



The Use of GIS for Air Pollution and Noise Assessment in Denmark

Jibrán Khan, Assistant Professor, Department of Environmental Science,
Aarhus University, Roskilde. E-mail: jibrán@envs.au.dk.

AU GIS Day 2023

Content

- **GIS – What and Why?**
- **Air Pollution and Noise – Why do we care?**
- **Air Pollution**
- **Noise Pollution**
- **GIS Showcase**
- **Takeaways**

This Talk

Does not cover:

- Details of GIS
- RS/GIS tools and techniques

Covers:

- Use of GIS for
 - Air Pollution
 - Noise
 - Mapping/Exposure Assessment

Note:

*All images are copyrighted unless stated otherwise (mentioned image source).
Any reuse of images in any form requires permission from the
presenter of this presentation*

Acknowledgements

- All the amazing colleagues – Section of Atmospheric Environment at AU-ENVS (Modelling, Emissions, Measurements)

GIS – What and Why?

“

GIS, GIS, on the map so high,
Pixel dancing in the digital sky.
With data magic, you're the star,
Mapping worlds, both near and far!

-

Anonymous

”

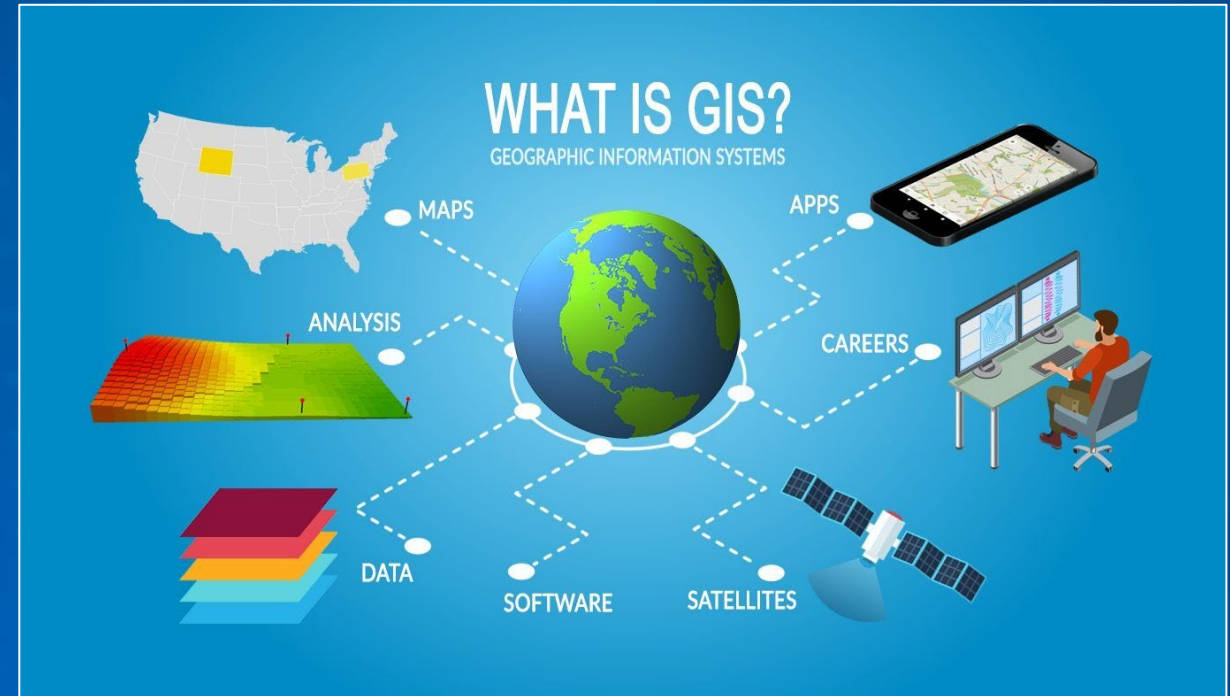
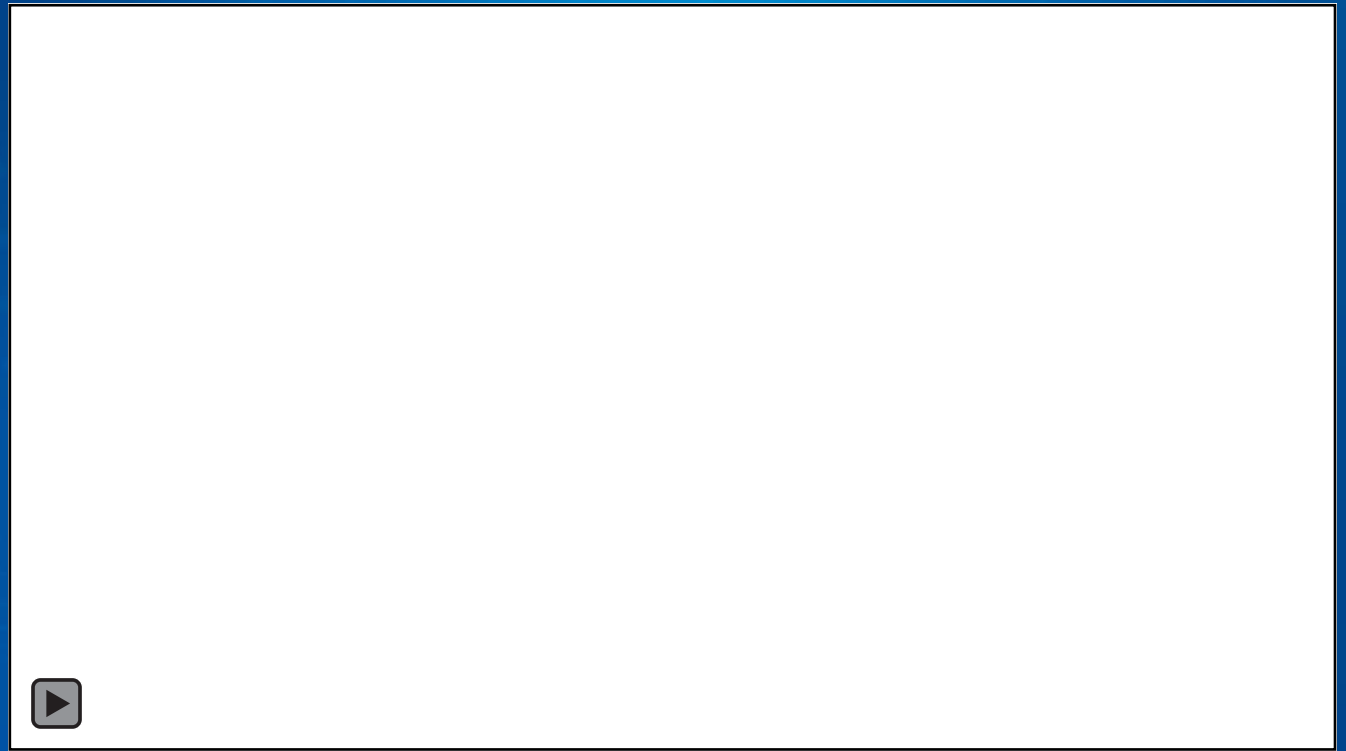
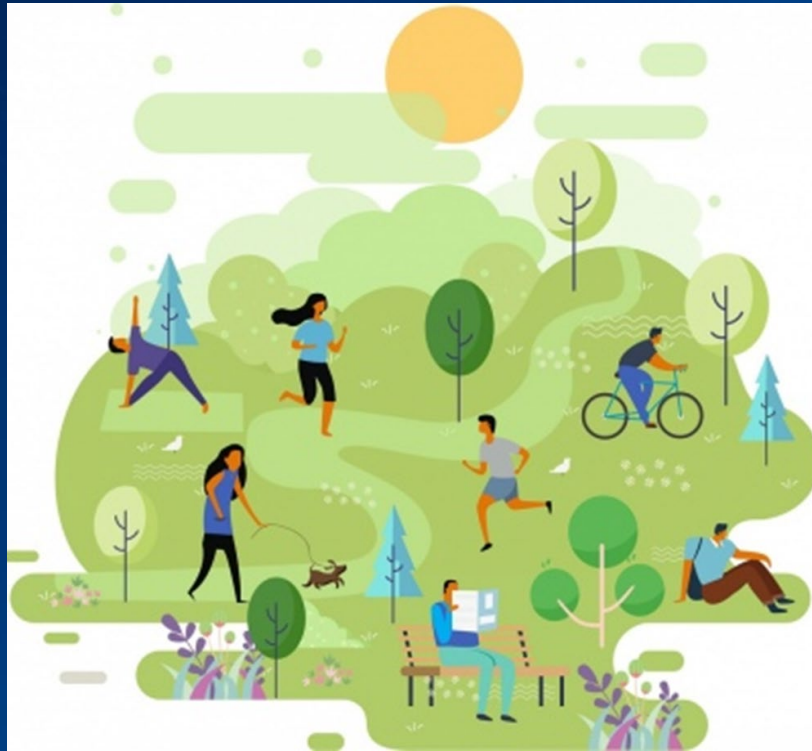


Image source: GIS Geography

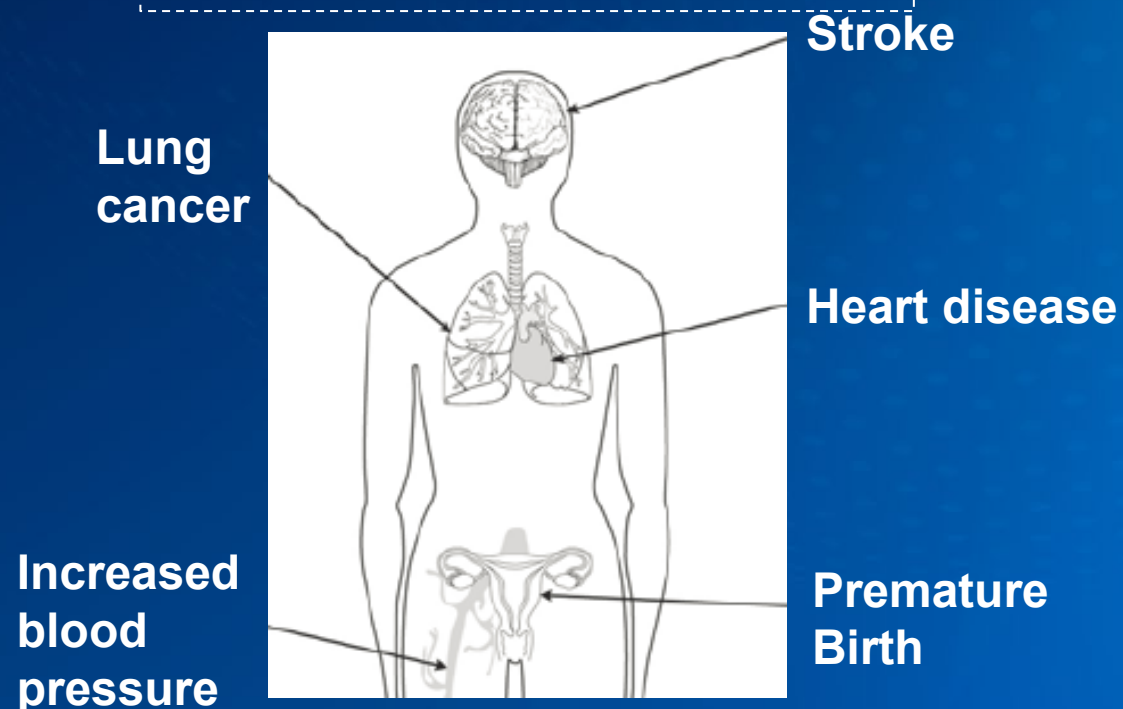
Air Pollution and Noise



Air and Noise Pollution is a geographical phenomena!

Air Pollution and Noise

Health effects of air pollution
and noise

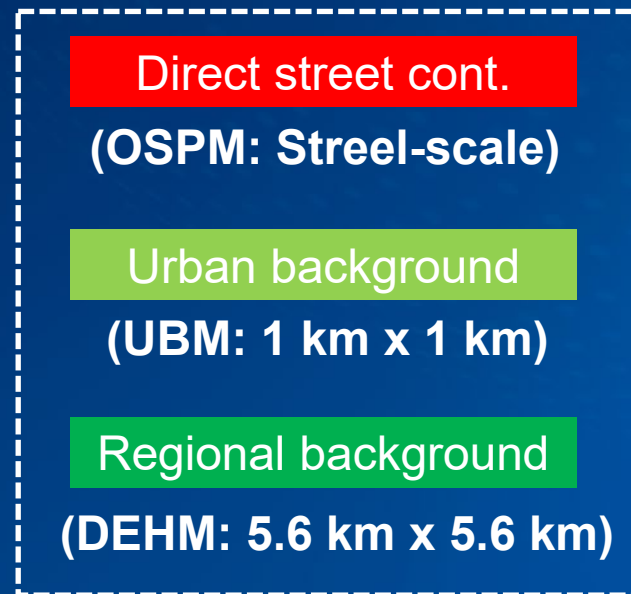


Air pollution and noise – the first and second most harmful environmental risk factors!

GIS for Air Pollution

The DEHM-UBM-AirGIS System (Khan et al. 2019)

Standard system to estimate air pollution at any location of interest in Denmark



“DEHM-UBM-AirGIS” OR
The Danish AirGIS System

Concentration

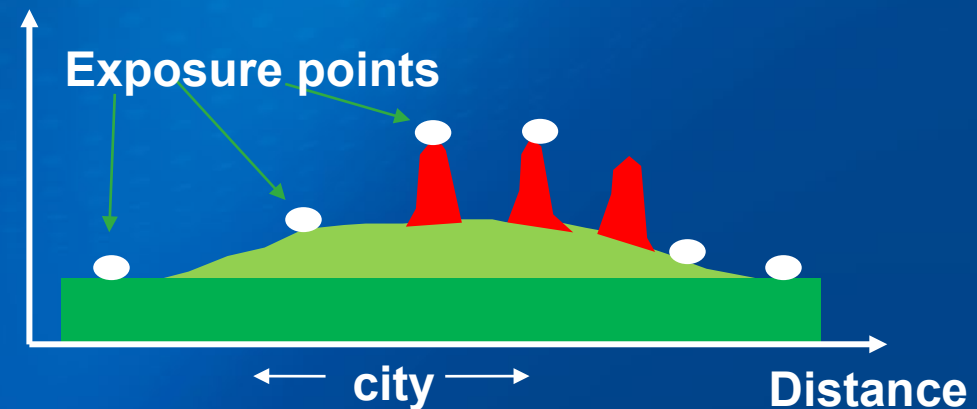
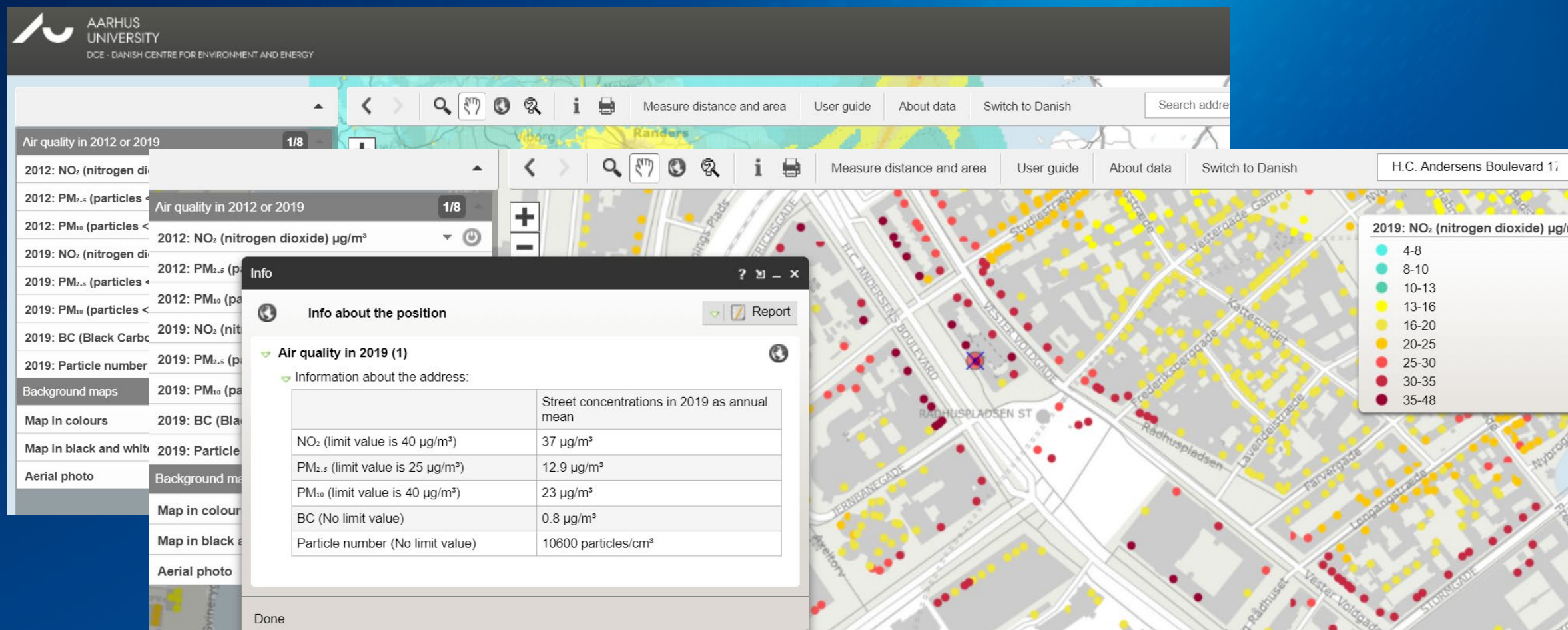
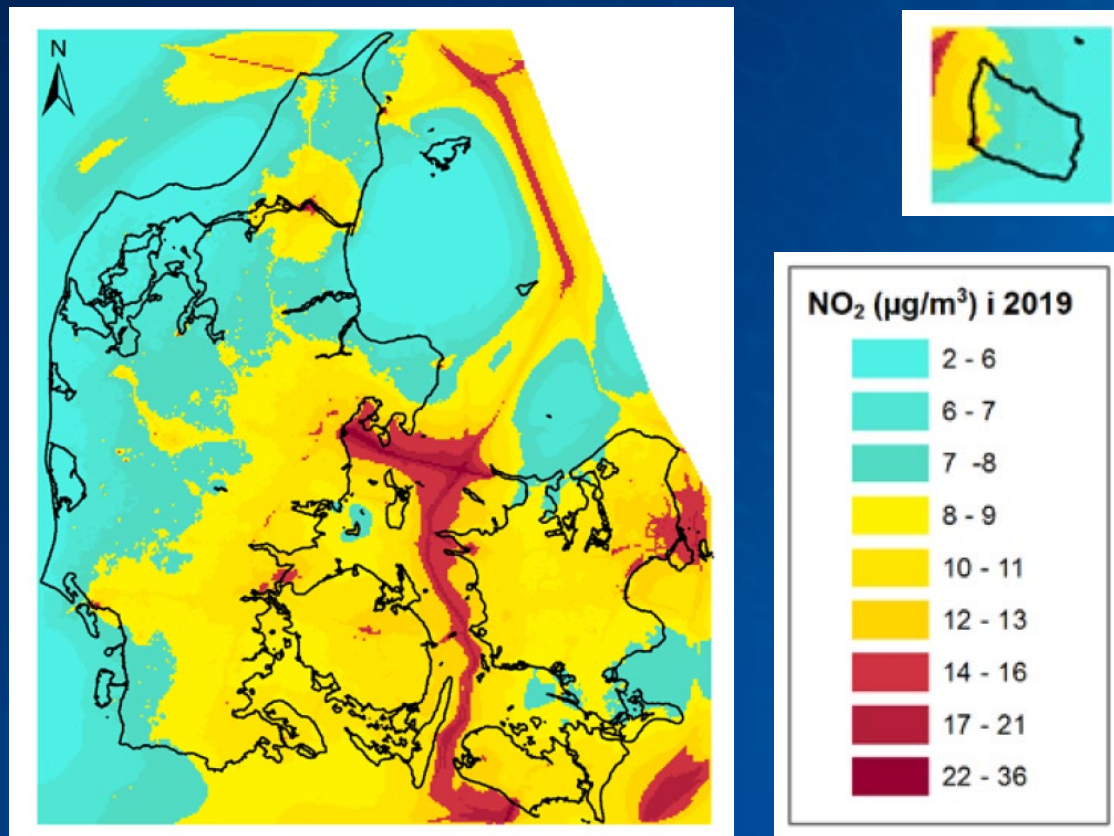


Image source : Khan et al. 2019

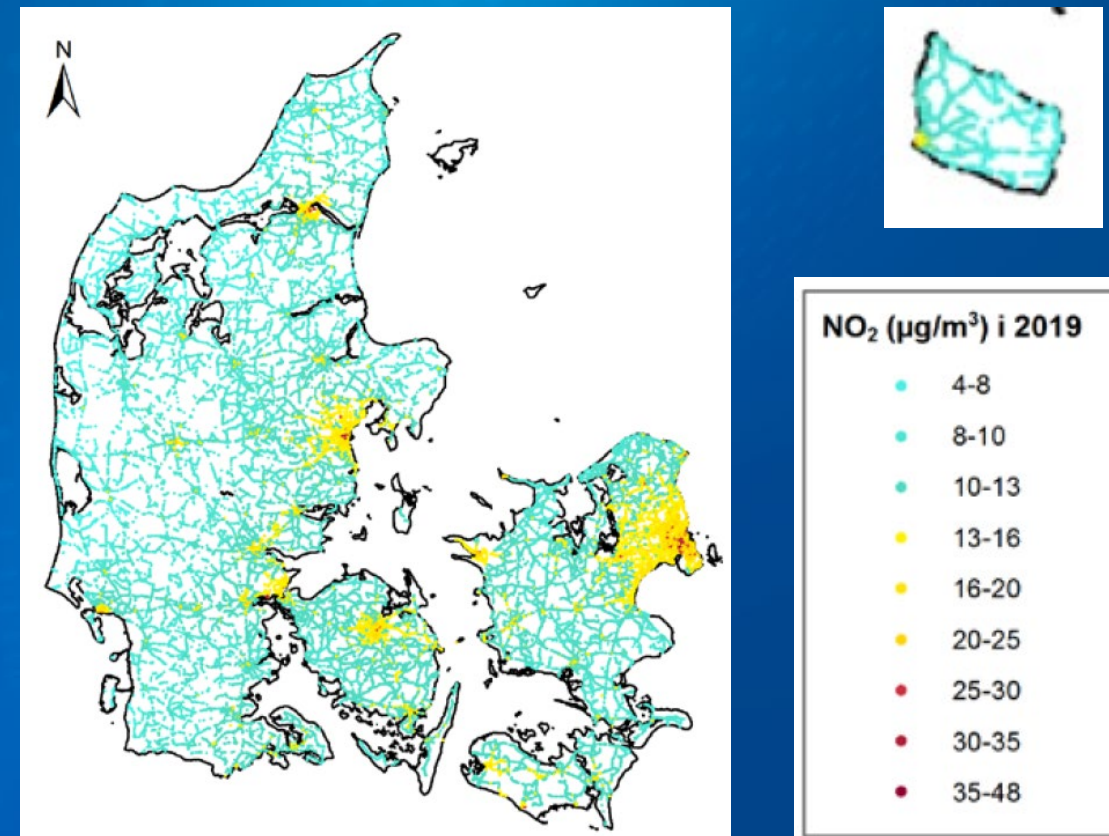
GIS for Air Pollution – Showcase



GIS for Air Pollution – Showcase

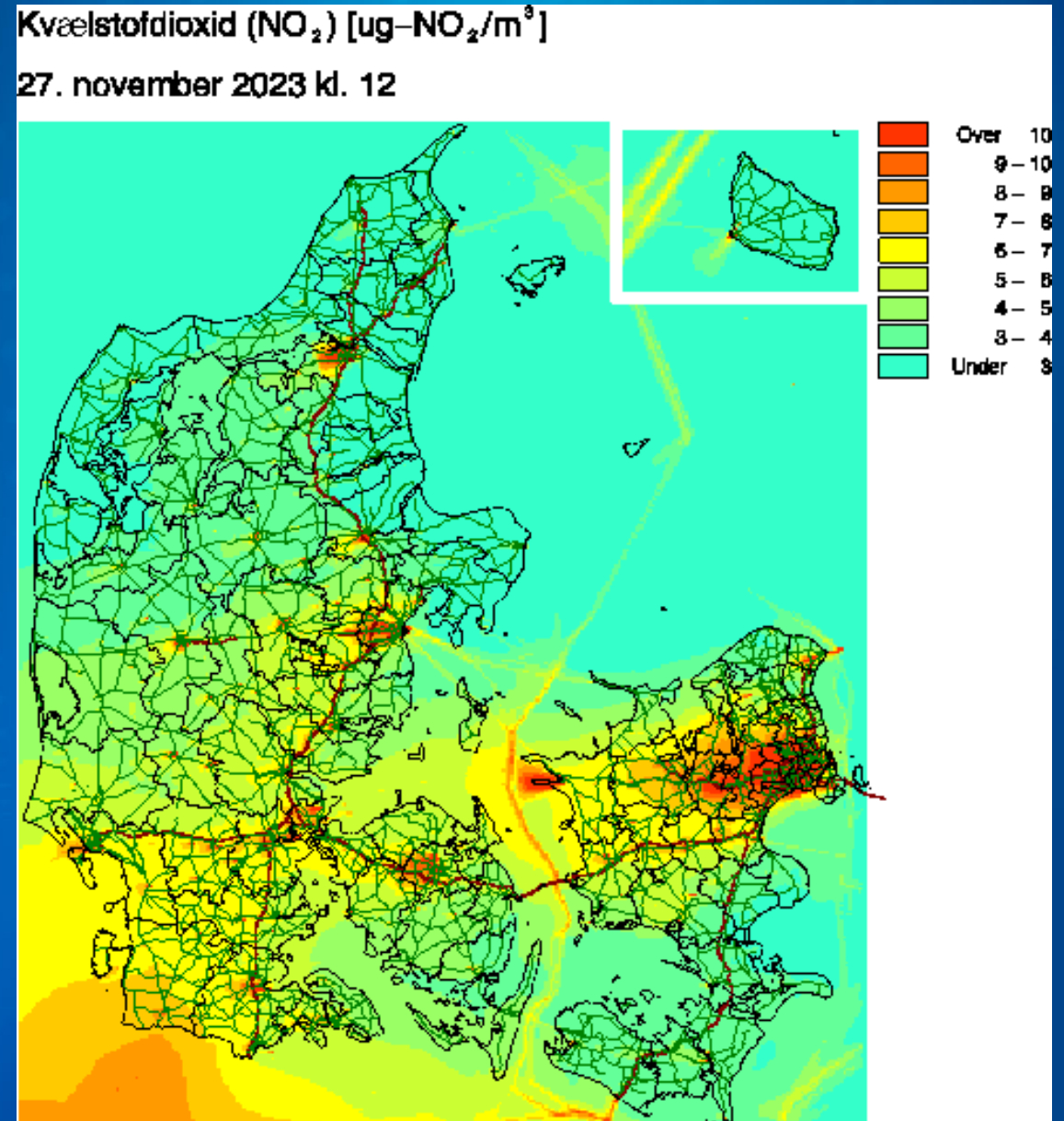
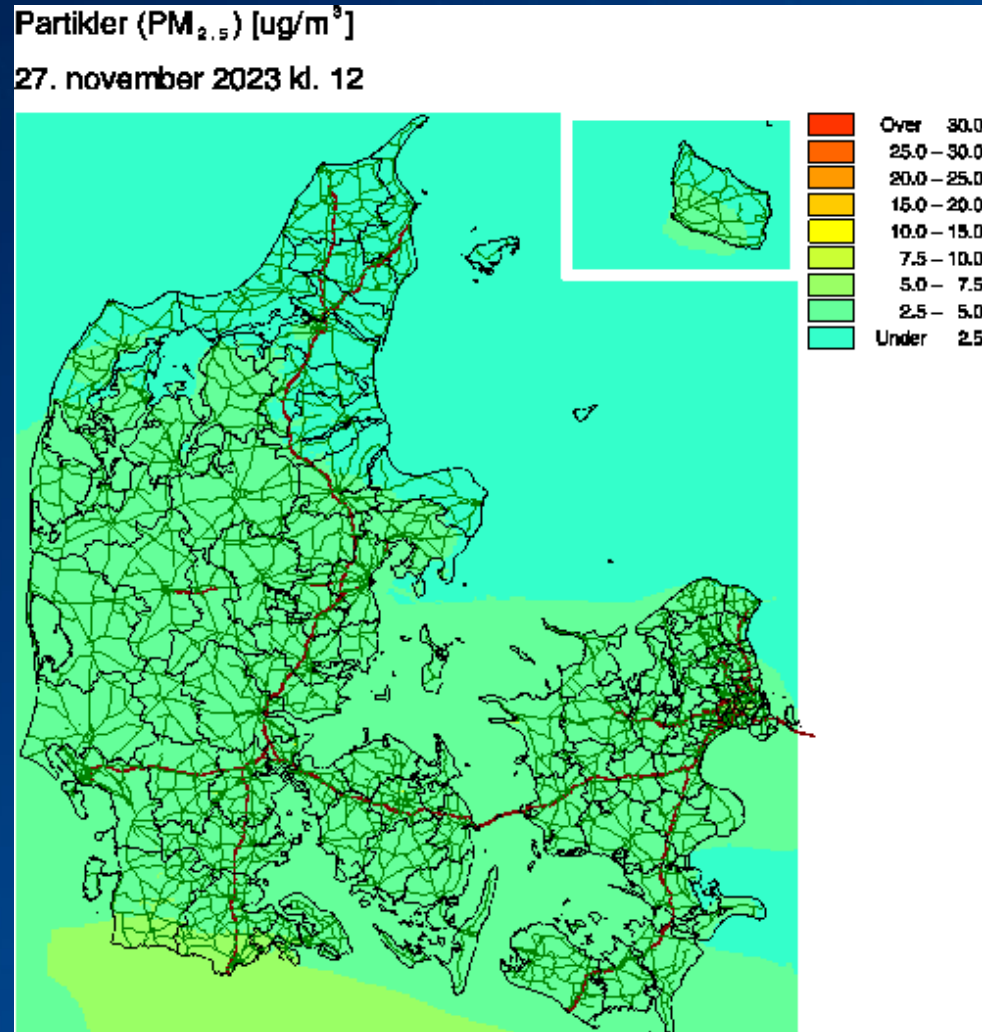


Background (1 km x 1 km)



Address-level (> 2.5 million)

Real-time Air Pollution Forecast via the THOR System

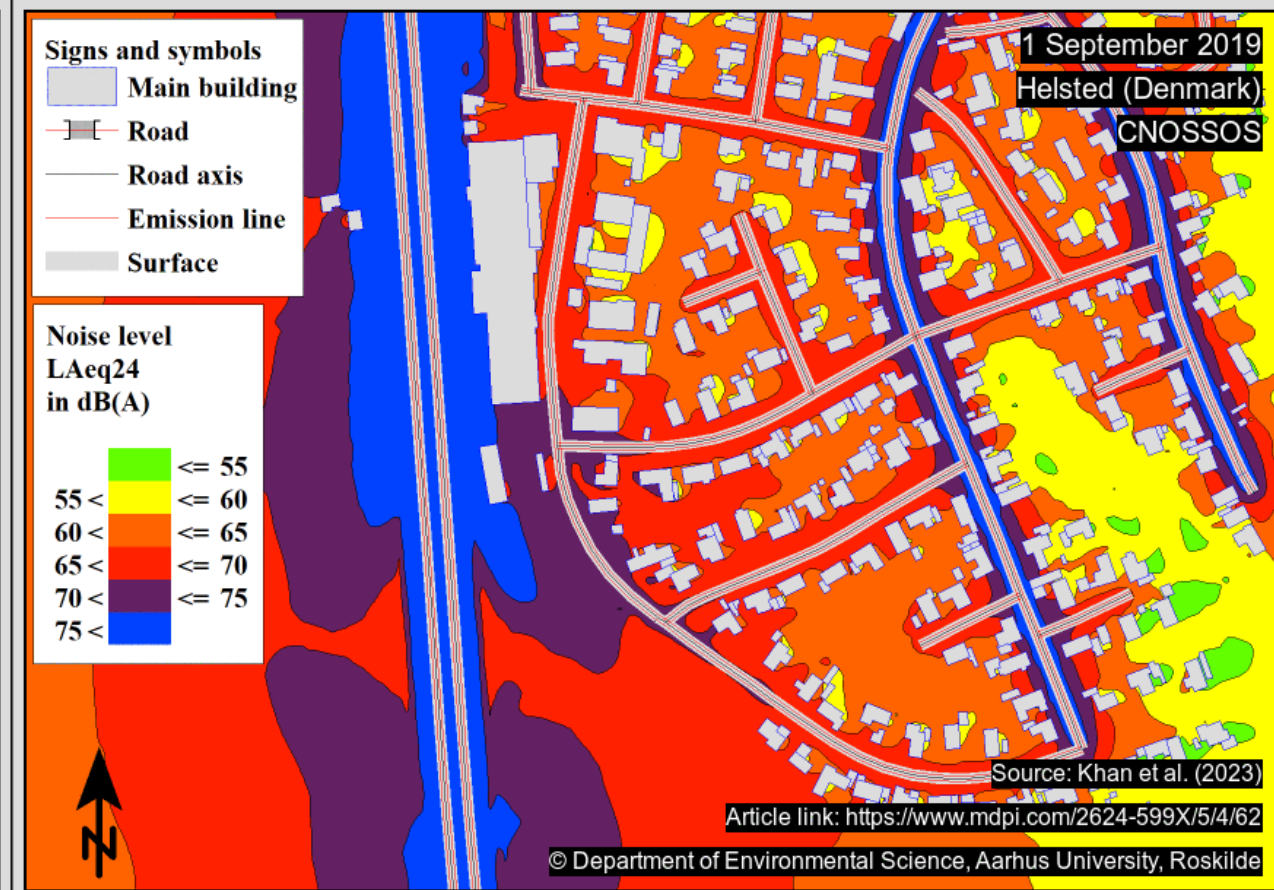
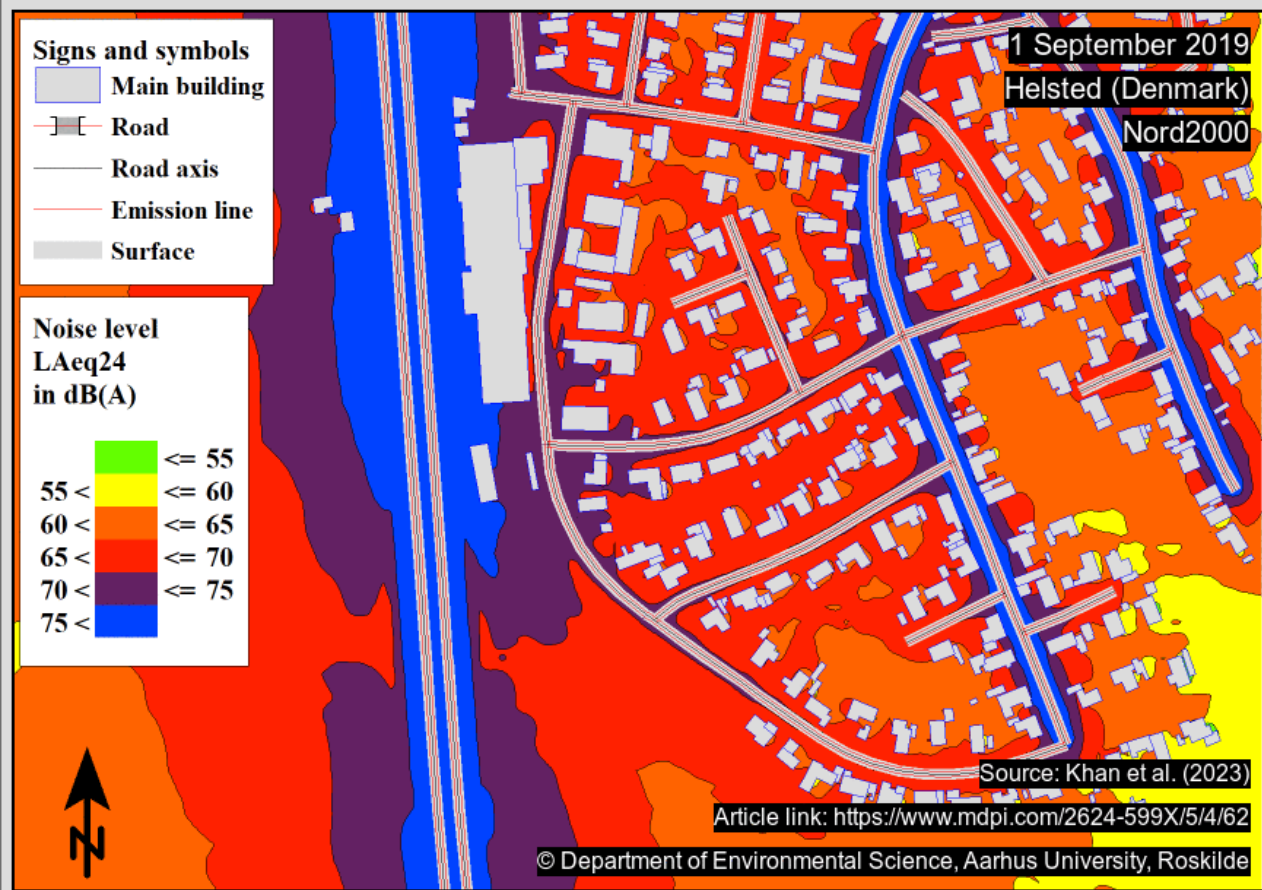


GIS for Noise



3D (or 2.5D) building polygons in noise simulations

GIS for Noise – Showcase



GIS for Exposure Assessment

Exposure modelling + Linked National Registers

thebmj

covid-19

Research

Edu

OM OS WEBSHOP VÆRKTØJSKASSEN NYHEDER PRESSE



Research

Residential exposure to transportation noise in a national cohort study

BMJ 2021 ; 374 doi: <https://doi.org/10.1136/bmj.n1954>

Cite this as: BMJ 2021;374:n1954

Liver Transplant Registry

Statistics Denmark SES data

Hjem

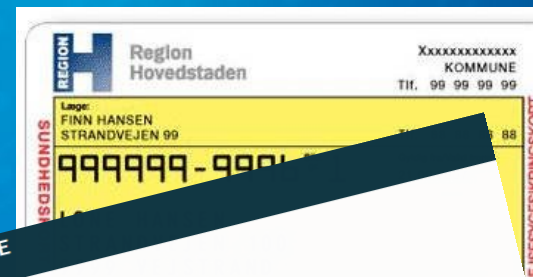
Støj fra trafik øger din risiko for demens

20. september 2021
Af Kasper Jørgensen

Hvis det larmer fra vej- eller jernbanetrafik, der hvor du bor, har du større risiko for at udvikle demens, viser et stort dansk registerstudie. Ca. 30 procent af danskerne bor et sted, hvor støjniveauet overstiger grænseværdien.

OBS: Denne nyhed er mere end en måned gammel. Se [her](#) for de seneste tal om demens.

a:



Takeaways

- GIS is crucial for
 - Air Pollution Prediction and Mapping
 - Noise Prediction and Mapping
 - Exposure Assessment

- Public Awareness
- City Planning
- Health Assessments

