University of Malta
L-Università ta' Malta

The Spatial Distribution of Nitrogen Dioxide in the Local Atmosphere: An Analysis

Rosalie Camilleri

Research Student, Institute for Climate Change and Sustainable Development

Eco-sustainability aspects of the Country-Specific Recommendations for Malta

organised by the European Commission Representation in Malta
23 September 2013, Malta

European Commission

Nitrogen dioxide (NO_2)

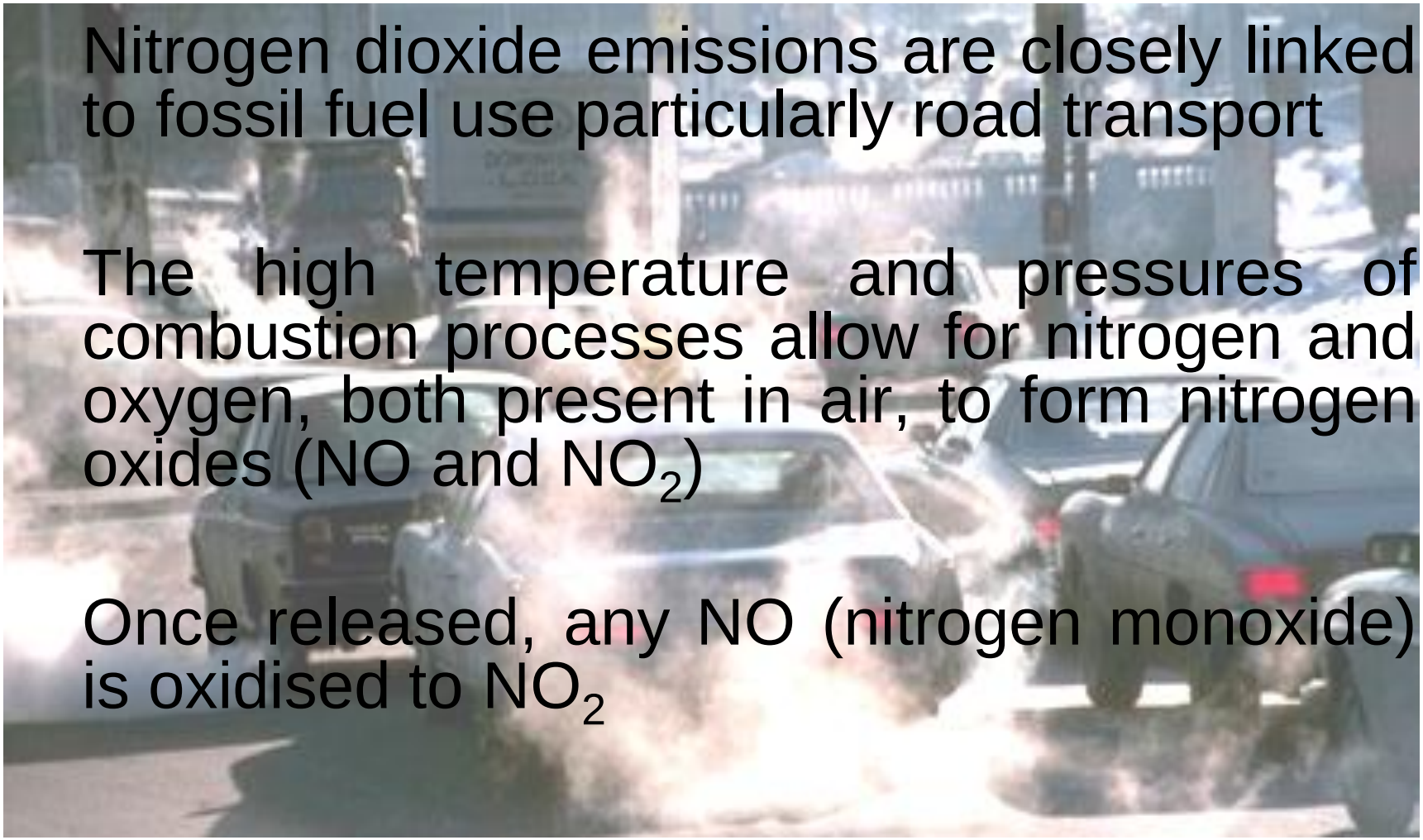
University of Malta
L-Università ta' Malta

NO_2 is a gaseous pollutant which is characteristic of urban areas.

The air pollutant is known to be a strong respiratory irritant and an important precursor to another pollutant namely ozone.

Road Transport as an Important Source

University of Malta
L-Università ta' Malta



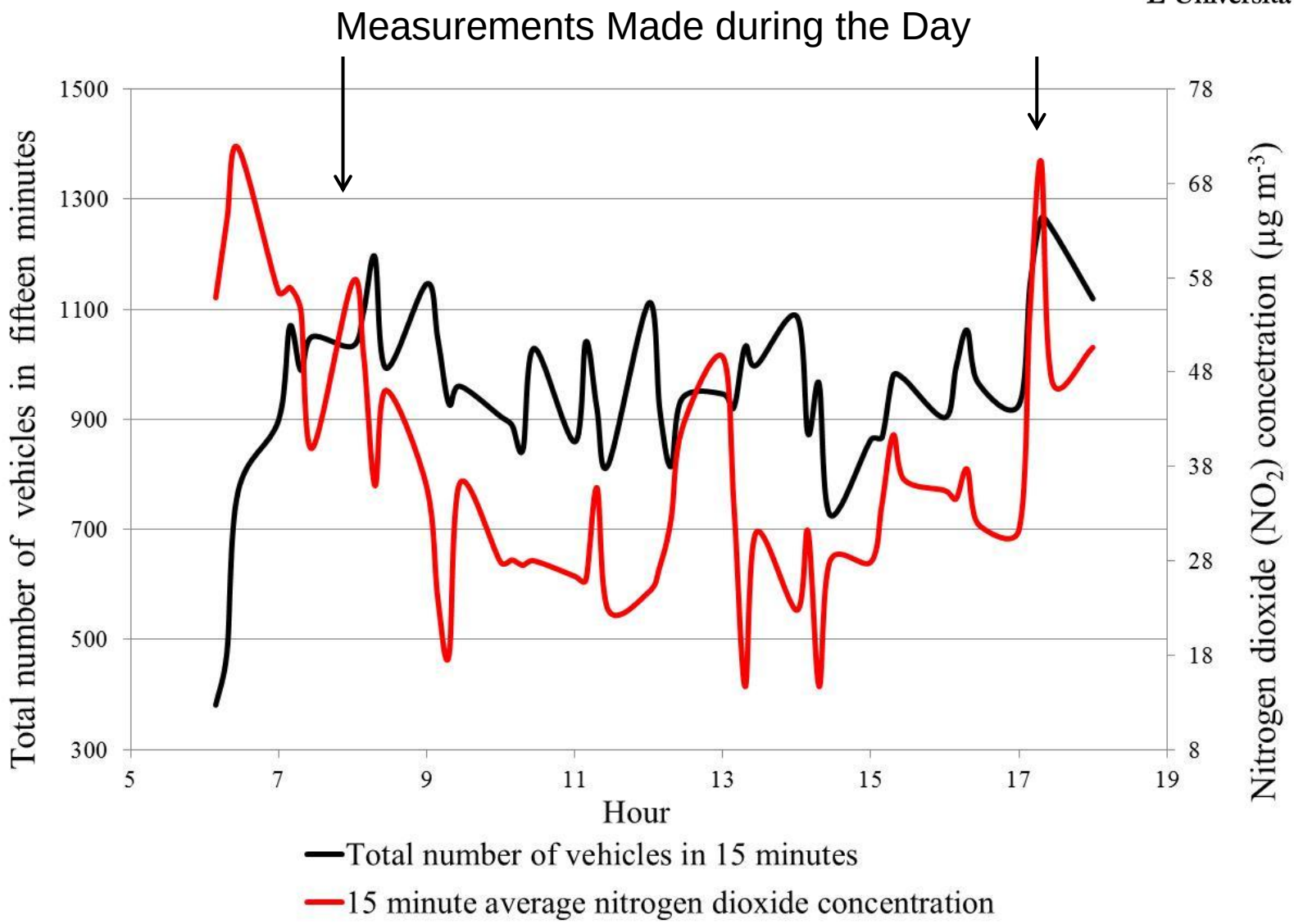
Nitrogen dioxide emissions are closely linked to fossil fuel use particularly road transport

The high temperature and pressures of combustion processes allow for nitrogen and oxygen, both present in air, to form nitrogen oxides (NO and NO_2)

Once released, any NO (nitrogen monoxide) is oxidised to NO_2

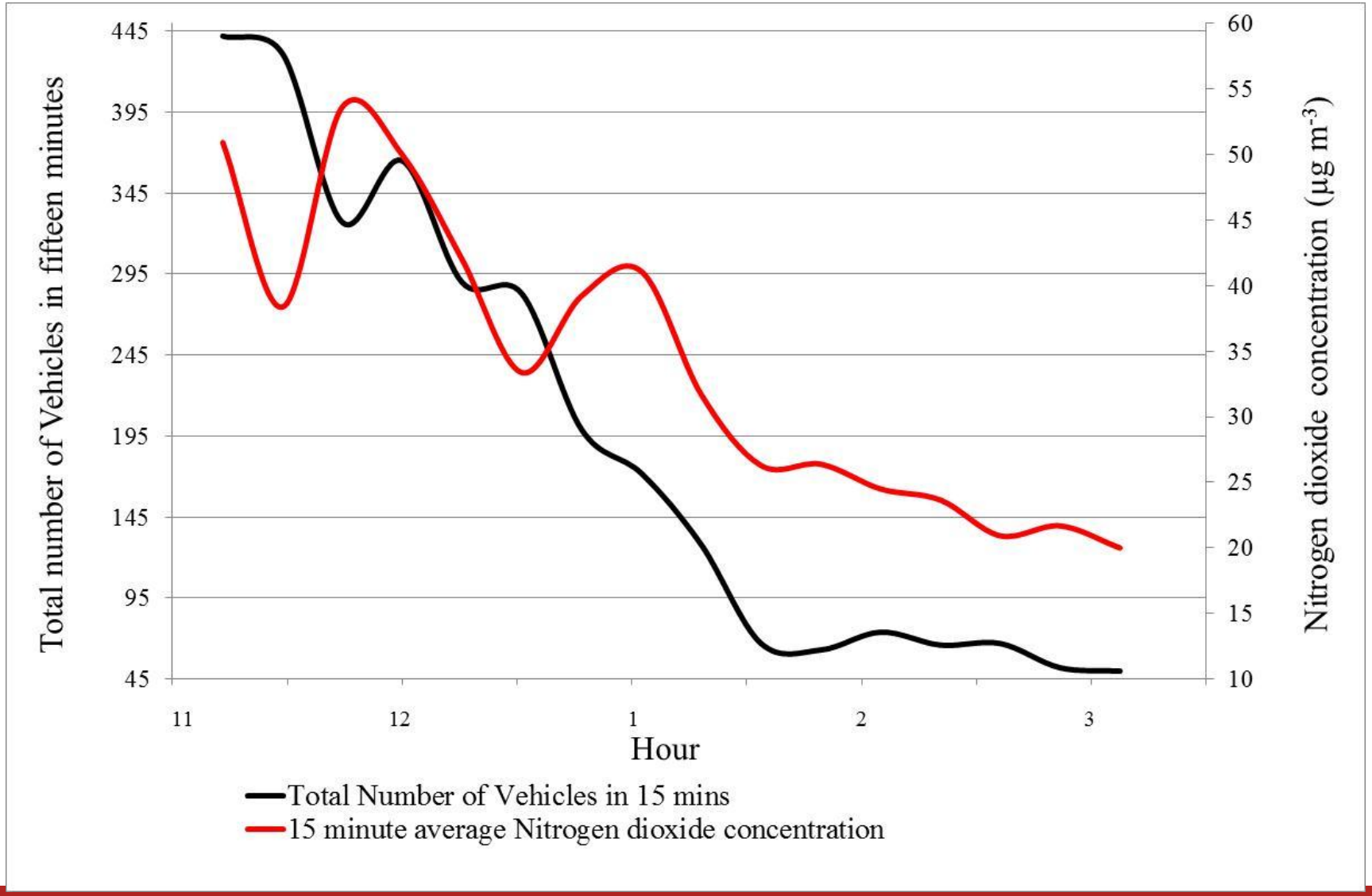
A strong correlation between traffic and NO_2

University of Malta
L-Università ta' Malta



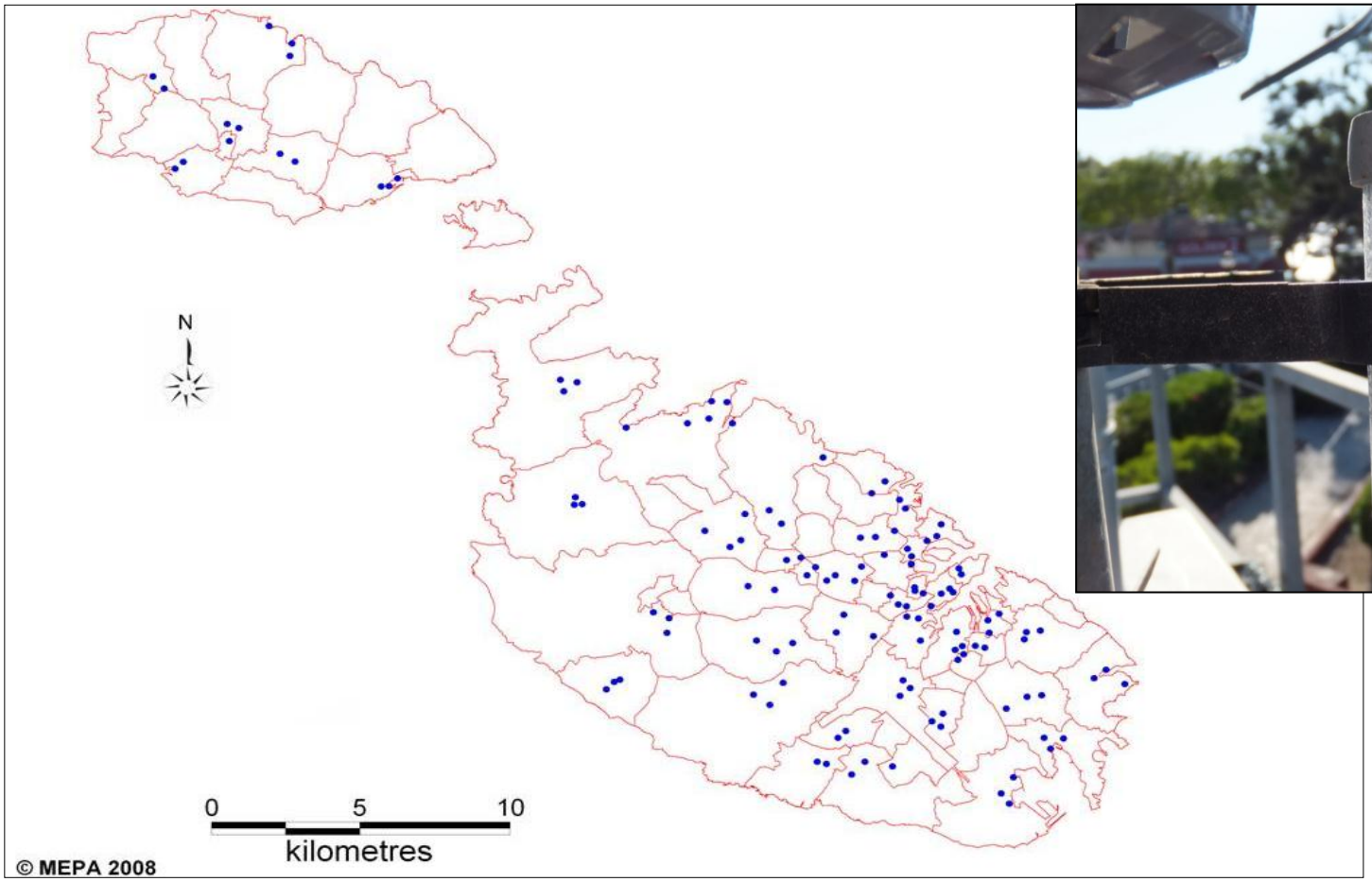
University of Malta
L-Università ta' Malta

Measurements Made during the Night



Analysis of the Spatial Distribution of NO_2

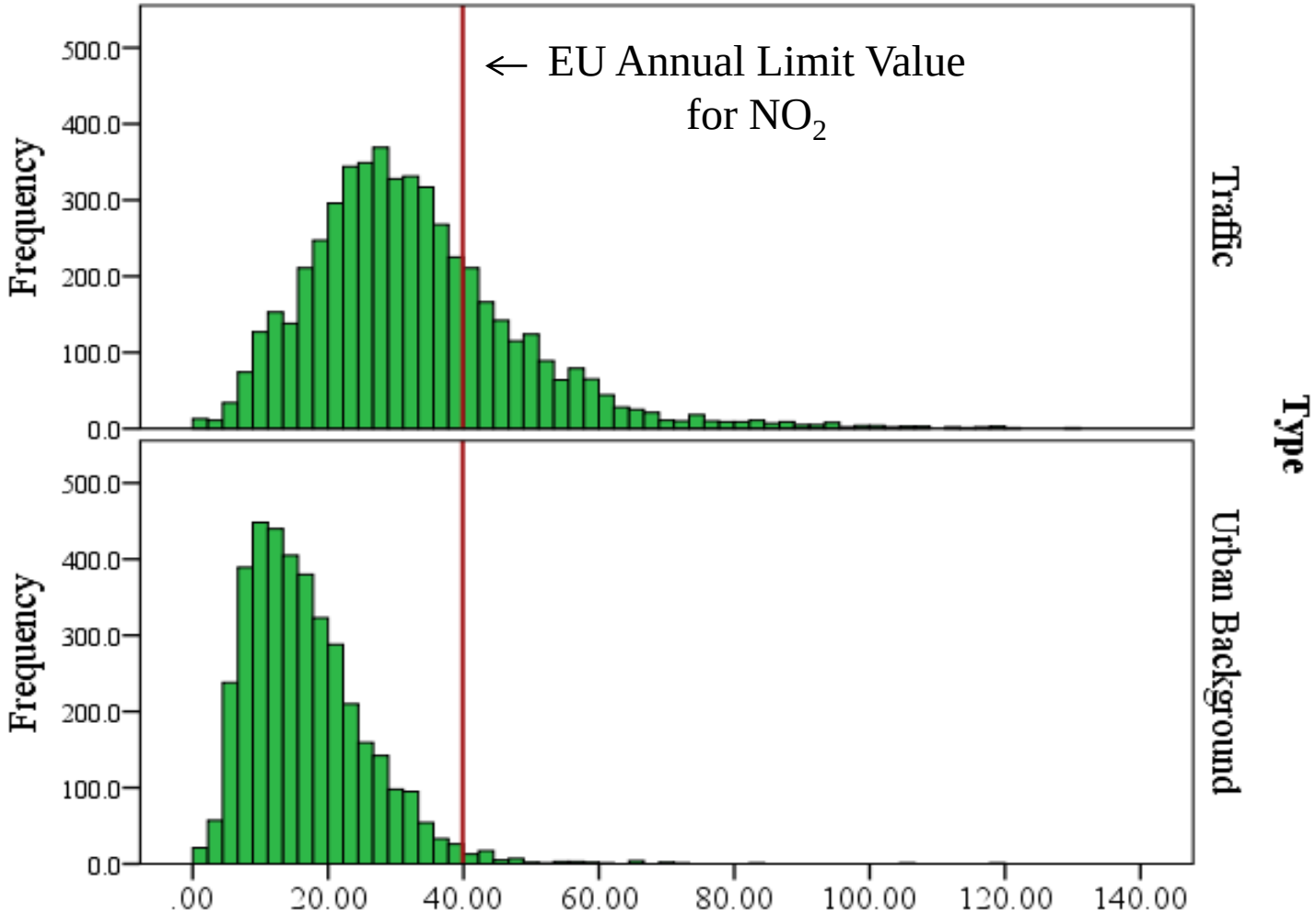
University of Malta
L-Università ta' Malta



Data from MEPA's diffusion tube was used as the basis for spatial analysis

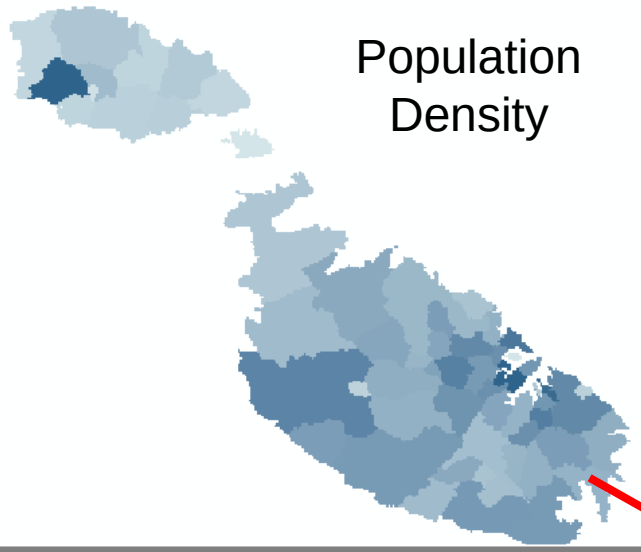
NO_2 Concentrations at different site types

University of Malta
L-Università ta' Malta



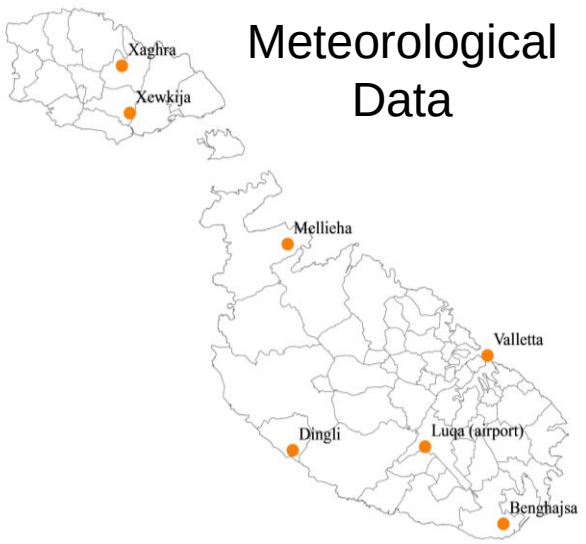
Nitrogen dioxide surface maps from point data

Population Density



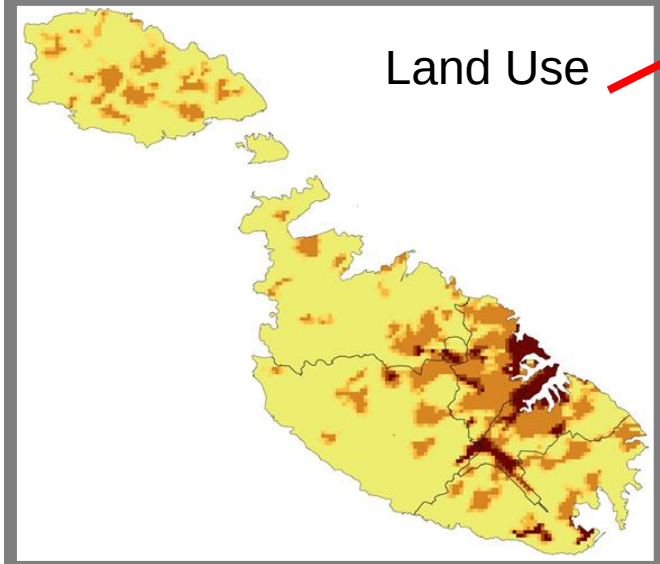
Nitrogen dioxide point data

Meteorological Data



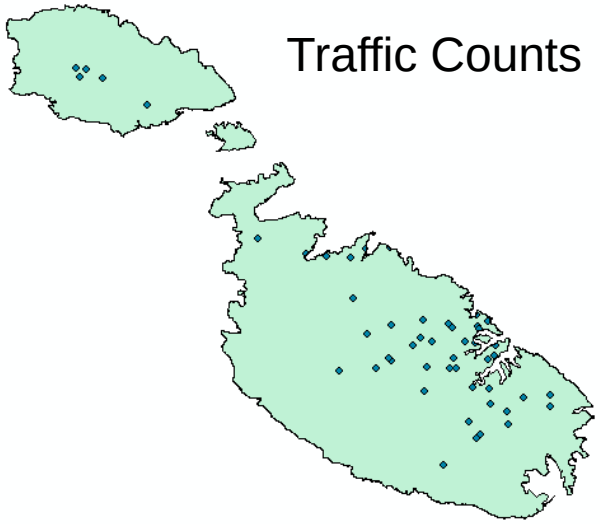
Geographic Information Systems (GIS)

Land Use

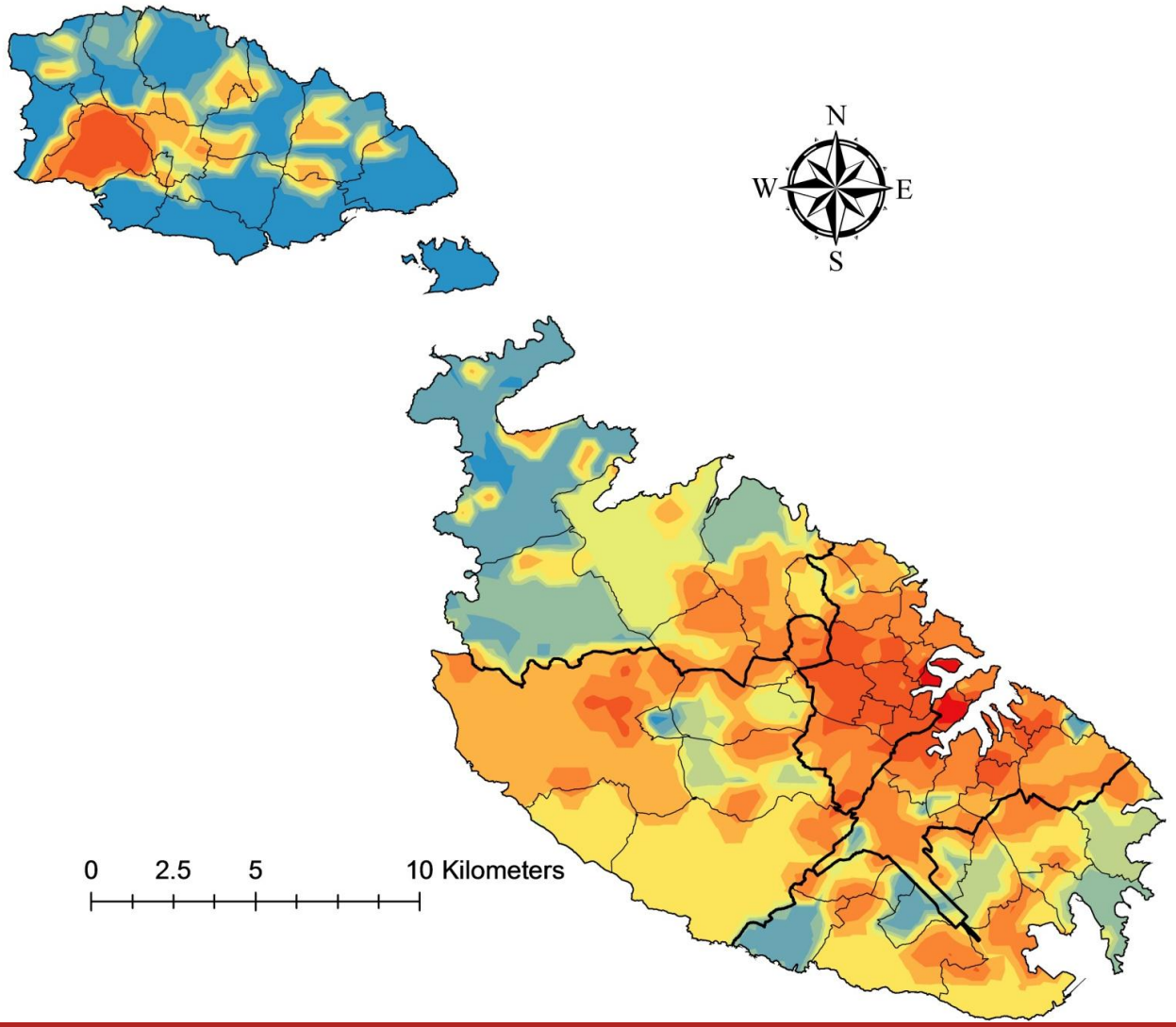


Pollution Surface Maps

Traffic Counts



Results
for the traffic environments



University of Malta
L-Università ta' Malta

Legend

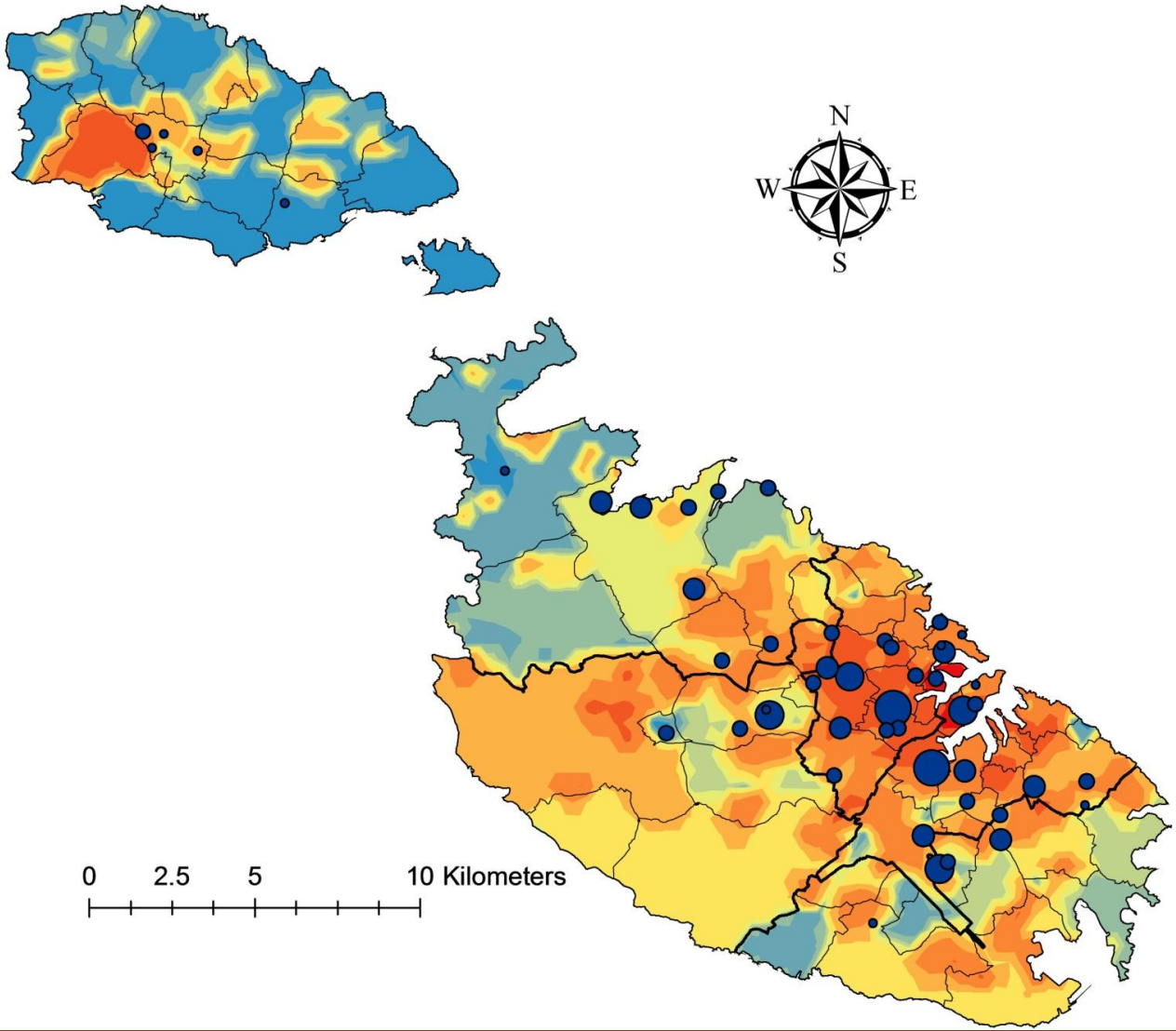
Nitrogen Dioxide Concentration

- 11.33 – 13.48
- 13.48 – 14.64
- 14.64 – 15.27
- 15.27 – 15.61
- 15.61 – 16.23
- 16.23 – 17.39
- 17.39 – 19.54
- 19.54 – 23.55
- 23.55 – 30.99
- 30.99 – 44.82

Local Council Boundaries

Malta Districts

Results



University of Malta
L-Università ta' Malta

Legend

Nitrogen Dioxide Concentration

- 11.33 – 13.48
- 13.48 – 14.64
- 14.64 – 15.27
- 15.27 – 15.61
- 15.61 – 16.23
- 16.23 – 17.39
- 17.39 – 19.54
- 19.54 – 23.55
- 23.55 – 30.99
- 30.99 – 44.82

Daily Traffic Counts

- 729 - 8318
- 8319 - 21550
- 21551 - 34230
- 34231 - 57368
- 57369 - 95410

Local Council Boundaries

Malta Districts

Actions aimed at reduction of NO_2 Levels are already in place:

University of Malta
L-Università ta' Malta

1. Emission testing in road transport (VRT)
2. Higher registration tax for second hand cars
3. Lower registration tax for electrical vehicles
4. Car scrappage scheme

5. Emission Alert Campaign
6. Park and Ride and Controlled Vehicular Access projects
7. Public transport reform

Proposals for better Air Quality

University of Malta
L-Università ta' Malta

1. Private sector involvement to promote modal shift. (e.g. provision of transport to and from work and incentives to promote car sharing)
2. Introduction of teleworking facilities
3. Reintroduction of public transport regional hubs which would lessen the dependence on Valletta terminus
4. Development of programmes that encourage other forms of transport e.g. cycling

University of Malta
L-Università ta' Malta

Thank You