



REPUBLIKA SLOVENIJA
MINISTRSTVO ZA KMETIJSTVO IN OKOLJE
AGENCIJA REPUBLIKE SLOVENIJE ZA
OKOLJE

Pollutant levels in Slovenia

sources of elevated levels and their identification

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Outline

- Specific national circumstances
- AQ assessment legal framework
- AQ assessment regime
- AQ monitoring network
- Pollutant levels
- AQ (source) dispersion modelling
- AQ receptor modelling
- Source attribution

Specific national circumstances

Unfavourable dispersion conditions

- low wind speed (continental part ≈ 1 m/s)
- frequents and pronounced temperature inversions (Ljubljana 180 fog days)
- cities and settlements in closed basins and valleys

Residential heating – widespread use of wood in outdated appliances

Dispersed population and decline of the public transport in the past - intense local traffic

Pronounced transit road traffic

2 million inhabitants, 20.000 km²



AQ assessment legal framework

Environmental protection act:

- monitoring is mainly responsibility of the government,
- local authorities may perform additional monitoring,
- polluters might be required to perform monitoring of their impact.

AQ decree - Environmental agency is responsible for:

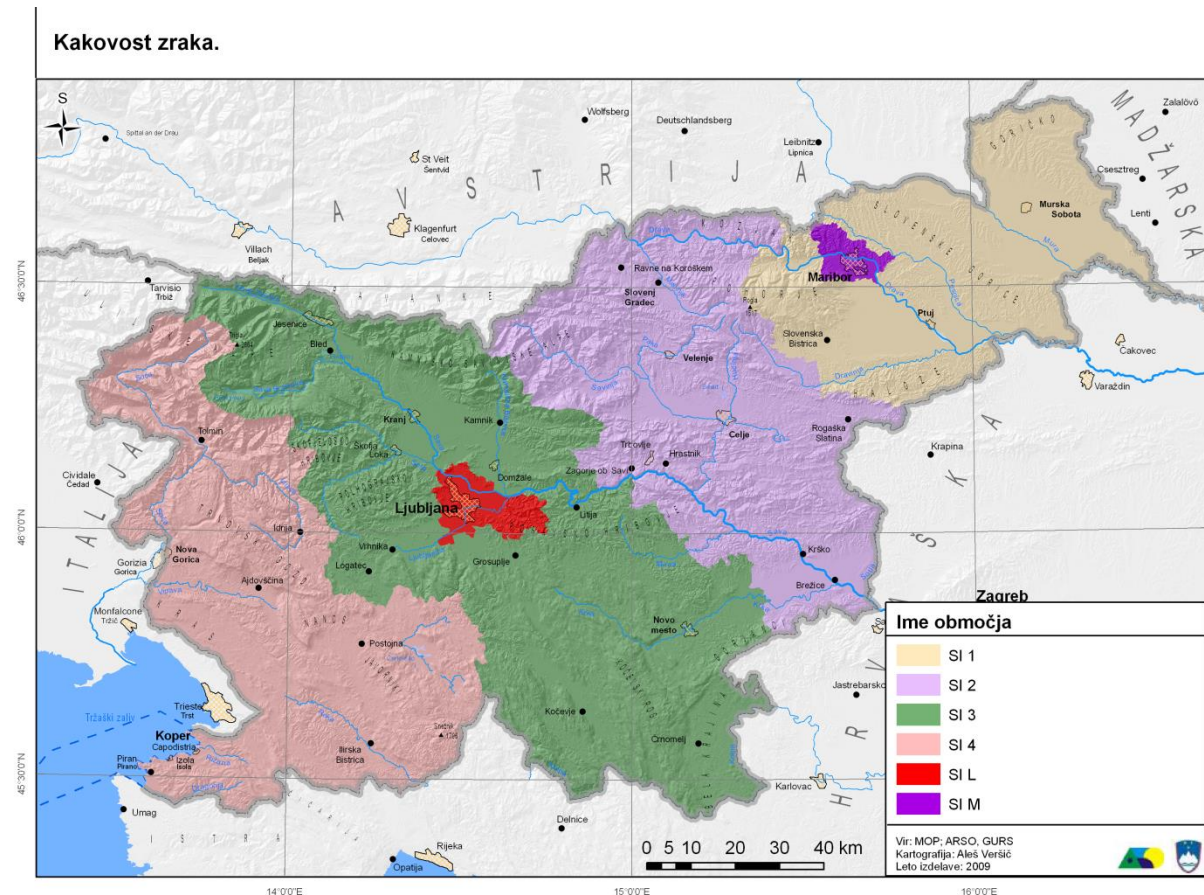
- assessment of ambient air quality;
- approval of measurement systems (methods, equipment, networks and laboratories);
- ensuring the accuracy of measurements;
- analysis of assessment methods;
- local coordination of Community-wide quality assurance programmes.

AQ assessment regime (1)

Zones and agglomerations

4 zones;
3.000 - 6.000 km²,
300.000 – 600.000 inh.

2 agglomerations
300.000 and 100.000
inhabitants



AQ assessment regime (2)

AQ assessment 2010 (2005-2009 data)

CO: below LAT

NO_x: below LAT

SO₂, mainly below LAT

HM: below LAT, hotspot

benzene : agglomerations between LAT and UAT, zones below LAT

BaP: agglomerations between LAT and UAT, zones below LAT

NO₂: agglomerations between LAT and UAT, zones below LAT

Ozone: above UAT

PM₁₀ : above UAT

Reassessment 2015

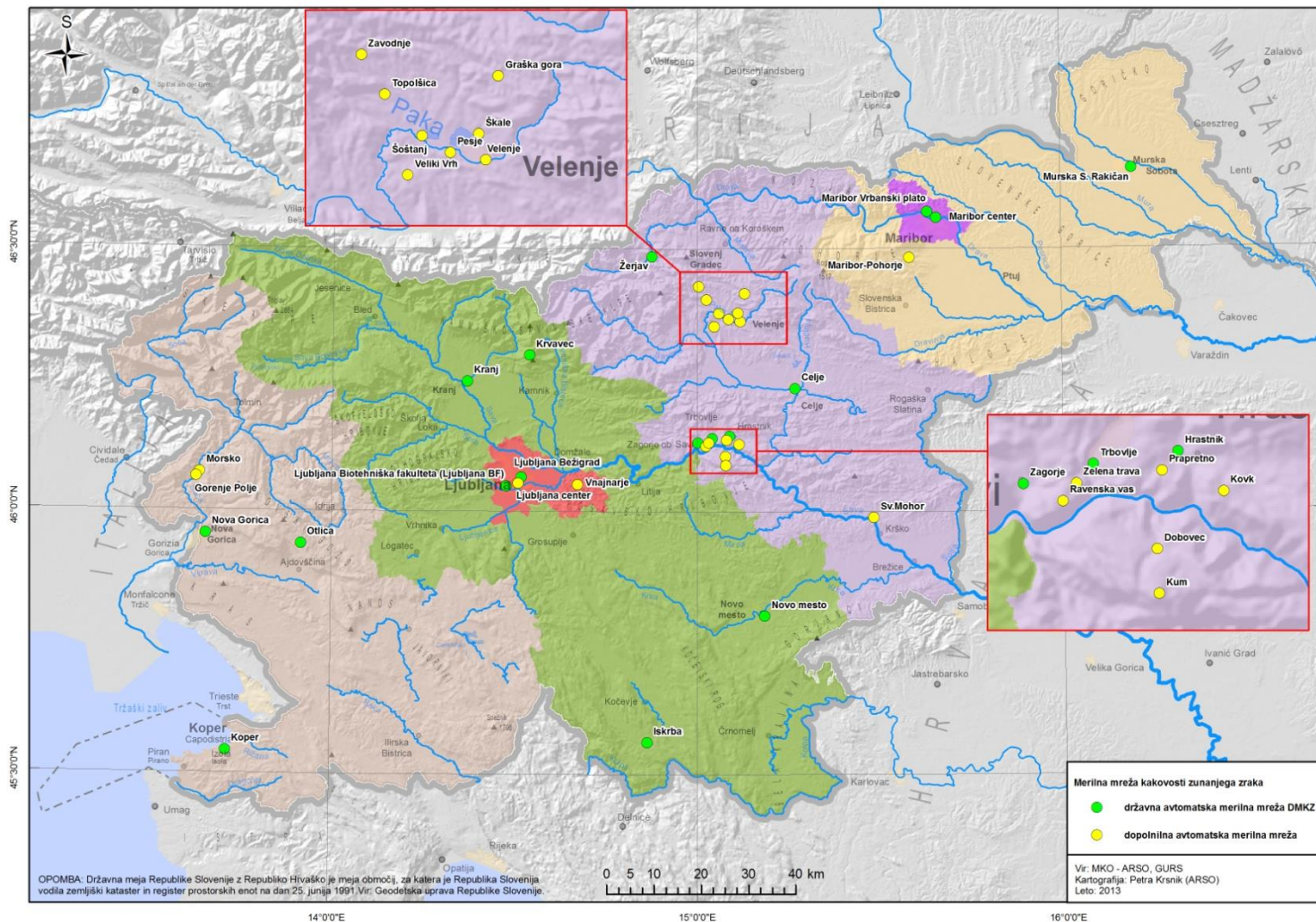
AQ monitoring network

Stations

17
Env.agency

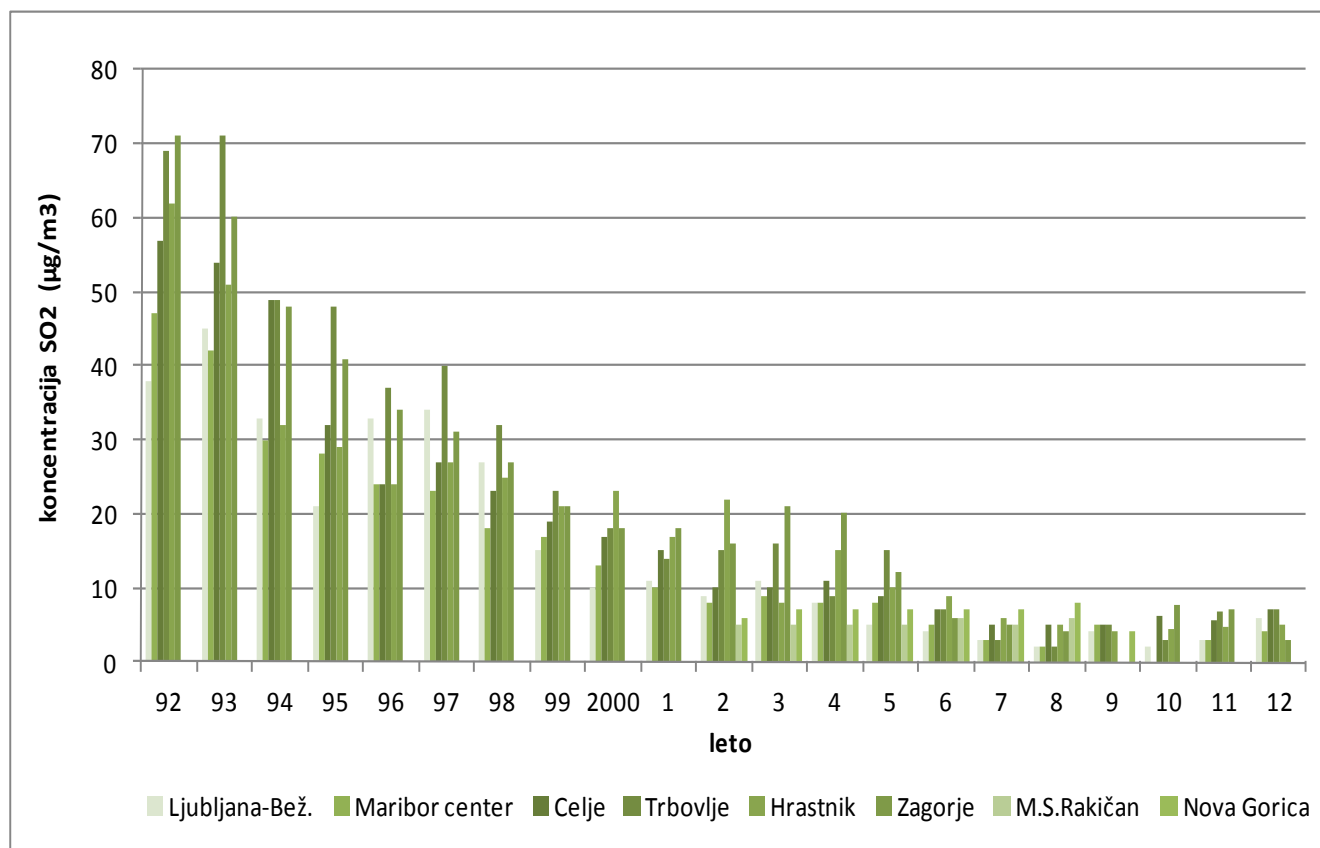
3
local
communities

17
industry



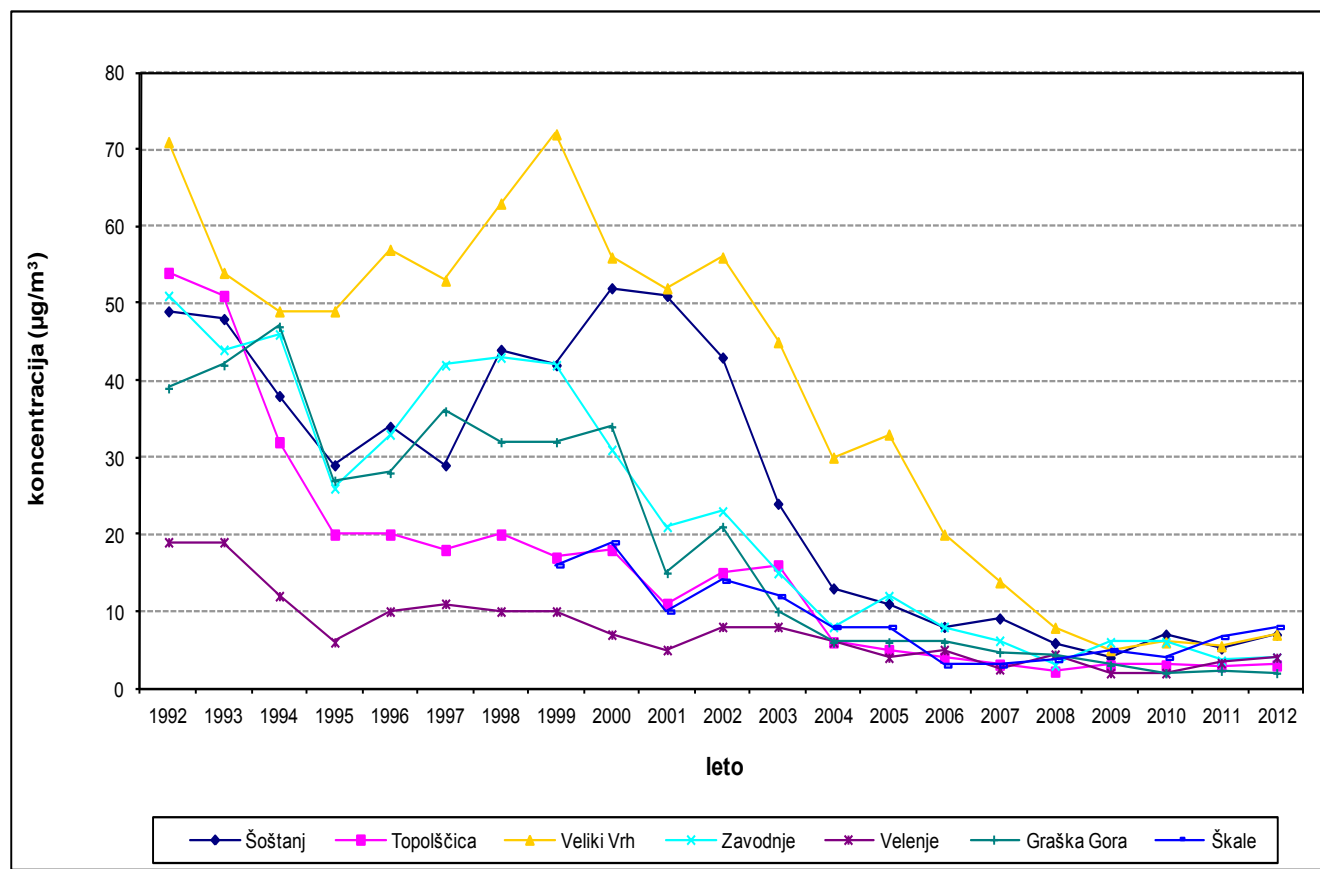
Pollutant levels - SO₂

Urban stations - yearly average values

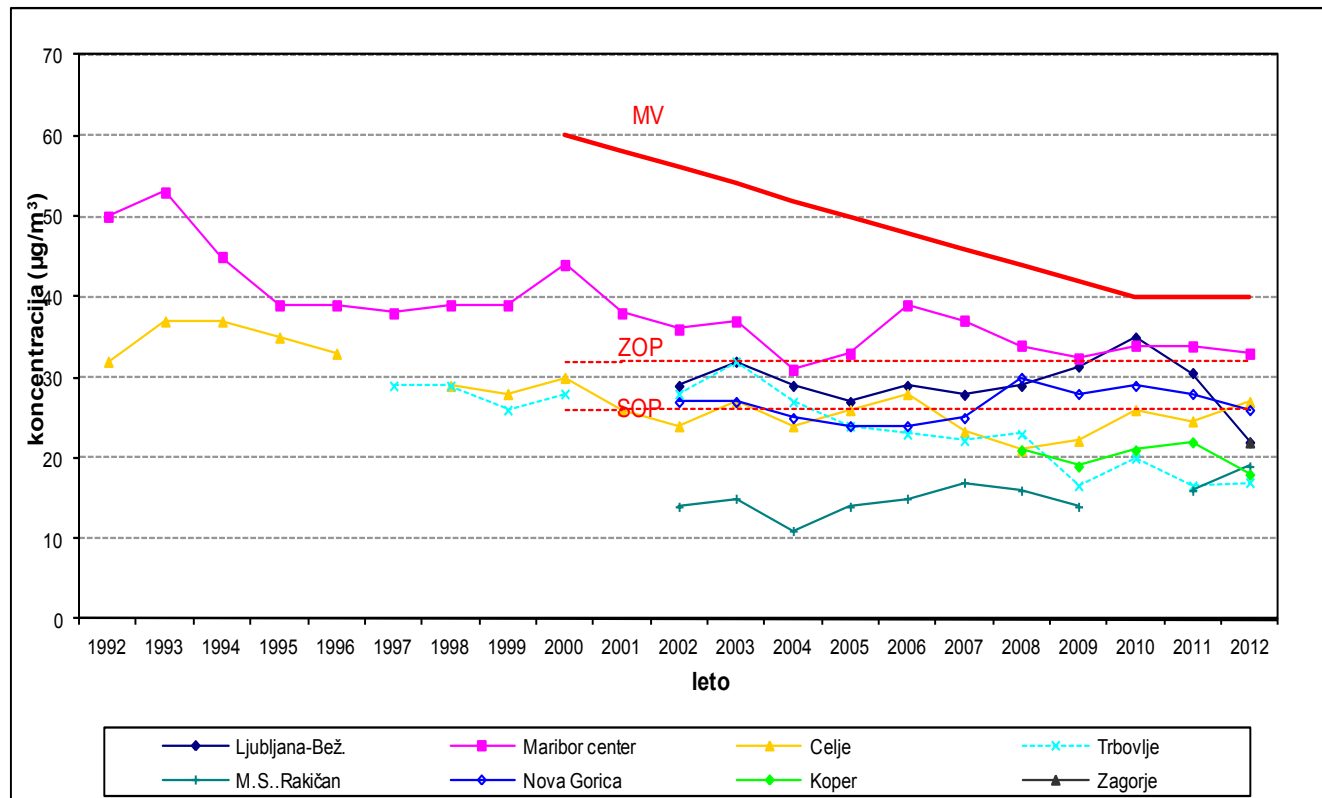


Pollutant levels - SO₂

Power plant Šoštanj monitoring system - yearly average values

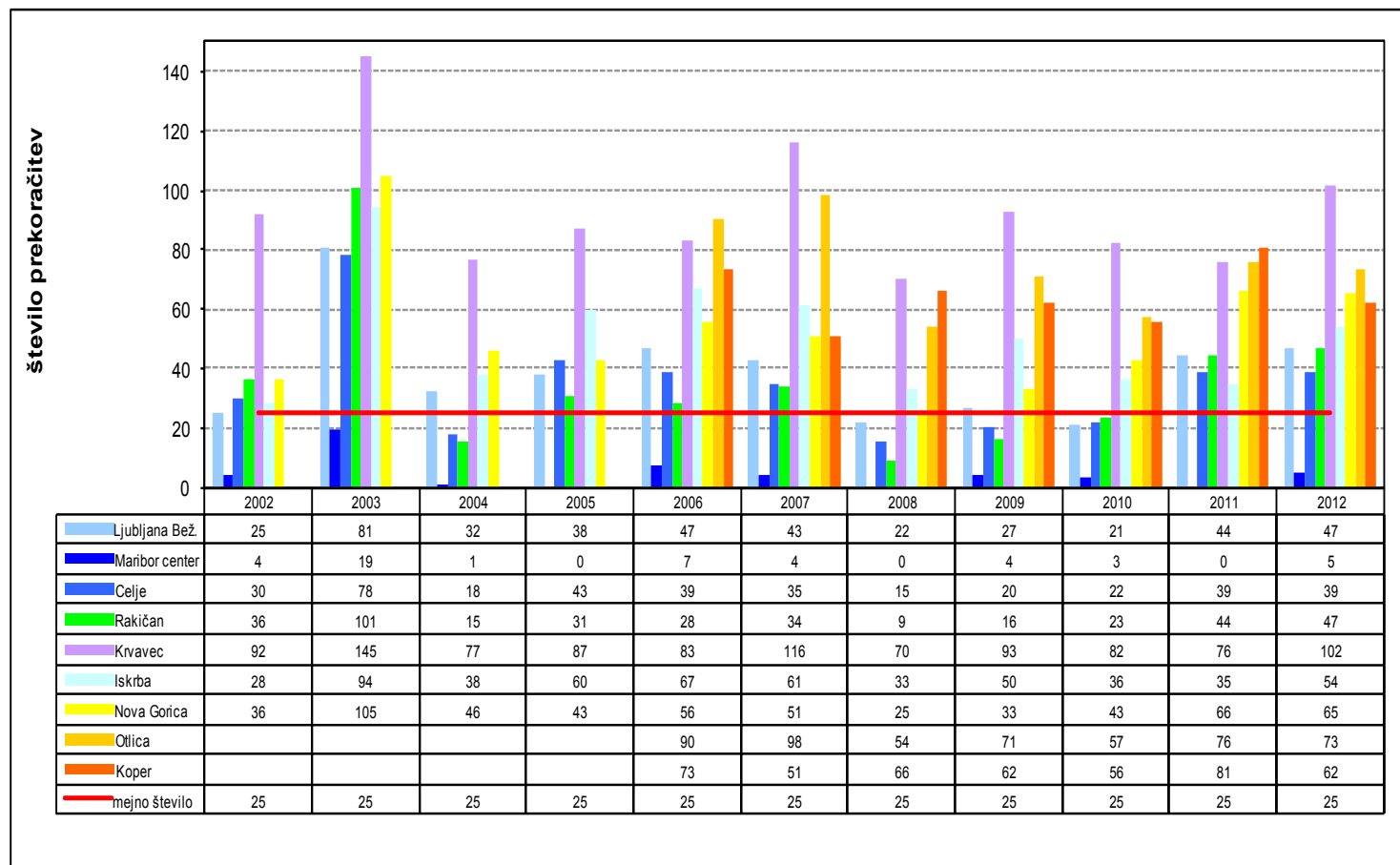


yearly average values



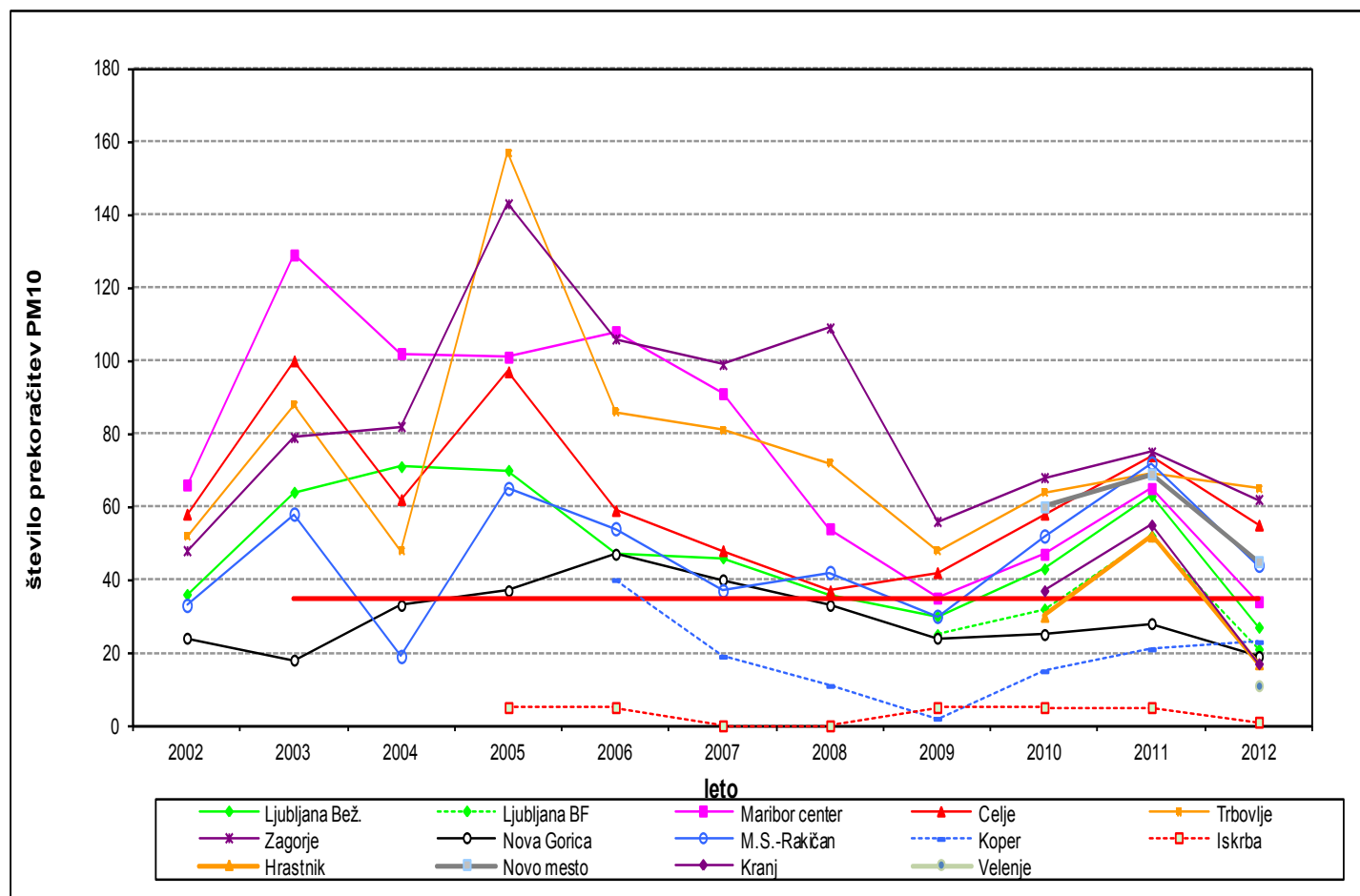
Pollutant levels - O₃

8 hour target value – number of exceedances



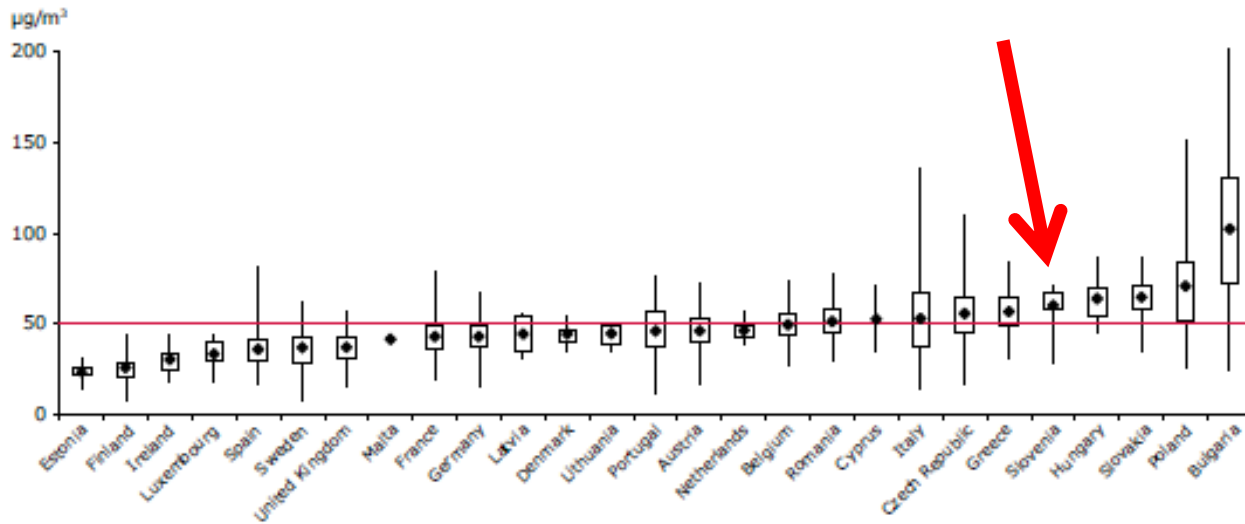
Pollutant levels – PM₁₀

Daily limit value- number of exceedances



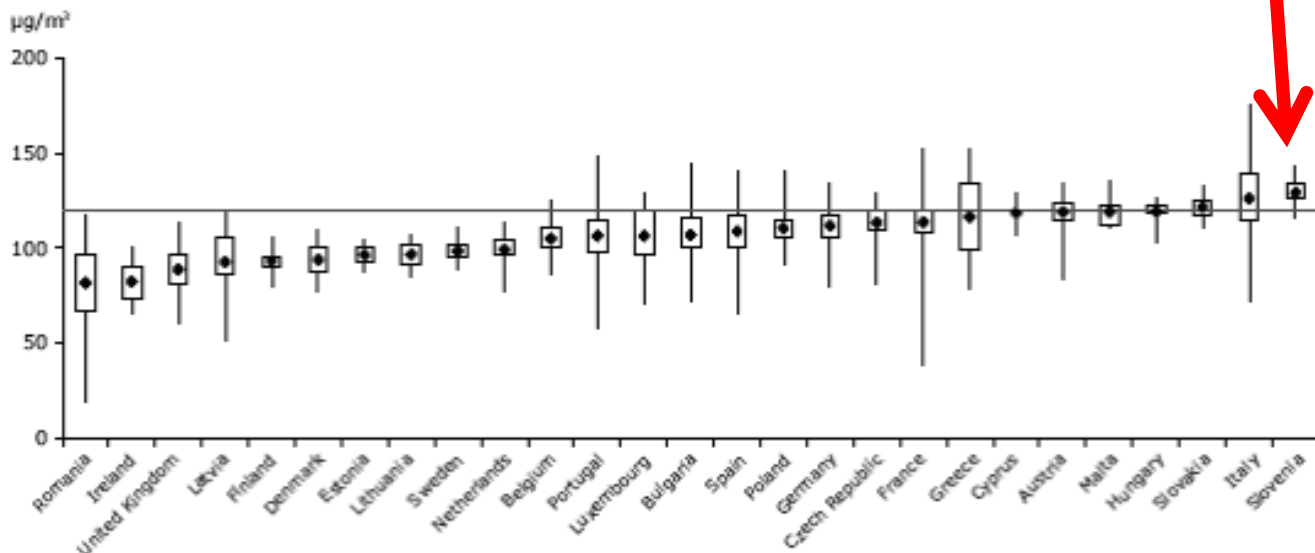
EU comparisson

Figure 2.3 Attainment situation for PM₁₀ in 2011



Source: EEA

Figure 3.2 Attainment situation for O₃ in 2011



Dispersion modelling

Point sources: regulatory requirements for bigger industrial sources

- Challenge due to complex terrain
- Meteo input data
- Interpretation of the results

Regional photochemical dispersion modelling

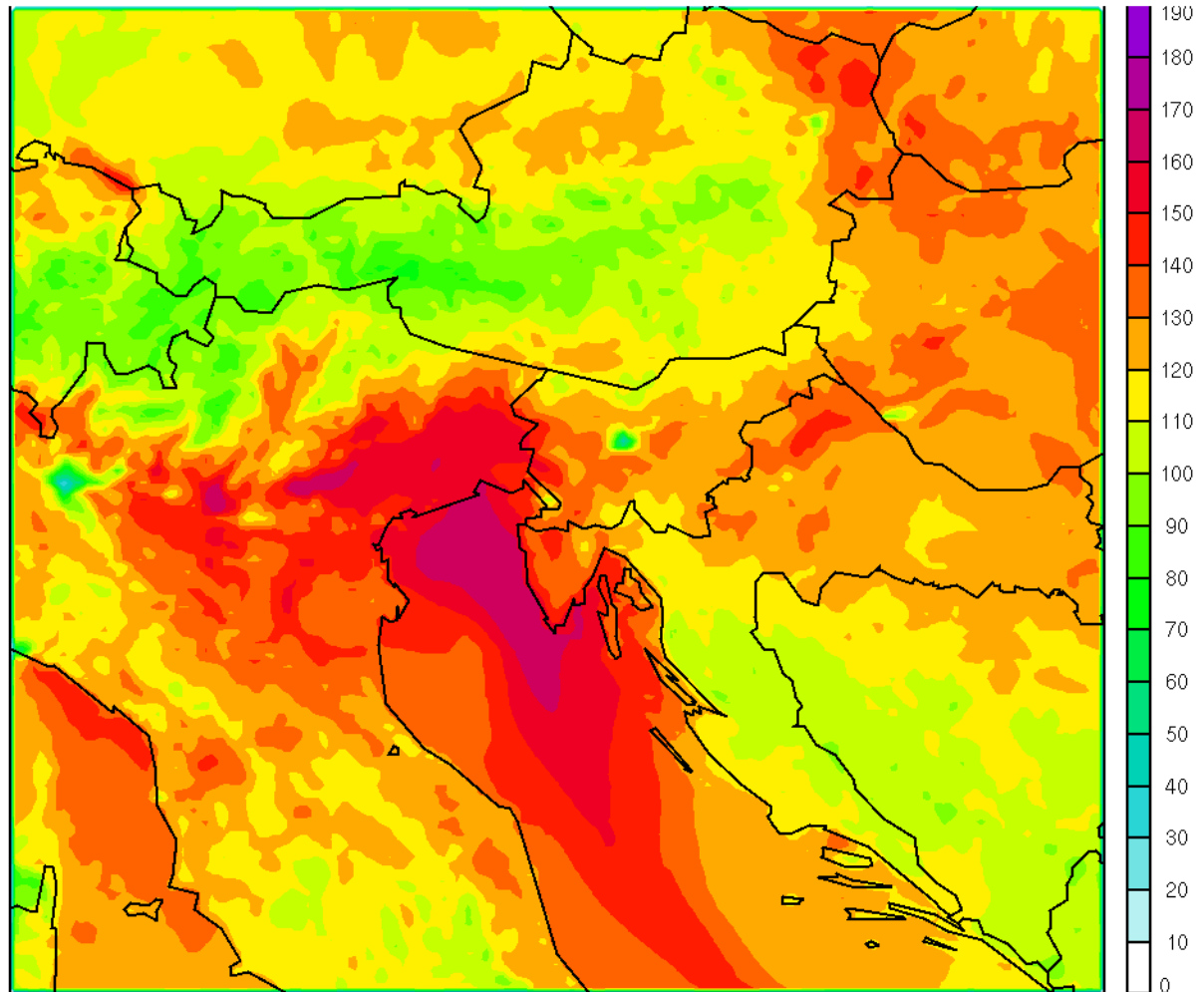
- CAMx model pilot phase implementation at the Agency 4 km resolution
- Meteo input – ALADIN , emissions national + MACC
- To be operational next year

Urban scale

- Limited application up to now
- Main problem: emission inventories and meteo data
- Assimilation of measured meteo data seems to be essential

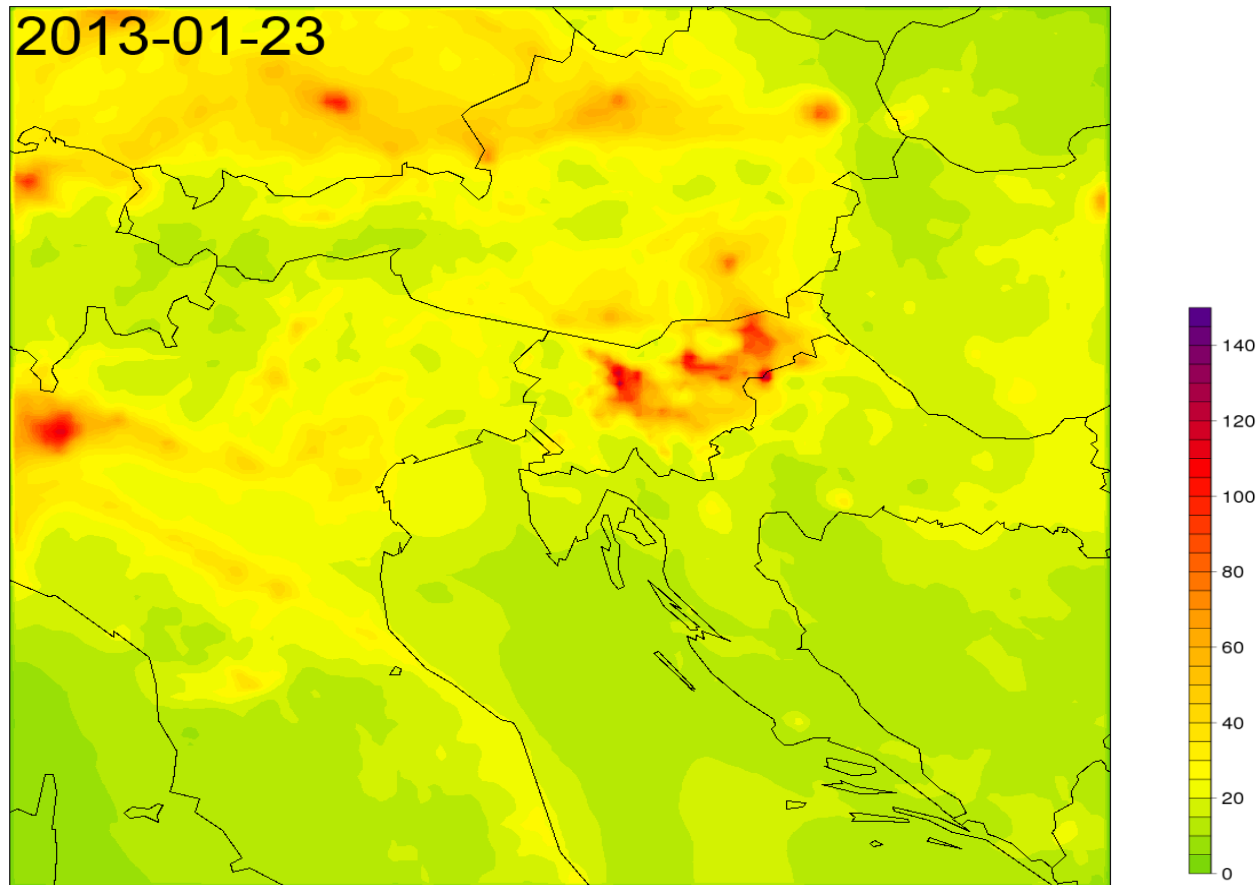
Dispersion modelling

CAMx model run: O₃ concentrations field 26.7.2013 12-13 UTC



Dispersion modelling

CAMx model run: PM₁₀ daily values 23.1.2013

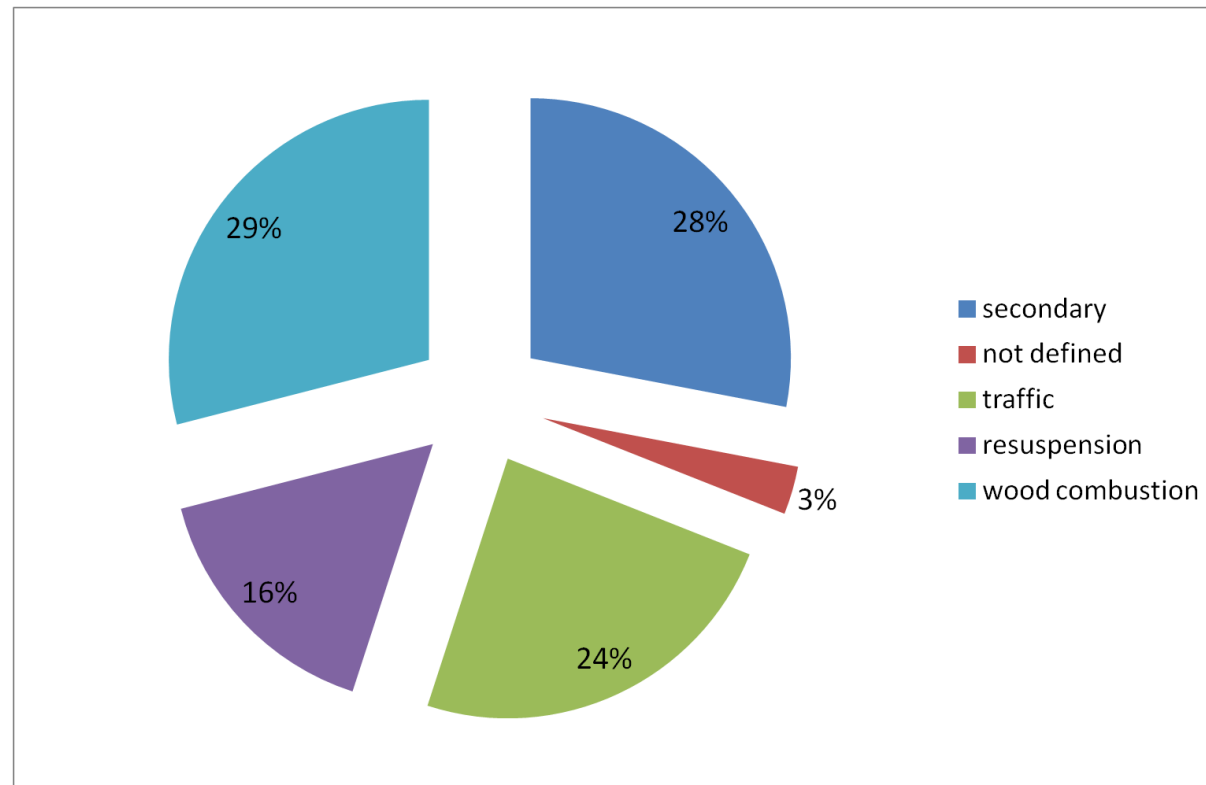


PM₁₀ receptor modelling

- attributes the contribution of the different sources to the level at a given receptor site
- elemental and chemical composition required
- no need for emission inventory& meteo data
- low computational requirements

PMF model results
for Ljubljana 2010

**JRC Source
apportionment guide !**



PM₁₀ source attribution

PM₁₀ emissions in Slovenia

