Environmental friendly technologies
KEE/ENT

ESF II project of the University of West Bohemia in Pilsen

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Lecture 8

Decreasing emission from burning fossil fuels

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Main instances monitored in CR

Imission limits for health protection

- SO2
- NO2
- CO
- Suspended fractions PM10 a PM2,5
- Benzen

- Target imission limits for health protection
- Ground ozon
- Heavy metals
  - Pb, Cd, As, Ni

Benzo and pyren

- Another substances
  - Hg, NH3

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Main instances monitored in CR

Target imission limits for health protection

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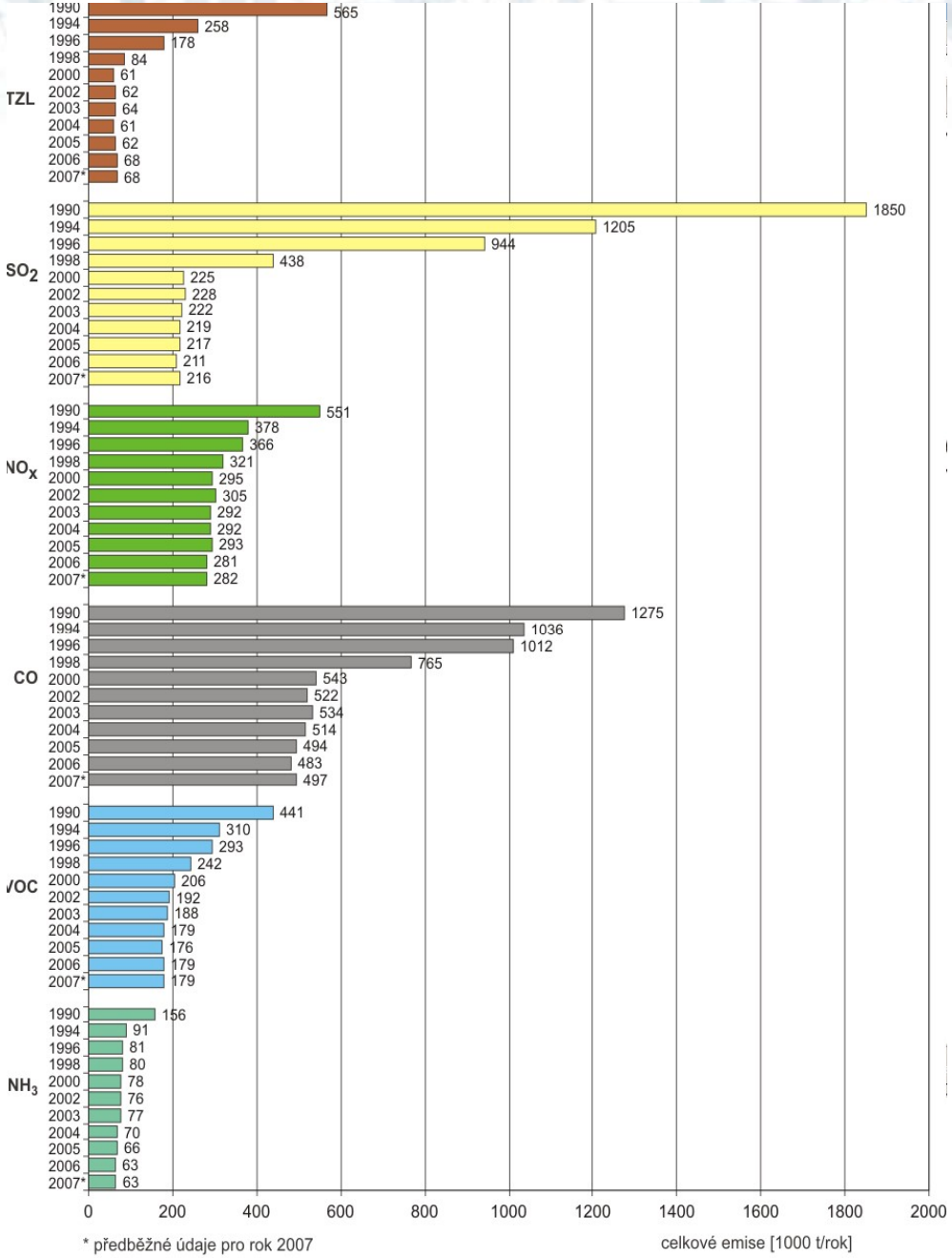
  Pb, Cd, As, Ni

Benzo and pyren

- Another substances

  Hg, NH3

Total imissions in CR



SO_2

Sources

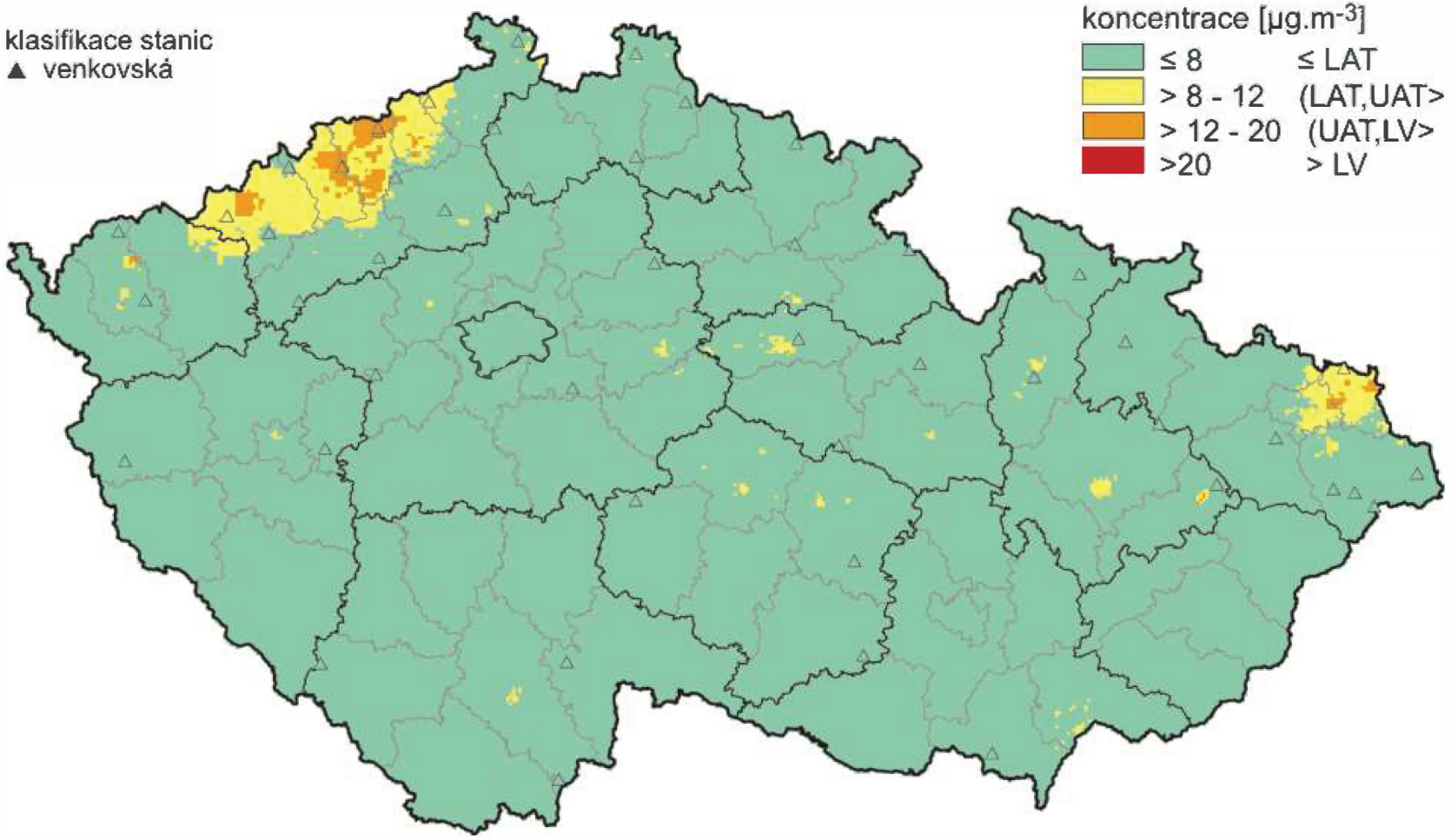
- **natural**

-volcanic gases
-volcanic liquids
(H_2SO_3)

- **antropogennous:**

-burning processes
(fossil fuels)
-industrial processes
-communal heating

One of the main substances of pollution in European cities!



Pole roční průměrné koncentrace oxidu siřičitého v roce 2007

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SO2 - imission limits

Imision limit for health protection
Hourly concentration: 350 µg· m-3 , max. 24 x year
Average 24 hours concentration: 125 µg· m-3 , max. 3 x year

The most affected area in CR is Ustecky region.

24h průměr [µg/m³]
daily average [µg/m³]

SO_2 2007

LV - 125 µg/m³



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NOx

-mixture of NO a NO2 (+ others)

Sources

- natural: earth substrate (decomposition of organic matter), ocean
- antropogennous: burning of liquid fuels

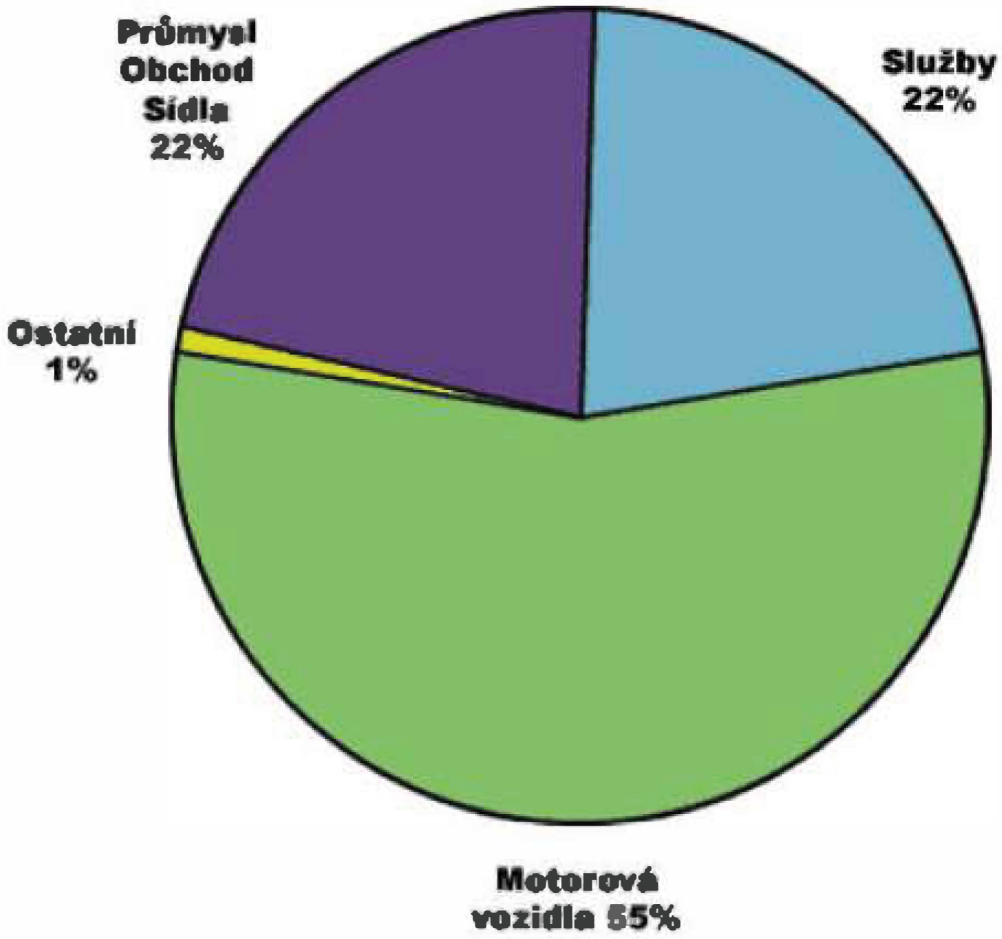
Fast conversion to NO2 in atmosphere

- The main source is motor traffic!!!!!g

(55 % antropogennous Nox – burning quality fuels at high temperatures)

-chemical processes (artifitial accids, fertilizer production)

Antropogení zdroje NOx - 2003



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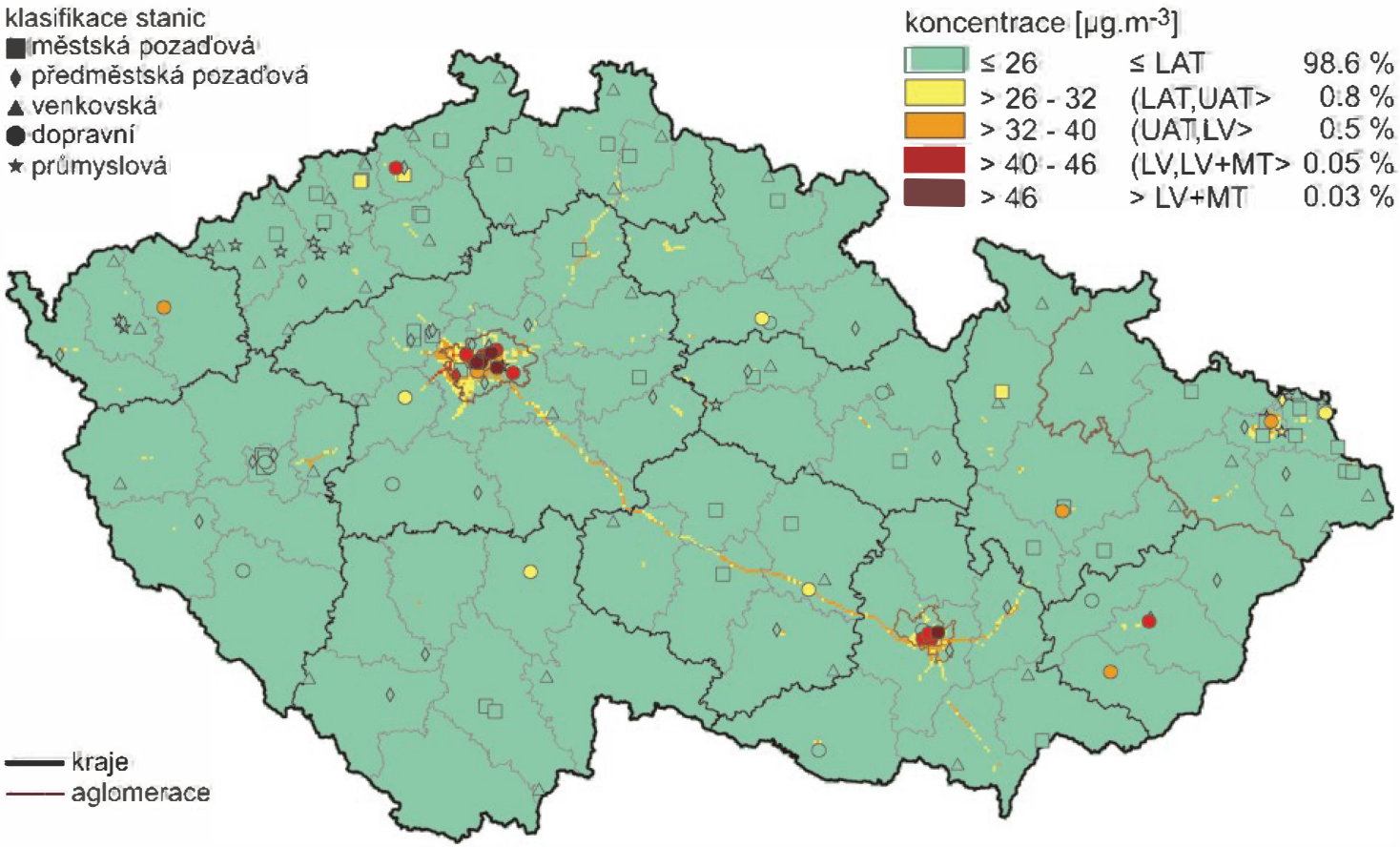
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Environmental influence
-acid rains (like SO_2)
-acidification of earth and water
-affecting surfaces of structures

-ground ozon
→ origin of photochemical smog

→ greenhouse gas
increasing climate temperatures

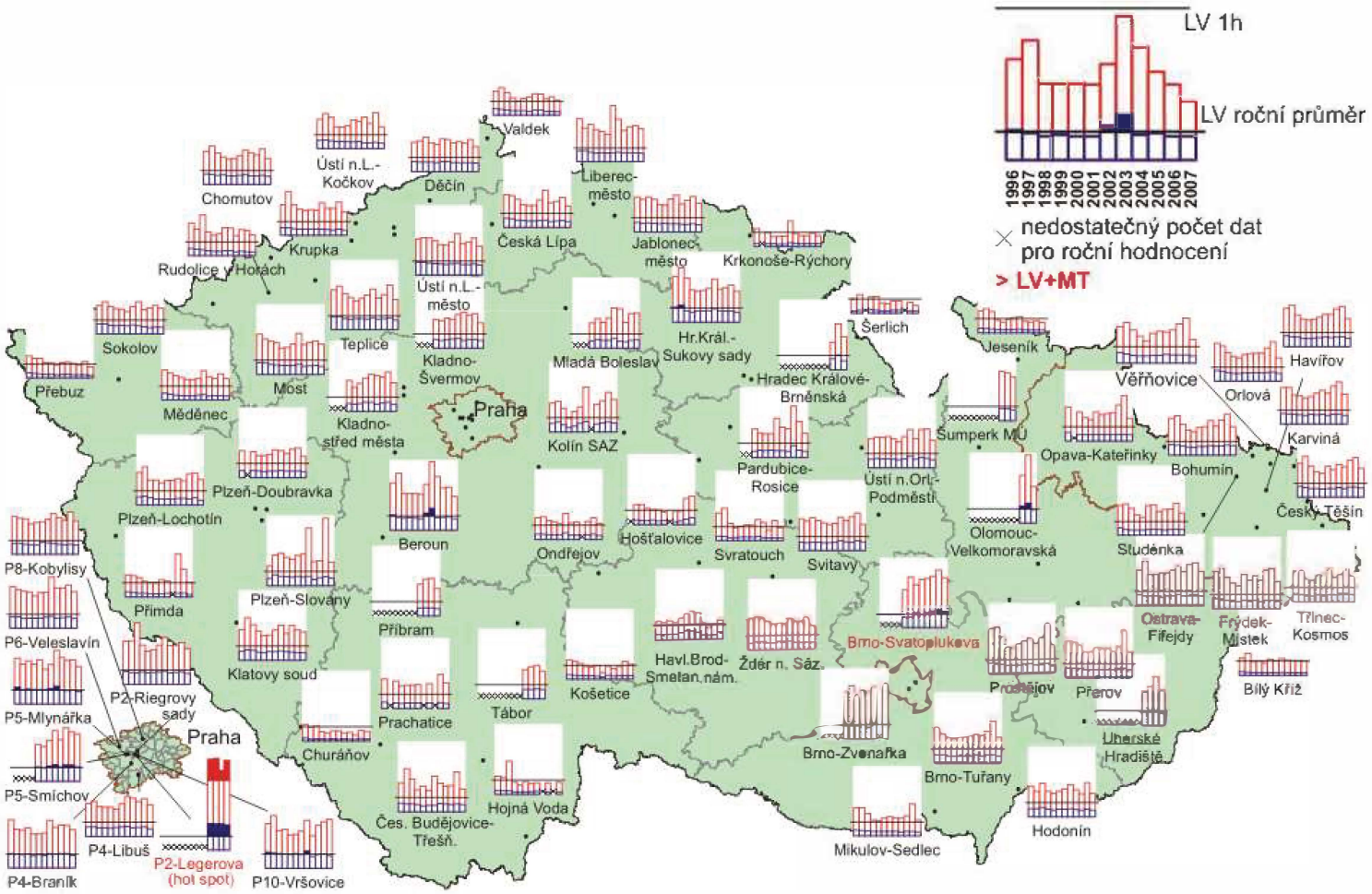
Influence on plants
➢Similar to SO_2



Pole roční průměrné koncentrace NO_2 v roce 2007

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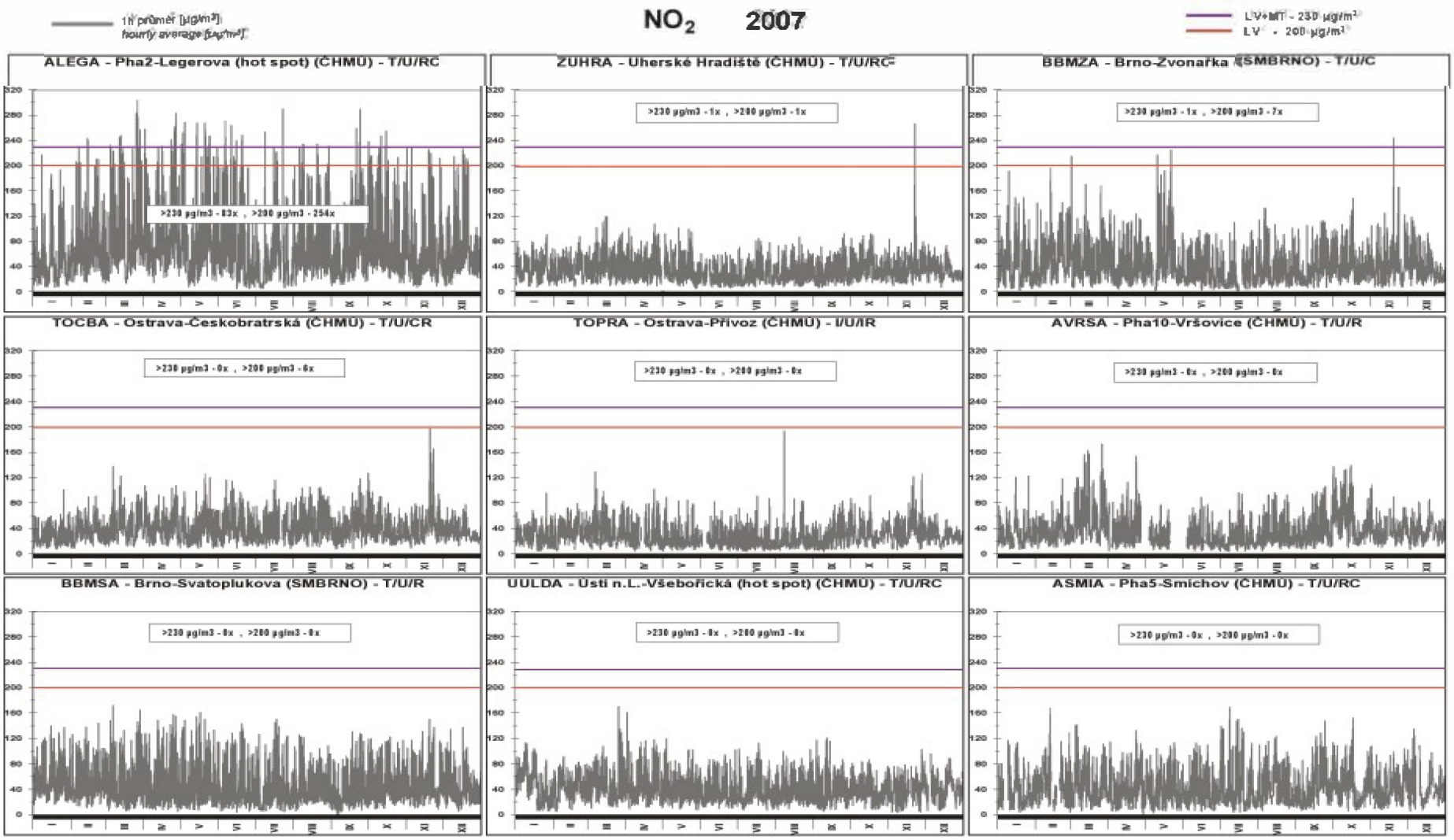
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19. nejvyšší hodinové koncentrace a roční průměrné koncentrace NO_2 v letech 1996-2007 na vybraných stanicích

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CO

High toxicity

One of the most important pollutants!!!!!!!!!!!!!

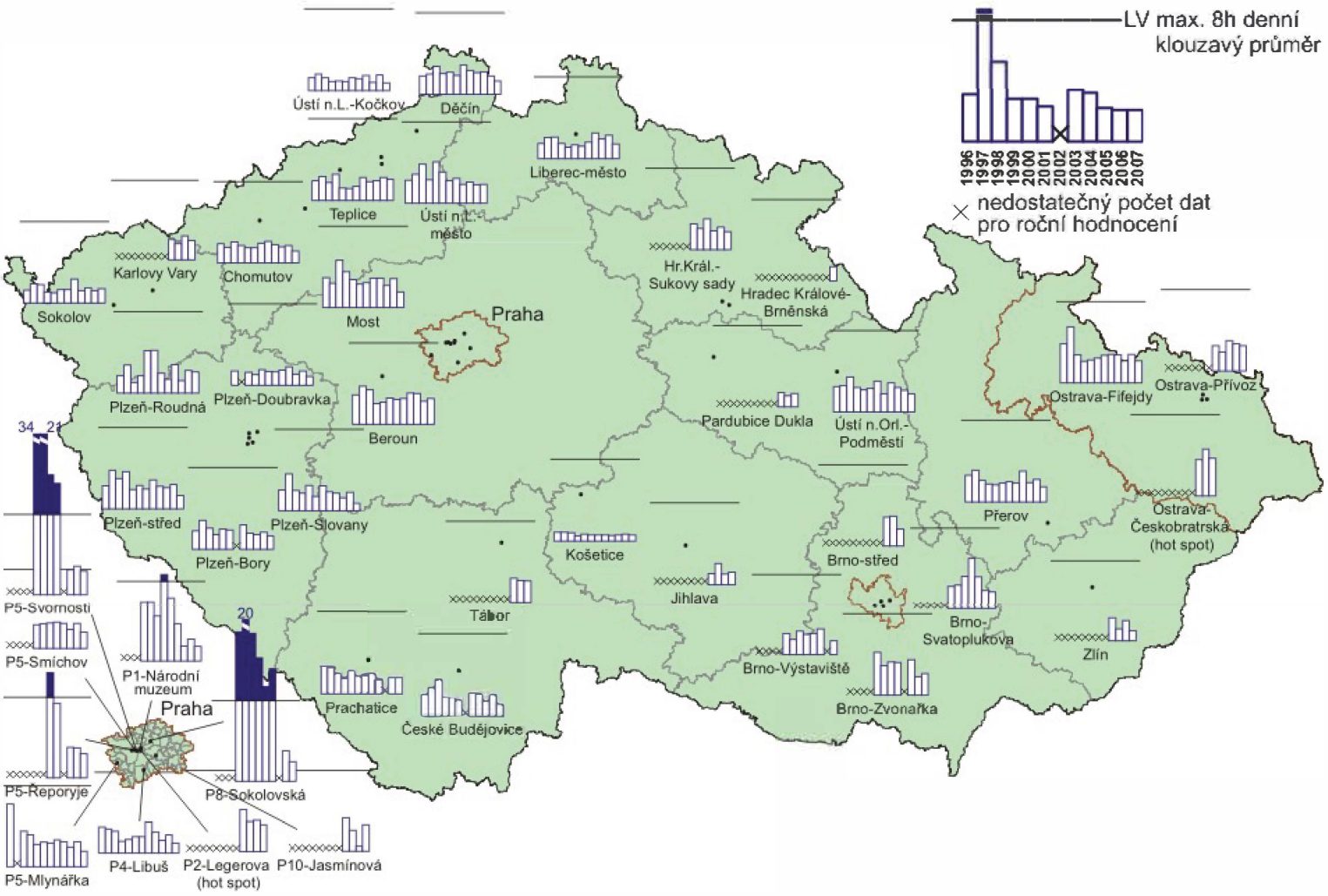
Influence on nervus and cardiovascular system

Degradation of hemoglobin
12x faster than O2

Blood poisoning – structurat degradation – dangerous!!!!!!!!!

Low concentration – headache
High concentration - death

At 1% composition of CO in atmosphere – 90% of hemoglobin is transformed to karboxyhemoglobin. Transformation of 70% means death !!!!



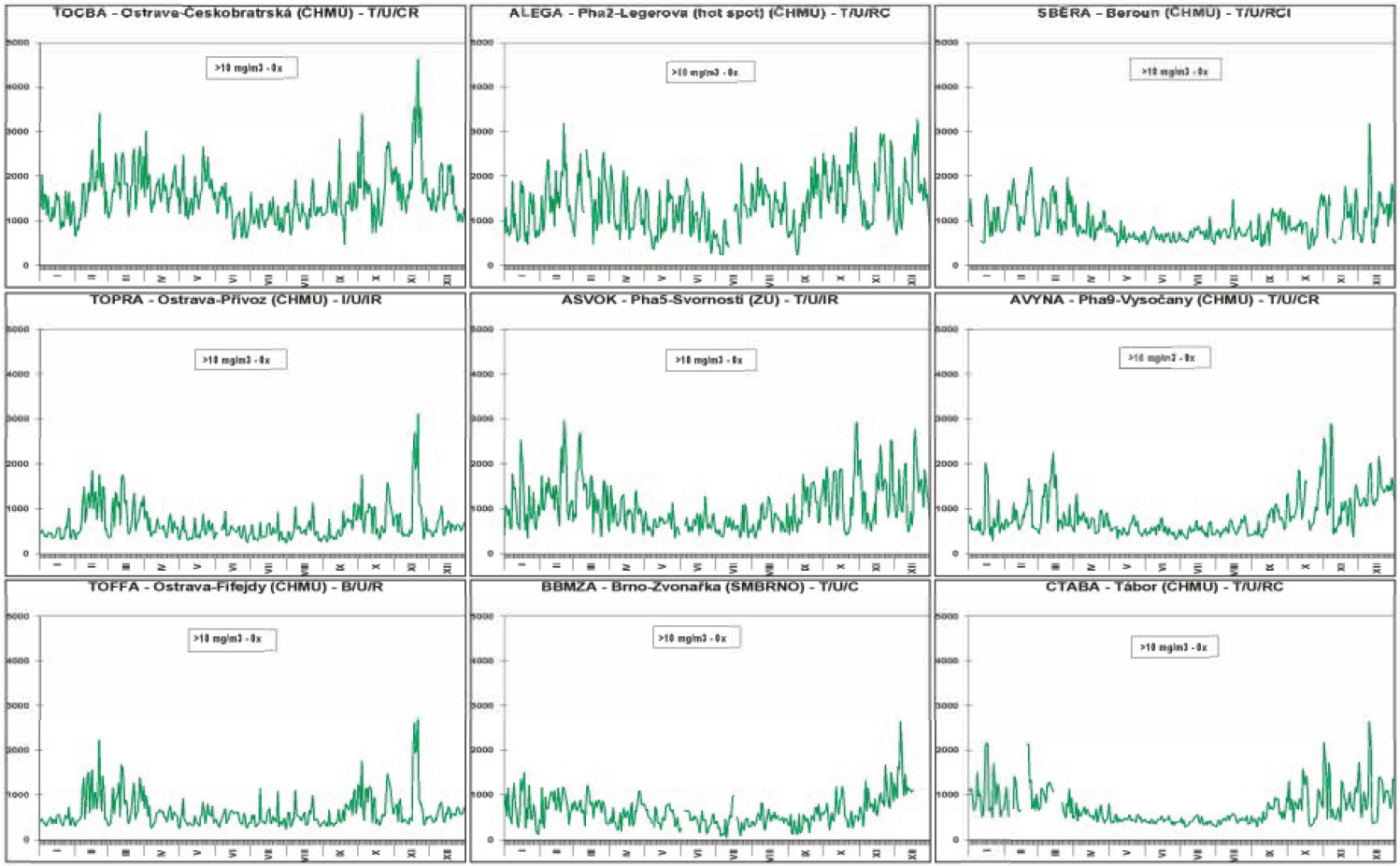
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8h max. klouzavý průměr za den [µg/m³]
8-hour max. running average by the day [µg/m³]

CO 2007

LV - 10000 µg/m³



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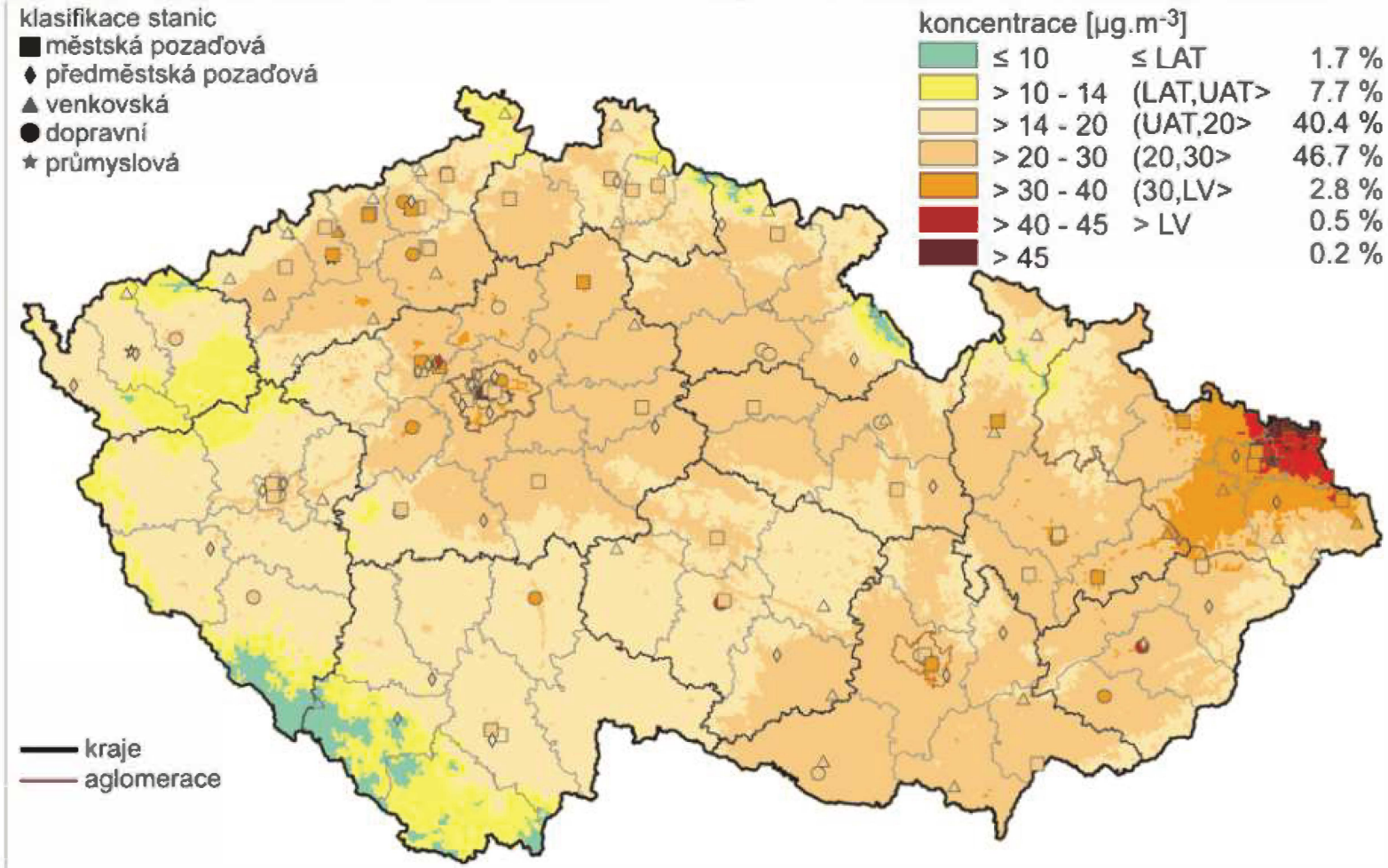
ARTIFITIAL AEROSOL
(Suspended fractions PM10 and PM2,5)

-solid harmful instances (TZL)
- One of the main pollutants in CR
- Increasing trend!!!!!

Sources:
Primary – emited directly to atmosphere - natural or antropogennous
Secondary – oxidation and reaction of gaseous instances in atmospere

➢natural
-volcanic activity, fires, ocean, earth processes

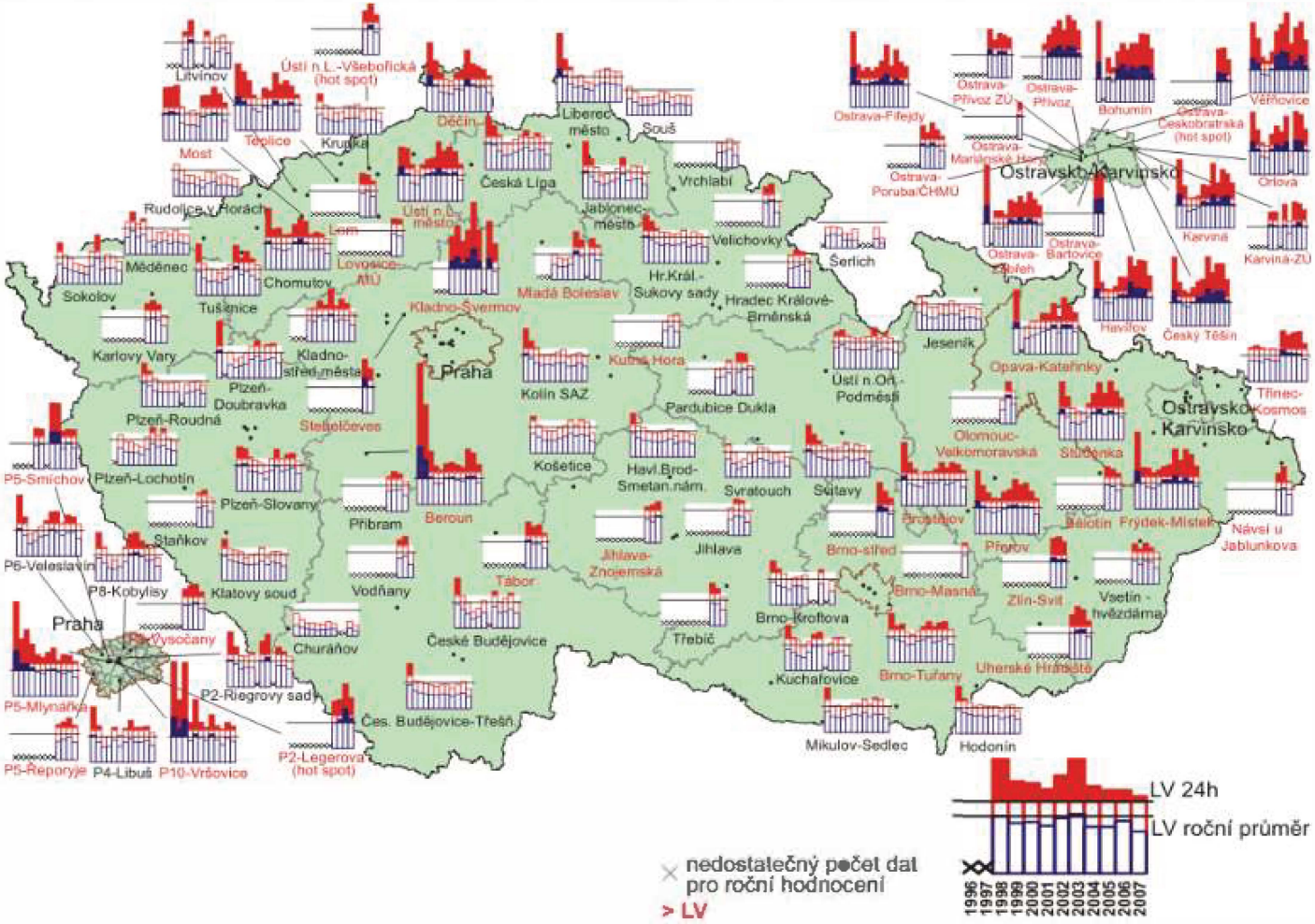
➢Antropogennous
-in Europe most intensive
-transportation, power stations, burning processes……



Pole roční průměrné koncentrace PM_{10} v roce 2007

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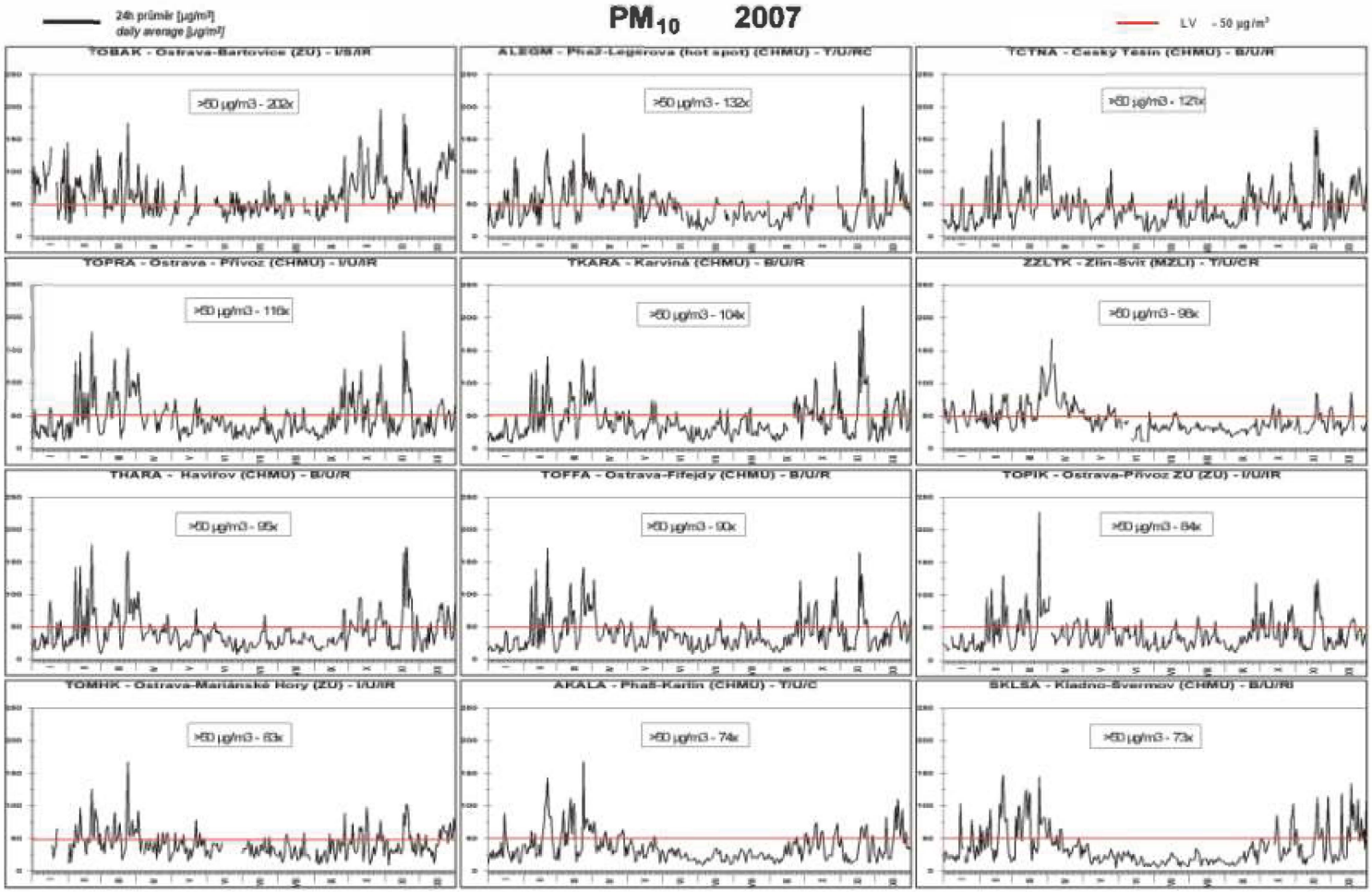
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36. nejvyšší 24hod. koncentrace a roční průměrné koncentrace PM_{10} v letech 1996-2007 na vybraných stanicích

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Stanice s nejvyšším překročením LV pro 24hod. koncentrace PM_{10} v roce 2007

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Thank you for your attention...

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