

VI. SMOG WARNING AND REGULATION SYSTEM

With credentials issued by the Ministry of the Environment, the CHMI operates the Smog Warning and Regulation System (SWRS). Information provided through this system serves both for issuing warnings of extreme levels of air pollution (smog situations) and for regulating (reducing) release of pollutants from selected sources significantly affecting ambient air quality in the respective area. The monitored pollutants include the PM₁₀ suspended particles, sulphur dioxide SO₂, nitrogen dioxide NO₂ and ground-level (tropospheric) ozone O₃.

Since 1 September 2012, the SWRS has been regulated by Act No. 201/2012 Coll., on air protection, and Decree No. 330/2012 Coll., as amended. Its rules are summarized in Tab. VI.1.

The current list of areas and representative stations for PM₁₀, SO₂ and NO₂ (Fig. VI.1, Fig. VI.3, and Fig. VI.4) is specified by the Bulletin of the Ministry of the Environment and, for O₃ (Fig. VI.2), by the CHMI

Director's Directive. From the beginning of 2019, a list published in the MoE Bulletin No. 7/2018 (MŽP 2018) applied for PM₁₀, SO₂ and NO₂ and a list published in the MoE Bulletin No. 5/2019 (MŽP 2019) applies from October 2019. For O₃, the list specified by the CHMI Director's Directive No. 2015/01 was in force throughout the year. As of 1 October 2019, the following changes took place in the representative SWRS stations: Košetice (JKOSA) - representativeness extended for PM₁₀, NO₂ and SO₂ substances to the Central Bohemian and South Bohemian zones and for O₃ to the Central Bohemian zone¹, Běloutín (MBELA) – representativeness extended for PM₁₀ to the Moravian-Silesian zone, Rožďalovice-Rusá (SRORA) – representativeness extended for PM₁₀ to the Hradec Králové and Pardubice regions and for SO₂ and NO₂ to the Northeast zone, and Ostrava-Poruba/CHMI (TOPOA) – a new representative station for SO₂ and NO₂ for the Ostrava/Karviná/Frýdek-Místek (O/K/F-M) agglomeration and for PM₁₀ for the O/K/F-M agglomeration without the Třinec area.

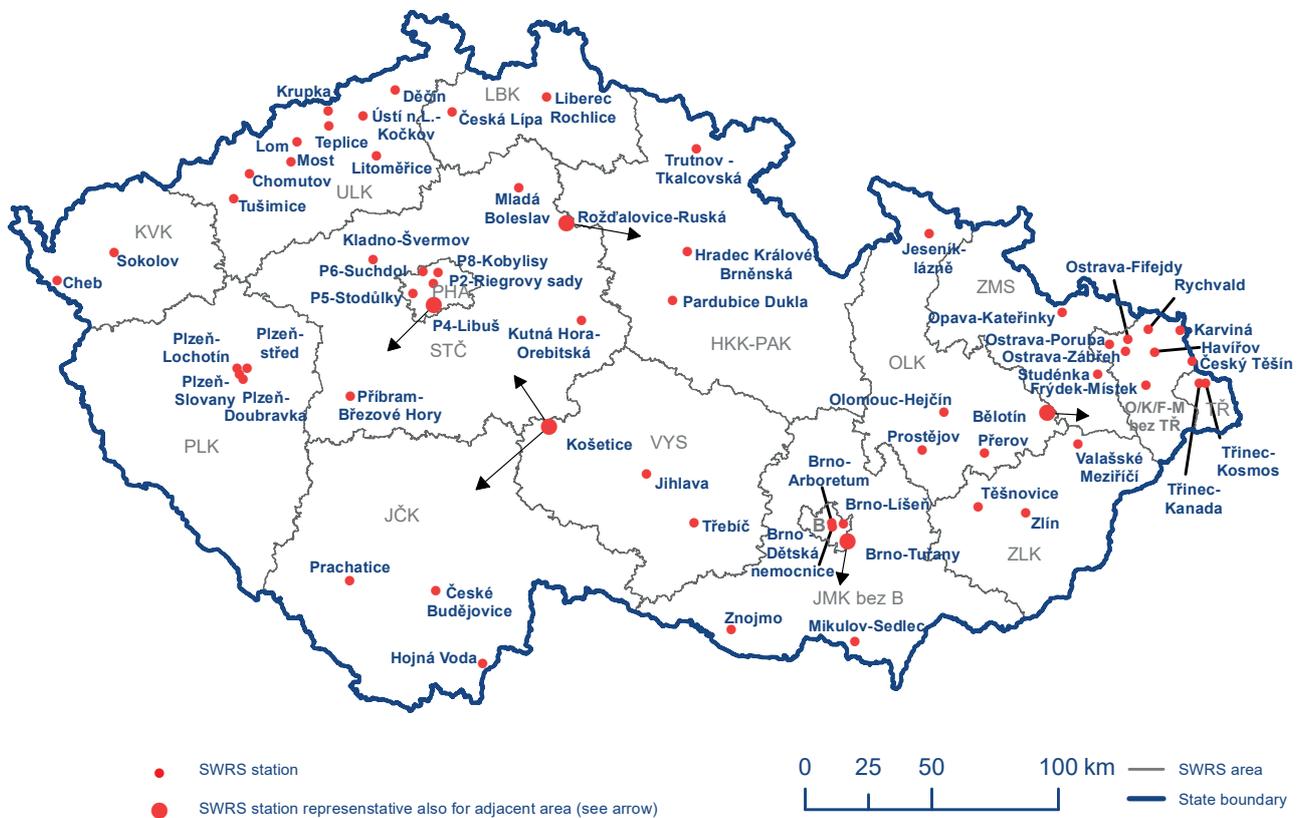


Fig. VI.1 SWRS areas and representative stations for PM₁₀ as of 1 October 2019

¹ This extension for ozone was confirmed retrospectively by CHMI Director's Directive No. 2019/12 for the implementation of the Smog Warning and Regulation System, issued on 9 January 2020.

Tab. VI.1 The rules for the announcement and cancellation of smog situations and regulations (alerts)

Substance	Threshold value			Exceedance duration	Number of stations*	Supplementary condition
	Abbreviation	$\mu\text{g}\cdot\text{m}^{-3}$	Interval			
Announcement of smog situation						
PM₁₀	IPH	100	12 h	1 h	50 % (two stations if there are just two of them)	Based on an evaluation of the forecast of meteorological conditions and pollution situation no decrease of the concentration below the informative threshold value can be expected during next 24 hours.
NO₂		200	1 h	3 h	1 station	
SO₂		250				
O₃		180	1 h			---
Announcement of regulation						
PM₁₀	RPH	150	12 h	1 h	50 % (two stations if there are just two of them)	Based on an evaluation of the forecast of meteorological conditions and pollution situation no decrease of the concentration below the informative threshold value can be expected during the next 24 hours.
NO₂		400	1 h	3 h		
SO₂		500				
Announcement of alert						
O₃	VPH	240	1 h	1 h	1 station	---
NO₂	RPH	400		3 h		
SO₂	RPH	500				
Cancellation						
The smog situation terminates and the regulation is revoked if no measuring site representative for the pollution level in an area of minimum 100 km ² reports the concentration of polluting substances above the corresponding threshold value and this state lasts continuously for at least 12 hours and no recurrent instance of exceeding the informative, regulatory or warning threshold value can be expected in the next 24 hours based on the meteorological forecast.						
12-hour time interval is being reduced up to 3 hours in a case when meteorological conditions cannot be assessed as leading to the smog situation and recurrent instance of exceeding the informative, regulatory or warning value can almost be excluded in the next 24 hours in accordance with the meteorological forecast.						

* Station must be representative for the pollution level in an area of minimum 100 km².

Note: **IPH** – information threshold value, **RPH** – regulatory threshold value, **VPH** – alert threshold value. The requirements for the number of stations are related to the representative stations for the given SWRS area.

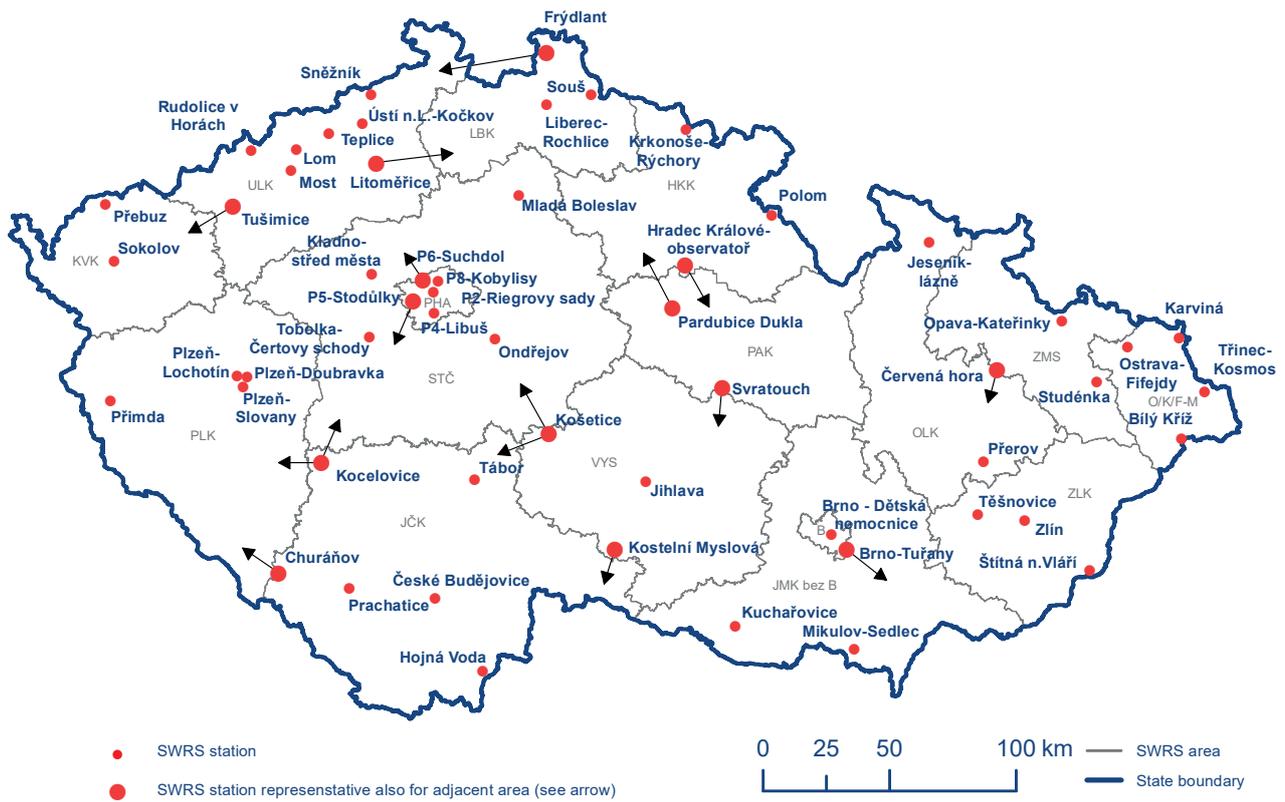


Fig. VI.2 SWRS areas and representative stations for O₃ as of 1. 10. 2019

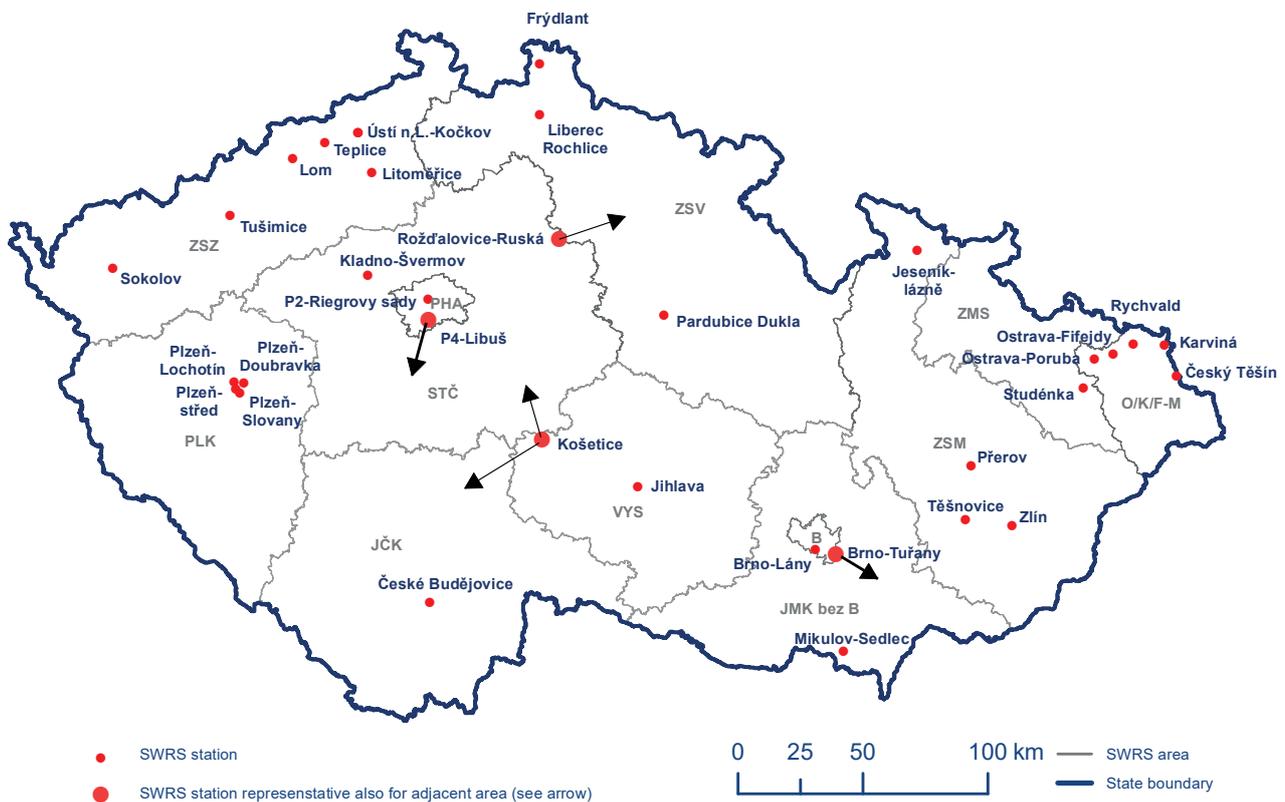


Fig. VI.3 SWRS areas and representative stations for SO₂ as of 1 October 2019

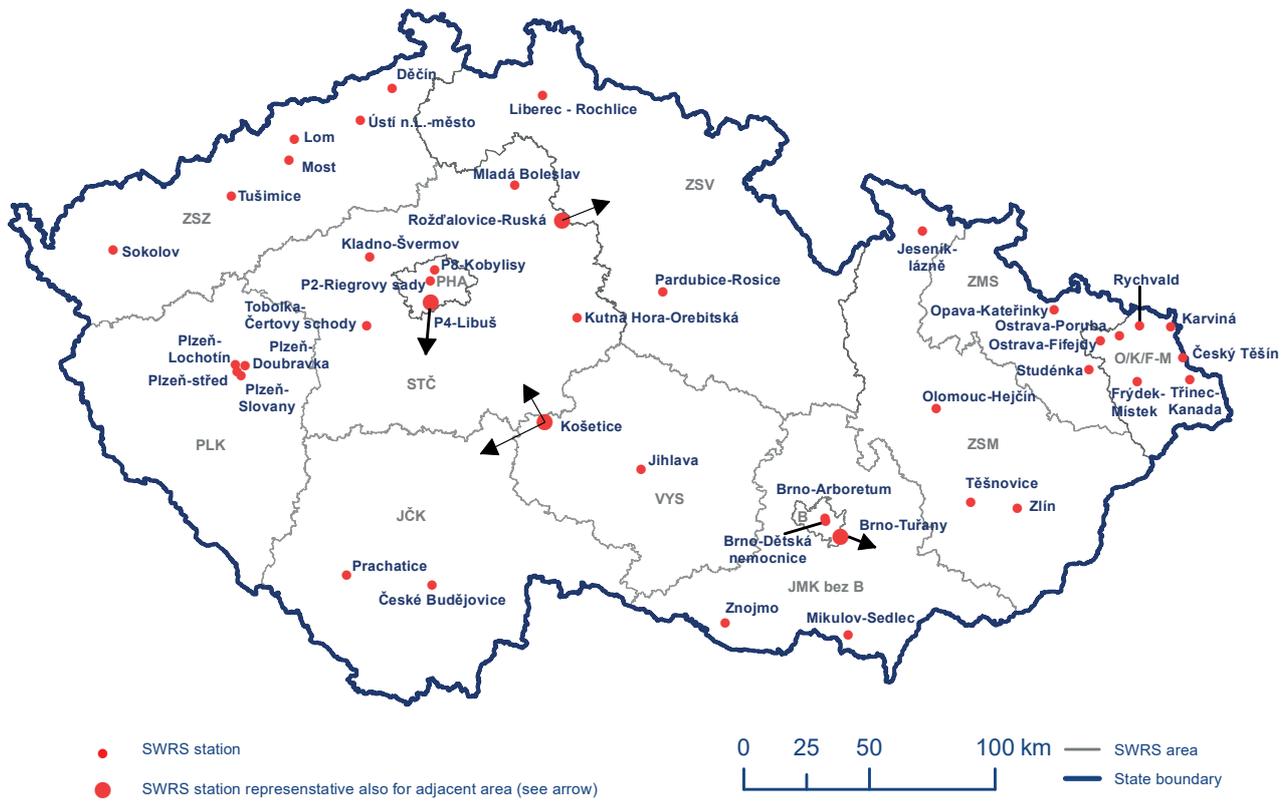


Fig. VI.4 SWRS areas and representative stations for NO₂ as of 1 October 2019

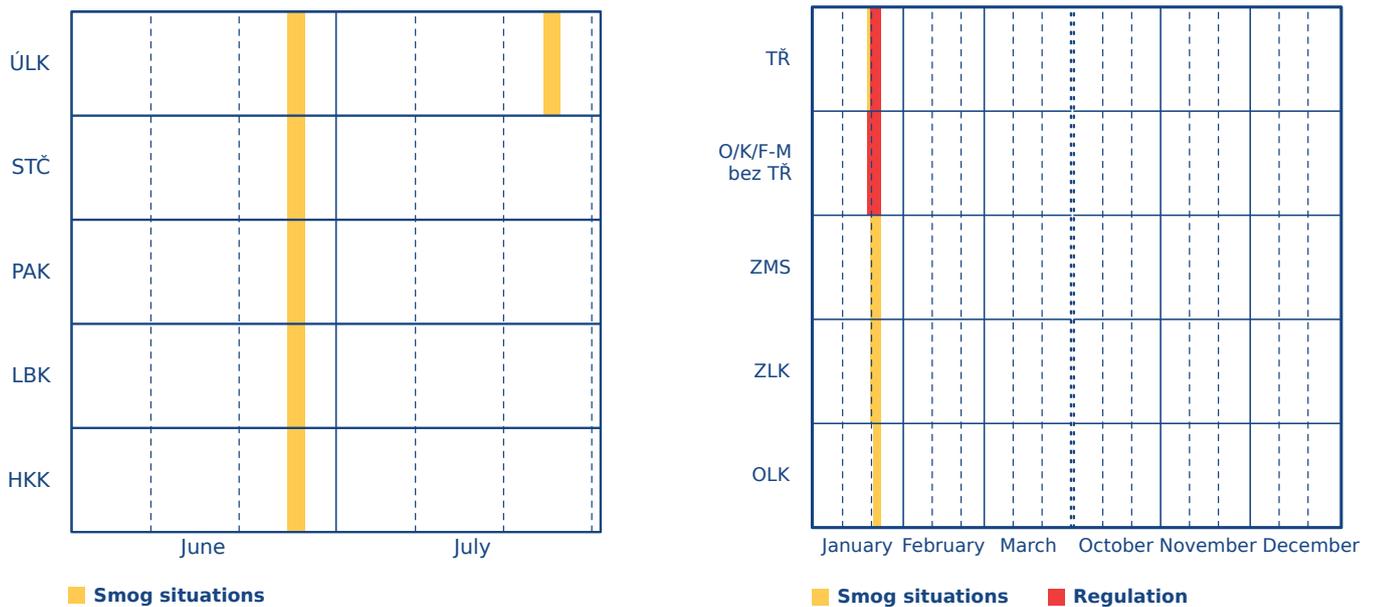


Fig. VI.5 Smog situations and regulations (alerts) for PM₁₀ (right) and O₃ (left) in the SWRS areas in which at least one smog situation was announced, 2019

Announced smog situations and regulations (warnings)

In 2019, smog situations were announced due to exceeding the threshold values for PM₁₀ and ground-level ozone O₃. The threshold values for NO₂ were not exceeded at representative SWRS stations during 2019. In the case of SO₂, the warning threshold was exceeded at one representative SWRS station (Sokolov, SKOMA), but other conditions necessary for the declaration of a smog situation were not met.

Due to the high concentrations of suspended PM₁₀ particles, 5 smog situations were announced with a total duration of

385 h (approx. 16 days) and 2 regulations with a total duration of 162 h (approx. 7 days; Tab. VI.2). All smog situations and regulation occurred in January, in 5 out of the 16 SWRS areas (Fig. VI.5). Smog situations were announced in the territory of the O/K/F-M agglomeration without the Třinec area, further in the Třinec area, in the Moravian-Silesian zone and in the Zlín and Olomouc regions.

6 smog situations were announced for ground-level ozone O₃ with an overall duration of 90 h (approx. 4 days; Tab VI.4). Smog situations were announced mainly in the third decade of June 2019 (5 situations) and, in the Ústí nad Labem region, also at the end of July (Tab. VI.5). The warning threshold was not exceeded at any representative SWRS station in 2019.

Tab. VI.2 Smog situations and regulations for PM₁₀ – number and duration, 2019

SWRS Area	Number of announcement		Duration [h]	
	Smog situation	Regulation	Smog situation	Regulation
Agglomeration of O/K/F-M without Třinec area	1	1	94	84
Třinec area	1	1	90	78
Moravia-Silesia zone	1	x	75	x
Zlín region	1	x	73	x
Olomouc region	1	x	53	x
Czech Republic in total	5	2	385	162

Note: Included only the SWRS areas in which at least one smog situation was announced. The duration of the smog situation includes also the duration of the regulation, if announced.

Tab. VI.3 Smog situations and regulations for PM₁₀ – dates and times of announcement, 2019

Announcement		Cancellation		Duration	
Smog situation	Regulation	Regulation	Smog situation	Smog situation	Regulation
day and hour CET				[h]	
Agglomeration of O/K/F-M without Třinec area					
20.01.2019 11:32	20.01.2019 14:02	24.01.2019 02:08	24.01.2019 09:58	94	84
Třinec area					
20.01.2019 21:23	21.01.2019 01:54	24.01.2019 08:09	24.01.2019 15:43	90	78
Moravia-Silesia zone					
21.01.2019 02:01	x	x	24.01.2019 04:49	75	x
Zlín region					
21.01.2019 07:45	x	x	24.01.2019 08:46	73	x
Olomouc region					
22.01.2019 00:24	x	x	24.01.2019 05:16	53	x

Note: CET – local time, i.e. Central European Time. The duration of the smog situation includes also the duration of the regulation, if announced.

Synoptic situation during selected smog situations

19 – 24 January 2019

During the 18 and 19 January, the pressure high advanced through Central Europe to the east. The Czech Republic was thus affected by the back of this pressure high with the south-eastern flow. During 20 January, further pressure low was gradually restored over Central Europe, advancing slowly to the east with a weak south-eastern flow resuming over the Czech Republic on 22 January. At the same time, the pressure low over the western Mediterranean deepened and its edge affected the weather in our territory. Throughout the period, the air was cold in Central Europe, and the temperature at

850 hPa ranged from –12 to –5 °C. Occasionally, the cloud cover decreased, and with a mostly weak south-east wind, temperature inversions with unfavourable dispersion conditions occurred, especially at night. It was not until 25 January that the flow changed to the north-west with the extension of the higher air pressure ridge from the west, and the dispersion conditions improved.

26 – 27 June 2019

Between the pressure high above Eastern Europe and the area of air pressure low above Germany and southwestern Europe, warm air flowed over our territory from the south to the south-west. In mostly sunny weather on 26 June, the air temperatures reached 31 to 37 °C. On 27 June, a cold front crossed our territory to the south-east and ended the influx of very warm air.

Tab. VI.4 Smog situations and alerts for O₃ – number and duration, 2019

SWRS area	Number of announcement		Duration [h]	
	Smog situation	Alert	Smog situation	Alert
Hradec Králové region	1	x	13	x
Pardubice region	1	x	12	x
Liberec region	1	x	12	x
Ústí nad Labem region	2	x	40	x
Central Bohemia zone	1	x	13	x
Czech Republic in total	6	x	90	x

Note: Included only the SWRS areas in which at least one smog situation was announced. The duration of the smog situation includes also the duration of the regulation, if announced.

Tab. VI.5 Smog situation and alerts for O₃ – dates and times of announcement, 2019

Announcement		Cancellation		Duration	
Smog situation	Alert	Alert	Smog situation	Smog situation	Alert
day and hour CEST				[h]	
Hradec Králové region					
26.06.2019 21:03	x	x	27.06.2019 09:47	13	x
Liberec region					
26.06.2019 18:36	x	x	27.06.2019 07:02	12	x
Pardubice region					
26.06.2019 21:03	x	x	27.06.2019 08:34	12	x
Ústí nad Labem region					
26.06.2019 13:27	x	x	27.06.2019 03:20	14	x
25.07.2019 16:28	x	x	26.07.2019 18:46	26	x
Central Bohemia zone					
26.06.2019 18:36	x	x	27.06.2019 07:32	13	x

Note: CEST – local time, i.e. Central European Summer Time. The duration of the smog situation includes also the duration of the regulation, if announced.