

UNIVERSITY OF
BIRMINGHAM



Air Quality Observations

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WM-AIR
CLEAN AIR SCIENCE FOR
THE WEST MIDLANDS



Air Quality Observations

- Aim is to increase the observational capability of air pollution across the West Midlands
- Using a variety of techniques to complement existing capacity:
 - Low Cost Sensors (UoB)
 - Procured 'off the shelf' sensors
 - High time resolution PM2.5 composition / size distribution observation
 - Daily PM2.5 composition for source apportionment
 - Machine learning to evaluate CAZ impact

Sensors

Earthsense Zephyr



Altasense PM



Sensor Locations to date

Birmingham Sensor Locations

CAZ

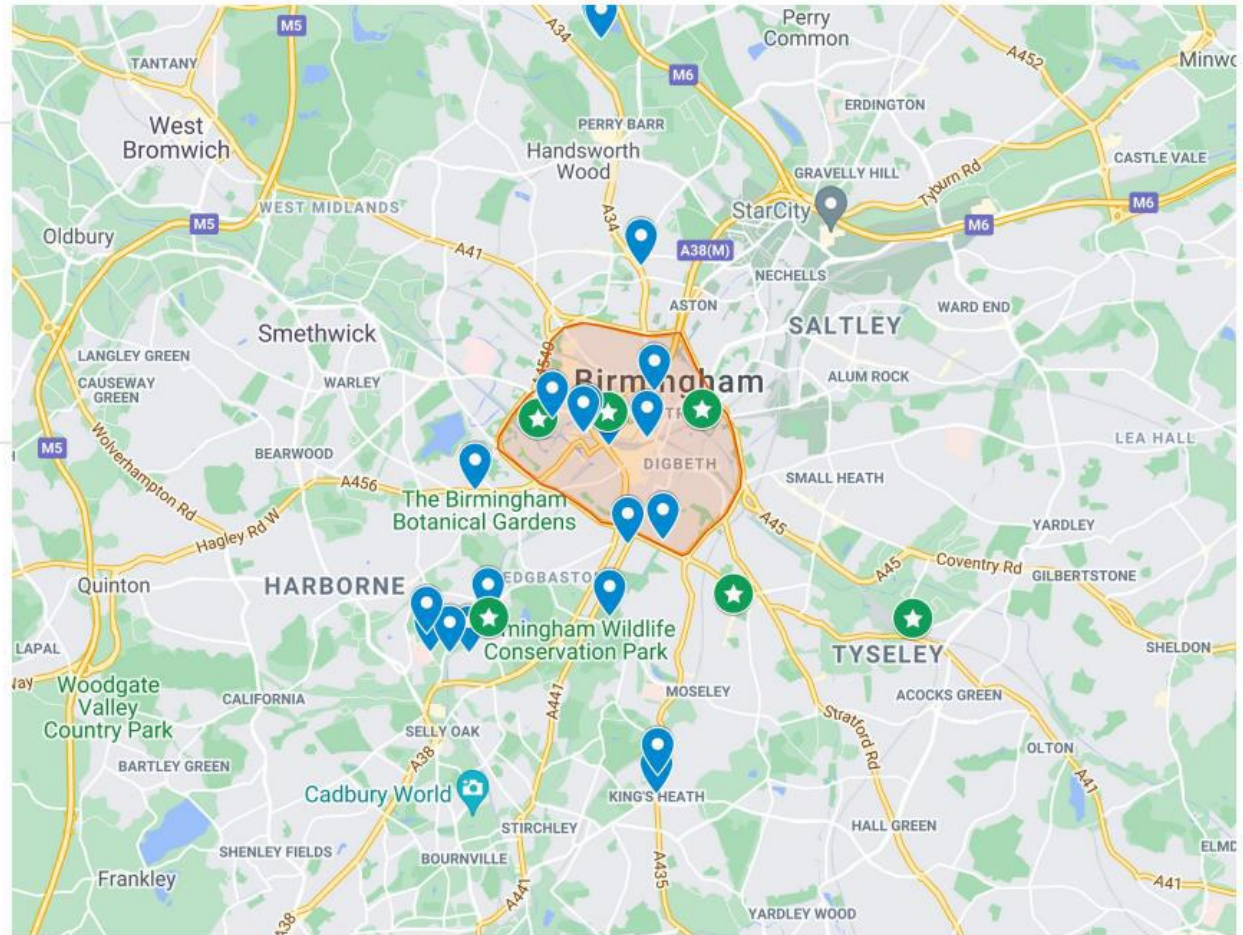


AltasensePM

- ★ Ladywood
- ★ Tyseley Redfern
- ★ Eastside City Park
- ★ BAQS
- ★ Ladypool Rd
- ★ Newhall St

Zephyrs

- 📍 BAQS
- 📍 Geography Building
- 📍 QE Main Entrance
- 📍 University Station
- 📍 Women's Hospital
- 📍 Pershore Rd
- 📍 Horton Sq
- 📍 Town Hall Car Park
- 📍 New Street
- 📍 Children's Hospital
- 📍 A34
- 📍 Summer Hill St
- 📍 Hagley Rd

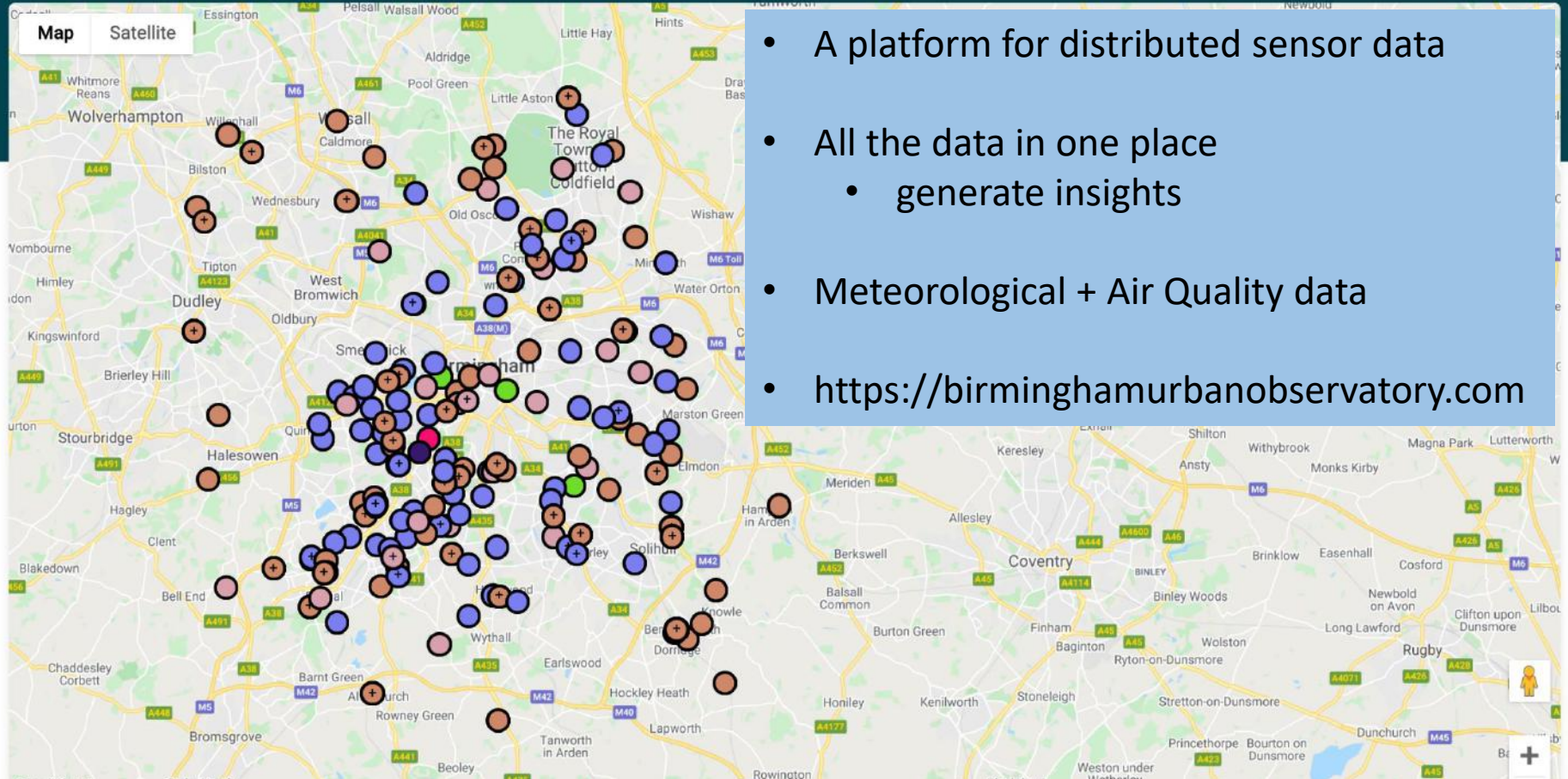


Birmingham Urban Observatory

← → ↻ 🔒 data.birminghamurbanobservatory.com/map/platforms 🔍 ☆ 👤 ☰

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Sensor Platforms



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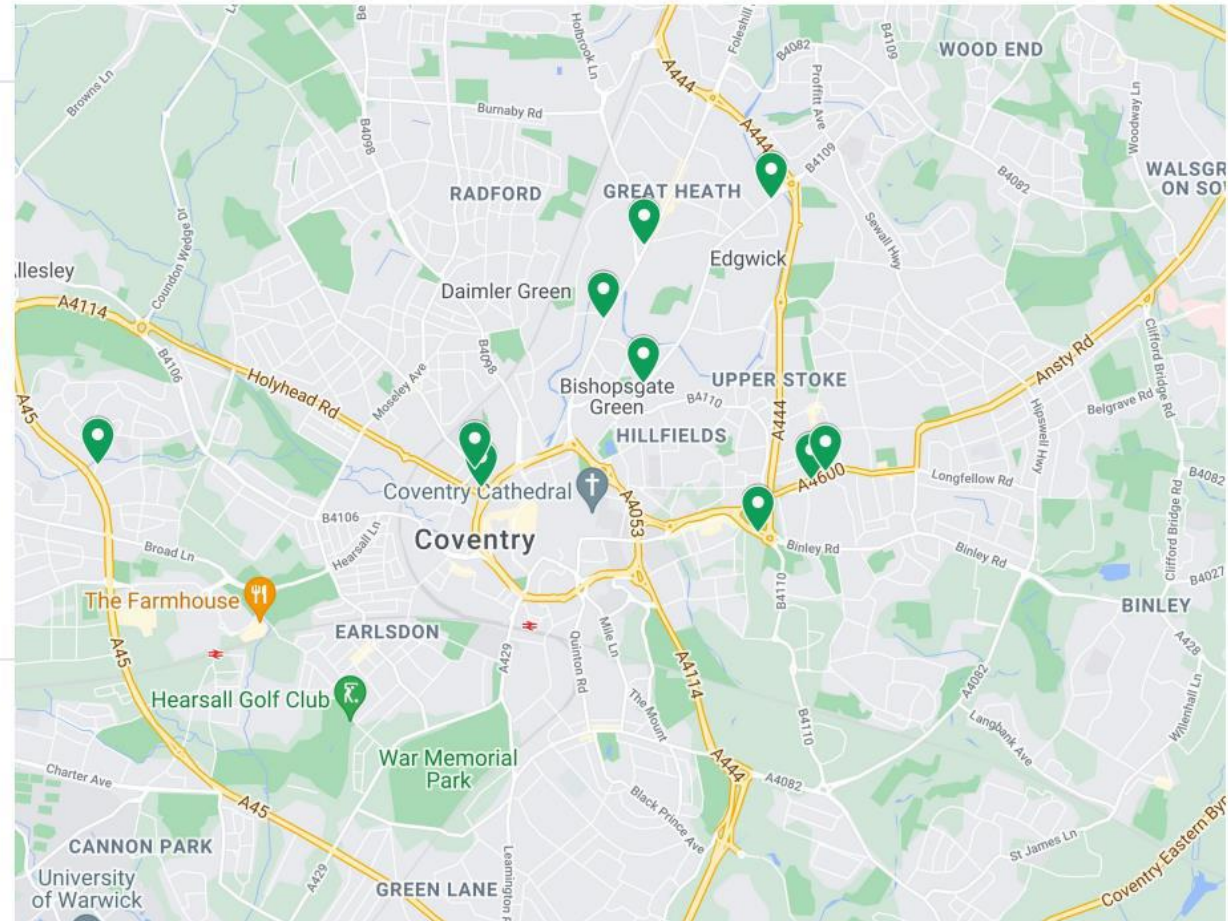
Sensor Locations to date

Coventry Locations

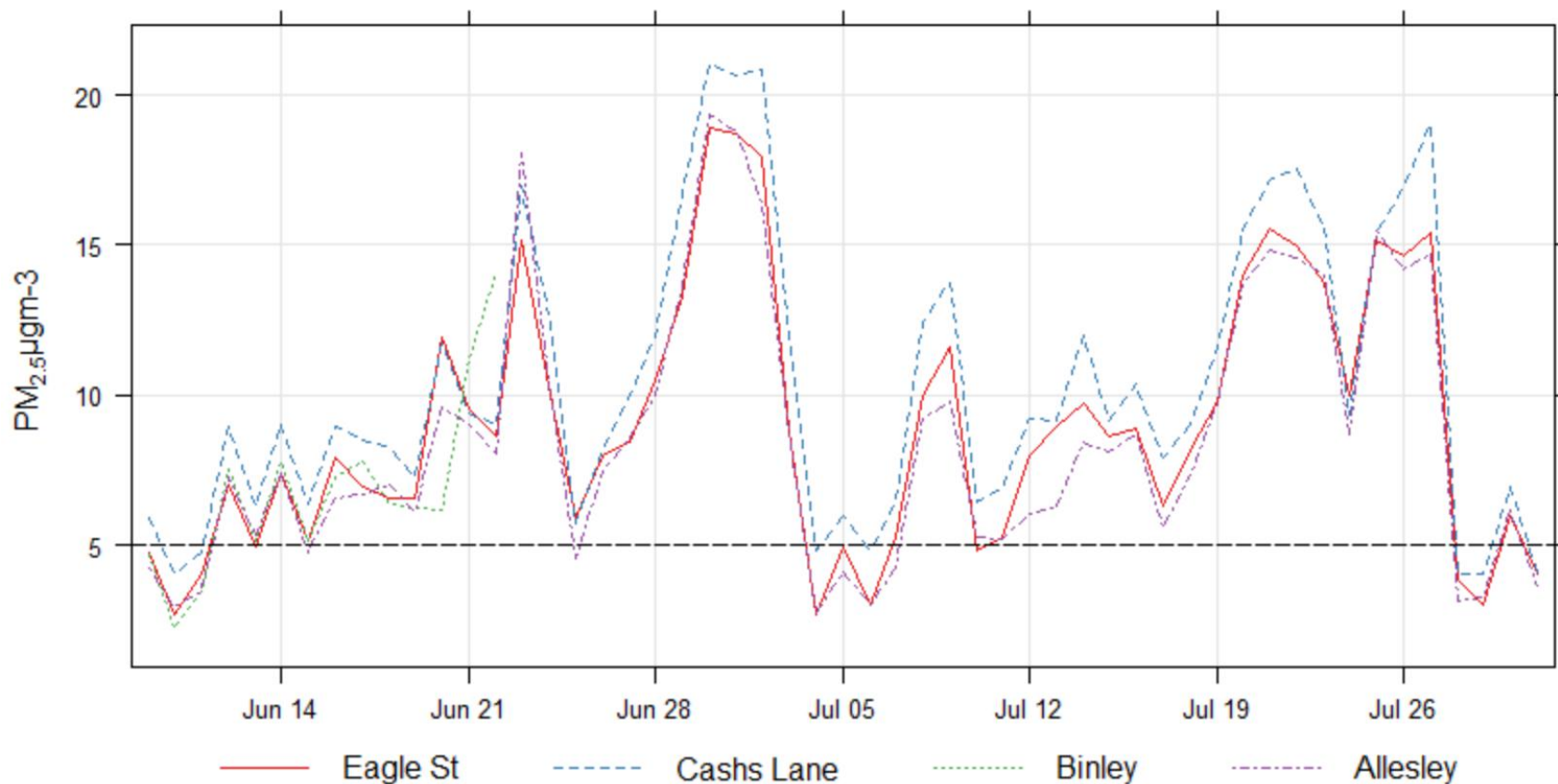
AltasensePM

Untitled layer

- St Osburgs
- Coundon Rd/Upper Hill Street
- Binley Road nr AURN
- Alleseley AURN
- Foleshill rd/Cash In
- Foleshill rd
- Stoney Stanton Eagle St E
- Stoney Stanton Gallagher Retail Park
- Walsgrave rd/Clay In
- Walsgrave rd

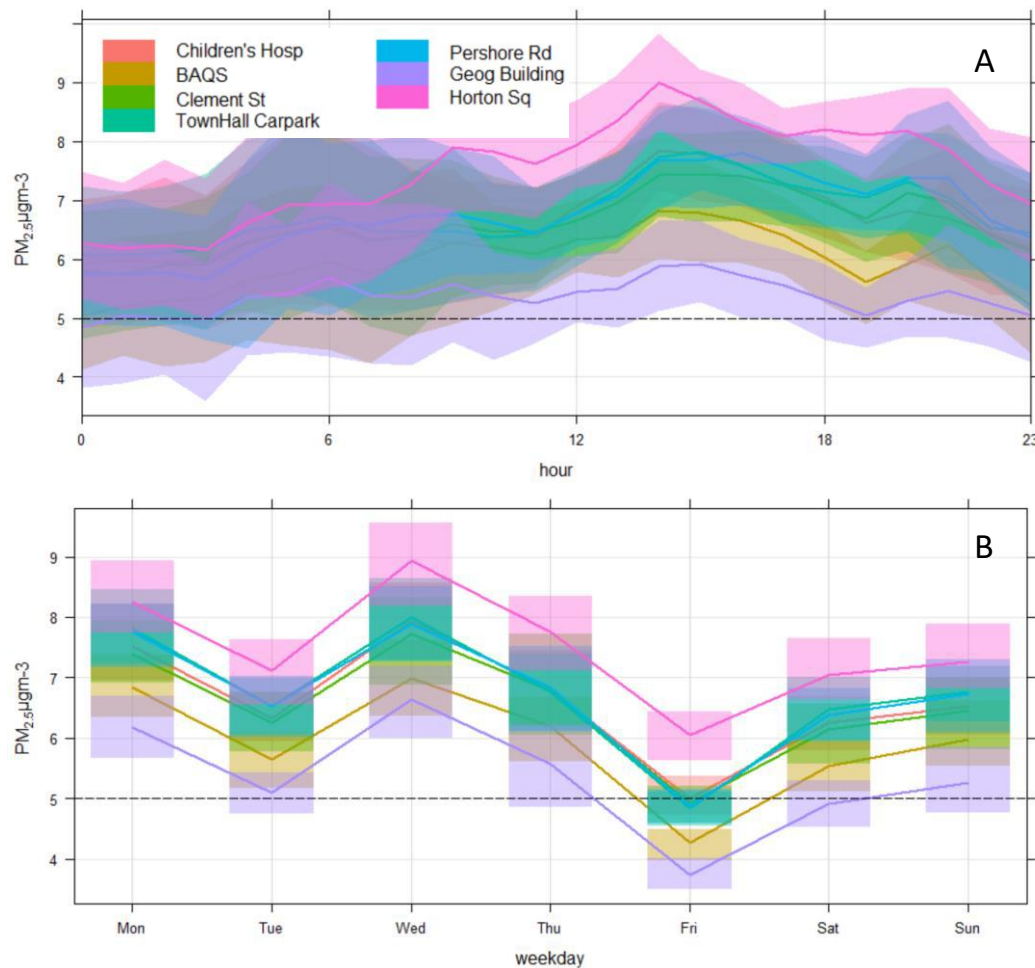


Sample Altasense PM Coventry Results



Daily average PM_{2.5} for 4 sites across Coventry. Dotted line shows WHO recommended annual avg limit.

Sample Zephyr Average PM_{2.5} Birmingham Results



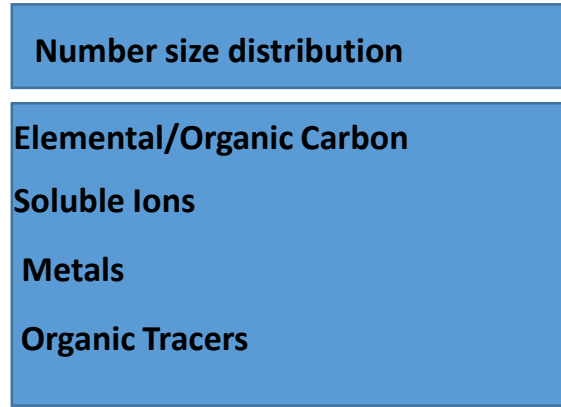
Average A) Diurnal and B) Weekly profiles for August 2021 across various sites in Birmingham. Dotted line demonstrates new WHO guidelines for annual PM_{2.5}

PM Source apportionment Workflow

PM2.5 Filter



Filters collected
Winter 2019 - Present



Air Quality Supersite Triplets



Urban

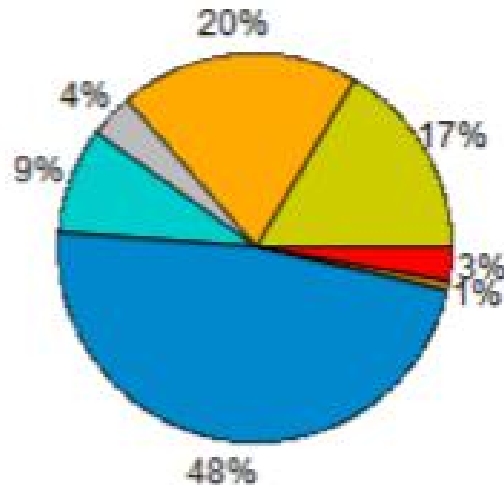


Rural /
mobile



Roadside

Receptor
models



Birmingham CAZ impact on NO₂

We are applying a machine learning technique to quantify the causal effect of CAZ on NO₂ levels across Birmingham monitoring sites.