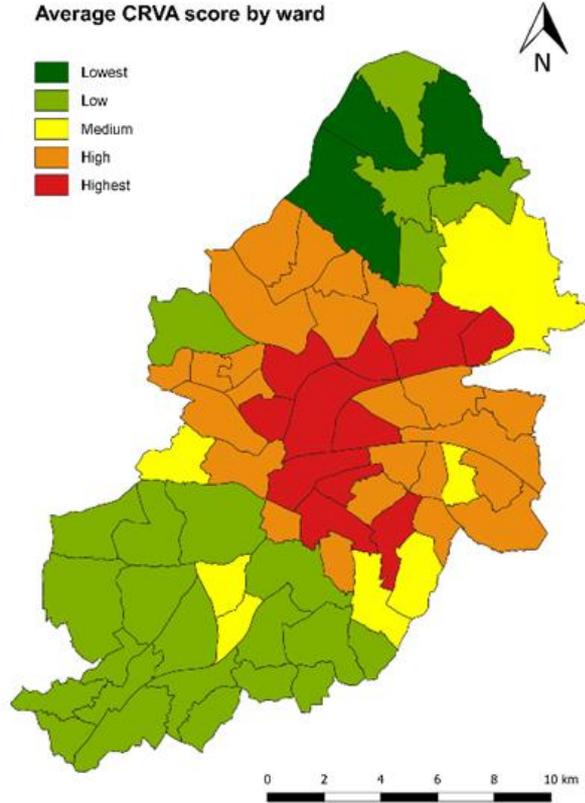
Birmingham City Council: What Did We Do ?

Collaborated in the creation of the CRVA methodology

Development of automated workflow

Scan to view the map!

Created 2 data products (Ward & LSOA) Hosting the map

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The map

We can do this today

Using 670k virtual points – generating 7.5-minute walking service areas
Merged service areas to give overall city-wide access

Doctors

Railway Stations

Pubs
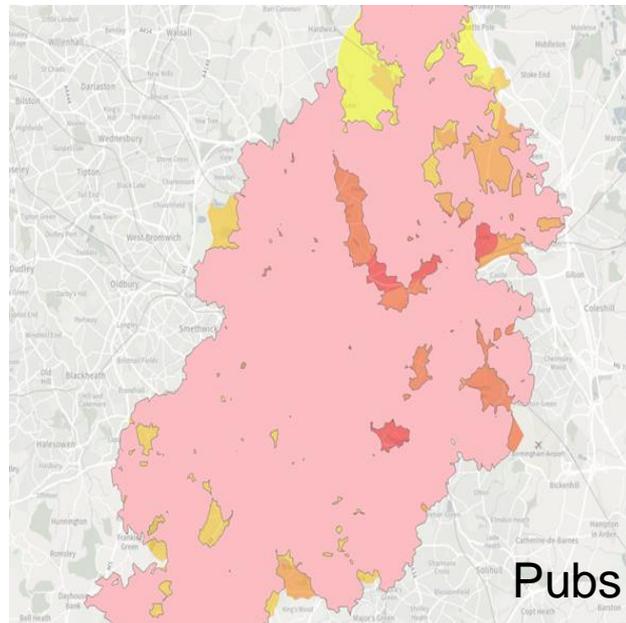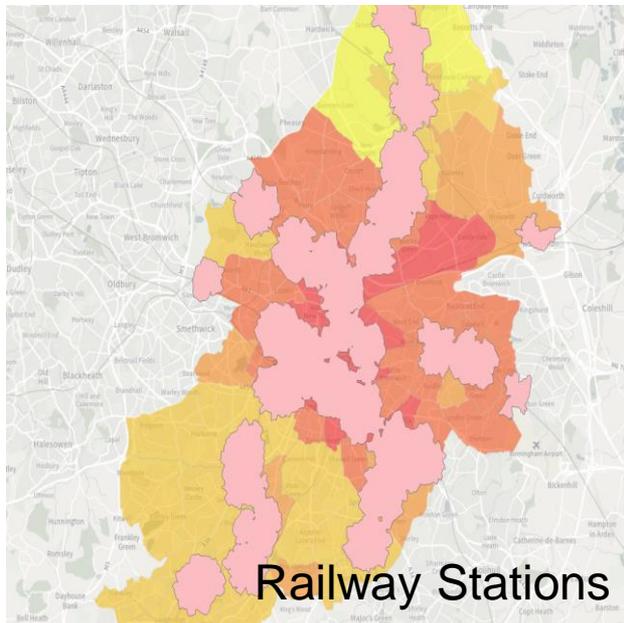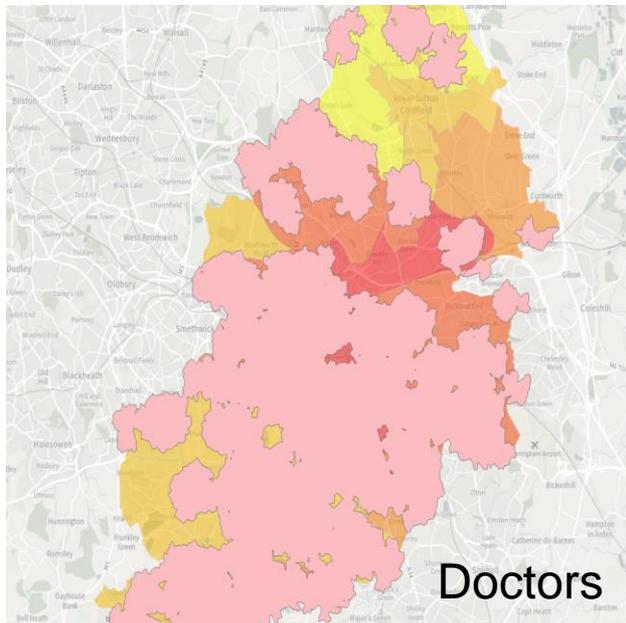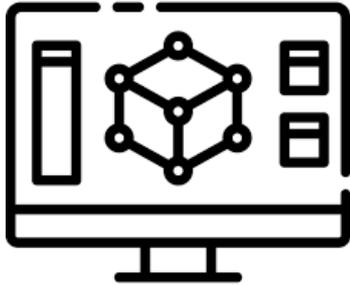
What's next for BCC

Re-run analysis…
(5-yearly)
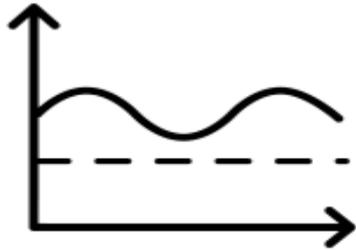
… to measure and show change

Public-facing tool for Citizens to test "what-ifs?"

API for developers to submit and verify plans

Scenario tool for BCC planners

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What's next for the CRVA?

Regional upscaling (WM-CRVA)

West Midlands Combined Authority: spatial dimensions of climate vulnerability, citizen engagement, addressing transport infrastructure risks (NERC funding; 8 months)

Further application

Climate-Resilient Development Pathways in Metropolitan Regions of Europe (CARMINE): Birmingham as one of eight European case study areas (EU funding; 4 years)

Upcoming outputs

Peer-review research article on CRVA in Birmingham (in draft)

CRVA use in BCC Liveable Neighbourhoods pilot

BCC development of CRVA tools

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Further information: WM-Air UDGI/BCC team

GIS, data and methodology

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Air quality, atmospheric science and applications

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Implications for green infrastructure and policy

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UK RI Natural Environment Research Council

UK RI Engineering and Physical Sciences Research Council

Birmingham City Council

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