Tracking urban progress towards climate and environmental goals

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June 5, 2024

HAQAST Massachusetts

Support from NASA Health and Air Quality Applied Sciences Team, Wellcome Trust

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Urban climate and environmental goals

Greenhouse gases

Urban climate action plans

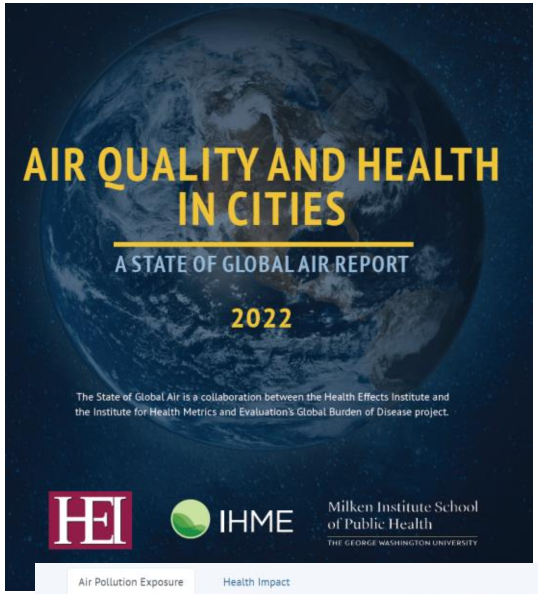
Air pollution

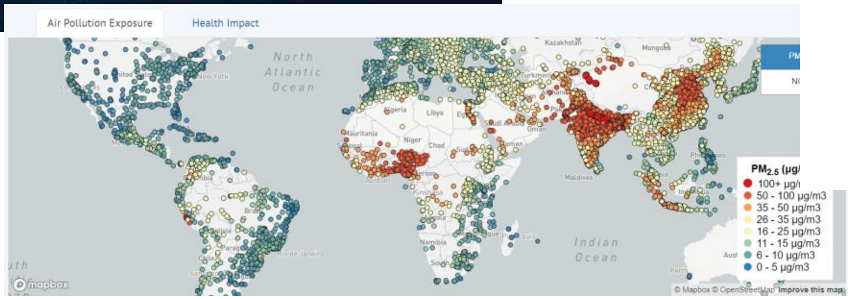
Ambient air quality standards
WHO guidelines

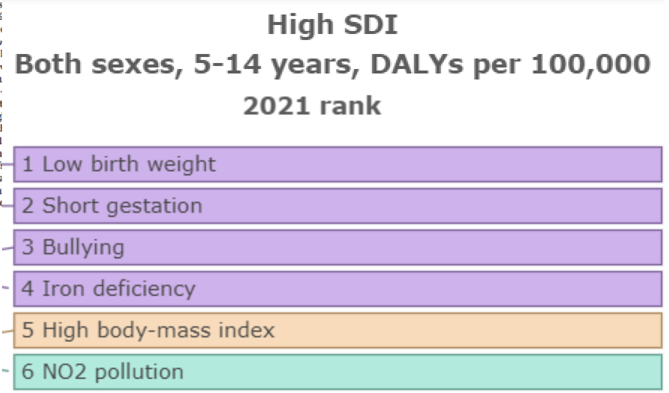
Natural spaces

C40 Urban Nature Declaration

Air pollution in 13,000 cities: Research to action









Led by Veronica Southerland, Arash Mohegh, Danny Malashock

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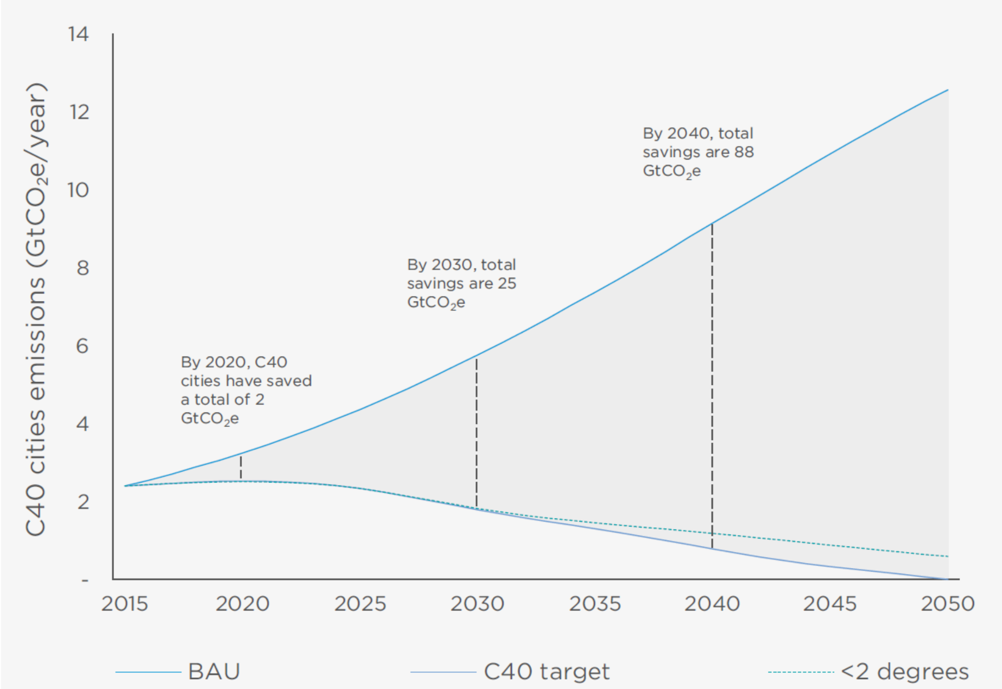
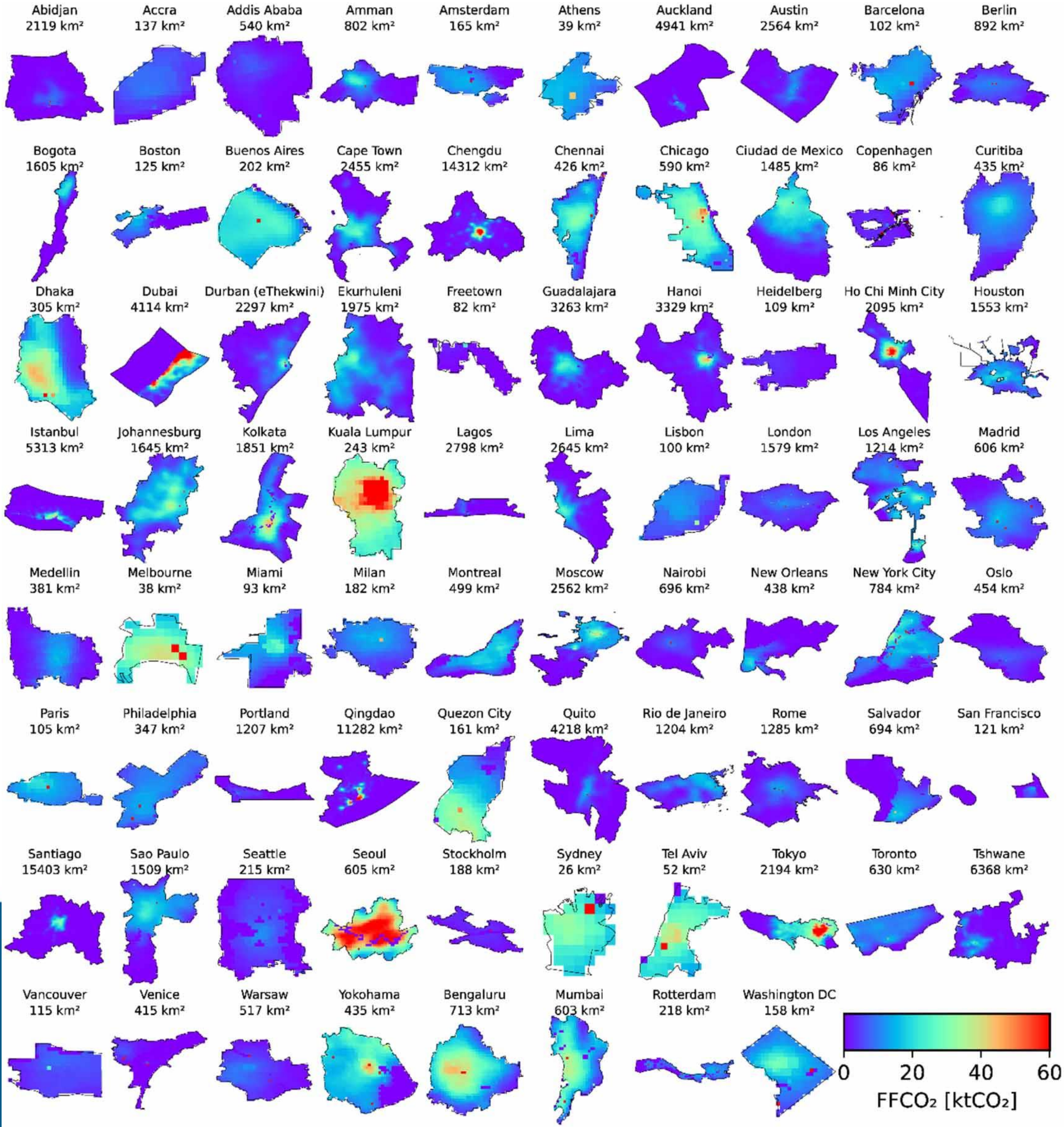
Tracking urban CO_2 emissions



Led by Doyeon Ahn
Co-mentorship by Dan Goldberg
Ahn et al., Environ. Res. Lett., 2023

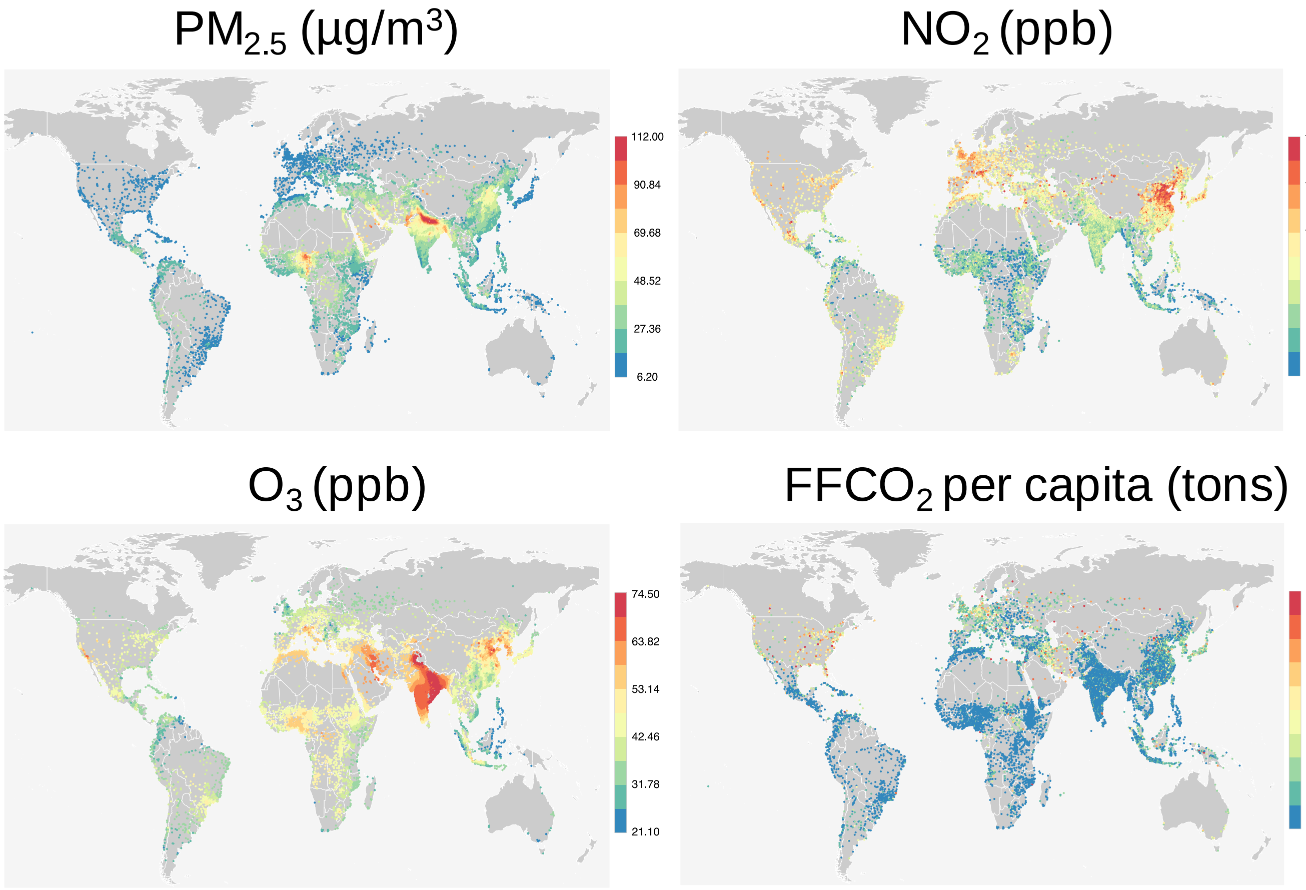


Air pollution and CO_2 emissions in 13,000 cities

Updated estimates with new concentrations datasets

- Van Donkelaar et al. (2021) for $PM_{2.5}$
- Larkin et al. (2023) for NO_2
- DeLang et al. (2021) for ozone
- EDGAR v7.0 for CO_2

Most recent year for which all datasets were available: 2019



Led by Soo-Yeon Kim, GW PhD student
Co-mentorship by Gaige Kerr

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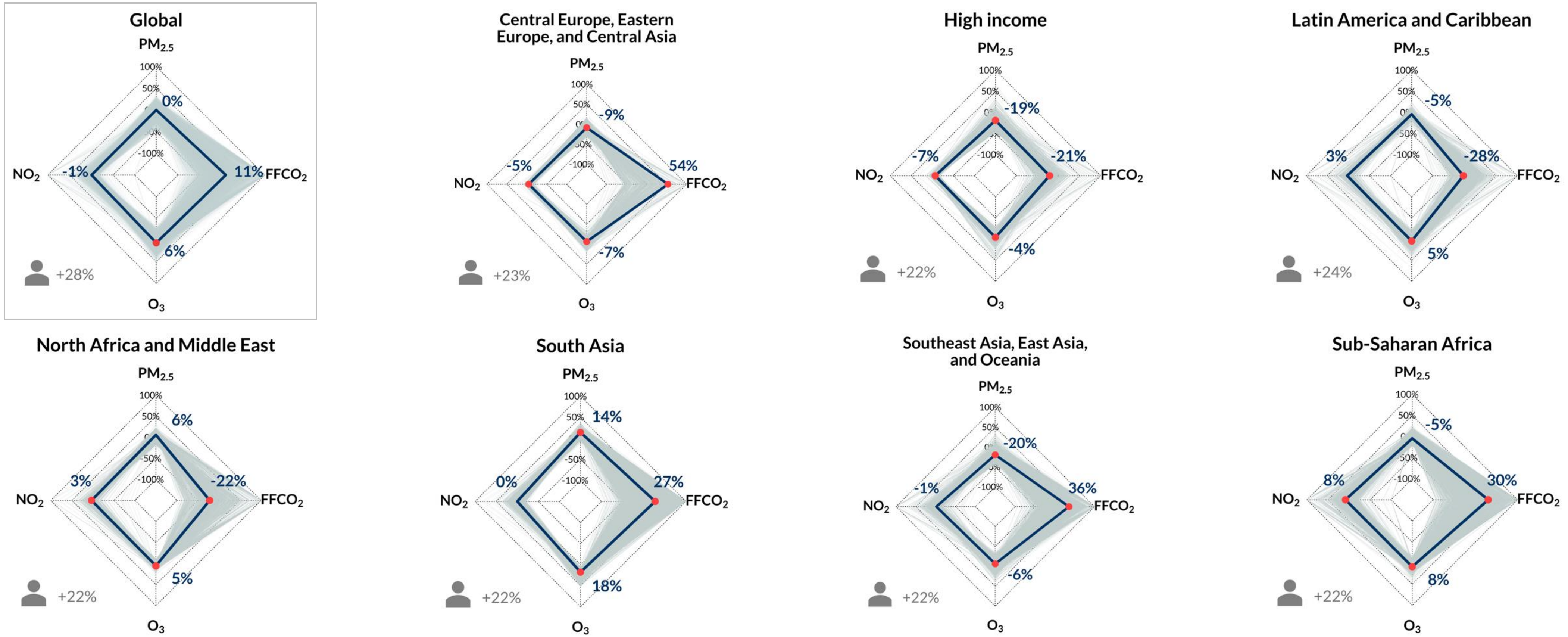
Air pollution and CO_2 emissions in 13,000 cities: Trends 2005 to 2019



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Co-mentorship by Gaige Kerr

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C40 Urban Nature Accelerator

PATHWAY 1
QUALITY TOTAL COVER

Heat & Water related risk

30-40% of the total built-up city surface area is:

- **Green spaces**
(eg., street trees & urban forests, parks, building integrated vegetation)

and/ or

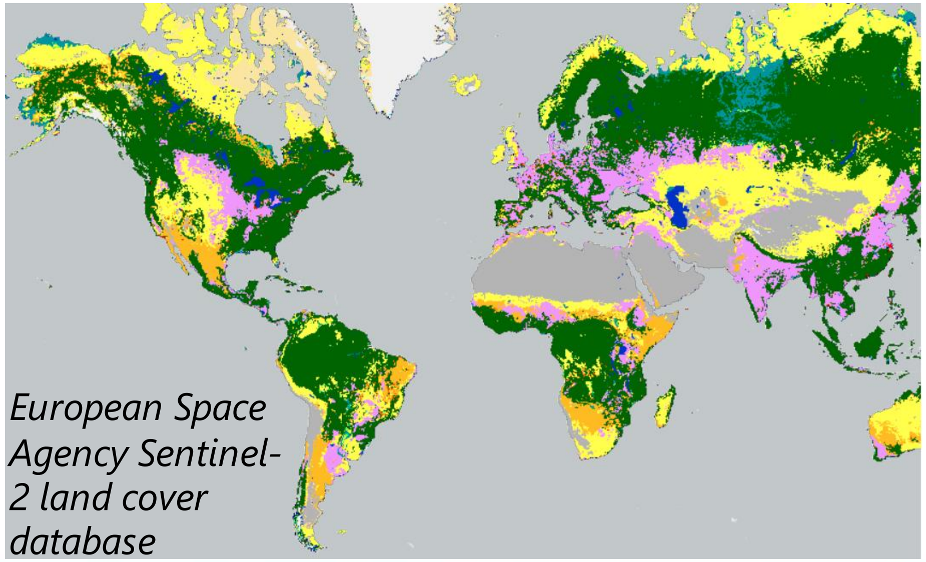
- **Permeable spaces**
(eg., pavements, infiltration trenches, swales, detention basins, regenerative urban agriculture)

PATHWAY 2
EQUITABLE SPATIAL DISTRIBUTION

Accessibility and connectivity

15 min city

70% of the city population has access to a fit for purpose green or blue space within 15 minutes' - equitably prioritised to maximise accessibility and connectivity to nature for the most vulnerable



European Space Agency Sentinel-2 land cover database

How much does this…

…tell us about this?

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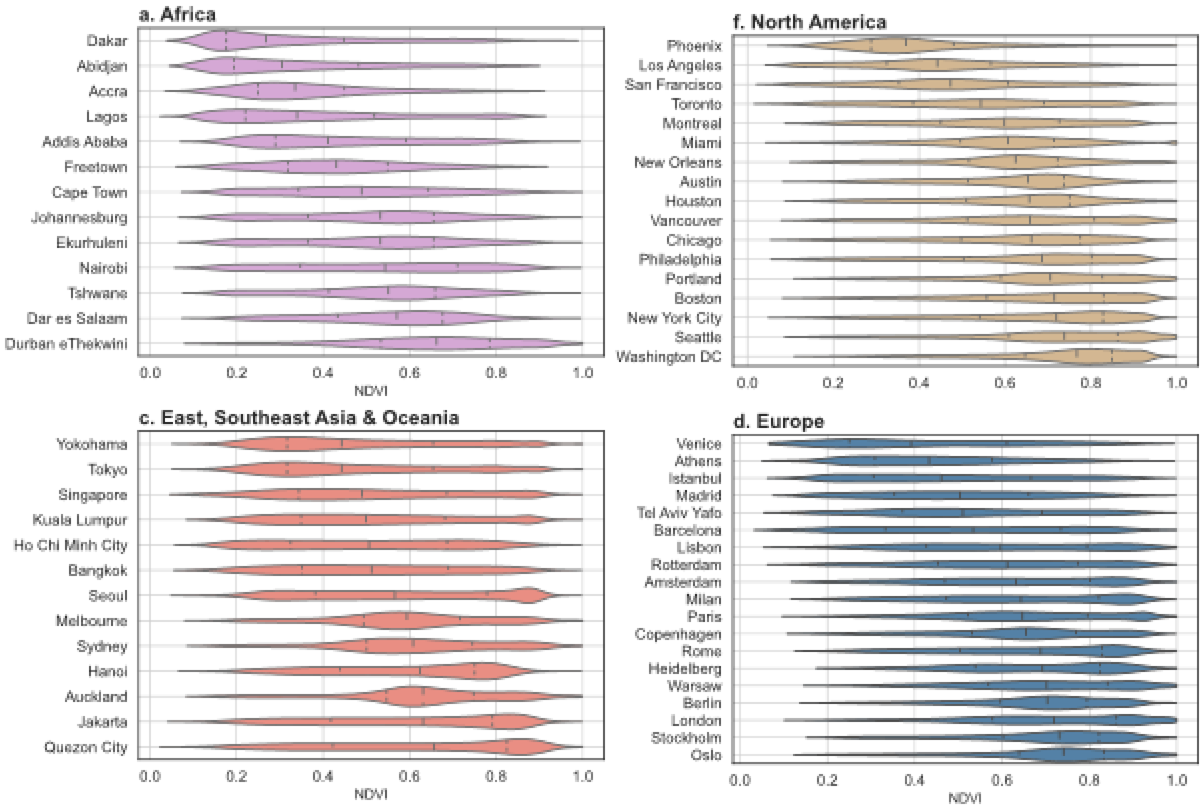
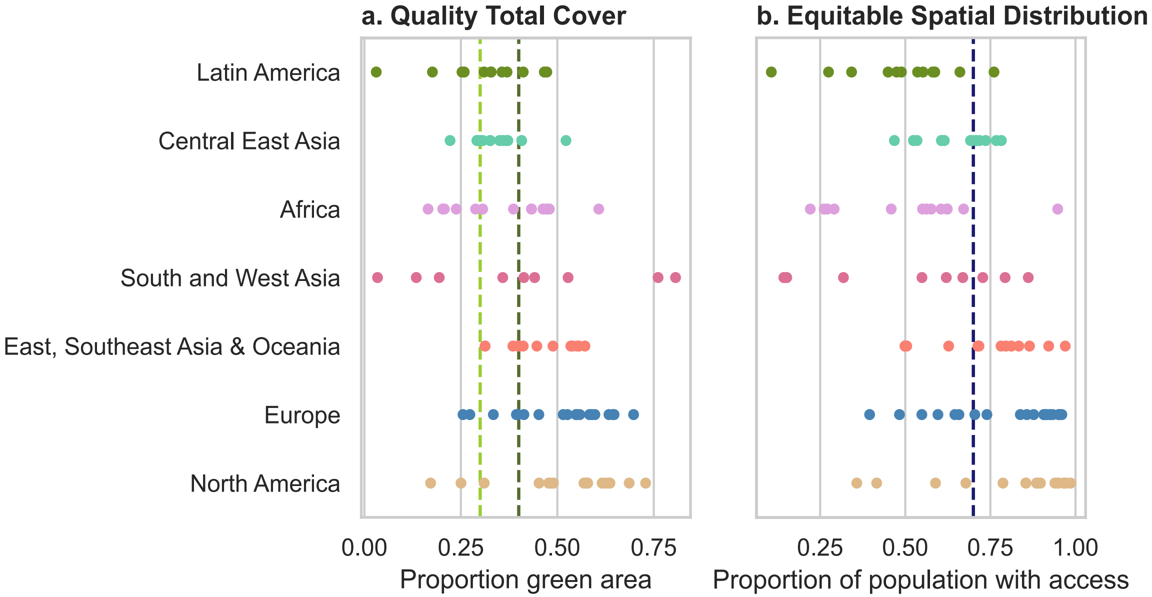
Tracking progress towards urban nature targets

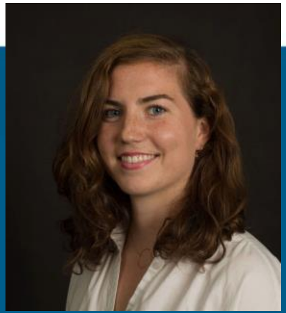
Distribution of urban greenspace (NDVI)



Distribution of urban progress towards Urban Nature Accelerator targets



European Space Agency Sentinel-2 NDVI and WorldCover datasets



Work led by Greta Martin, GW PhD student
Co-mentorship by Kate O'Dell
Martin et al., GeoHealth, 2024

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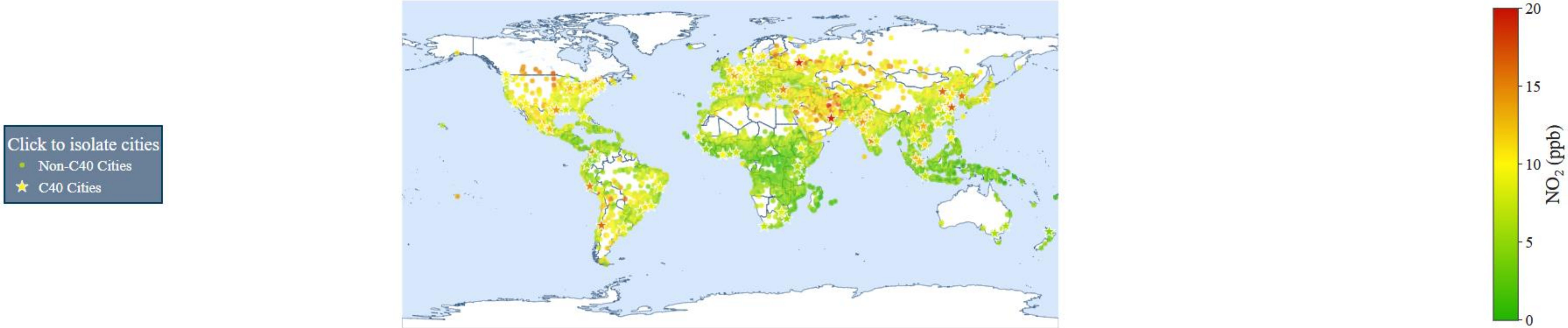
Urban Air Quality Explorer

Map | Percent Change | Data Codebook | Data Download | Video Walkthrough | About

NO_2 | O_3 | $PM_{2.5}$ | CO_2

Concentration | PAF | Cases | Rates



2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 **2019**

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