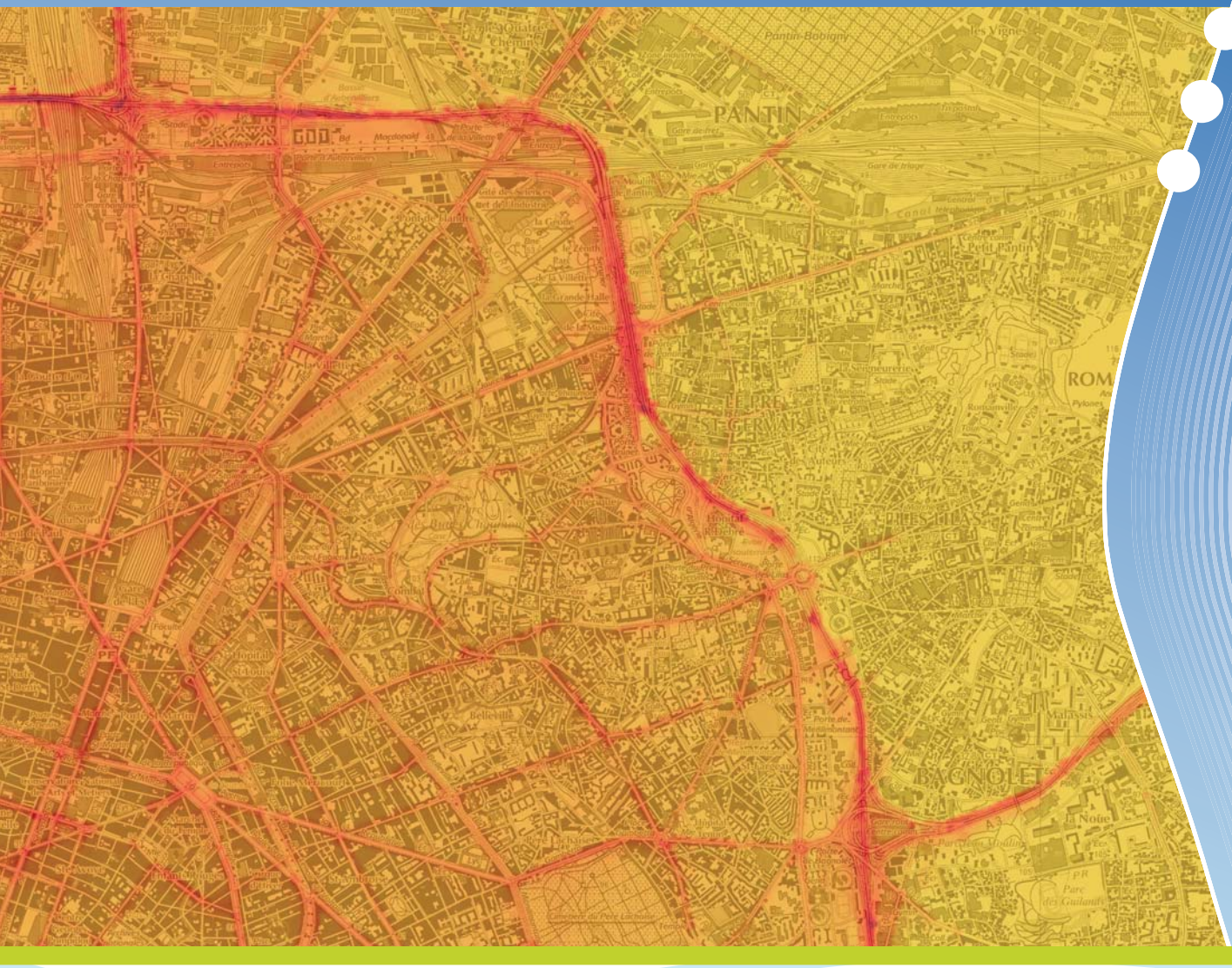
AIR QUALITY IN PARIS REGION
2014

Summary

May 2015



AIR PARIF

AIR QUALITY IN THE PARIS REGION 2014

Summary

May 2015

This report is an English summary of the annual report on ambient air quality in the Paris region. It gives an overview of the concentrations for the European Union regulated pollutants during year 2014.

The complete report in French can be downloaded at
http://www.airparif.asso.fr/_pdf/publications/bilan-2014.pdf

Air quality complete data in the Paris region can be downloaded on AIRPARIF website
http://www.airparif.asso.fr/telechargement/telechargement-statistique

Annual pollution maps are available at *http://www.airparif.asso.fr/etat-air/bilan-annuel-cartes*

Cover illustration: map of the hourly PM_{10} concentration (source AIRPARIF)

Contact us

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I. Key facts for 2014

In 2014, particles and nitrogen dioxide levels remain an issue in Ile-de-France region with substantial exceedances of limit values. However, 2014 confirms a decrease of chronic pollution levels for these pollutants.

With regards to meteorology, 2014 is the warmest year since 1900. Temperatures were above normal throughout the year, except for the summer months, which were cool, cloudy and rainy. This particular weather has hugely impacted the Ile-de-France air quality (reduction of emissions, few photochemistry).

On a trend line basis, mean levels in 2014 were slightly lower than those in 2013. For particles, a net decrease is observed.

➡ Daily and annual limit values for PM_{10} particles are still greatly exceeded on roadside sites. In 2014, **around 400 000 inhabitants in the agglomeration living close to main roads were potentially affected by the PM_{10} exceedance of the daily limit value**. This is far less than in 2013. This is related to less exceedances of the PM_{10} 50 µg/m³ daily threshold during the 2014 winter months.

For fine particles ($PM_{2.5}$), **in 2015, 11.1 million inhabitants of Ile-de-France were potentially affected by air quality objective exceedance.** Background levels away from road traffic were, on average, 1.5 times higher than the objective and up to three times higher on roadside situations. The 2014 limit value is met, for the first time, on the three roadside sites, as the A1 highway site registered a concentration equal to this value.

➡ **The slight decrease of nitrogen dioxide (NO_2) levels is confirmed both in the greater Paris urban agglomeration for roadside levels and away from the traffic.**

Along the main roads, levels are on average twice the annual limit value. **The limit value is thus largely exceeded over a wide portion of the Ile-de-France road network, as almost 1500 km of roads are concerned.** Levels slightly decrease at most sites in 2014. **The limit value is also exceeded at background sites, away from the traffic, in the centre of the agglomeration.**
All in all, in 2014, around 2,3 million Ile-de-France inhabitants were potentially exposed to NO_2 levels exceeding the annual limit value. After a period of stability, a slight decrease of background levels of nitrogen dioxide is observed over the past two years in the agglomeration.

➡ **Regarding ozone levels, every year, the quality objective, is exceeded in all parts of the region, and especially in sub-urban and rural areas. In 2014, summer was fresh, cloudy and rainy. Therefore, exceedances of the quality objective for health protection are less important in 2014 than in 2013.**

➡ **After a long period of sharp decrease which began at the end of the 1990's, benzene levels continue to decline slightly on the whole region, and especially near traffic**. Although the quality objective for background is met everywhere, this is not the case at roadside sites where the national quality objective is exceeded on about 130 km of regional roads. **Generally speaking, almost 100 000 Ile-de-France inhabitants, in the agglomeration and at roadside situations, are potentially exposed to an exceedance of the annual quality objective for benzene.**

Regarding pollution episodes, **the information and warning procedure was triggered 16 days in 2014**. This is more than twice less than in 2013.
Almost all of these episodes are due to PM_{10}: 11 days of exceedance of the information warning threshold and 4 days for the alert threshold, among which 12 between March 6th and April the 1st. This major pollution episode led to the alternate plate traffic restriction on 2014 March 17th. One exceedance of the information threshold has been also recorded for nitrogen dioxide during this period. No exceedance was observed for ozone in summer.

	Trend 2000-2014		Standards to be met Limit value		Non-binding standards Quality objective		Non-binding standards Target value	
	Away from traffic	Roadside	Away from traffic	Roadside	Away from traffic	Roadside	Away from traffic	Roadside
PM10	↘	↘	Met	Exceeded	Met	Exceeded		
PM2.5	↘	↘	Met	Met	Exceeded	Exceeded	Met	Exceeded
NO_2	↘	↘	Exceeded	Exceeded	Exceeded	Exceeded		
O_3	→				Exceeded		Met	
Benzène	↘	↘	Met	Met	Met	Exceeded		

II. Pollutants exceeding air quality standards

Particulate matter in brief

400 000 inhabitants are potentially exposed to an exceedance of the PM_{10} daily limit value.

Recurrent and severe exceedances of PM_{10} limit value near traffic.

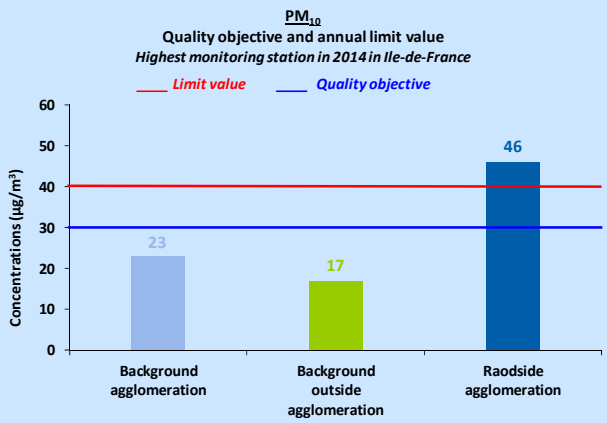
$PM_{2.5}$ background levels are almost 1,5 times higher than the quality objective threshold, and 2 or 3 times higher near traffic. All the Ile-de-France inhabitants, that is to say 11.1 million people, would be exposed to an exceedance of this threshold.

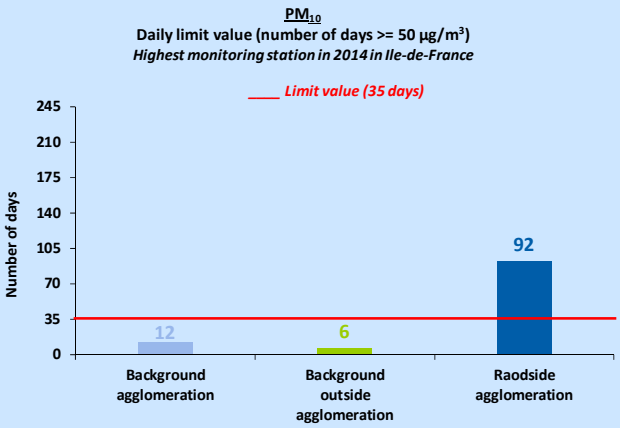
exceedance intensity	
very important	> + 50 %
important	+ 30 à + 50 %
moderate	+ 10 à + 30 %
light	0 à + 10 %

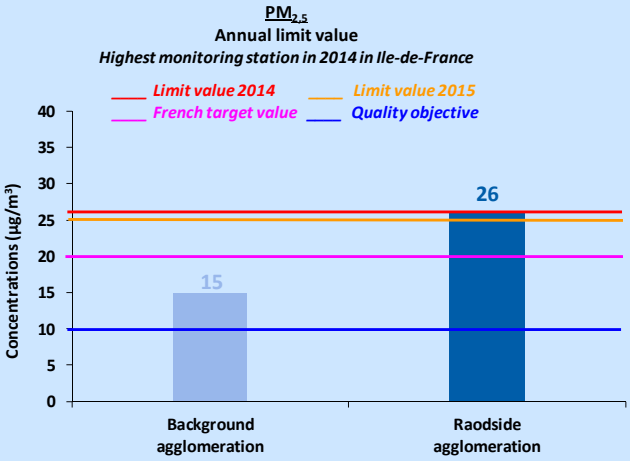
no exceedance

Particulate Matter (PM_{10})	2014			2001-2013		
	Background agglomeration	Rural background	Roadside	Background agglomeration	Rural background	Roadside
Annual quality objective exceedance						
Annual limit value exceedance						
Daily limit value exceedance				2007 2009 : max = threshold		

Particulate Matter ($PM_{2.5}$)	2014			2001-2013		
	Background agglomeration	Rural background	Roadside	Background agglomeration	Rural background	Roadside
Quality objective exceedance						
French target value exceedance				2007, 2009		
Limit value (2015) exceedance						every year
Limit value (2014) exceedance				*non applicable*		







Summary of air quality standards exceedances for particulate matter (PM_{10} and $PM_{2.5}$) in Ile-de-France

PM_{10} Particles

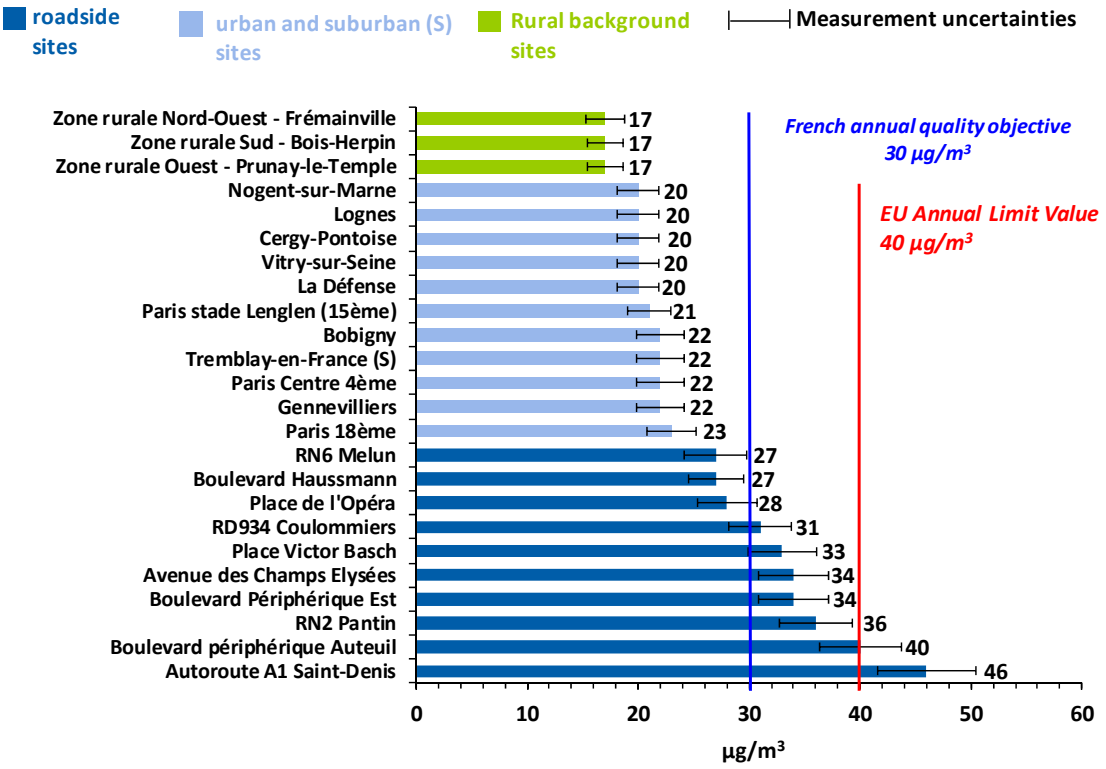


Figure 1: PM_{10} annual mean concentration for all continuous monitoring sites (TEOM FDMS / BAM) in the Paris region in 2014

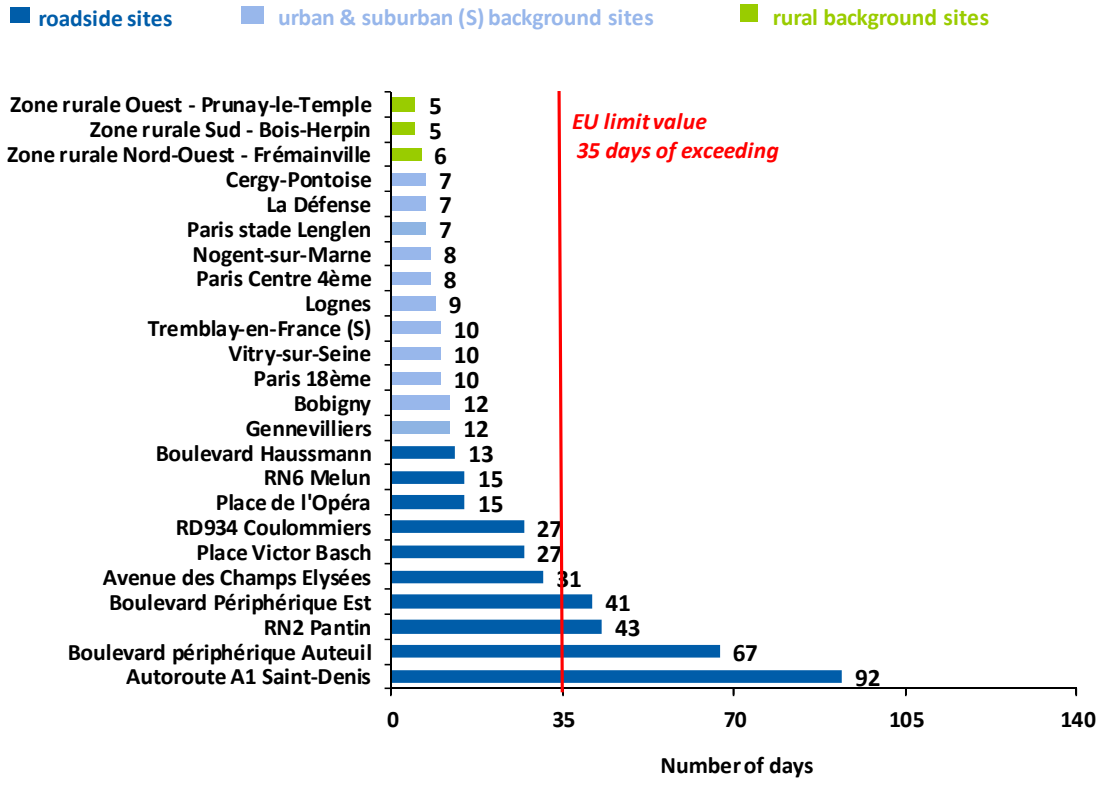


Figure 2: PM_{10} annual number of days exceeding the 50 µg/m³ EU threshold for all continuous monitoring sites (TEOM FDMS / BAM) in the Paris region in 2014

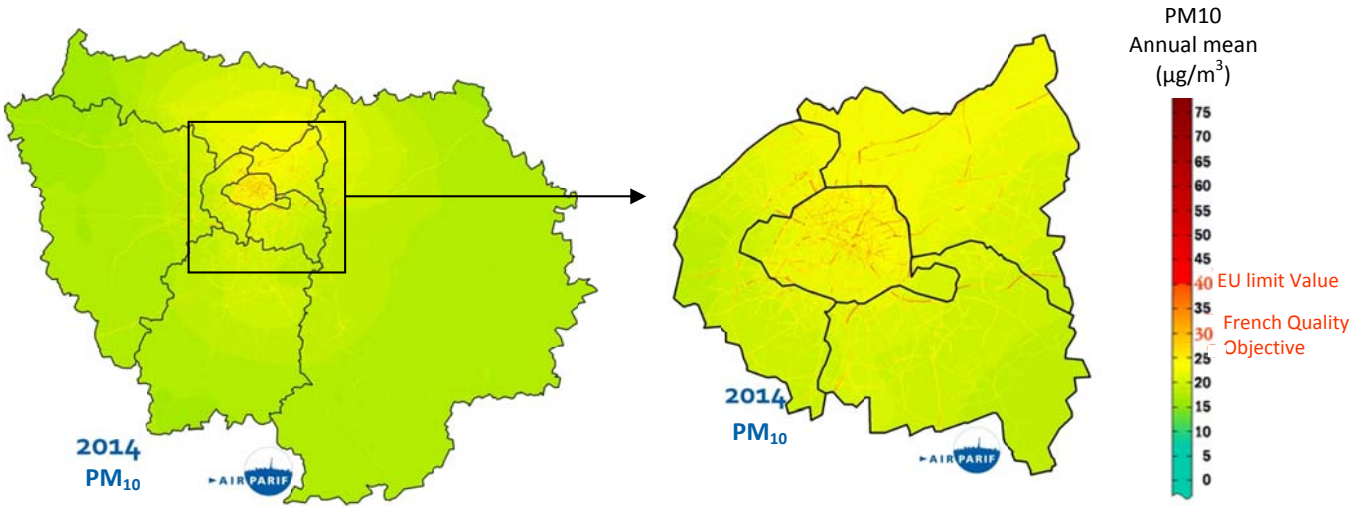
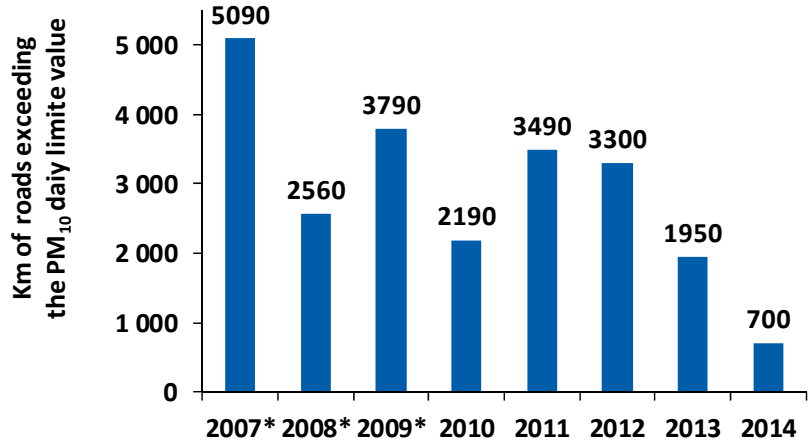
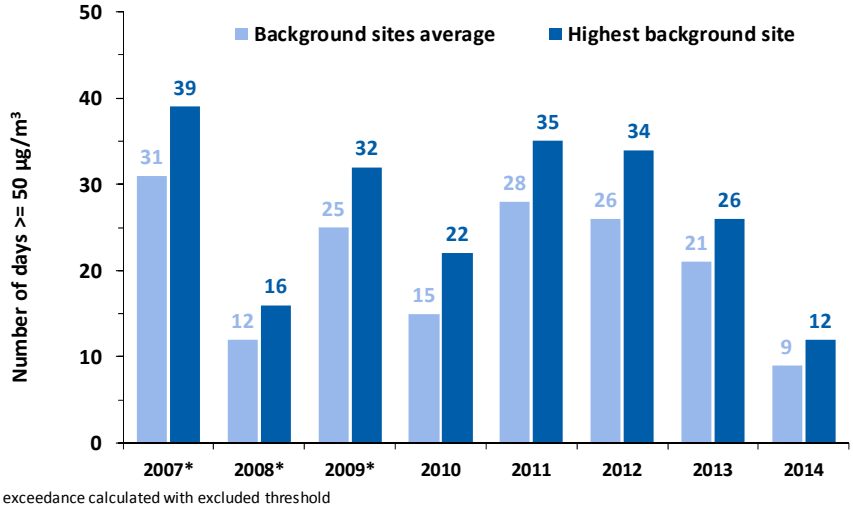


Figure 3: PM10 annual mean concentration in the Paris region, background and roadside, focus on Paris and near suburbs, 2014



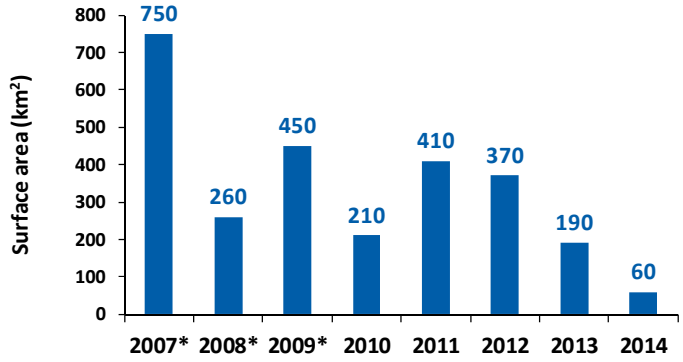
* exceedance calculated with excluded threshold

Figure 4: Kilometres of roads exceeding the PM_{10} daily limit value in the Paris region, 2007 to 2014



* exceedance calculated with excluded threshold

Figure 5: number of days exceeding PM_{10} 50 µg/m³ threshold, average and highest background site, 2007 to 2014



* exceedance calculated with excluded threshold

Figure 6: Trend in surface area exceeding daily limit value in PM_{10} in the Paris region, 2007 to 2014

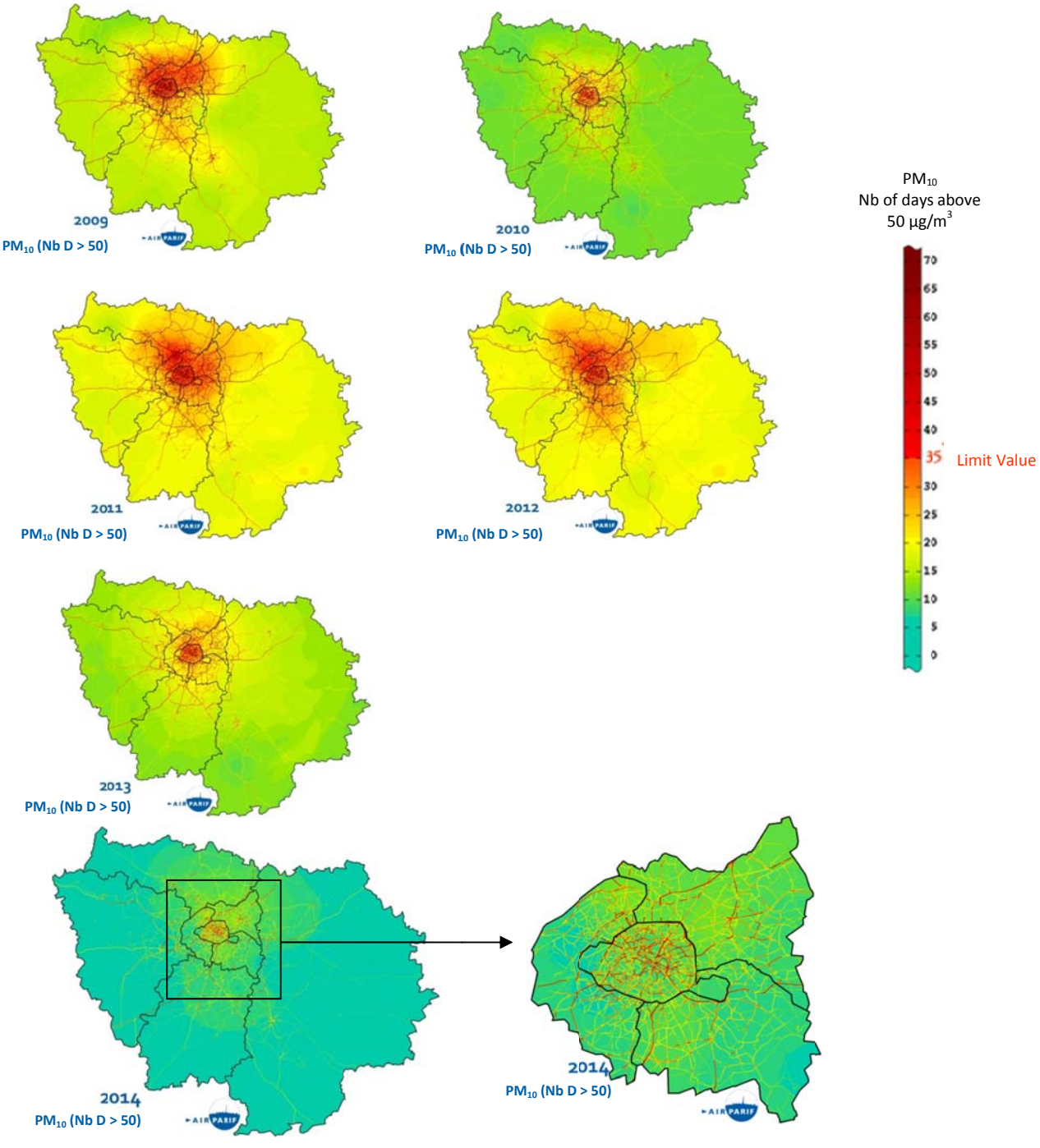
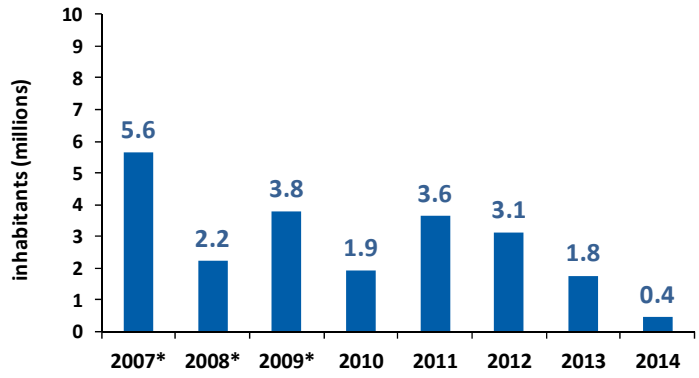


Figure 7: Risk of exceeding the EU daily limit value in PM_{10} in the Paris region, background and roadside



* exceedance calculated with excluded threshold

Figure 8: millions of inhabitants potentially exposed to PM_{10} level exceeding the EU daily limit value in the Paris region, 2007 to 2014

$PM_{2.5}$ Particles

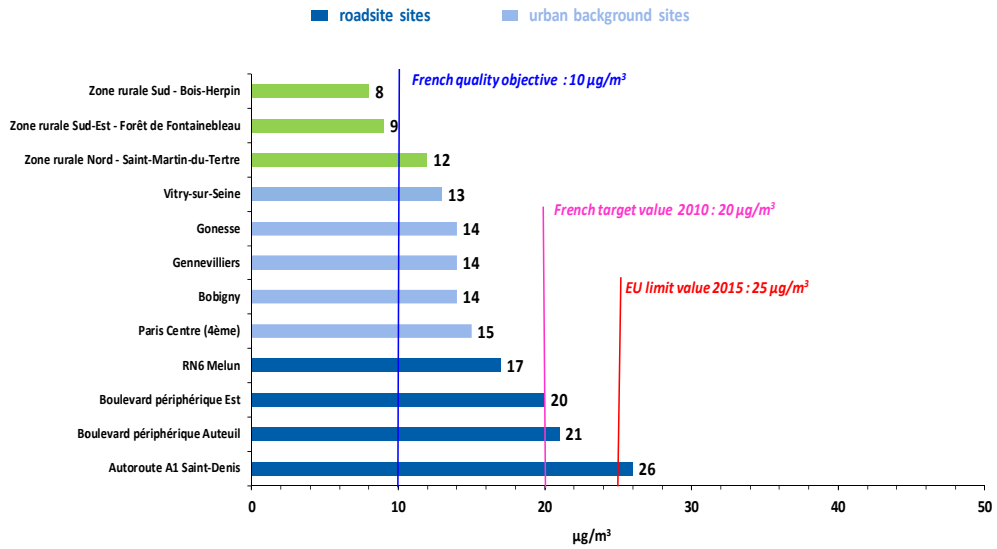


Figure 9: $PM_{2,5}$ annual mean concentration for all continuous monitoring sites (TEOM FDMS) in the Paris region in 2014

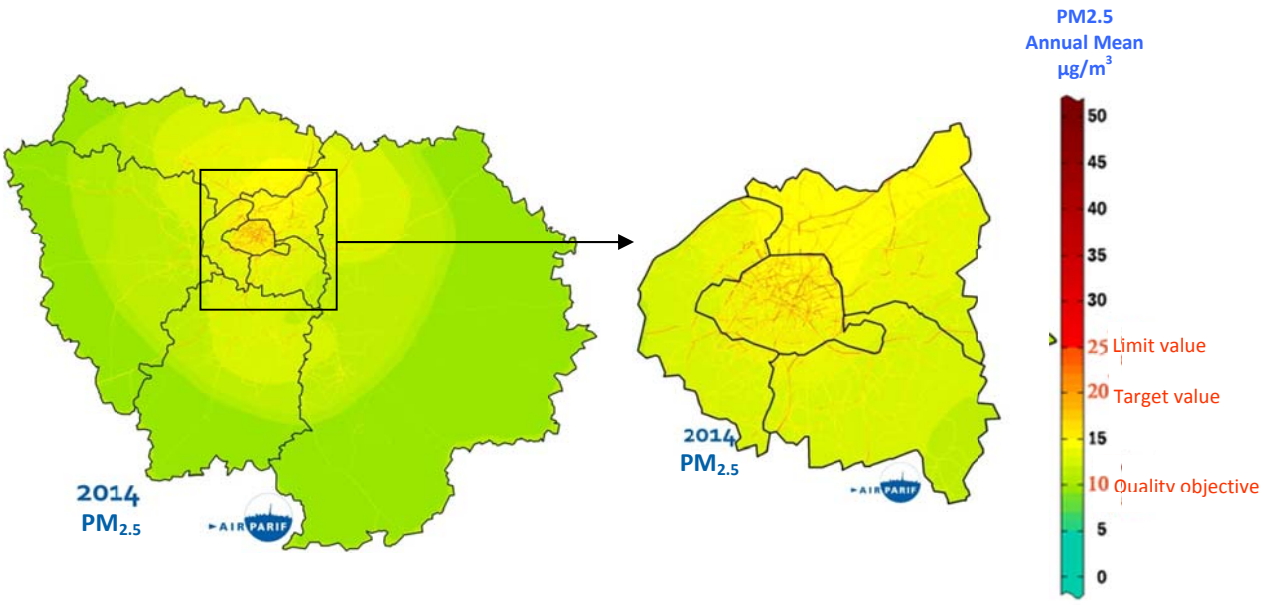


Figure 10: annual mean concentration of fine particles $PM_{2,5}$ in the Paris region and focus on Paris and suburbs, background and roadside in 2014

Nitrogen dioxide in brief

**Nitrogen dioxide remains an important issue in Ile-de-France:
in 2014, around 2,3 million inhabitants living in the centre of the agglomeration were potentially exposed to an exceedance of the annual limit value.**

Recurrent limit value exceedances are recorded, especially near road traffic.

**Background levels are overall stable between 2013 and 2014.
After a significant decrease of background levels since the beginning of the 2000's, concentrations have been more stable for several years.**

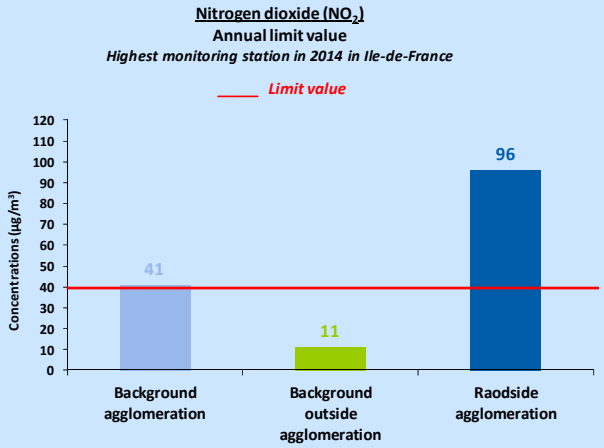
The main source of nitrogen dioxide remains road traffic, particularly from diesel powered vehicles. Levels along major roads can be twice higher than the air quality standards.

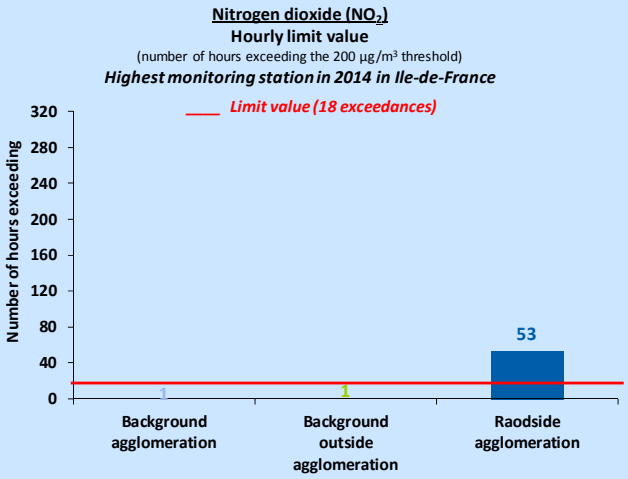
exceedance intensity	
very important	> + 50 %
important	+ 30 à + 50 %
moderate	+ 10 à + 30 %
light	0 à + 10 %

no exceedance

Nitrogen dioxide (NO_2)	2014			2001-2013		
	Background agglomeration	Rural background	Roadside	Background agglomeration	Rural background	Roadside
Annual limit value exceedance *				2003, 2007, 2009, 2010, 2011, 2012, 2013		every year
Hourly limit value exceedance *						since 2006

* *considering margins of tolerance decreasing from year to year*





Summary of air quality standards exceedances for nitrogen dioxide (NO_2) in Ile-de-France

Nitrogen dioxide

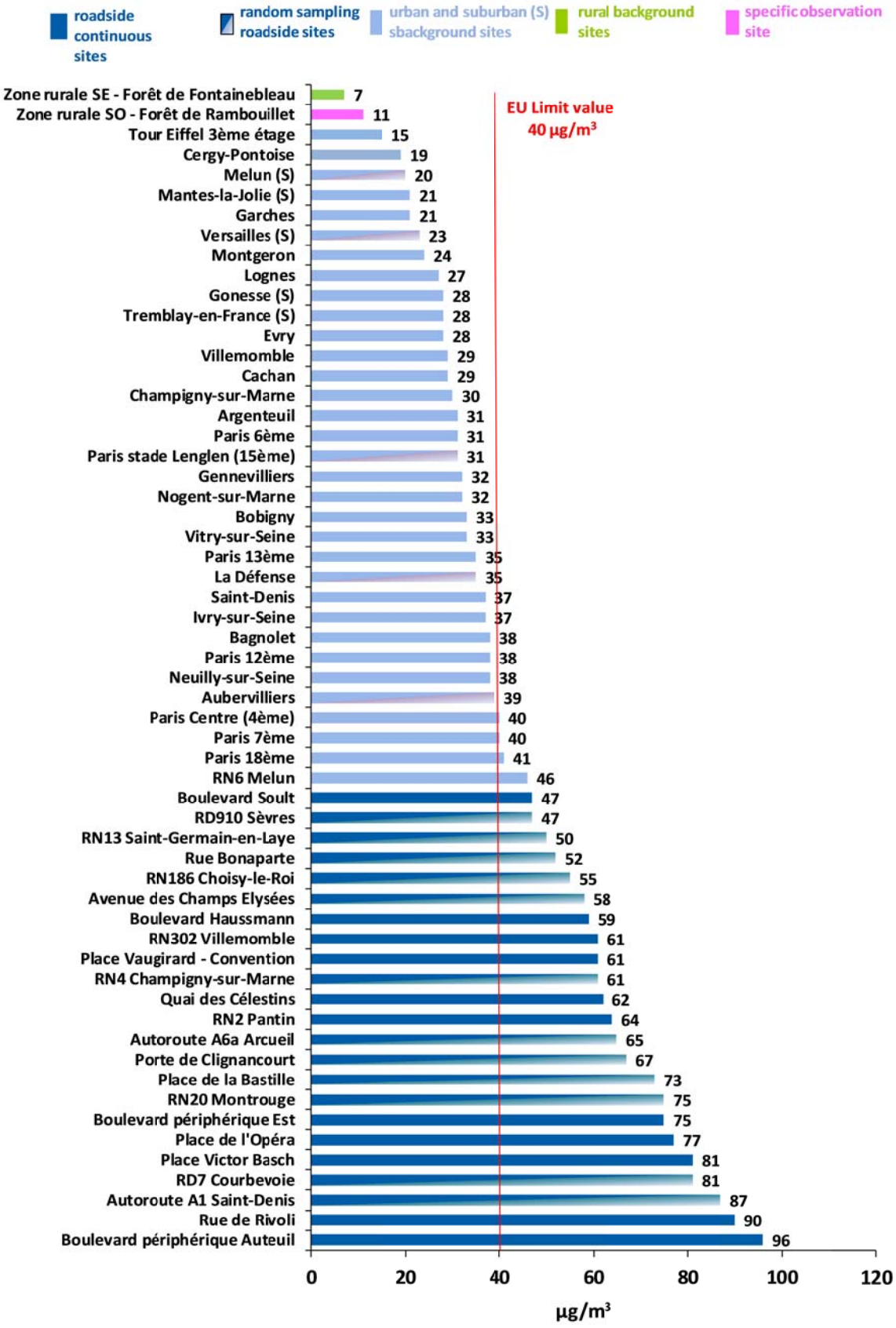


Figure 11: nitrogen dioxide (NO_2) annual mean concentration for all monitoring sites in the Paris region in 2014

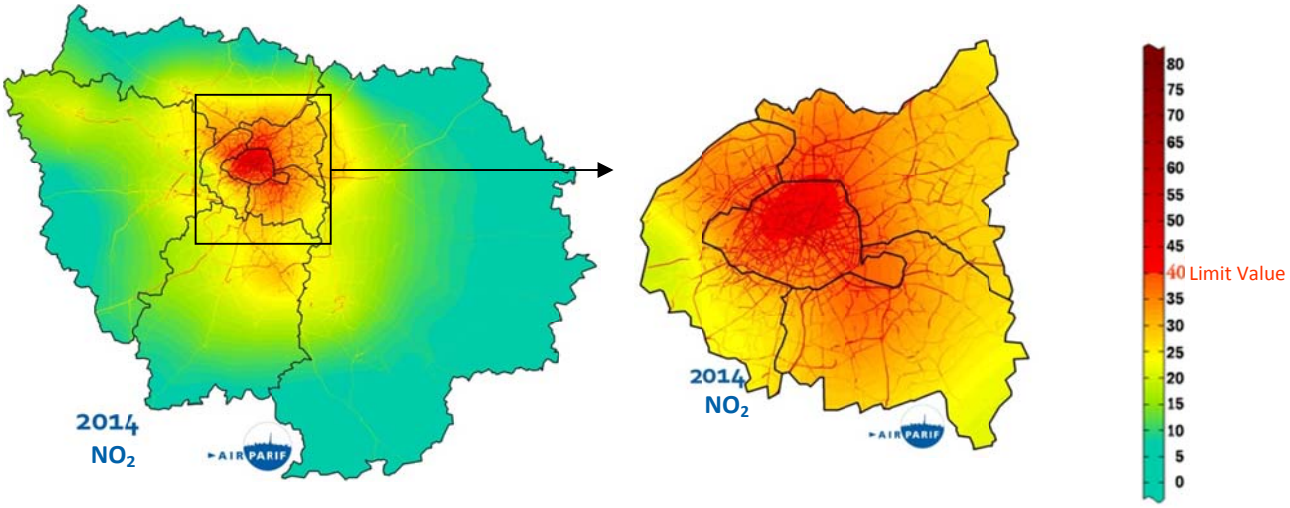
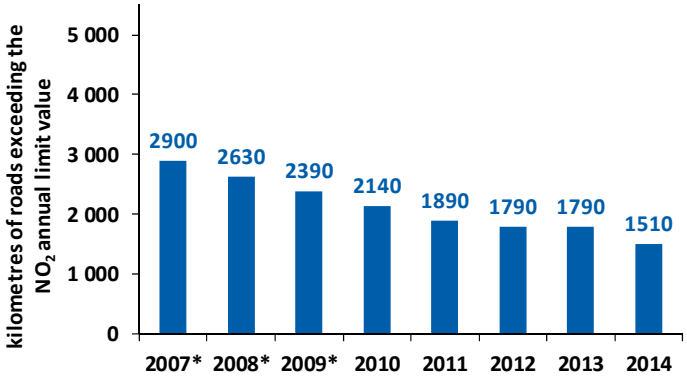
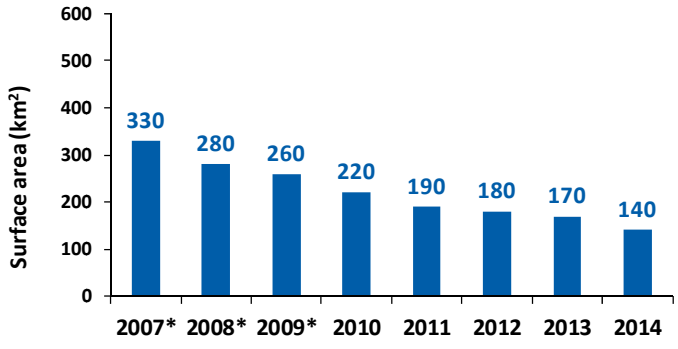


Figure 12: nitrogen dioxide (NO_2) annual mean concentration in the Paris region, background and roadside, focus on Paris and near suburbs, 2014



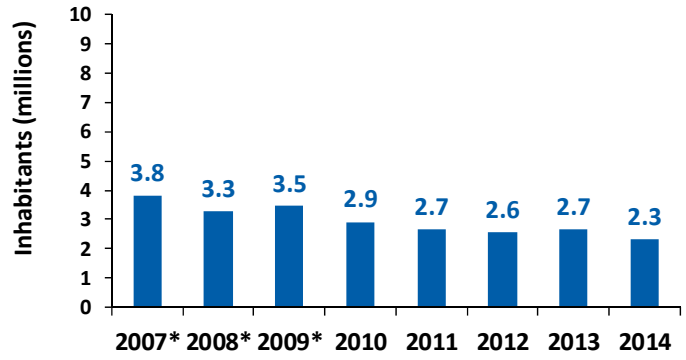
* exceedances calculated with excluded threshold

Figure 13: kilometres of main road network exceeding the nitrogen dioxide (NO_2) EU annual limit value in the Paris region, 2007 to 2014



* exceedances calculated with excluded threshold

Figure 14: trend in surface area exceeding the annual limit value (40 µg/m³) in nitrogen dioxide (NO2) in the Paris region, 2007 to 2014



* exceedances calculated with excluded threshold

Figure 15: millions of inhabitants potentially exposed to nitrogen dioxide (NO_2) level exceeding EU annual limit value in the Paris region, 2007 to 2014

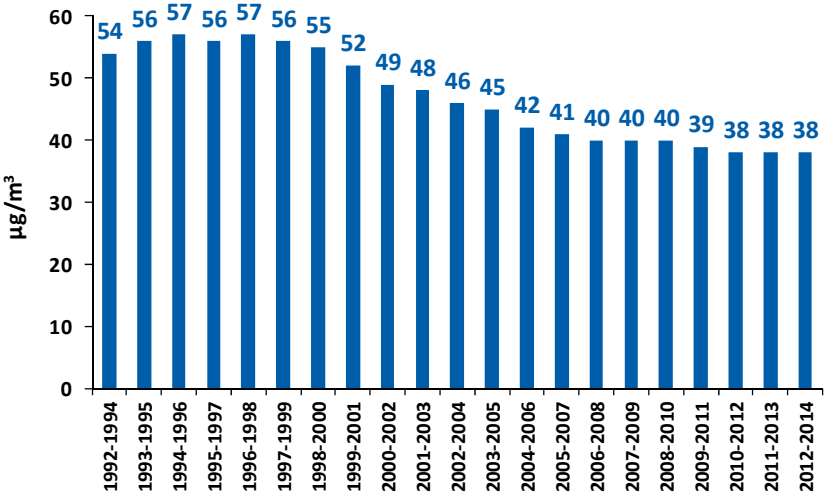


Figure 16: trend in the nitrogen dioxide (NO_2) tri-annual mean concentration, sample of the same six urban background sites in the Paris agglomeration, 1992-1994 to 2012- 2014

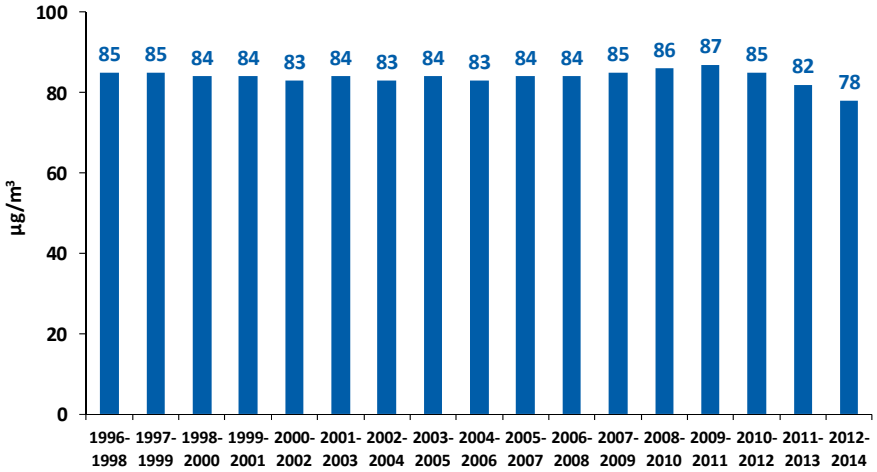


Figure 17: trend in the nitrogen dioxide (NO_2) tri-annual mean concentration, sample of the same five roadside sites in the Paris agglomeration, 1996-1998 to 2012- 2014

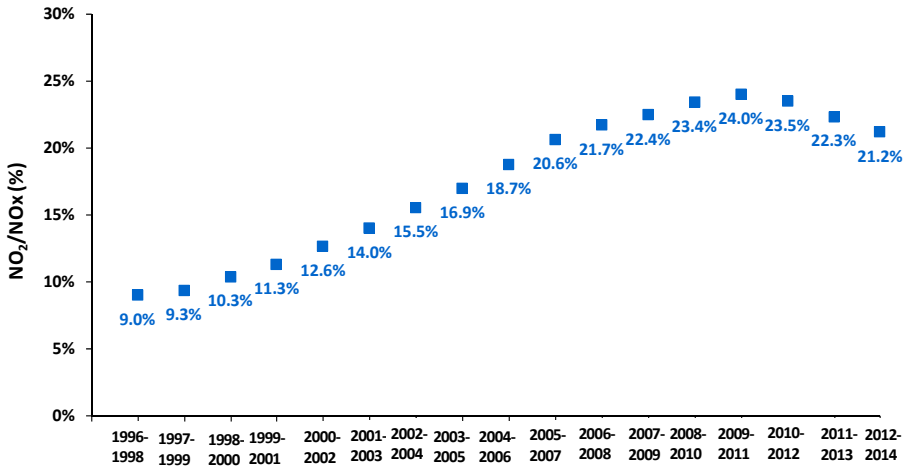


Figure 18: [NO2]/[NOx] ratio trend, averaged roadside sites in the Paris agglomeration (background level subtracted), 1998 to 2014

Ozone in brief

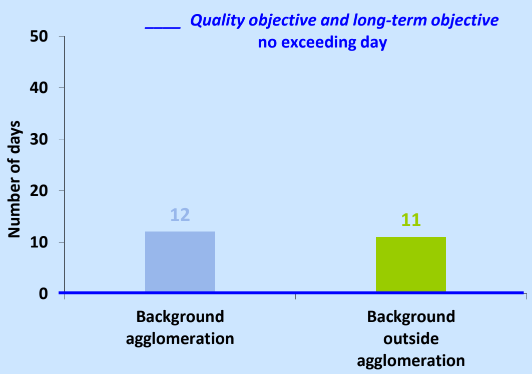
Stabilization of the mean levels increase.

Less exceedances of the quality objective than 2013 because of a cloudy and rainy summer.

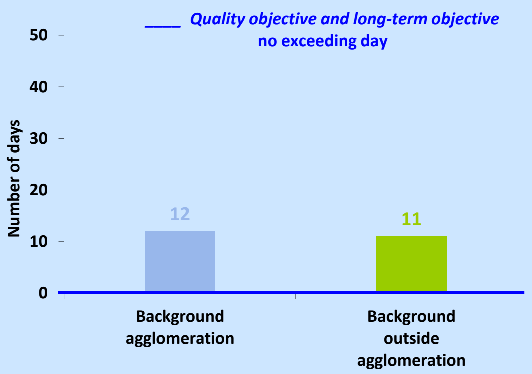
exceedance intensity		no exceedance
very important	> + 50 %	(green)
important	+ 30 à + 50 %	
moderate	+ 10 à + 30 %	
light	0 à + 10 %	

Ozone (O_3)	2014			2001-2013		
	Background agglomeration	Rural background	Roadside	Background agglomeration	Rural background	Roadside
Quality objective exceedance (health) Long term objective applicable in 2020 (health)	(red)	(red)	*no measurement*	every year	every year	*no measurement*
Target value exceedance applicable in 2012 (health)	(green)	(green)	*no measurement*	every year until 2006	every year until 2006	*no measurement*
Quality objective exceedance (vegetation) Long term objective applicable in 2020 (vegetation)	(red)	(red)	*no measurement*	every year	every year	*no measurement*
Target value exceedance applicable in 2012 (vegetation)	(green)	(green)	*no measurement*	(green)	(green)	*no measurement*

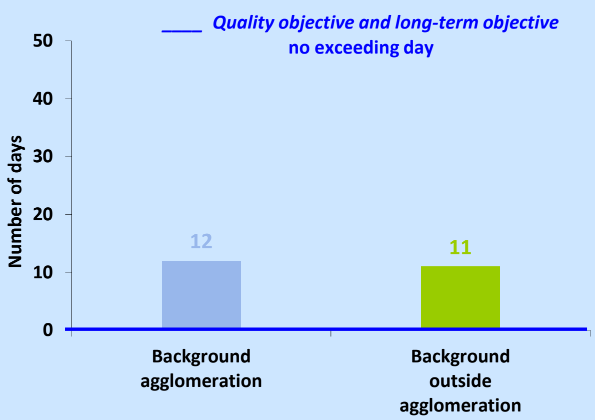
Ozone (O_3) health
Quality objective and long-term objective
Highest monitoring station in 2014 in Ile-de-France



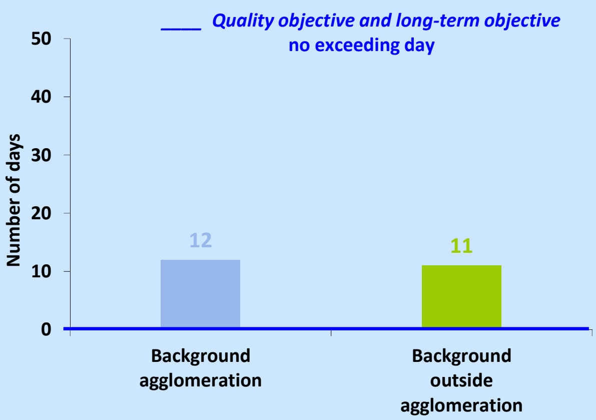
Ozone (O_3) health
Quality objective and long-term objective
Highest monitoring station in 2014 in Ile-de-France



Ozone (O_3) health
Quality objective and long-term objective
Highest monitoring station in 2014 in Ile-de-France



Ozone (O_3) health
Quality objective and long-term objective
Highest monitoring station in 2014 in Ile-de-France



Summary of air quality standards exceedances for ozone (O_3) in Ile-de-France

Ozone

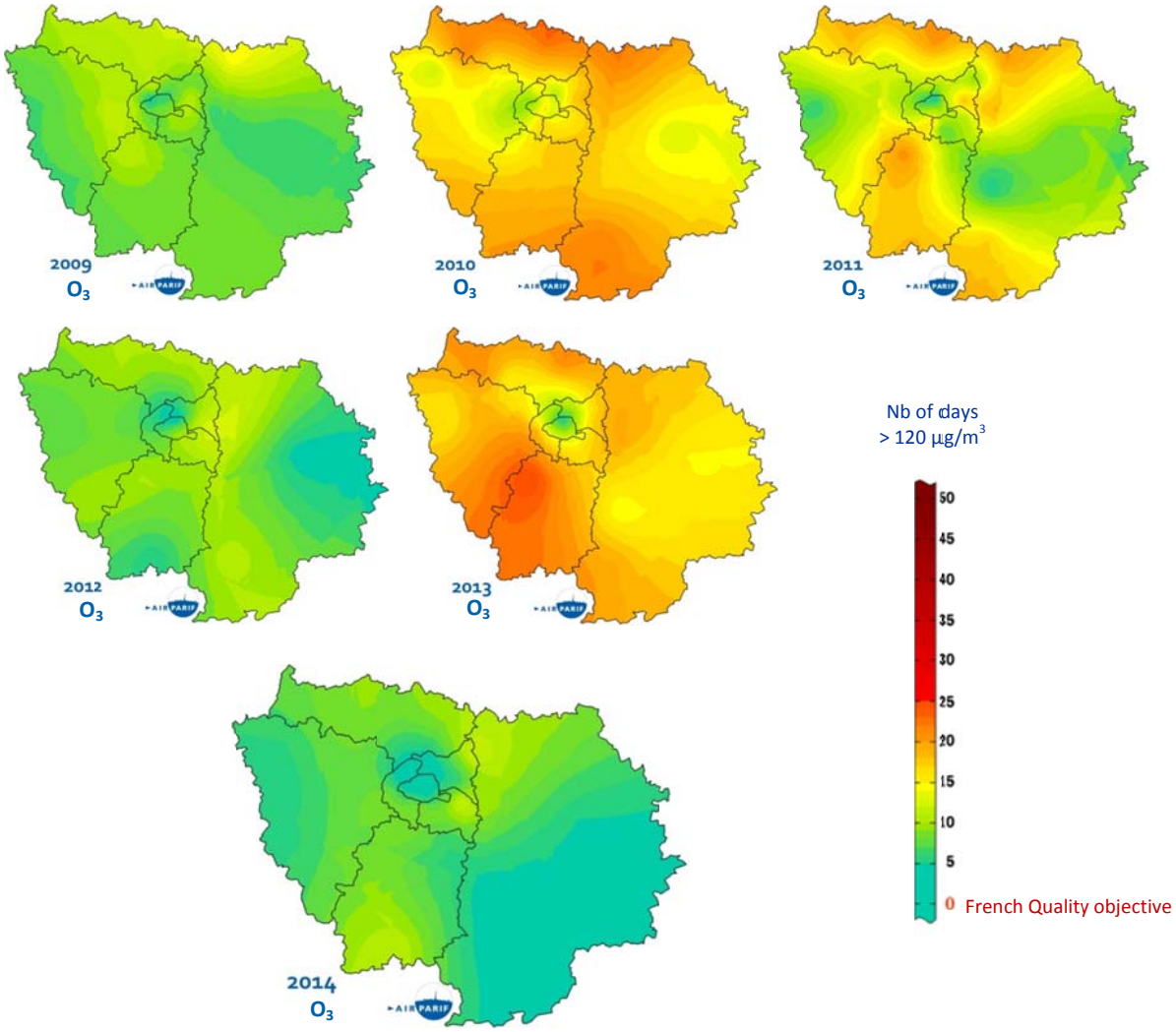
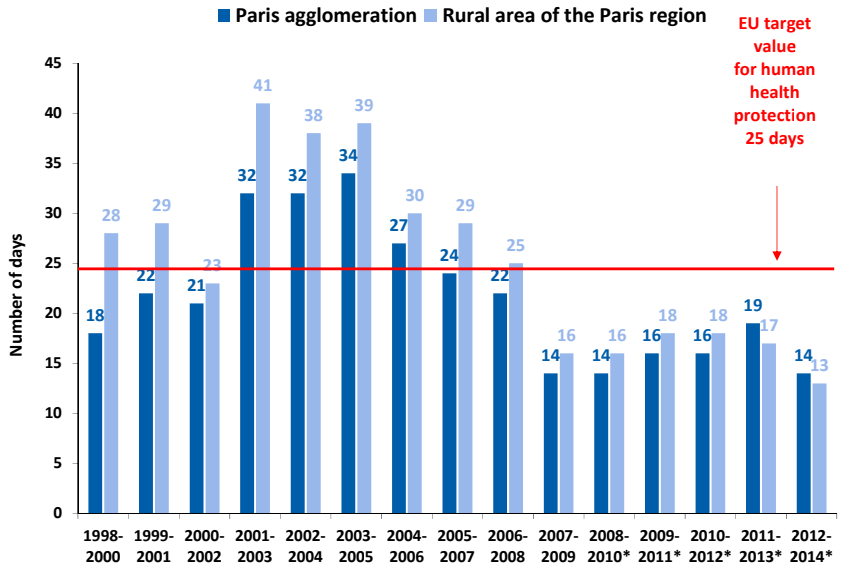


Figure 19: number of days exceeding the French quality objective (=EU long-term objective), threshold 120 µg/m³ 8-hour mean, objective = no exceeding) for ozone (O_3) in the Paris region, 2002 to 2014



exceedance calculated with excluded threshold

Figure 20: number of days exceeding the threshold of the EU target value for protection of human health (120 µg/m³ 8-hour average, not over 25 days of exceeding on a 3 years period) in the Paris region, for the highest monitoring site in urban and rural parts of the region, 1998-2000 to 2012-2014

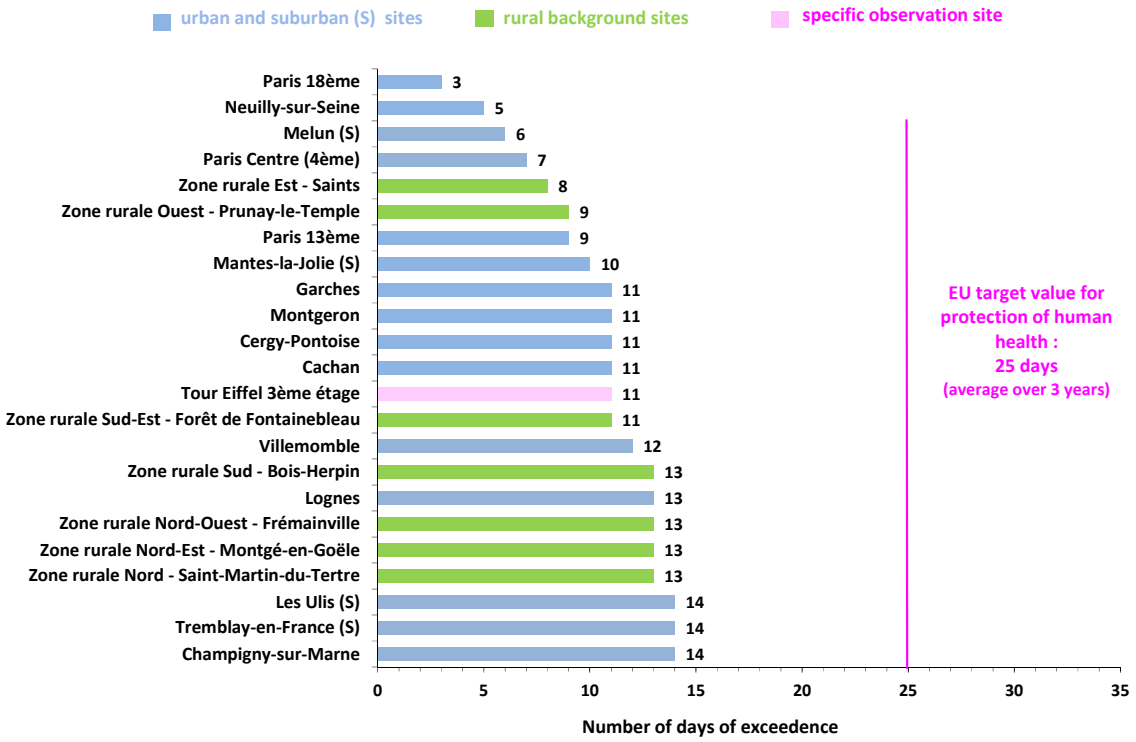


Figure 21: number of days exceeding the threshold of the EU target value for protection of human health (120 µg/m³ 8-hour average) in the Paris region (3 years average 2012-2014)

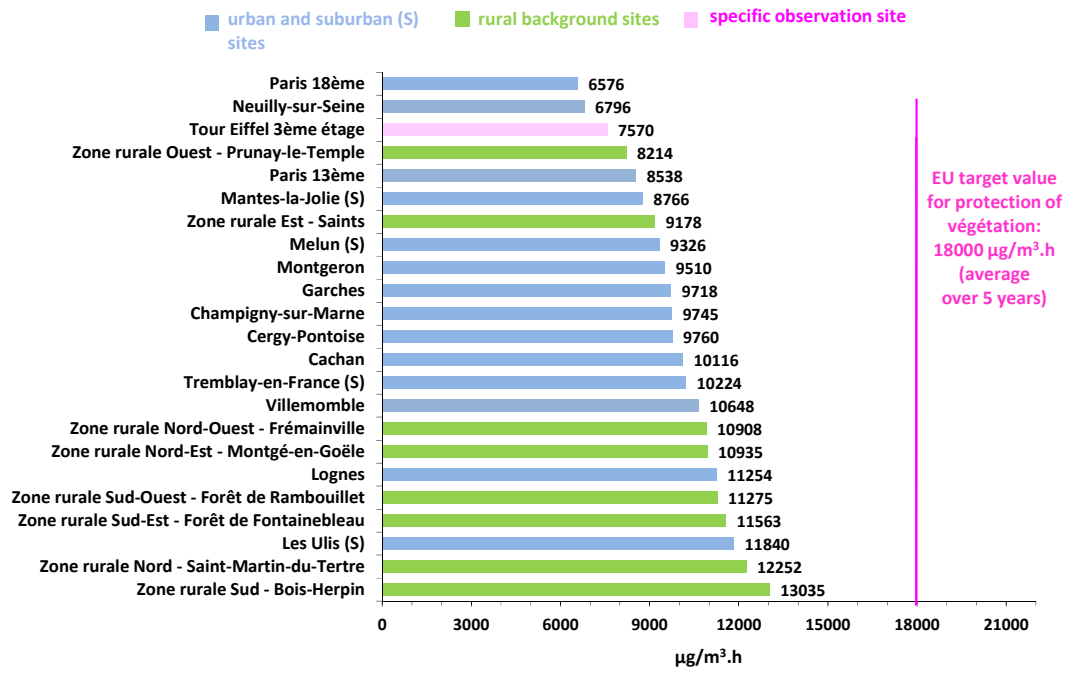


Figure 22: target value in ozone for the protection of vegetation (AOT40, threshold of 18000 µg/m³.h) in the Paris region (average 2010-2014)

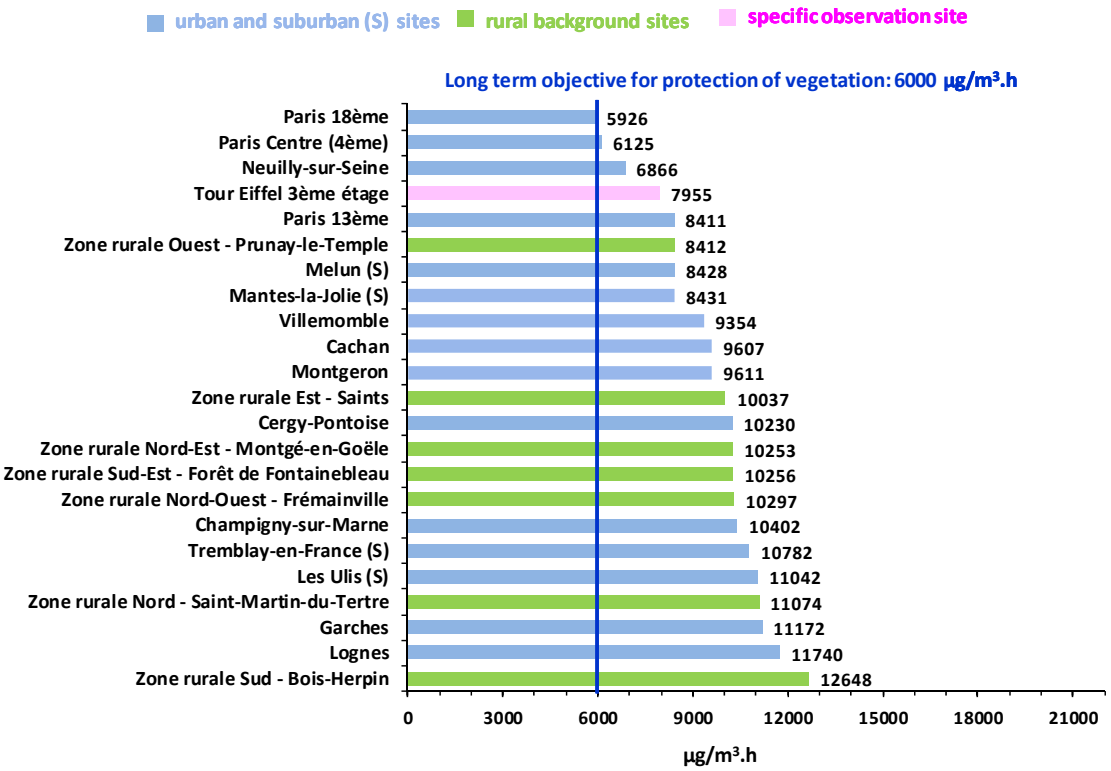


Figure 23: long-term objective in ozone (O3) for the protection of vegetation (AOT40, threshold of 6000 µg/m³.h) in the Paris region in 2014

Benzene

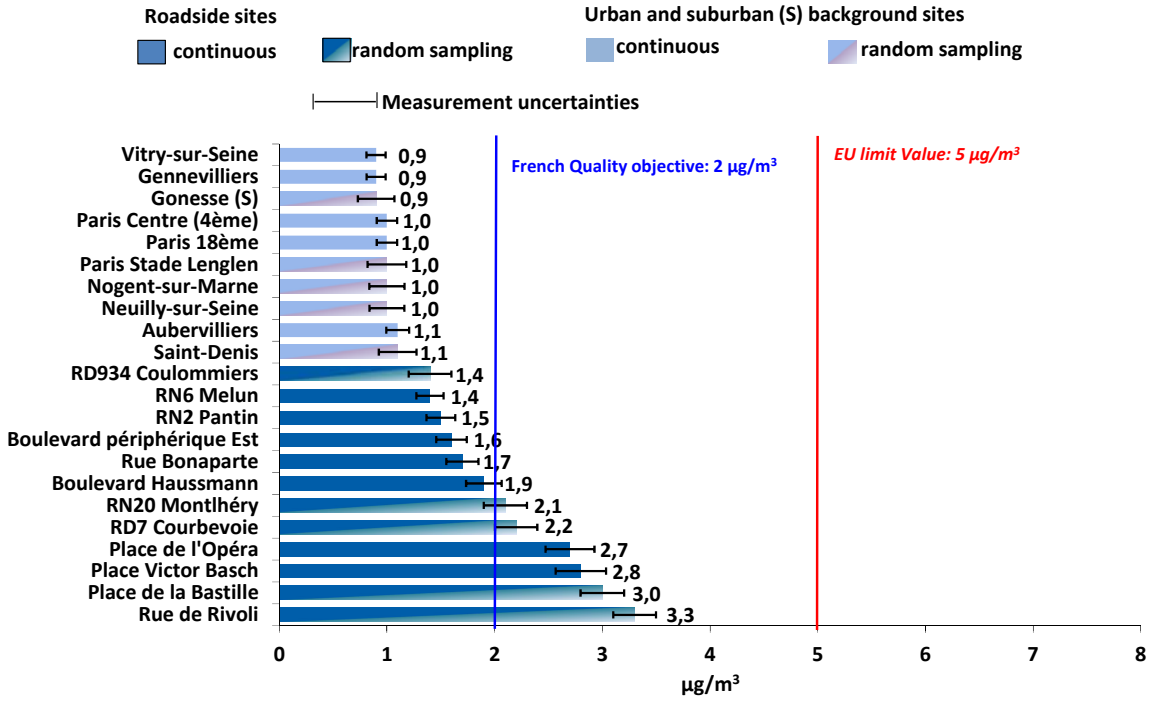


Figure 24: annual mean concentration of benzene in the Paris region in 2014

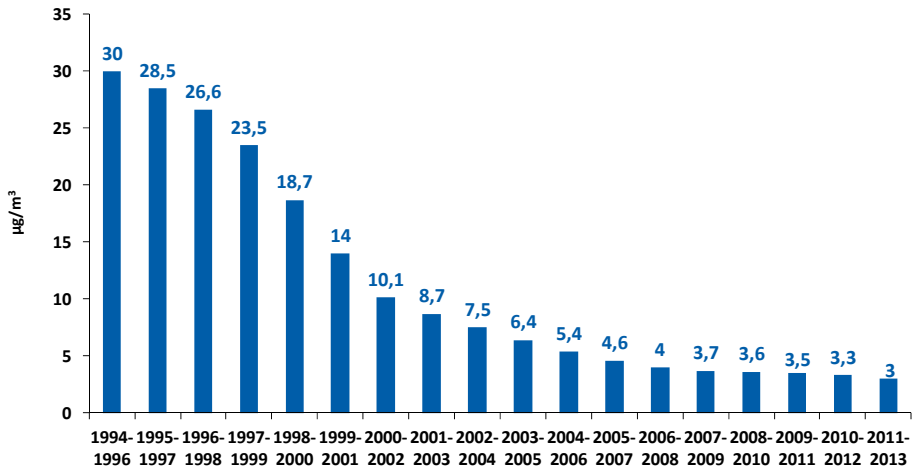


Figure 25: trend in the benzene annual mean concentration on Place Victor Basch Paris roadside monitoring site, 1994 to 2014

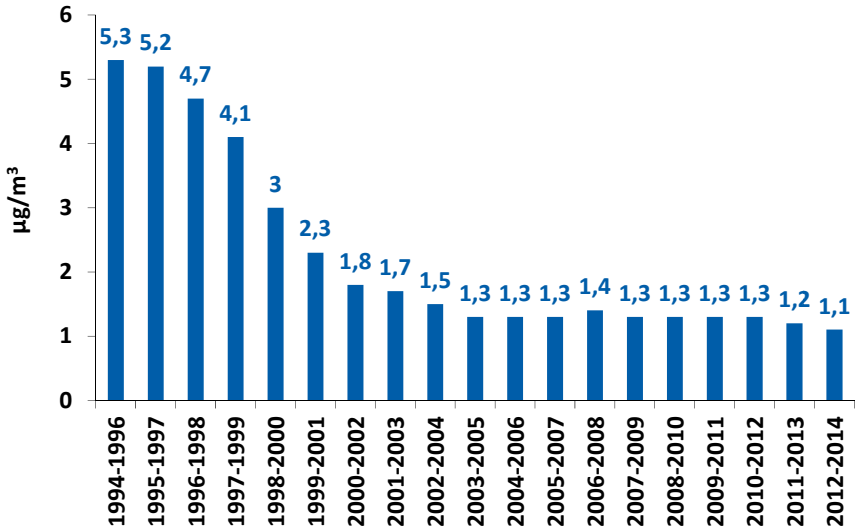


Figure 26: trend in the benzene tri-annual mean concentration, sample of five to ten urban background sites in the Paris agglomeration, 1994-1996 to 2012- 2014

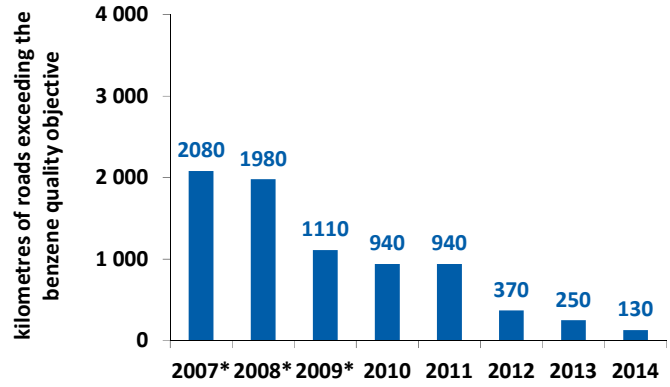


Figure 27: kilometres of main road network exceeding the benzene French quality objective (2 µg/m³) in the Paris region, 2007 to 2014

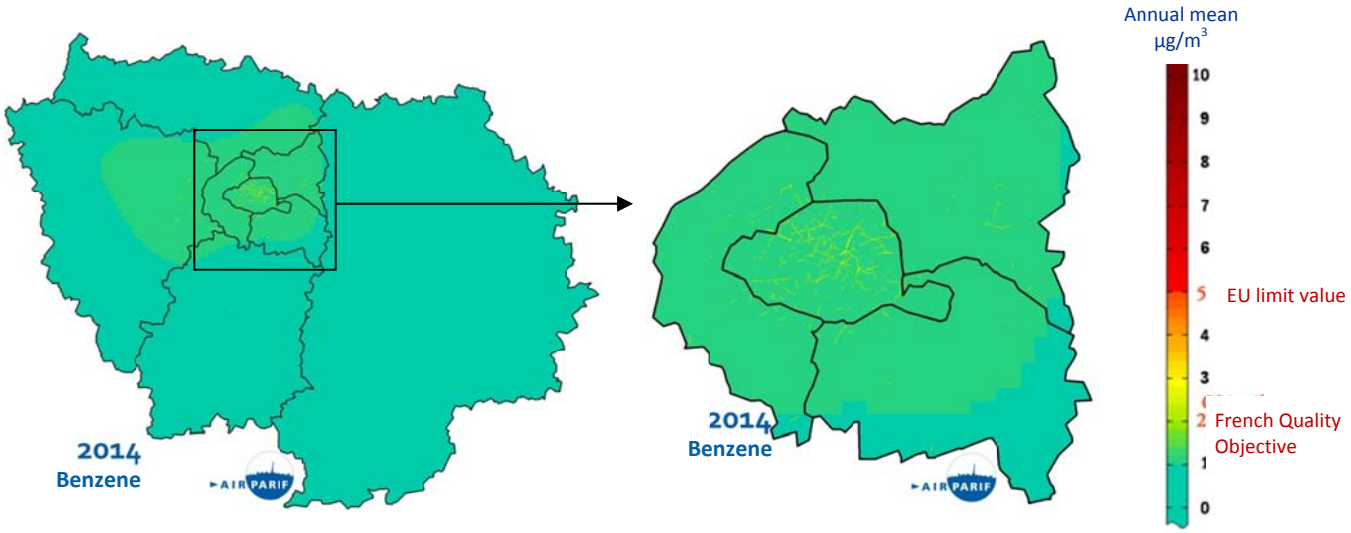


Figure 28: benzene annual mean concentration in the Paris region, background and roadside, focus on Paris and near suburbs, 2014

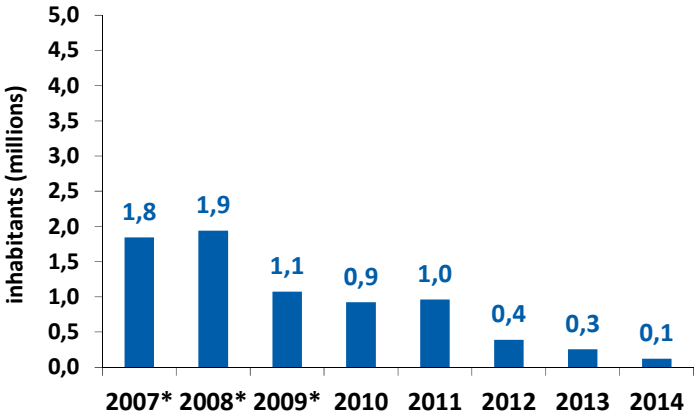
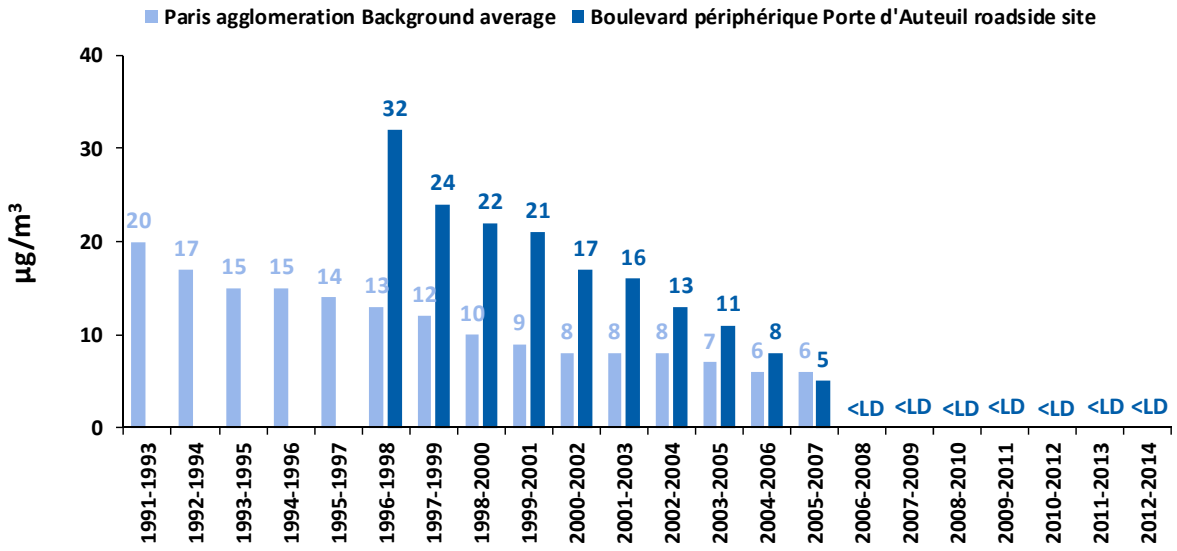


Figure 29: millions of inhabitants potentially exposed to an exceeding of the benzene French quality objective (2 µg/m³) in the Paris region, 2008 to 2014

III. Pollutants meeting air quality standards

Sulfur dioxide (SO_2)



<LD: under the detection limit

Figure 30: trend in the sulphur dioxide (SO_2) tri-annual mean concentration, changing sample of urban background sites in the Paris agglomeration and roadside site on Paris ring road, 1991-1993 to 2012- 2014

Carbon monoxide (CO)

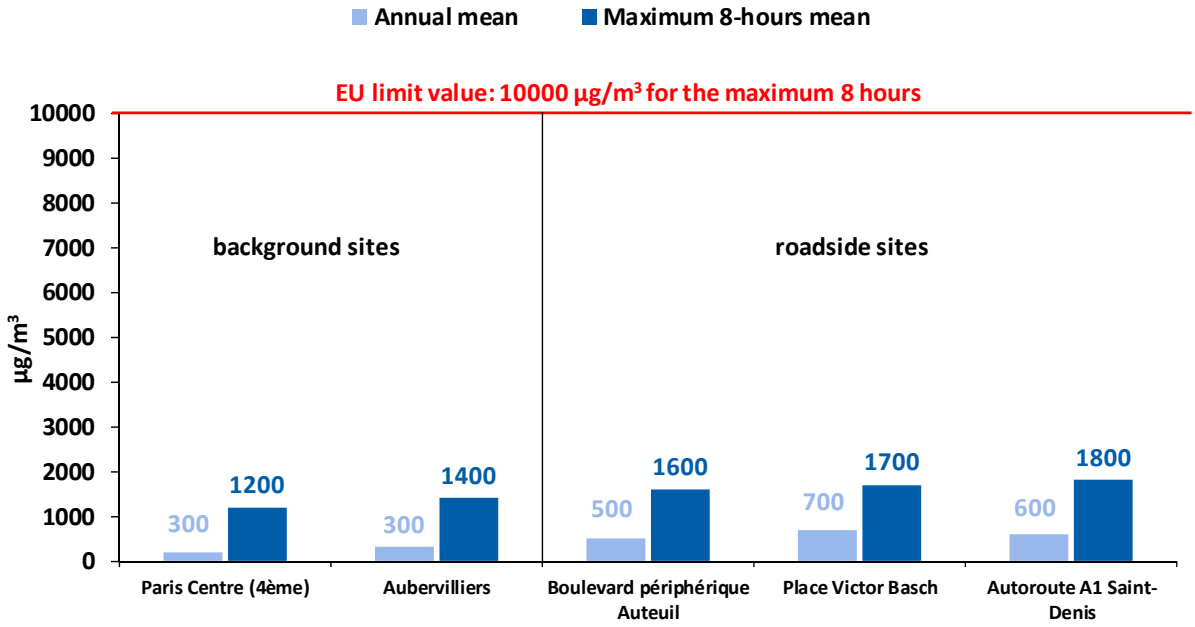


Figure 31: carbon monoxide (CO) annual mean and annual maximum 8-hour mean concentration for all continuous monitoring sites in the Paris region in 2014

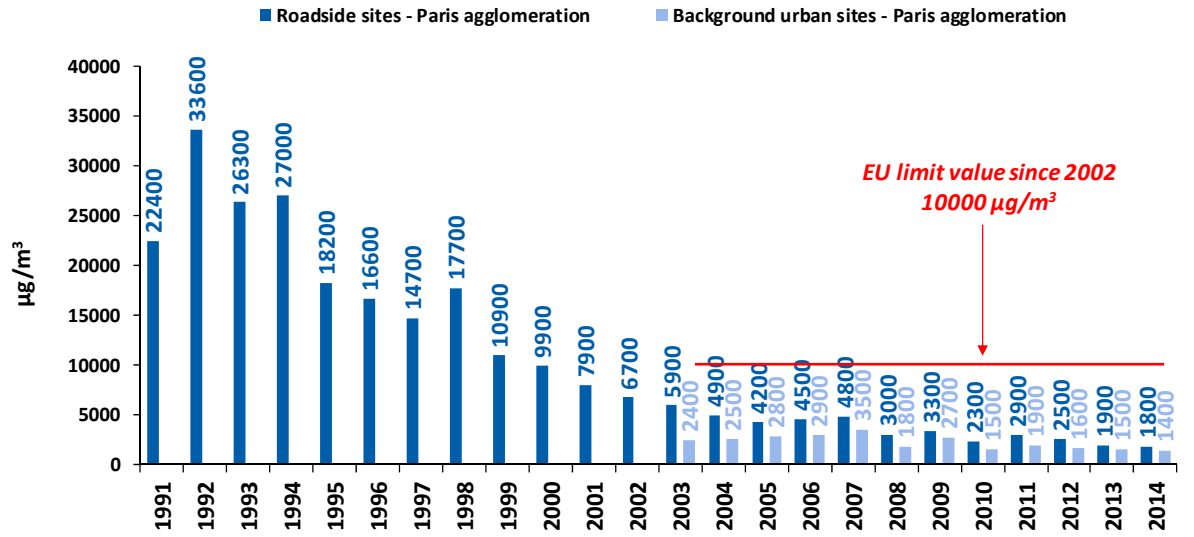


Figure 32: trend in the carbon monoxide (CO) annual maximum 8-hour mean concentration, urban background sites and roadside sites in the Paris agglomeration, 1991 to 2014

Metals (Lead, Arsenic, Cadmium and Nickel)

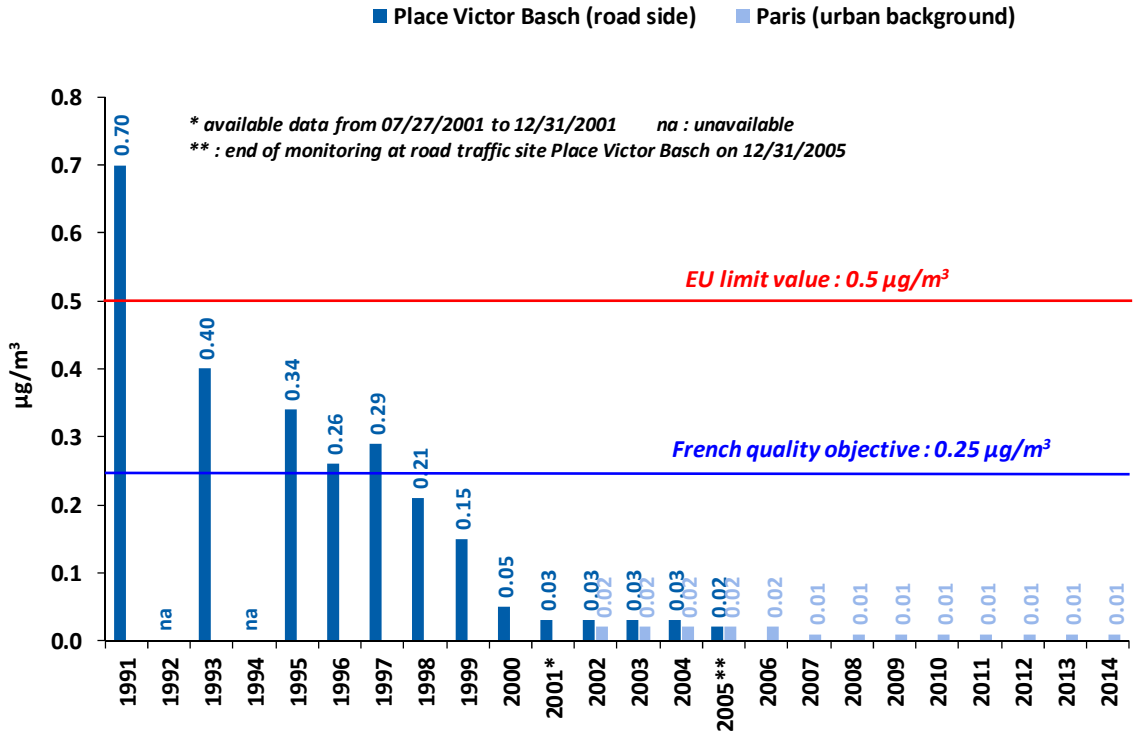


Figure 33: trends in the lead annual mean concentration, urban background and roadside sites in Paris, 1991 to 2014

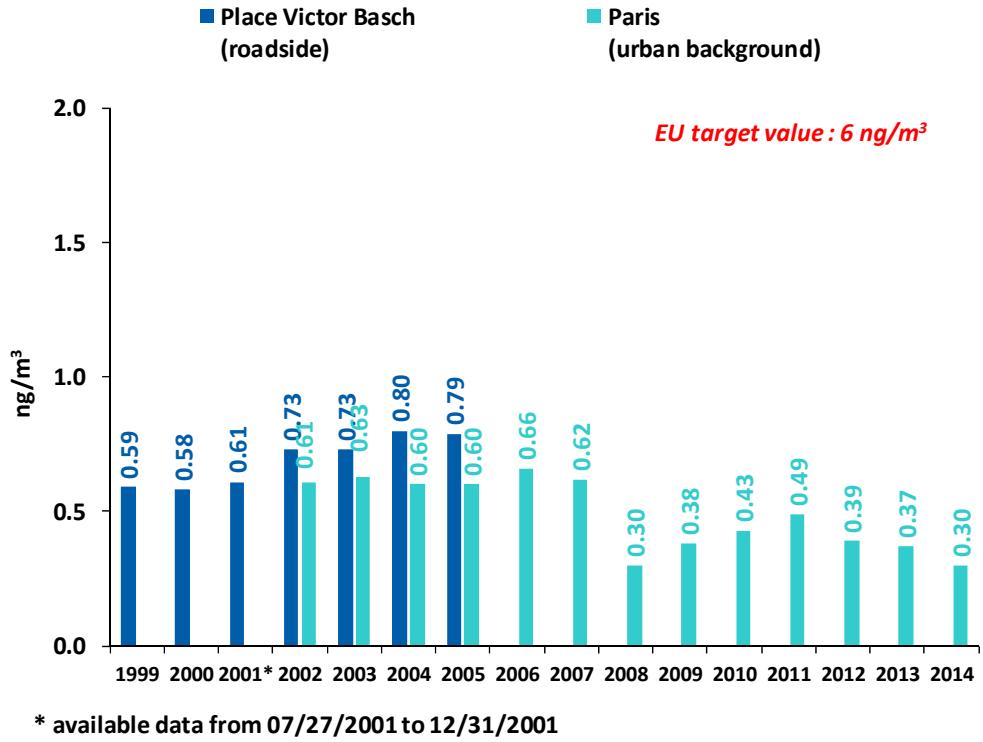


Figure 34: trends in the arsenic annual mean concentration, urban background and roadside sites in the Paris region, 1999 to 2014

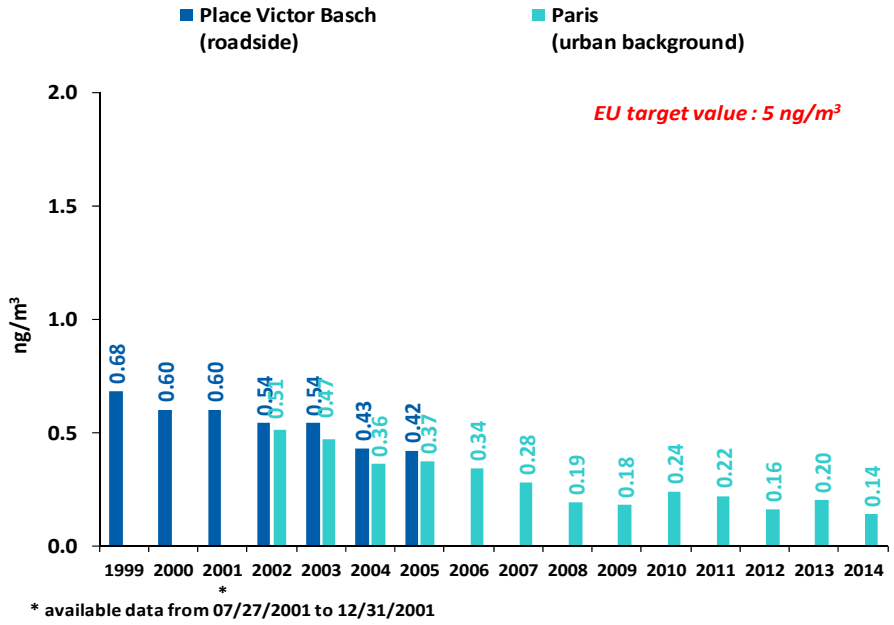
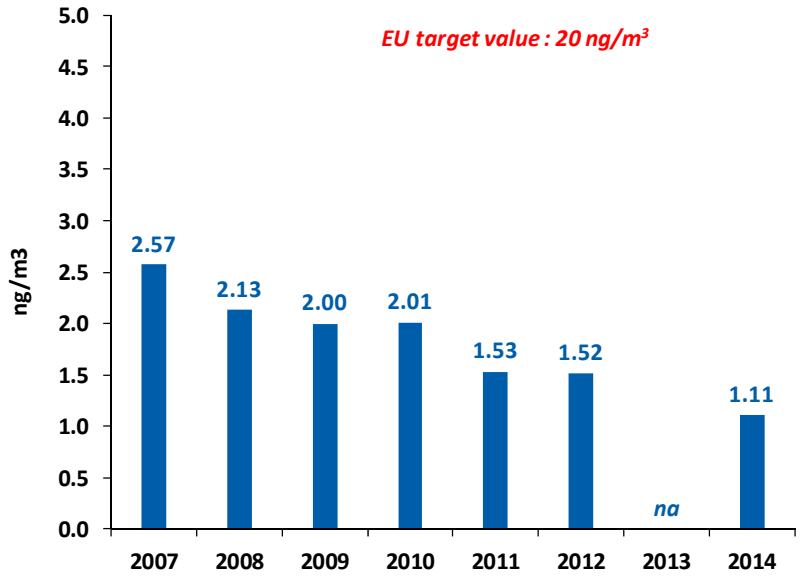


Figure 35: trends in the cadmium annual mean concentration, urban background and roadside sites in the Paris region, 1999 to 2014



na : non available

Figure 36: nickel annual mean concentration, urban background site in Paris, 2007 to 2014

Benzo(a)pyrene

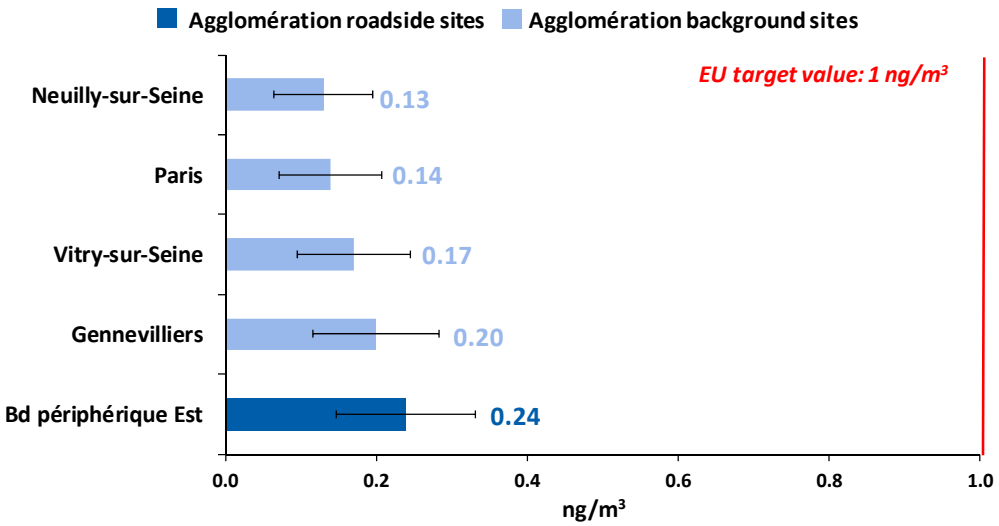


Figure 37: benzo(a)pyrene annual mean concentration for all monitoring sites in the Paris region in 2014

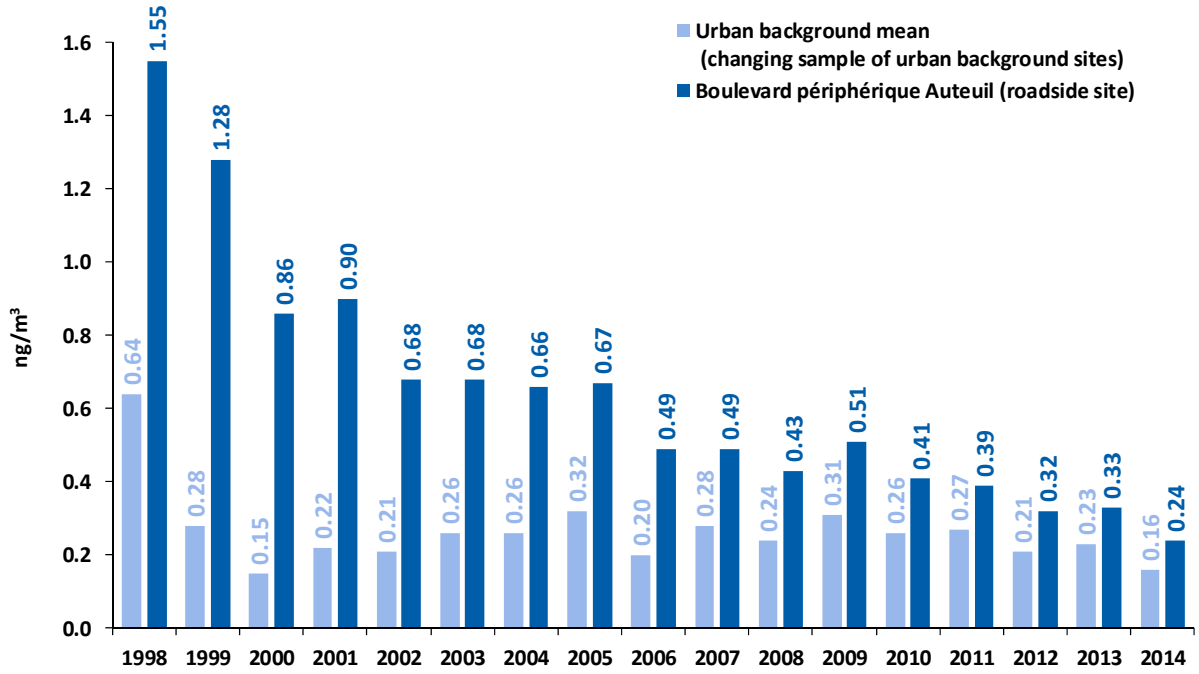


Figure 38: trend in the benzo(a)pyrene annual mean concentration, urban background sites mean and roadside site in the Paris agglomeration, 1998 to 2014