

Environmental Assessment Report 2017

AIR QUALITY IN MONTRÉAL

Service de l'environnement



Montréal 



Portrait of air quality



The Network in short

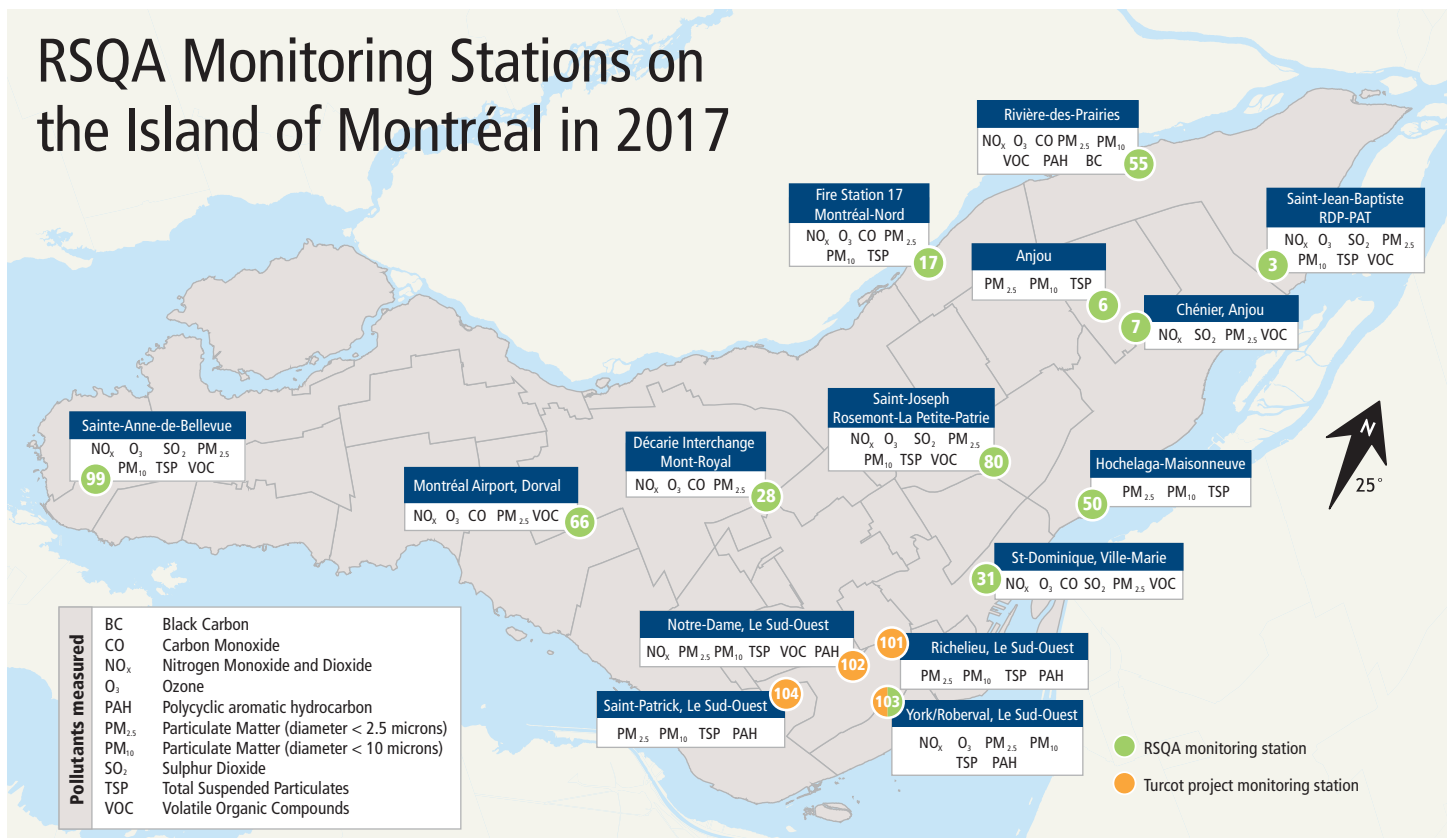
Over the past year, the Réseau de surveillance de la qualité de l'air (RSQA) (the Network) of the Service de l'environnement pursued its activities throughout the territory of the Montréal agglomeration. The results of this monitoring confirm that the good quality of the air has been maintained. Indeed, the average concentrations of fine particulate matter, ozone, sulfur dioxide, nitrogen dioxide and carbon monoxide remained stable. Information on the air quality in Montréal is available in real time on the RSQA's Web site at rsqa.qc.ca.



According to established standards...

A poor air quality day is one where concentrations of fine particulate matter (PM_{2.5}) are greater than 35 µg/m³ during at least three hours for a given station. To be characterized as a smog day, concentrations of PM_{2.5} need to be greater than 35 µg/m³ during at least three hours over 75% of the territory of the agglomeration. During a smog day, concentrations of PM_{2.5} generally remain high over a period of 24 hours and sometimes longer.

RSQA Monitoring Stations on the Island of Montréal in 2017

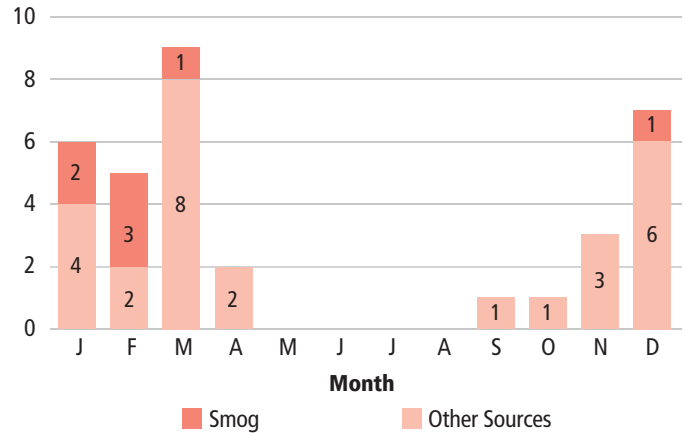




Poor air quality days

34 poor air quality days, of which 7 smog days, were recorded in 2017 on the territory of Montréal. Fine particulate matter were responsible for all poor air quality days. As far as smog days are concerned, they occurred in January, February, March and December. Indeed, all poor air quality days occurred in the fall and winter. Since the closure of station 13 in 2016, a significant decline in the number of poor air quality days has been observed compared to the results of previous years. However, if their number has increased in 2017 compared to 2016, one should remember that their number is bound to fluctuate from one year to another depending on weather conditions.

Poor air quality days in Montréal in 2017

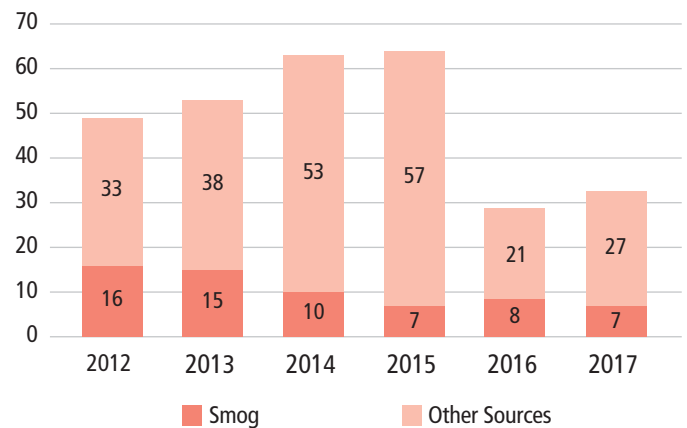


Air Quality Index (AQI) by station

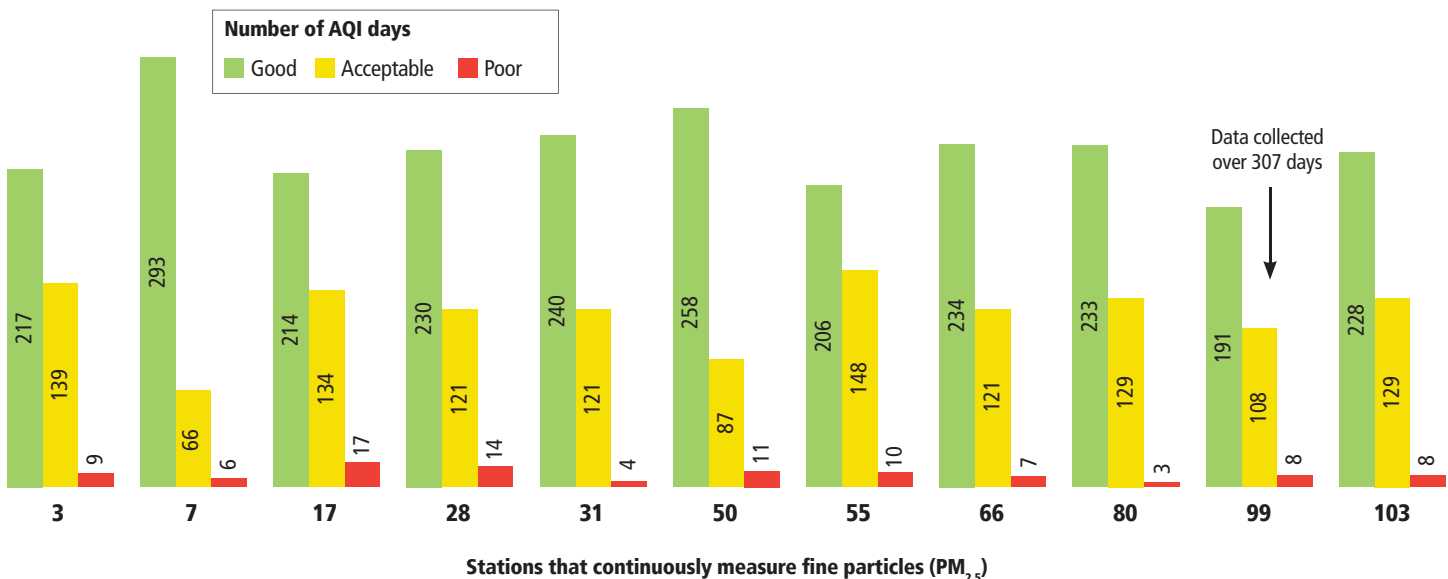
Did you know that the stations located nearest to sources of human activities were those that recorded the greatest number of poor air quality days? Here are a few examples:

- Station 3: industries in the east end of Montréal
- Station 17: fleet work yards of Montréal-Nord
- Station 28: intersection of Décarie North Blvd. and Highway 40 East
- Station 50: activities of the Port of Montréal and traffic on Notre-Dame Est Blvd.
- Station 55: wood burning in the winter

Poor air quality days in Montréal since 2012



Air Quality Index (AQI) by monitoring station in 2017





A rejuvenated station

Station 99 located in Sainte-Anne-de-Bellevue since 1997 has undergone a rejuvenation.



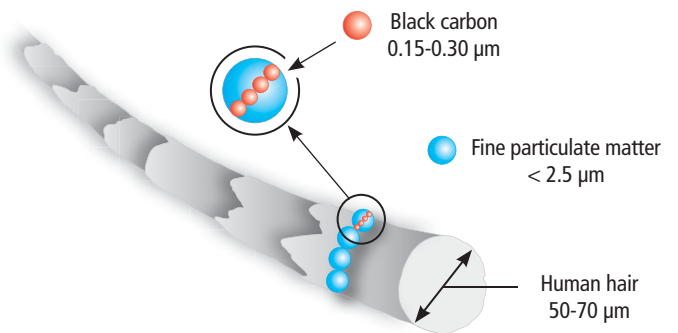
Station 99
Sainte-Anne-de-Bellevue



Elementary my dear... carbon !

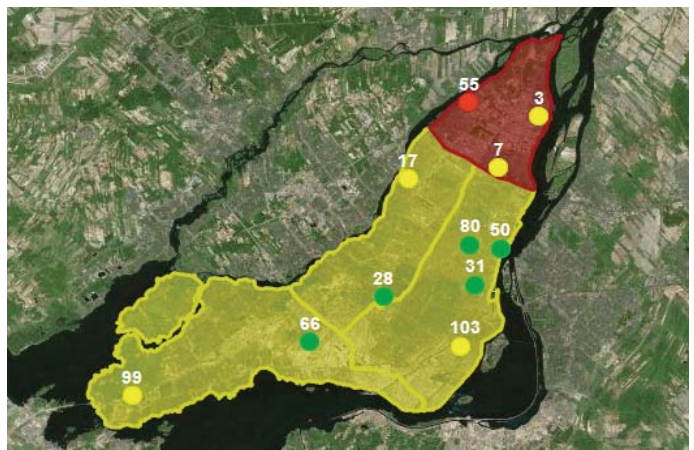
A continuous analyzer of black carbon was installed in station 55 in the borough of Rivière-des-Prairies. Black carbon (BC), also known as soot carbon, is the result of the incomplete combustion of fossil fuels (oil, petrol) or biomass, namely wood burning.

Diameter of black carbon vs. fine particulate matter



January 6, 2017 at 4 p.m., a smog warning was issued for the agglomeration of Montréal. Concentrations of fine particles increased at all stations, and this, until midnight. Station 55 was the only one where the air quality was poor (see map). The BC analyzer showed that the source of the fine particulate matter measured during the evening was the combustion of firewood. And this, despite the fact that, since August 2015, it is forbidden under Bylaw 15-069 to use a solid fuel appliance or fireplace during a smog warning. Given the high density of wood burning stoves and fireplaces in the vicinity of this station, it is very likely that the use of wood burning appliances, despite the smog warning in effect, resulted in a deterioration of the air quality, from acceptable to poor, in this sector.

January 6, 2017



Validation of data

In order to comply with the quality assurance and control guidelines of the program of Environment Canada's National Air Pollution Surveillance (NAPS) network, the results obtained by the RSQA are submitted to a rigorous multi-step validation process. First of all, a daily validation is conducted to ensure that all equipment is functioning adequately. Then, any data that are deemed suspicious are submitted to an in-depth analysis in order to determine their cause. Each case is treated individually and documented in the data base. After which, the data are compared with monthly and annual trends for Montréal. Finally, the data would only be made public once the validation process is completed.



Turcot Project

Air quality monitoring within the framework of the rebuilding of the Turcot Interchange is ongoing. In 2017, average daily concentrations of fine particulate matter (PM_{2.5}) exceeded the *Ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques* (MDDELCC) 30 µg/m³ standard on only 4 occasions at station 102, compared to 13 in 2016. An improvement was also observed at all other stations.

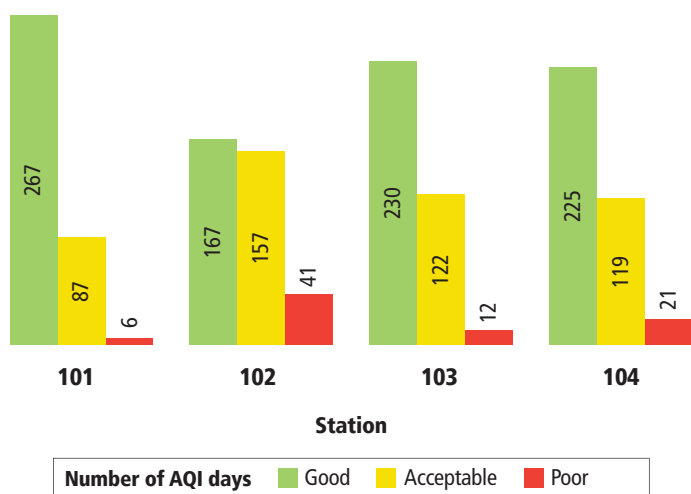
Exceedances of standard for fine particulate matter (PM_{2.5})

Stations	101	102	103	104
Total 2016	1	13	1	3
Total 2017	0	4	0	1

The activities underway in the vicinity of the stations strongly influence the results observed at each one of them. Described below are some of the characteristics of the environment surrounding the stations:

- Station 101: Presence of a temporary noise abatement wall, mitigation of the emissions of the 136 roadway
- Station 102: On the construction site, near the Turcot ramps
- Station 103: Near an exit ramp of Highway 15
- Station 104: Industrial sector and, near the snow dump, heavy truck traffic

Air Quality Index (AQI) by Turcot Project station in 2017



The data are available online at the Web site of the *Ministère des Transports, de la Mobilité durable et de l'Électrification des transports* (MTMDET) at seti-media.com/infopopulation/rsqa_turcot.



Conferences

In June 2017, Movin'On, an international conference sponsored by Michelin, was held in Montréal under the theme, From ambition to action – Smart and sustainable urban mobility for all. The City of Montréal was well represented and the *Réseau de surveillance de la qualité de l'air* was invited to present its report on air quality in Montréal.



Also, in September 2017, a team from RSQA attended a conference on air quality sensors, Making Sense of Sensors, organized by the South Coast Air Quality Management District (SCAQMD) and the California Air Pollution Control Officers Association (CAPCOA). This conference, among other offerings, allowed attendees to familiarize themselves with the new technologies used by the sensors now on the market, to assess the quality of the data collected by the sensors and to better understand the context in which they can be used. The conference also afforded us a unique opportunity to visit the laboratory of the AQ-SPEC (Air Quality-Sensor Performance Evaluation Center) for the testing of air quality sensors.



Credit: © AQ-SPEC

Canadian Ambient Air Quality Standards

The Canadian Ambient Air Quality Standards (CAAQS) were set for fine particulate matter (PM_{2.5}), ozone (O₃) and sulfur dioxide (SO₂). In December 2017, new standards were added for nitrogen dioxide (NO₂). These standards are at the heart of the Air Quality Management System (AQMS) put forward by the Canadian Council of Ministers of the Environment. These data are presented in micrograms per cubic metre (µg/m³) or in parts per billion (ppb).

Since 2011, an improvement in concentrations of PM_{2.5} has been observed in Montréal's ambient air. However, the changes between 2014-2016 and 2015-2017 are insignificant. These results are below the threshold set for 2020.

Concentrations of fine particulate matter expressed in µg/m³

3-year average of the annual 98 th percentile of the daily 24-hour average concentrations Standard = 28 in 2015 Standard = 27 in 2020				
2011-2013	2012-2014	2013-2015	2014-2016	2015-2017
26	25	24	21	20

3-year average of the annual average concentrations Standard = 10 in 2015 Standard = 8.8 in 2020				
2011-2013	2012-2014	2013-2015	2014-2016	2015-2017
9.7	9.6	9.4	8.6	8.5

The trend, in terms of O₃, is rather stable with 3-year averages ranging from 55 to 58 ppb between 2011 and 2017. Despite a slight upward trend since 2012-2014, the concentrations recorded remain below the 2020 threshold.

Concentrations of ozone (O₃) expressed in ppb

3-year average of the annual 4 th highest daily maximum 8-hour average concentrations Standard = 63 in 2015 Standard = 62 in 2020				
2011-2013	2012-2014	2013-2015	2014-2016	2015-2017
57	55	55	56	58

The results for SO₂ over the last 5 years show an almost constant improvement and are compliant with the 2020 threshold. The variation from last year is insignificant.

Concentrations of sulfur dioxide (SO₂) expressed in ppb

3-year average of the annual 99 th percentile of the daily maximum 1-hour average concentrations Standard = 70 in 2020 Standard = 65 in 2025				
2011-2013	2012-2014	2013-2015	2014-2016	2015-2017
26	23	23	21	18

Arithmetic average over a single calendar year of all 1-hour average concentrations Standard = 5.0 in 2020 Standard = 4.0 in 2025				
2013	2014	2015	2016	2017
1.0	1.1	0.9	0.7	0.8

The 3-year averages for NO₂ show very little variation between 2011 and 2017. The concentrations recorded in 2015-2017, i.e. 45 ppb, are well below the 2020 standard, but just above the 2025 standard (42 ppb). The use of fossil fuels in automobiles and domestic heating systems are the main source of NO₂. As far as the annual averages are concerned, they are compliant with the 2020 and 2025 standards despite a slight increase in 2017.

Concentrations of nitrogen dioxide (NO₂) expressed in ppb

3-year average of the annual 98 th percentile of the daily maximum 1-hour average concentrations Standard = 60 in 2020 Standard = 42 in 2025				
2011-2013	2012-2014	2013-2015	2014-2016	2015-2017
45	44	46	45	45

Arithmetic average over a single calendar year of all 1-hour average concentrations Standard = 17 in 2020 Standard = 12 in 2025				
2013	2014	2015	2016	2017
9.7	9.5	8.4	10.0	10.3

PRODUCTION

Ville de Montréal
Service de l'environnement
Division de la planification et du suivi environnemental
Réseau de surveillance de la qualité de l'air (RSQA)

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