

ROLE OF THE REGIONAL PUBLIC HEALTH AUTHORITY IN AIR QUALITY

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Introduction

Moravian-Silesian Region (MSR) is in the long term among the worst regions within the Czech Republic in terms of air quality. The main pollutants are the particulate matter, measured in the fractions PM₁₀, PM_{2,5} and benzo(a)pyrene, whose maximum values are reached mainly in the industrial area of Ostrava-Karviná district (districts of Ostrava, Karviná, Frýdek-Místek, Třinec). The average annual PM₁₀ concentrations are in the long term above the limit value (set by Act No.

201/2012 Coll., On Air Protection at 40 µg/m³) in the most heavily loaded area. Depending on the actual meteorological and climatic conditions, especially with regard to the length and course of the heating season, the average annual concentrations also exceed 50 µg/m³ at some measuring stations in the region. Dust is a pollutant with no threshold effects, where the "safe" value according to epidemiological studies can be considered 10–20 µg/m³.

History

The Public health has always dealt with the health of the population regarding to air quality through various projects:

- Project Bilthoven (1992-1994) – monitoring the environmental factors necessary for assessing the health status of the inhabitants of the cities of Ostrava and Karviná (monitoring air quality, drinking water, biological monitoring and health - allergies, acute respiratory infections)
- Project Slezsko (1991 – 1994) – an international project supported by the World Bank, governments of the Czech Republic, Poland and the US and the US EPA. In the region of Silesia, air and surface water pollution, contamination of drinking water and food, waste and occupational diseases were monitored. Results used for risk analysis and management in

the environment (Environmental Risk Assessment, Environmental Risk Management, Environmental Impact Assessment)

- Special monitoring of the health status of the population of the Ostrava-Karviná region in relation to the environment (1993 – 2003) – detailed environmental monitoring (drinking water, bathing water, mycobacteria in warm water, air including genotoxicity assessment), Monitoring the health status of the population and health status of workers
- MONARO (1995 – 2007) – Monitoring of acute respiratory diseases by age groups and diagnoses and simultaneous monitoring of air quality
- HAPIEE - Health, Alcohol and Psychosocial factors in Eastern Europe (2002 - 2007) – international health and lifestyle study

Current projects and activities

- The national project Monitoring of health status in relation to the environment (subsystems: air, drinking water, noise, dietary exposure, biological monitoring, population health, working conditions, soil contamination)
- Preparation of a warning and information smog system, including a PM₁₀ concentration proposal of 100 µg/m³ for the purpose of declaring a smog situation (on the basis of health risk assessment)
- Initiation of negotiations on the benzene problem in Ostrava – local problem, average annual concentrations exceeded the limit value of 5 µg/m³ over the long term
- Health risk assessment of high concentrations of

SO₂ – solution of the current SO₂ leakage problem from the redevelopment works

- Estimation of the impact of PM₁₀ concentrations on mortality and morbidity of the inhabitants of Ostrava during smog episodes in 2009 and 2010
- Evaluation of the PM₁₀ air pollution level in a relation to the health of the inhabitants of Ostrava in the period 2001-2010
- Risk analysis of the municipal air of selected cities in the region – PAH, PM₁₀
- Health 21, Health 2020
- Participation in air quality improvement programs in the region (comments on strategic materials, participation in SEA and EIA processes)

Immission situation

The monitoring network of the Czech Hydrometeorological Institute and the Public Health Institute monitors the basic pollutants and selected health-related indicators (metals, organic substances). Their limit concentrations are determined by the national legislation – by Act No. 201/2012 Coll., on air quality.

Limit concentrations are determined by taking into account the health effects of short or long-term concentrations of individual pollutants. The basic unit is µg/m³ – see table on the right. Currently, attention is paid to the smallest particles of dust – PM1 or chromium.

Air as a health determinant

Dust particles, depending on their size, shape and other properties, act alone or in combination with other harmful substances on the respiratory and circulatory system and are one of the determinants of health effects. Based on the knowledge of their effects (acute, chronic, possible carcinogenic and mutagenic effects), the health status of the population is monitored according to various indicators. The general indicator is life expectancy. Acute respiratory diseases are monitored for acute effects, the indicator of the chronic impact is standardized mortality (general, diseases of

the circulatory system, respiratory system, neonatal and infant). Late-onset effects are tumor diseases – in relation to the air, the diagnosis C 33, 34 is monitored – malignant neoplasms of the trachea, bronchi and lungs. Late effects can also be characterized by the incidence of birth defects and developmental defects. An independently monitored indicator is allergy and asthma.

Poor health indicators do not always correspond to the polluted area.

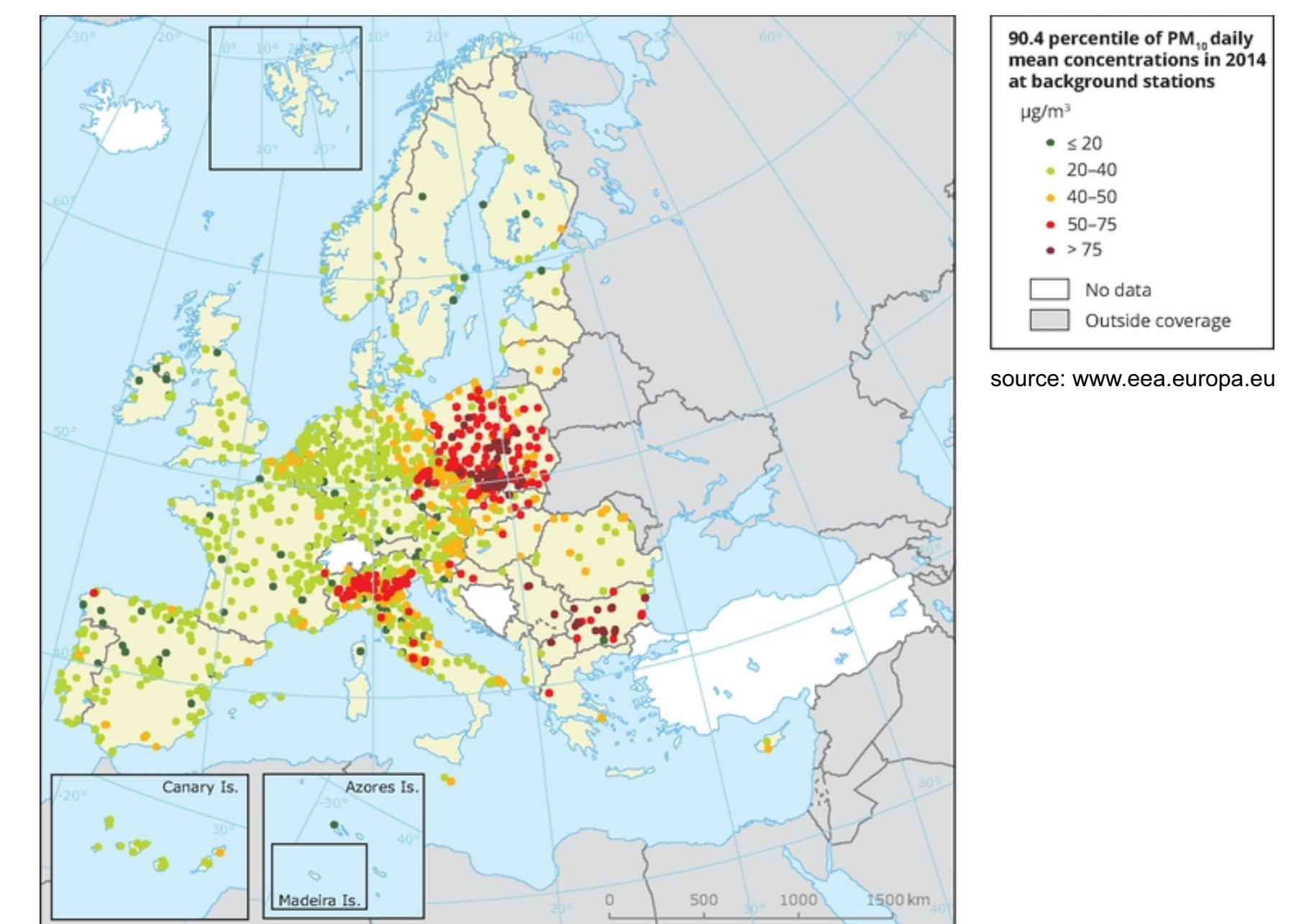
The Conclusion

Polluted air in the Moravian-Silesian Region (MSR), especially in the Ostrava-Karviná region, with regard to the exceedance of the suspended particulate matter (PM₁₀ and PM_{2,5}) and PAH/benzo(a)pyrene limits is a risk factor in relation to the health of the population.

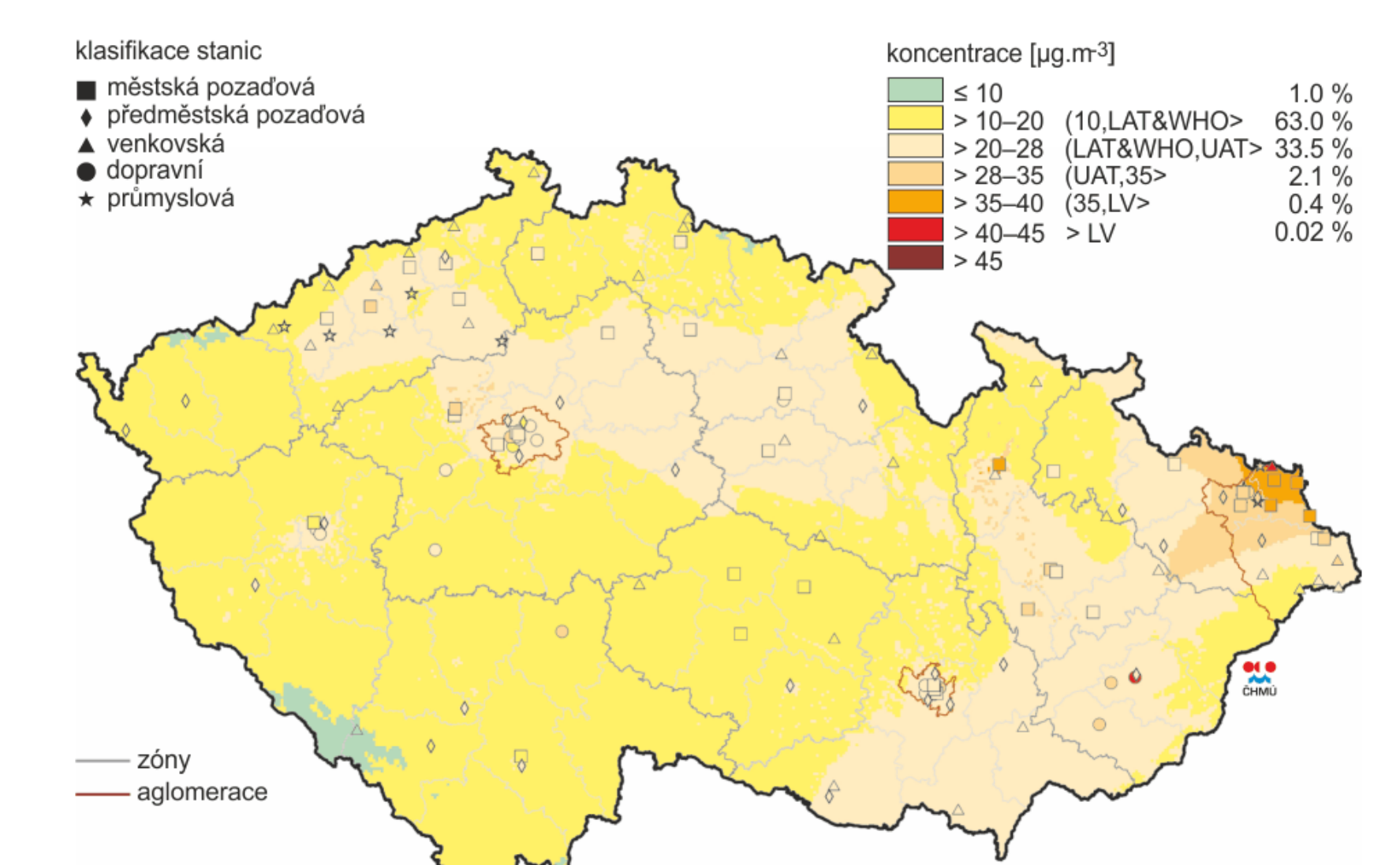
The Regional Public Health Authority (RPHA), in cooperation with the Public Health Institute Ostrava, The National Institute of Public Health and other institutions, is engaged in a detailed investigation of air and health relations in the MSR, including information on www.khsova.cz, one-day conferences and local

meetings and also publishes its own Annual Report and Newsletter. In the area of air quality RPHA cooperates with individual state authorities and autonomy offices in the fulfillment of tasks within a state health surveillance (boiler subsidies) and enhancing the health of children (healing stays in nature). RPHA employees participate on regular meetings in environmental commissions of Regional Authority and municipalities in the region. They also present possible health impacts in relation to the polluted environment in conferences and seminars.

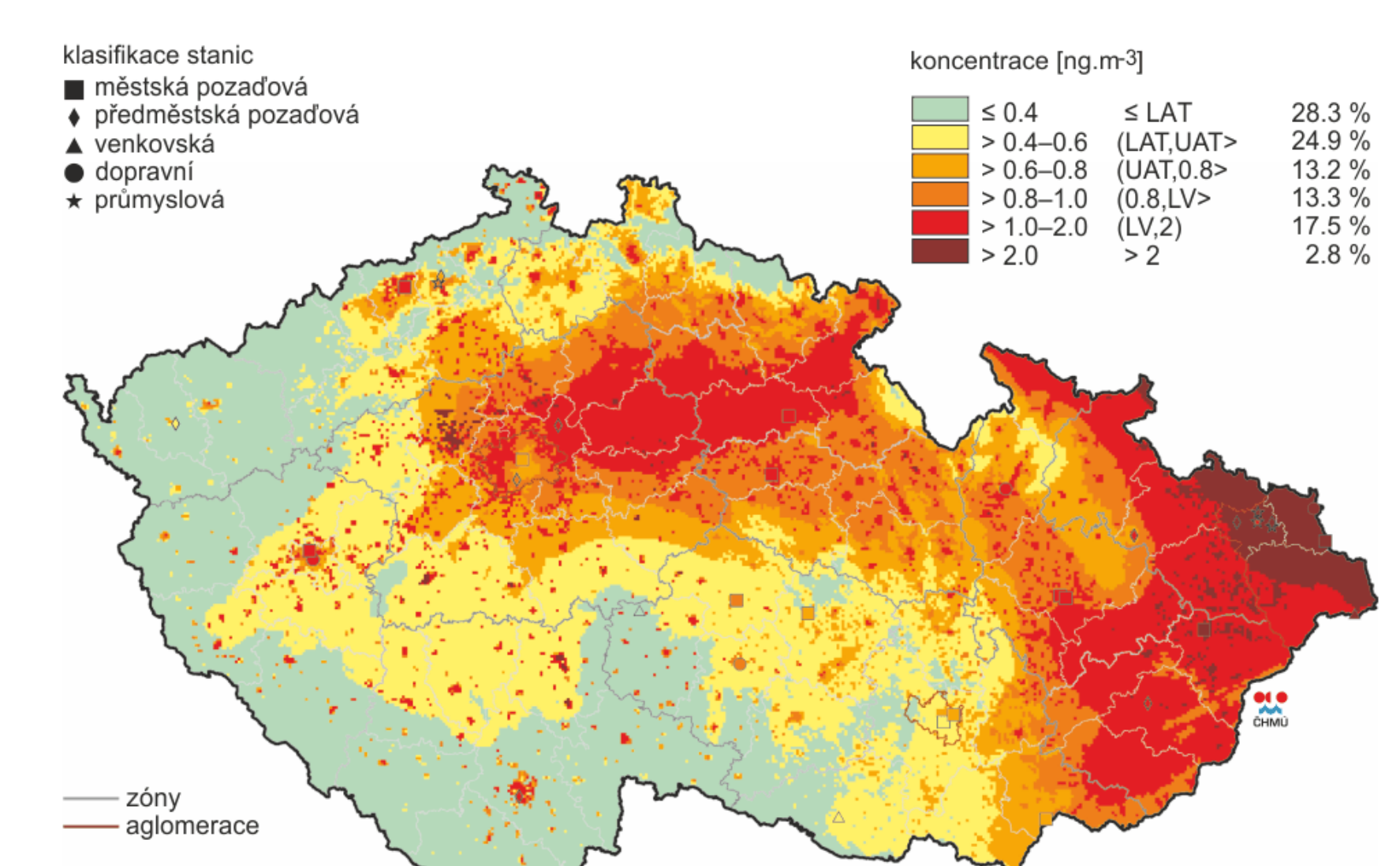
Daily mean concentrations, 2014



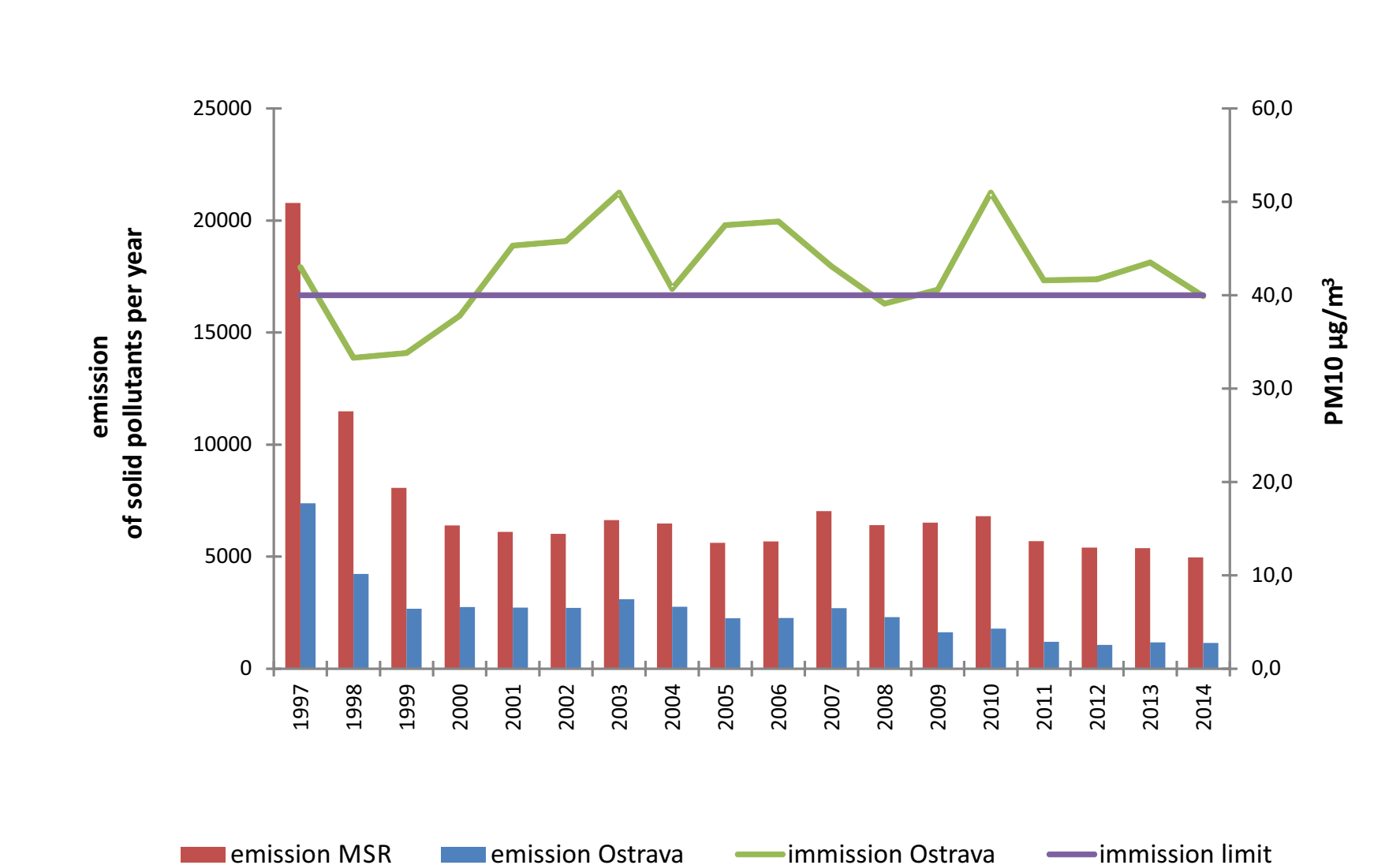
Annual average concentration PM₁₀, 2015



Annual average concentration benzo(a)pyren, 2015



Particulate matter



Immission limits according to Act No. 201/2012 Coll., On air protection and Decree No. 330/2012 Coll.

	hour	day	year	note
PM ₁₀		50	40	according to WHO 10 - 20
PM _{2,5}			25	
SO ₂	350	125		
NO ₂	200		40	
CO		10000		8 hours average
O ₃		120		8 hours average
benzo(a)pyrene			0,001	content in PM ₁₀
benzene			5	
As			0,006	content in PM ₁₀
Cd			0,005	content in PM ₁₀
Pb			0,5	
Ni			0,02	content in PM ₁₀

