

V.4 Air quality index in cities

The new air quality index (AQI) was designed by the CHMI Air Quality Department in cooperation with the National Institute of Public Health (SZÚ) and has been available on the CHMI website¹ since November 2019. For the purposes of evaluating the year-round situation, the AQI was recalculated using the same methodology for the entire year 2019. The AQI is also embedded in the Air Quality Information System (AQIS). The calculation of the air quality index has changed² due to a more accurate assessment of the current state of air quality and related health implications.

The calculation of the index is based on the simultaneous evaluation of 3-hour moving average concentrations of sulphur dioxide (SO₂), nitrogen dioxide (NO₂), and suspended particles (PM₁₀). In the summer period (1 April to 30 September), 3-hour moving average concentrations of ground-level ozone (O₃) are also evaluated. According to the National Institute of Public Health (SZÚ), the 3-hour moving average better describes the potential impact of polluted air on the health of the population. The advantage of the new air quality index is the basic three-level colour indication of the index, including specific advice and recommendations of the SZÚ to ensure the protection of human health (Table V.4.1)³. These health recommendations are based on the World Health Organization (WHO) evaluations. The air quality index at city stations in 2019 is shown in Fig. V.4.1.

Tab. V.4.1 Recommendation of the SZÚ for reducing the exposure of the population to air pollutants and protection of the health

Level	Index range	Air quality	Sensitive and vulnerable groups	General population
1A	< 0,34	Very good to good	Ideal conditions for outdoor activities.	Ideal conditions for outdoor activities.
1B	≥ 0,34 – 0,67		Outdoor activities without restrictions.	Outdoor activities without restrictions.
2A	≥ 0,67 – 1,00	Moderate	There might be a slight risk of inconvenience to a very small number of persons who are extremely sensitive to air pollution. No need to change your usual outdoor activities if you do not notice symptoms such as coughing and throat irritation.	Outdoor activities without restrictions.
2B	≥ 1,00 – 1,50		Consider reducing or postponing/moving intense outdoor activities, notably if your health condition aggravates or you experience symptoms such as coughing and throat irritation.	No need to change your usual outdoor activities.
3A	≥ 1,50 – 2,00	Poor to very poor	Reduce intense activities, particularly outdoors, notably if your health condition aggravates or symptoms such as coughing and throat irritation occur. Asthmatics and persons with chronic disease may need to use a relief medicine more often. All older people and children should limit their physical activity.	Consider reducing or postponing/moving intense outdoor activities if you experience symptoms such as coughing and throat irritation occur.
3B	≥ 2,00		Shorten your stay outdoors and avoid physical activities. Asthmatics and persons with chronic disease may need to use a relief medicine more often.	Reduce or postpone intense outdoor activities, notably if you experience any discomfort and symptoms such as irritation in the throat, eye irritation, coughing, etc.

1 www.chmi.cz/files/portal/docs/uoco/web_generator/actual_3hour_data_CZ.html

2 Until 2019, the calculation of the air quality index was based on hourly concentrations.

3 www.chmi.cz/files/portal/docs/uoco/web_generator/d_szu.pdf

At the Plzeň-Doubravka and Plzeň-Lochotín stations of the Plzeň region, indices at 1A and 1B levels (very good to good air quality) were reached with frequencies higher than 65% of the situations, and in more than 32% of situations the air quality was moderate (AQI at 2A and 2B level).

In Sokolov in the Karlovy Vary region, the highest frequency (over 63%) was achieved by the categories of very good to good air quality and less than 37% by the moderate air quality.

At the Most, Ústí nad Labem-city and Ústí nad Labem-Kočkov stations (Ústí nad Labem region), air quality indices 1A and 1B (very good to good) ranged with frequency between 52% and 55%. Moderate air quality indices (2A and 2B) reached frequencies of 44 and 47%.

At the Liberec-Rochlice station in the Liberec region, the most frequent situations were with very good to good air quality (60%) and about 40% of moderate air quality situations.

At the stations Mladá Boleslav and Kladno (Central Bohemian region) in 2019, the incidence of air quality indices 1A and 1B was 57–64 %, 2A and 2B 36–43 %.

In 2019, air quality in Prague was very good to good in most cases (Prague-Libuš 60%, Prague-Riegrovy sady and Prague-Kobylisy 56%). The frequency of moderate air quality in Prague-Libuš was 40%, and 44% in the Prague-Riegrovy sady and Praha-Kobylisy stations.

At the stations České Budějovice and Prachatice (South Bohemian region), the air quality level in 2019 was very good to good in 66 to 70% of situations. In 30 to 34% of situations, a moderate air quality index was reached.

In the Vysočina region at the Jihlava station, very good to good air quality was reached with frequency of 64% and the category of moderate air quality with frequency of 36%.

In Hradec Králové of the Hradec Králové region, the frequency of situations with air quality indices 1A and 1B was 61% and with 2A and 2B levels nearly 39%.

In Pardubice (Pardubice region) in 2019, air quality was most often very good to good (67% frequency), and further moderate (33%).

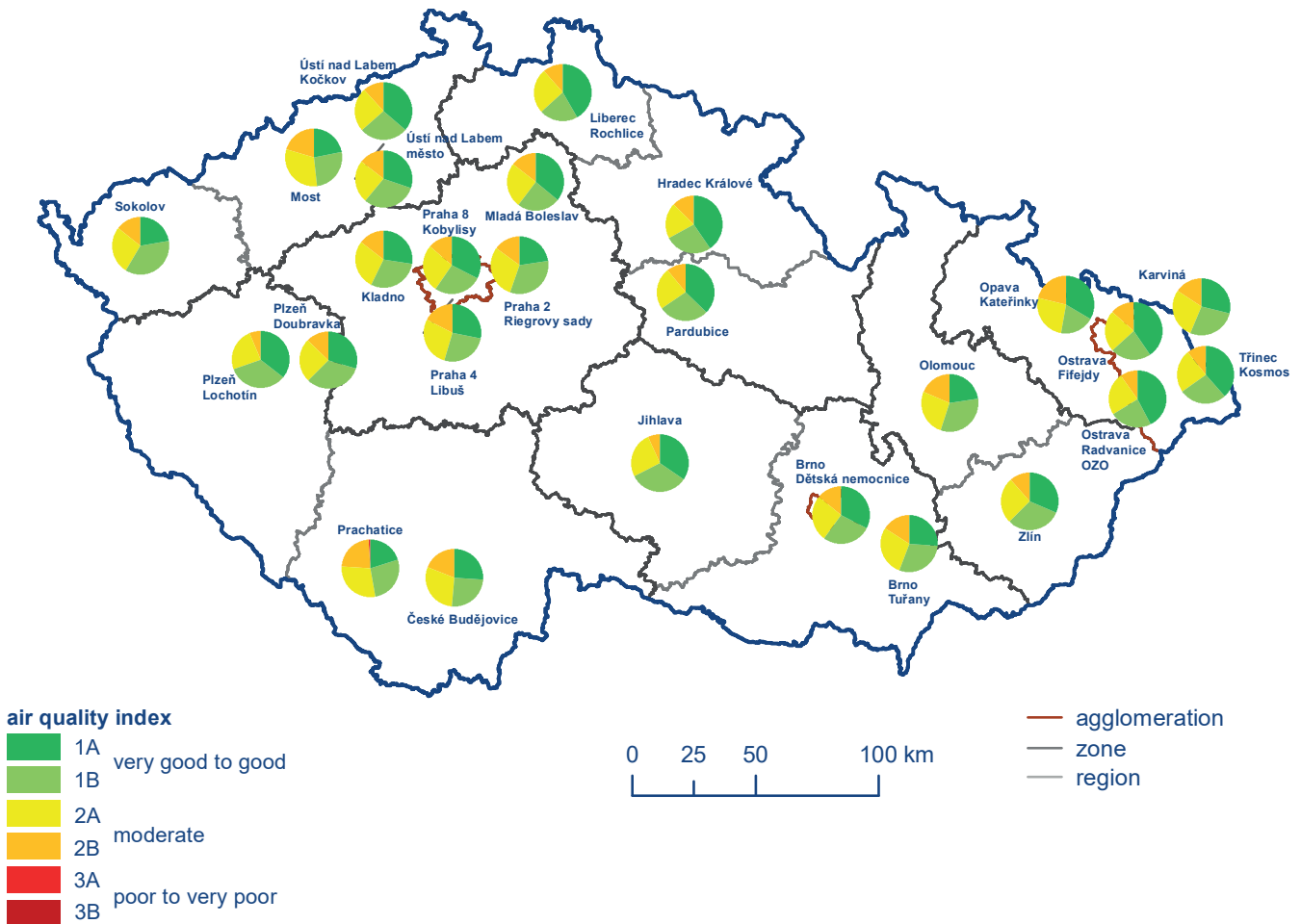


Fig. V.4.1 Proportional representation of the air quality index at selected urban and suburban stations, 2019

At the Brno-Dětská nemocnice station of the South Moravian region, air quality index 1A and 1B was achieved in 59% of cases, index 2A and 2B in 41% cases. Mostly very good to good air quality (62%) and moderate air quality in 38% of cases was reached at the Brno-Tuřany station.

At the Olomouc-Hejčín station of the Olomouc region, the air quality was mostly very good to good (55% frequency) in 2019. Situations with the index of the moderate level was reached with frequency of approx. 44%.

At the Zlín station of the Zlín region, the highest frequency of air quality was very good to good (62%). The index of the moderate level reached the frequency of 37%.

At the stations in the Moravian-Silesia region, the Karviná and Ostrava-Radvanice OZO stations reached the highest frequency of 2A and 2B index of moderate air quality (51 and 52%). Index 1A and 1B was achieved in 48% of cases at the Karviná station and 47% in the Ostrava-Radvanice OZO. In Ostrava-Fifejdy, index 1A and 1B was achieved in 51% and 2A and 2B in 48% of cases. The difference in the frequency of indices for very good to good and moderate air quality in Opava-Kateřinky reached almost 20% when index 2A and 2B was achieved in about 40% of cases. In Třinec-Kosmos, this difference reached almost 30%, of which about 64% related to index 1A and 1B.

In 2019, the frequency of the index 3A and 3B (poor to very poor air quality) was low at all evaluated urban stations and did not reach even 2%. The highest frequency of these indices was reached in the Moravian-Silesia region at the Karviná and Ostrava-Radvanice OZO stations (1.6%) and at the Ostrava-Fifejdy station (1.2%).