

Impact of lifting lockdown restrictions on air quality in the Ile-de-France region

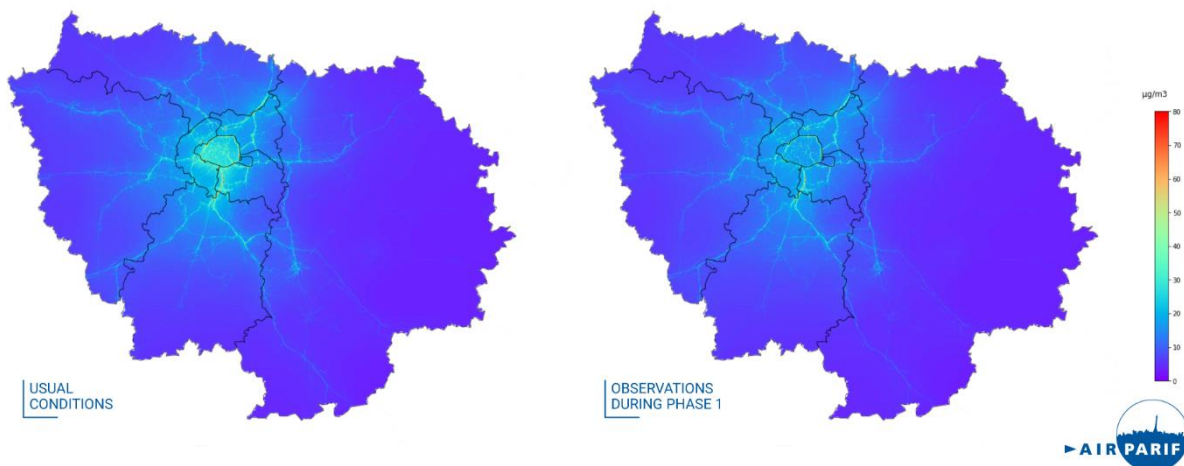
Assessment on June 10th, 2020

After the government's announcement on April 13th, France entered the first phase of lifting the lockdown on May 11th. Even if incentives for remote working and travel restrictions remain in place, there has been a gradual recovery in activity and therefore in road traffic since that date. During the two months of lockdown, Airparif monitored the impact of these measures on air quality in the Île-de-France region, observing a significant improvement in air quality, particularly for nitrogen dioxide (NO₂). This period also saw a 33% drop in emissions of carbon dioxide (CO₂), a greenhouse gas, which illustrates the strong links between air and climate issues. With the gradual lifting of the lockdown in France, Airparif remains mobilized to assess its consequences on air quality, with changes that are more gradual than with the lockdown itself, which has had a sudden impact.

Over the period from May 11th to 31st, the gradual resumption of activities, and particularly traffic, led to an increase in the quantities of pollutants released into the atmosphere (emissions) for nitrogen oxides (NO_x) and particulate matter (PM10 and PM2.5) to levels equivalent to 80% of the emissions observed before the lockdown (and up to 90% for the ring road "Boulevard Périphérique"). CO₂ emissions have also risen again, with an increase of up to 80% of usual levels.

In terms of the quality of the air breathed, in the Paris conurbation, the observed drop in nitrogen dioxide (NO₂) concentrations went from -25% during the lockdown to -15% within the first 3 weeks of lifting the lockdown. For PM10 and PM2.5, the impact was smaller due to a strong influence of weather conditions and more diverse emission sources. After a decrease of -7% during the lockdown, the typical levels observed at this time of the year were again reached.

AVERAGE NITROGEN DIOXYDE (NO₂) CONCENTRATIONS DURING PHASE 1 OF LIFTING LOCKDOWN



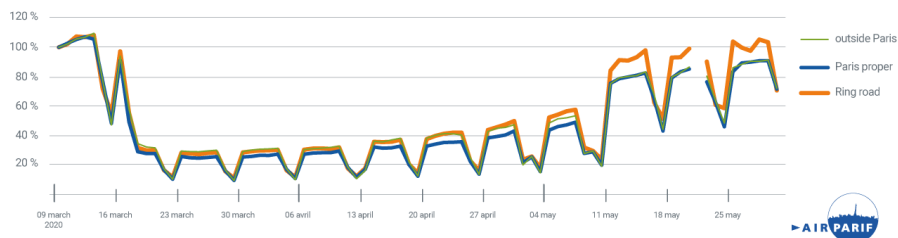
Comparison of nitrogen dioxide (NO₂) pollution levels during Phase 1 of lifting lockdown (May 11-31) compared to usual conditions.

The return to normalcy is therefore gradual, with a variable intensity depending on the pollutants. However, pollution levels are already approaching the usual conditions in Ile-de-France at this time of year.

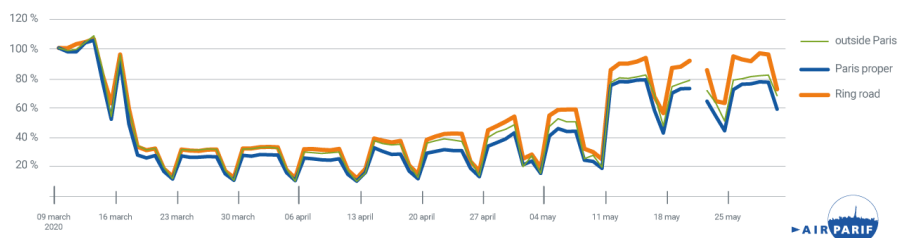
A gradual increase in road traffic emissions

During the lockdown, traffic-related emissions of nitrogen oxides (NO_x) and particulate matter (PM10 and PM2.5) fell sharply and at an unprecedented rate, with **emissions levels 4 times lower than before the lockdown**.

Daily nitrogen oxides (NO_x) emissions in Ile-de-France in comparison to March 9th, 2020



Daily particulate matter (PM_{2,5}) emissions in Ile-de-France in comparison to March 9th, 2020



On the contrary, the impact of lifting lockdown restrictions is much more incremental, with a gradual resumption of activity and thus traffic. Airparif pays particular attention to the increase in road traffic, the main source of pollution in the Île-de-France region.

From May 11th, when the lockdown was lifted, to May 31st, there was **an increase in traffic-related emissions**, but this was **gradual** because of the various measures still in place (remote working incentives, temporary road improvements to promote soft mobility, and a ban on travel beyond 100 kilometres without compelling reasons).

Three weeks into phase 1 of lifting the lockdown, emission levels are gradually approaching "normal" pre-lockdown levels. **Traffic-related emissions of NO_x, PM10 and PM2.5 have risen to 80% of their levels prior to the lockdown** (reference date March 9th), **for Paris and the Île-de-France region outside Paris, and up to 90% for the ring road**. Occasionally, a return to "normal" on certain days on the ring road can be observed, with emissions reaching 100% of their early March levels.

The increase is therefore differentiated depending on the area under consideration: weaker in Paris and the Île-de-France region outside Paris, it is much more significant for the ring road, which is a major transport route in the region.

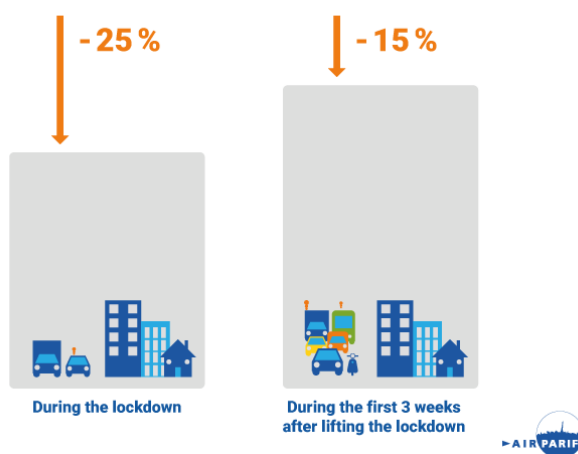
At the same time, temporary road improvements in a number of municipalities, particularly in Paris, which aim to promote cycling, are also helping to limit, to some extent, the resumption of road traffic in city centres and the saturation of public transport.

Air pollutant concentrations are approaching usual levels three weeks after lifting the lockdown.

Concentrations have also been impacted by the lockdown and lifting thereof. On average in the conurbation, **the impact of the lockdown on PM10 and PM2.5 levels was the least significant, given the more diverse sources (traffic, agriculture, heating, etc.), and weather conditions conducive to their creation and their transport throughout France and Europe, where the conditions were the same.** During the lockdown, concentrations decreased by -7%. Three weeks after lifting the lockdown, concentration levels are again close to those observed under usual conditions at this time of year in the Paris Region. This can be explained by a strong influence of weather conditions and more diversified emission sources.

For **nitrogen dioxide (NO₂)**, a gas resulting from combustion, the main source of which in Île-de-France is traffic, the drop observed went **from -25% during the lockdown to -15% over Phase 1 of lifting the lockdown (3 weeks).**

OBSERVATIONS IN THE PARIS CONURBATION COMPARED TO USUAL CONDITIONS



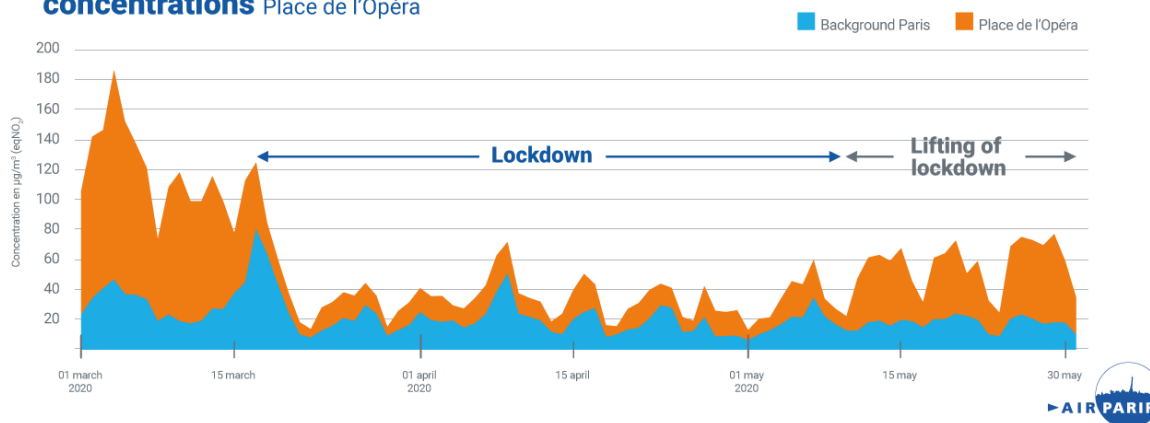
Focus on road traffic:

Along the traffic, the measurements taken by Airparif stations show:

- A sharp drop in concentrations during the lockdown.
- This drop gradually disappears after the lockdown was lifted, as the contribution of traffic along the roads increases again.

These changes vary greatly from one station to another, reflecting different types of roads and traffic conditions in the region. They are nevertheless more pronounced in inner Paris than on the ring road, as illustrated below at the Place de l'Opéra station in the 9th arrondissement.

Evolutions of daily nitrogen oxides (NO_x) concentrations Place de l'Opéra



Evolution of daily nitrogen oxide (NO_x) concentrations at the Place de l'Opéra measuring station, before, during and after the lockdown, and the impact of road traffic.

On the monitoring station located on Place de l'Opéra for instance, the drop in concentrations during the lockdown and their gradual increase since it was lifted is clearly evident. The blue curve represents the background pollution, i.e. the average concentration levels recorded at the Airparif stations that are not subject to the direct influence of roads. The orange curve represents pollution in the vicinity of road traffic. The difference between the two makes it possible to assess the impact strictly related to traffic on this axis. The graph above shows a **decrease in the direct contribution of traffic from March 18th onwards**, from the first days of the lockdown and throughout the period. **Since Phase 1 of lifting the lockdown entered into force, there has been a marked increase in the contribution of road traffic to concentration levels**, in line with the resumption of activities, and therefore traffic.

This increase in concentrations remains relatively limited for the moment thanks to emissions that have not yet returned to their pre-lockdown levels in inner Paris, and to weather conditions that are conducive to the dispersion of pollutants.

In the coming weeks, Airparif will remain fully mobilized to continue monitoring the impact of the next phases of lifting the lockdown on air quality in Île-de-France. Airparif's vigilance on this subject is all the more important since air pollution is an aggravating factor in the COVID-19 epidemic.