

Air pollution by ozone

Summer 2014 ozone assessment



Overview of exceedances of EC ozone thresholds values for April-September 2014

- The European Union (EU) has defined various standards to protect human health against pollution by ozone, including: information threshold, alert threshold, and long-term objective (LTO).
- During summer 2014, concentrations of ground-level ozone significantly exceeded these standards. However, the number of exceedances was lower than in many previous years, continuing the long-term downward trend observed over the last 25 years.
- The first standard, information threshold (whereby a 1 hour concentration of 180 $\mu\text{g}/\text{m}^3$ triggers an obligation to inform the population on possible risks), was exceeded at approximately 9% of all stations providing data.
- The alert threshold (which is triggered when a 1 hour concentration exceeds 240 $\mu\text{g}/\text{m}^3$ and requires countries to take immediate action) was exceeded only 4 times.
- The long-term objective (LTO, i.e. the maximum daily 8-hour mean concentration of ozone should not exceed 120 $\mu\text{g}/\text{m}^3$) was exceeded in almost all Member States and in 81% of all reporting stations.

Key facts

Exceedance of the information threshold

- Ozone concentrations higher than the information threshold were reported from monitoring sites in 16 EU Member States and two non-member countries. No exceedances were reported from Andorra, Bulgaria, Croatia, Estonia, Finland, Ireland, Lichtenstein, Lithuania, Romania, Serbia, Slovenia and Sweden in summer 2014.
- The information threshold was exceeded at approximately 9% of all stations providing data.
- Only one station in southern France and one in central Spain reported exceedances of the information threshold on more than five days.

Air pollution

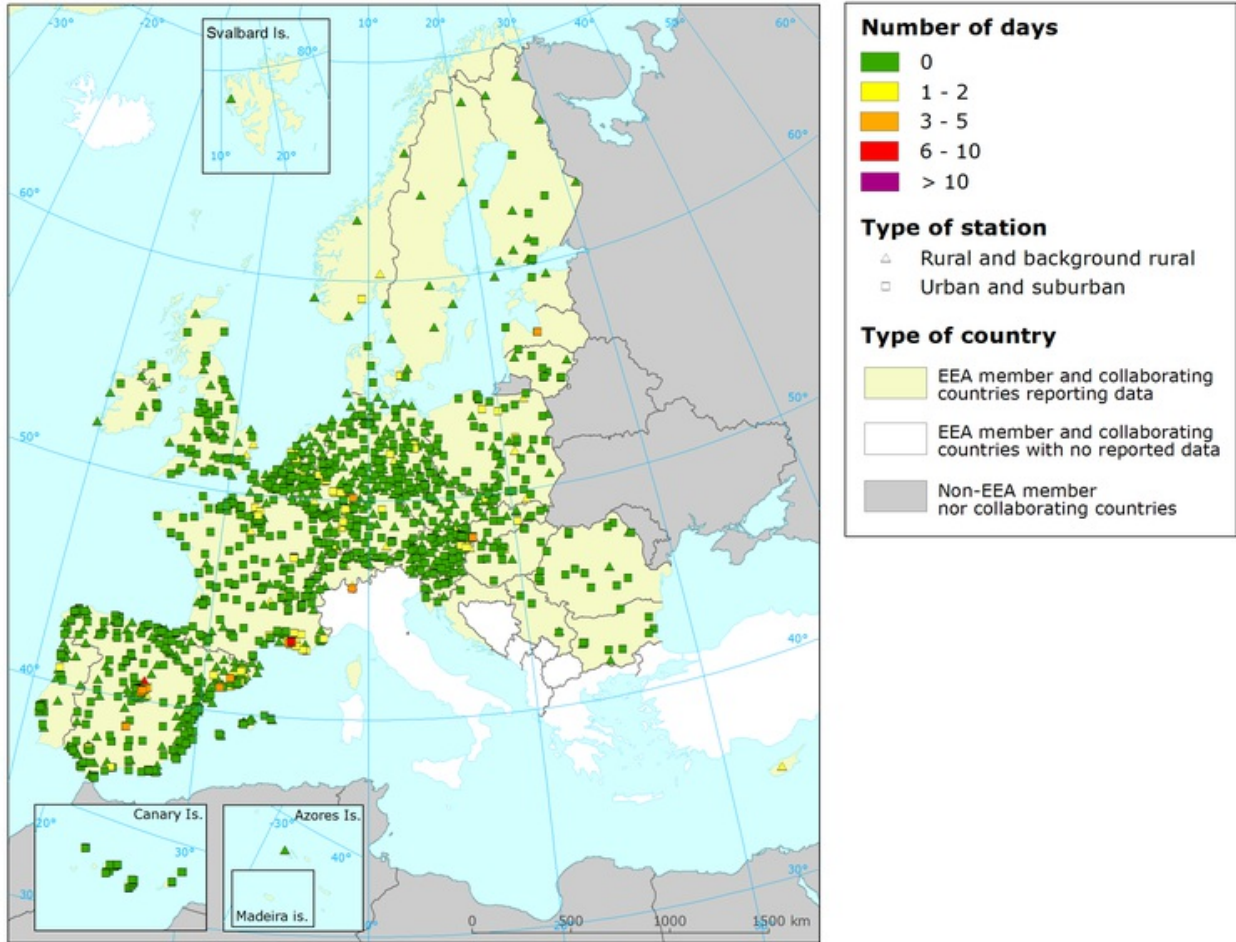
- The most of exceedances occurred during June and July, which respectively accounted for approximately 41% and 40% of all observed information threshold exceedances.

Exceedance of the alert threshold

- Ozone concentrations higher than the alert threshold were reported on four occasions. They occurred only in France (mainly in southern France) at four different locations.
- June and July accounted for, respectively, 75% and 25% of alert threshold exceedances.
- A maximum 1-hour ozone concentration of $305 \mu\text{g}/\text{m}^3$ was reported from Berre l'Etang, southern France, on 11 June 2014.

Air pollution

Map 1: Number of days on which ozone concentrations exceeded the information threshold during the summer of 2014 (provisional data)



Note: Only stations with known metadata relating to the ozone type of station are depicted.

Source: EEA

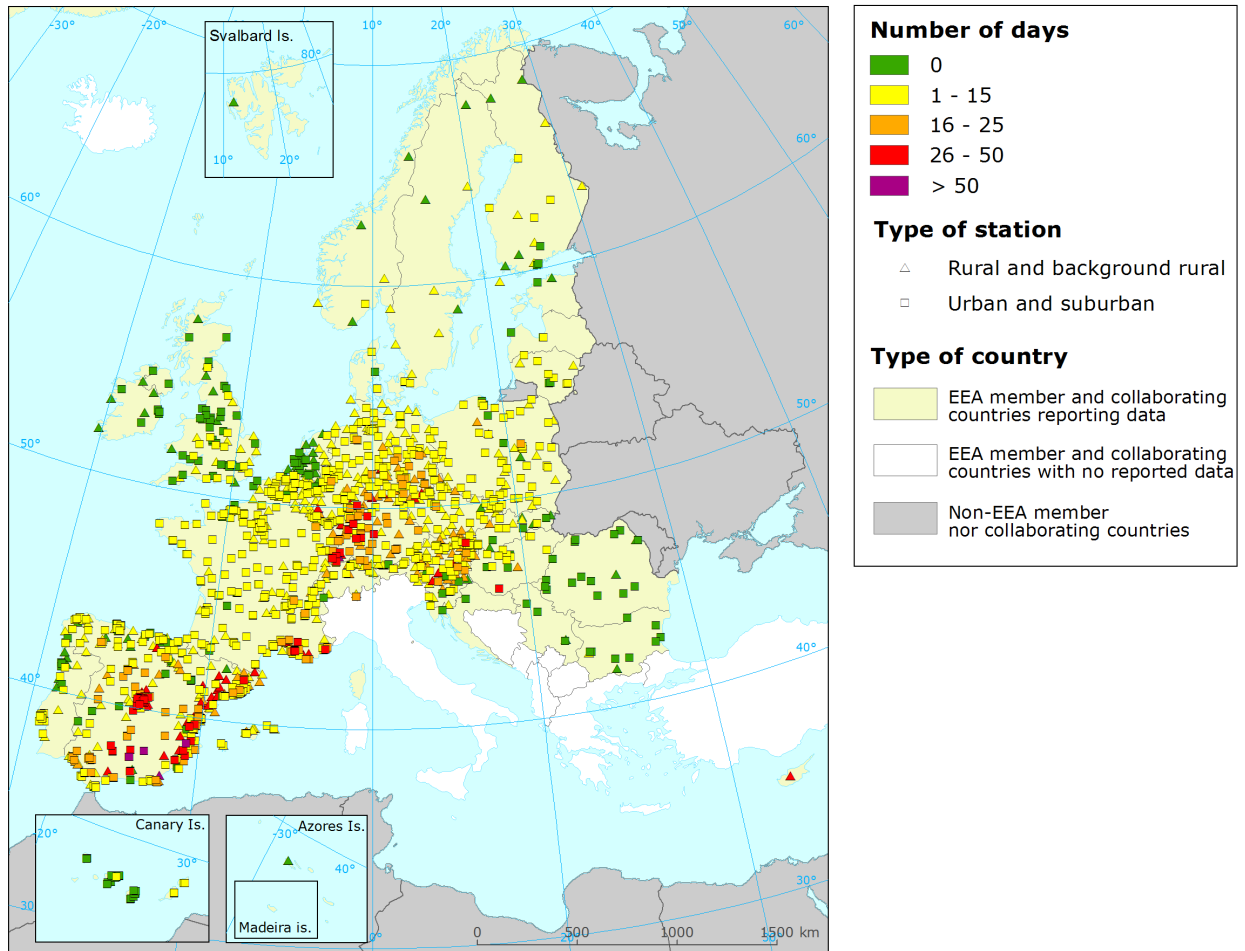
Air pollution

Exceedance of the long-term objective (LTO) for the protection of human health

- LTO was exceeded in all reporting countries except Croatia, Estonia, Ireland, Romania and Serbia.
- Approximately 81% of all the reporting stations recorded at least one exceedance during the summer period.
- The maximum number of exceedance days per country was 150 (out of a maximum of 183 days) in Spain.
- On average, those stations observing at least one LTO exceedance reported a total of 11 days of exceedance. The maximum number of 63 exceedance days was observed at the station Villanueva del Arzobispo in Spain.
- The highest number of exceedances occurred during June and July (35% of all observed exceedances in each month)

Air pollution

Map 2: Number of days on which ozone concentrations exceeded the long-term objective for the protection of human health during summer 2014 (provisional data)



Note: Only stations with known metadata relating to the ozone type of station are depicted

Source: EEA

Table: Overview of exceedances of the 2012 target value for the protection of human health (summer 2012, 2013 and 2014), by country

Country	Number of stations	Number of stations with TV exceedances	Percentage of stations with TV exceedances	Maximum number of days on which the TV was exceeded
Austria	105	38	36.2	50
Belgium	39	0	0.0	15

Air pollution

Bulgaria	17	1	5.9	63
Croatia	2	2	100.0	26
Cyprus	1	1	100.0	65
Czech Republic	51	3	5.9	42
Denmark	6	0	0.0	4
Estonia	2	0	0.0	0
Finland	18	0	0.0	4
France	298	23	7.7	65
Germany	250	18	7.2	41
Greece	0	-	-	-
Hungary	17	4	23.5	64
Ireland	10	0	0.0	1
Italy	0	-	-	-
Latvia	3	0	0.0	0
Lithuania	13	0	0.0	8
Luxembourg	5	1	20.0	32
Malta	0	-	-	-
Netherlands	33	0	0.0	9
Poland	62	1	1.6	26
Portugal	37	1	2.7	28
Romania	17	0	0.0	6

Air pollution

Slovakia	15	3	20.0	41
Slovenia	11	5	45.5	73
Spain	357	68	19.0	65
Sweden	9	0	0.0	5
United Kingdom	74	0	0.0	7
EU area	1452	169	11.6	
Norway	7	0	0.0	1
Serbia	3	3	100.0	39
Switzerland	29	7	24.1	56
Whole area	1491	179	12.0	

Note: Bold numbers refer to countries with exceedances of the 2012 TV

Source: EEA - Airbase and Air quality e-reporting database

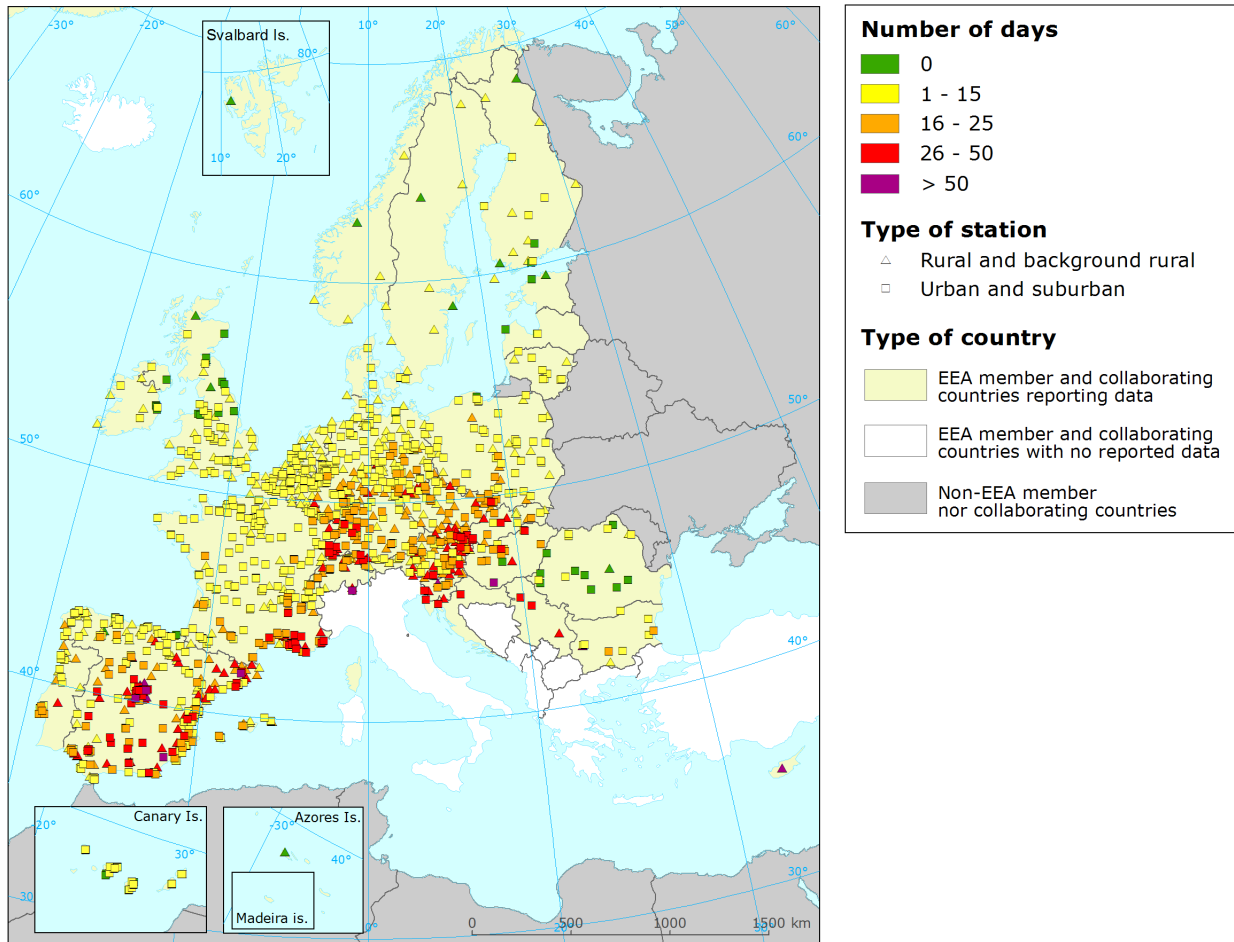
Air pollution

Exceedance of the target value (TV) for the protection of human health

- During summer 2014, more than 25 LTO exceedances occurred at stations in 7 EU Member States (Austria, Cyprus, France, Germany, Hungary, Luxembourg, and Spain).
- More than 25 LTO exceedances occurred at 6% of all reporting stations. This corresponded to approximately 1.1% of the area assessed, affecting approximately 1.0% of the total population.
- The 2012 TV (averaged for 2012-2014) could be calculated for all Member States (except Greece, Italy and Malta) and 3 other countries (Norway, Serbia and Switzerland). Only stations for which the number of LTO exceedances was available for all three summers of 2012–2014 were considered. This calculation is made only for information purposes.
- From a total of 2 280 stations reporting data from at least one year in 2012, 2013 and 2014, only 1 491 (65%) could be used for the 2012 TV calculation. Of these, 179 stations (12%) had exceedances of the TV.
- The 2012 TV was exceeded in 14 reporting EU Member States (Austria, Bulgaria, Croatia, Cyprus, the Czech Republic, France, Germany, Hungary, Luxembourg, Poland, Portugal, Slovakia, Slovenia and Spain) and in two of the other reporting countries with enough data in the three years period (Serbia and Switzerland).

Air pollution

Map 3: Number of days on which the 2012 target value for the protection of human health was exceeded (summers of 2012, 2013 and 2014).



Note: Only stations with known metadata relating to the ozone type of station in Airbase are depicted.

Source: EEA

Main ozone episodes

An 'ozone episode' is defined as 'a period of usually a few days up to two to three weeks with high ozone concentrations, characterised by daily exceedances of the thresholds set to protect human health. Ozone episodes occur under specific meteorological conditions characterised by large stagnant areas of high pressure. Since the formation of ozone requires sunlight, ozone episodes mainly occur during summer.

Summer 2014 was characterised by very few exceedances with only several days with increased

Air pollution

concentrations. One of these episodes occurred between 7 and 14 June, during which approximately 36% of the total number of exceedances of the information threshold, 75% of exceedances of the alert threshold, and 20% of LTO exceedances experienced during the summer took place.

About this assessment

Ozone (O₃) is a 'secondary' pollutant formed from gases such as nitrogen oxides (NO_x) and volatile organic compounds (VOCs) in the presence of solar light. Ozone levels typically become particularly high in regions where considerable emissions of these gases combine with stagnant meteorological conditions, high levels of solar radiation and high temperatures during the summer. Summer refers to the period from April to September.

Exposure to high O₃ concentrations can cause breathing problems, trigger asthma, reduce lung function and cause lung diseases.

Ozone is regulated under the Air Quality Directive (EU, 2008), which set some thresholds for ozone concentrations:

- information threshold: 1-hour average ozone concentration of 180 µg/m³,
- alert threshold: 1-hour average ozone concentration of 240 µg/m³,
- long term objective (LTO): the maximum daily 8-hour mean concentration of ozone should not exceed 120 µg/m³,
- target value (TV): LTO should not be exceeded on more than 25 days per calendar year, averaged over 3 years.

For description purposes a target value threshold (TVt) is also considered: LTO should not be exceeded on more than 25 days in a calendar year (instead of over the 3 year average).

Until 2014, Member States had to officially report on the summer ozone exceedances of these thresholds. Based on this past reporting, the European Environment Agency (EEA) has published annual **Technical Reports** analysing the summer ozone situation across Europe. After the entry into force of new EU rules for reporting air quality information (EU, 2011) a new system for reporting data was established. For the first time the analysis of the summer 2014 period was based on this new system. In total, 1 607 ozone-monitoring sites reported data; of these, 1 562 were located in EU Member States.

Published on 06 May 2015