MUNICIPALITY OF LINZ
Environmental and Technical Center

Report Nr. 2/2013

Air Quality Data in 2012

The Comparison of Cities and Regions in Europe

Authors: Judith Kreindl
Wilfried Hager

Environment + Technology

LINZ verändert

Inhalt

Contents

Luftgütedaten 2012 Nationaler und europäischer Städtevergleich

Einführung

Die Bekämpfung der Luftverschmutzung ist nach wie vor eines der zentralen Themen, mit denen Umweltämter, Umweltbehörden bzw. sonstige für den Umweltschutz tätige Organisationen beschäftigt sind. In Form von regionalen oder nationalen Luftreinhalteplänen wird versucht, die Luftverschmutzung in den Griff zu bekommen und die Luftqualität sukzessive zu verbessern. In den letzten Jahren ist die Belastung an Feinstaub (PM_{10}) und Stickoxiden besonders in den Mittelpunkt des Interesses gerückt, da die Grenzwerte für diese Luftschadstoffe in den meisten Ballungsräumen überschritten werden.

Um überhaupt den Erfolg von Sanierungsmaßnahmen nachweisen zu können, ist die Beobachtung der Schadstoffkonzentrationen mit Hilfe von Luftmessnetzen sinnvoll. In den meisten Messgebieten sind Luftmessnetze seit 2 bis 3 Jahrzehnten installiert, sodass bei einer Verfolgung der Luftschadstoffdaten über mehrere Jahre ein Trend zur Verbesserung (oder auch Verschlechterung) der Luftbelastung herauslesbar sein sollte. Sanierungsmaßnahmen in Betrieben und bei anderen Emittentengruppen müssten sich jedenfalls langfristig in einer verminderten Immissionsbelastung an Luftschadstoffen manifestieren.

Die Verfolgung *längerer Zeiträume* zur Bestimmung des Belastungstrends ist unbedingt notwendig, da auf Grund von unterschiedlichen meteorologischen Einflüssen die Immissionsbelastungen außerordentlich stark schwanken können. Beispielsweise wird ein Monat mit vornehmlich regnerischer Witterung und viel Wind wesentlich geringere Immissionskonzentrationen aufweisen als ein Monat, in dem häufig Inversionswetterlagen vorherrschen.

Air Quality Data in 2012 The Comparison of Cities and Regions in Europe

Introduction

The fight against air-pollution is still one of the major topics to deal with of organisations concerned with environmental affairs, such as national and local authorities. In the form of regional or national air-cleaning programmes one tries to get air pollution under control as well as to increase the air quality step by step. During the last years the pollutant stress of fine particulates (PM_{10}) and nitrogen oxides has become of more and more importance, for the European air quality standards for these pollutants are exceeded in most of the agglomerations.

To prove the success of measurements of redevelopment at all, the observation of the concentrations of air pollutants by means of monitoring station networks is useful. In most of the referred monitored areas air quality monitoring station networks have been installed since 2 – 3 decades. Thus following the air quality data through a longer period of years a trend for improvement (or even a change to the worse) of the air-pollutant stress should be able to be recognized. Measurements of redevelopment in companies, factories and other groups of emission sources should manifest in a reduced immission stress of air pollutants.

It is absolutely necessary to determine the trends of pollution through a *longer period of time*, because due to various meteorological influences the immission stress can alter extremely. For instance, a month with mostly rainy weather conditions and high wind speeds will have much less immission concentrations than a month, where the formation of inversion layers can be observed often.

Luftgütevergleiche werden durch das Umwelt- und Technik-Center (früher: Amt für Natur- und Umweltschutz) bereits seit vielen Jahren durchgeführt, genau genommen seit 1989. Anfänglich wurden nur österreichische Städte miteinander verglichen. In den folgenden Jahren wurde der Städtevergleich aufgrund des großen Interesses auf immer mehr europäische Städte und Regionen ausgedehnt. Im Jahr 2012 wurden Städte bzw. Regionen aus Deutschland, Großbritannien, Frankreich, Belgien, Dänemark, Schweden, Italien, Schweiz, Spanien, Polen, Bulgarien, Tschechien, Ungarn, Griechenland, Lettland, Portugal und Kroatien mit einbezogen. Die Städte Luxemburg, Sofia und Lissabon lieferten für das Jahr 2012 keine Daten.	Comparisons of the air quality have been carried out by our organization already for a number of years, exactly since 1989. At first only Austrian Cities were compared. During the last years the comparison was extended to other European cities and regions, for there is much interest in such studies. The comparison of the air quality of the year in 2012 comprised cities and regions of Austria, Germany, cities from Great Britain, France, Belgium, Denmark, Sweden, Italy, Switzerland, Spain, Poland, Bulgaria, Czech Republic, Hungary, Greece, Latvia, Portugal and Croatia. No data were sent to us by the city of Luxemburg, Sofia and Lisbon in 2012.
Die Stadt Bukarest liefert seit 12 Jahren keine Daten mehr. Sollten diese noch eintreffen, werden sie in künftigen Städtevergleichen in Form von Zeitreihen mit berücksichtigt.	The city of Bucharest has not been delivering any data for 12 years. In the case of delivery to us they will be taken into account for future reports in terms of time series.
Ab dem Jahr 2008 wurde der Luftgütevergleich mit dem lungengängigen Feinstaubanteil $PM_{2,5}$ ergänzt. Da diese Partikel erhebliche negative Auswirkungen auf die menschliche Gesundheit besitzen.	Since 2008 the comparison of the air quality has been extended with fine particulate matter $PM_{2,5}$. These respirable particles are responsible for significant negative impacts on human health.
Die Größe des Immissionsgebietes und die Bevölkerungszahl wurden ebenfalls seit 2008 in den Luftgütevergleich aufgenommen, um die Messstellendichte miteinander zu vergleichen.	Since 2008 the comparison is also extended with the immission area and the population in order to compare the closeness of the measurement points.

Kritische Anmerkungen

Als Kritikpunkt wird immer wieder angemerkt, dass ein Vergleich der Immissionsbelastung aus fachlichen Gründen nicht möglich sei, da

1. die Zahl der Messstellen sehr verschieden ist (die Anzahl der Messstellen pro Messgebiet ist in der Tabelle auf Seite 19 und den nachfolgenden Grafiken angeführt),
2. die Messstellendichte unterschiedlich ist,
3. die Situierung der Messstellen nicht immer vergleichbar ist (In manchen Städten wurde deswegen bei den Schadstoffkomponenten zwischen verkehrsbelasteten Messstationen und anderen Messstationen unterschieden).

Die Autoren sind sich dieser Tatsachen durchaus bewusst. Trotz der erhobenen Einwände gibt es einige Argumente für die Fortführung der Städtevergleiche:

1. Die Luftschadstoffmessungen werden im Allgemeinen technisch in der gleichen oder in ähnlicher Weise durchgeführt. Das bedeutet, dass die Luftüberwachung an bestimmten *Punkten* einer Stadt oder einer Region mit Hilfe automatisch registrierender Immissionsmessstationen durchgeführt wird. Die gemessenen Konzentrationen repräsentieren die Belastung eines mehr oder weniger weiten Bereiches um die Messstation. Die *Art der Probenahme* müsste also *vergleichbar* sein.
2. Die Luftgütestationen sollten an Punkten errichtet werden, die einen größeren Bereich um die Messstation abdecken und nicht nur die Schadstoffbelastung an einem bestimmten Punkt widerspiegeln. Ausgenommen sind besondere verkehrsbelastete Probenahmepunkte. Die Messnetzbetreiber wurden eingeladen, diese Messpunkte getrennt anzugeben, um die wirkliche Situation des überwachten Gebietes wiederzugeben. Wie bereits erwähnt, unterscheiden einige Städte zwischen verkehrsbelasteten und nicht vom Verkehr beeinflussten Messstationen.

Critical remarks

Over and over again it is critically remarked that it is not possible to compare the pollutant stress between monitoring areas. The following technical reasons are mentioned by some monitoring network services:

1. The number of monitoring stations differs very much (the number of monitoring stations of each monitoring network is mentioned in the table on page 19 and the subsequent charts),
2. the density of distribution of the monitoring stations is different,
3. the location of the monitoring stations is not always comparable (for that reason in some cities the network services distinguish between traffic-stressed and non-traffic-influenced monitoring stations).

The authors of the comparative study are thoroughly conscious of these facts. But despite to the raised objections there are also some arguments of continuing the activities:

1. The way of measurement of air pollutants is carried out by the same ore similar technical methods. This means, the results of air monitoring activities are obtained by sampling at special sampling *points* in a city or region by means of automatically recording monitoring stations. The registered concentrations represent the stress of a more or less wide area around the monitoring station. Due to this reason the *method of sampling* itself should be *comparable*.
2. The monitoring stations should be located at points representing a wider portion of the monitored area, not only the pollution stress representative for a focal point. Exceptions are designated traffic stressed sampling points. The runners of monitoring station network services were invited to separate such monitoring points in order to represent the real situation of the monitored area. As already mentioned, some cities distinguish between traffic-stressed and non-traffic-influenced monitoring stations.

3. Schließlich wird eine stärker objektivierende Basis der Auswertungen besonders dann erreicht, wenn längere Zeiträume betrachtet werden und daraus die Trendentwicklung der Schadstoffimmissionen abliest. Nachdem die Stadt Linz internationale und nationale Städtevergleiche schon seit vielen Jahren durchführt, gibt es für die Jahresmittelwerte auch die mehrjährige *Trendentwicklung* der Schadstoffbelastung seit 1993 für die einzelnen. Die Daten von Städten bzw. Regionen, die erst seit kurzem im Städtevergleich integriert sind, wurden dabei auch so weit wie möglich nachgeführt.	3. And finally the evaluations are put to a more objectified basis, if one observes longer term developments and derives thereof the trends of the pollutant immission. Since the city of Linz has been carrying out comparisons of the air quality for many years, this report also contains the *trend developments* for the annual mean value since 1993 for all immission regions. The data of cities or regions which only have been participating the comparison since a couple of years have been updated as far back as possible.

Immissionskenngrößen

In der vorliegenden Studie wurden verschiedene Immissionskenngrößen erhoben:

- Jahresmittelwert (Mittel aus allen Stationen einer Stadt/Region)
- Max. Monatsmittelwerte (höchstbelastete Station einer Stadt/Region)
- Max. Tagesmittelwert (höchstbelastete Station einer Stadt/Region)
- Max. 3-Stunden-Mittelwert (höchstbelastete Station einer Stadt/Region)
- Max. Einstunden-Mittelwert (höchstbelastete Station einer Stadt/Region)
- Max. Halbstunden-Mittelwert (höchstbelastete Station einer Stadt/Region)
- Max. 98-Percentil/Jahr (höchstbelastete Station einer Stadt/Region)
- Anzahl der Überschreitungen des PM_{10}-Tagesgrenzwertes an der höchstbelasteten Messstation
- Anzahl der Überschreitungen des NO_2-Grenzwertes für den 1h-Mittelwert an der höchstbelasteten Messstation

Von den einzelnen Messnetzbetreibern wurden die gewünschten Immissionsdaten in sehr unterschiedlicher Vollständigkeit zur Verfügung gestellt. Insbesondere betrifft dies die Perzentil-Auswertungen und manchmal auch die Auswertungen für max. HMW oder max. 3h-MW. Oftmals ist auch nicht das 98-Percentil verfügbar, sondern es werden andere Perzentilgrößen (z. B. 95-Percentil) gebildet. Die meisten Messnetzbetreiber berechnen die Perzentile aus den Halbstunden-Mittelwerten eines Jahres, manchmal werden jedoch auch die Tagesmittelwerte dafür herangezogen.

Wie schon in den letzten Berichten, ist der vorliegende Bericht bei den grafischen Auswertungen kürzer gefasst als in den früheren Jahren. Seit 2006 wurden die grafischen Darstellungen für die Perzentile, die max. 3-Stunden-Mittelwerte, die max. Halbstundenmittelwerte und die max. Monatsmittelwerte, da sie im Allgemeinen von nicht so starkem öffentlichem Interesse sind, herausgenommen. Aufgenommen wurden hingegen die grafischen Auswertungen über 1-Stunden-Mittelwerte, die nunmehr fast überall die Norm für die Bewertung von Kurzzeitbelastungen darstellen.

Immission reference values

The present study various immission reference values have been surveyed, such as:

- annual mean value (mean of all monitoring stations of a city/region)
- max. monthly mean value (max. stressed monitoring station of a city/region)
- max. daily mean value (max. stressed monitoring station of a city/region)
- max. 3-hours mean value (max. stressed monitoring station of a city/region)
- max. 1-hours mean value (max. stressed monitoring station of a city/region)
- max. 1/2-hours mean value (max. stressed monitoring station of a city/region)
- max. 98-Percentile/year (max. stressed monitoring station of a city/region)
- Number of violations of the PM_{10} daily mean standard at the highest stressed monitoring station
- Number of violations of the NO_2 1h mean standard at the highest stressed monitoring station

The runners of air pollution monitoring networks support us with immission data of very different completeness, especially referring to the evaluation of the percentiles or sometimes the evaluations of the max. 1/2-hours mean-value or the max. 3-hours mean-value. Often the 98-Percentile is not available but the value for the 95-Percentile is given. In most of the monitoring networks the percentiles are calculated based on the *1/2-hours mean* values of a calendar year, sometimes they were based on the *daily mean* values.

As already done in the latest report the present report has been shortened in comparison to former years, regarding the graphical evaluations of immission reference values. Since 2006 the graphical presentation of percentiles, max. 3h mean values, max. monthly mean values, 1/2h mean values have not been carried out any more, for they seem not to be of such a public interest as others. On the other hand the max. 1h mean values are graphically presented now, for they are nowadays the evaluation standard for short term stress nearly everywhere.

Es wurde also nur ein Teil der zur Verfügung gestellten Luftgütekennzahlen für die Grafiken verwendet. Die kompletten Datensätze können aus den Übersichtstabellen im Anhang entnommen werden.

Verglichene Luftschadstoffe

Folgende Luftschadstoffe wurden miteinander verglichen:
SO_2, CO, NO, NO_2, O_3, Feinstaub (PM_{10} und $PM_{2,5}$)

Anmerkung:
Schwebestaub (TSP) wurde nicht mehr ausgewertet, da die Messungen in den einzelnen Messgebieten mittlerweile durch PM_{10}-Messungen ersetzt worden sind.

Mehrjahresvergleich

Ein gutes Bild über die Entwicklung der Luftbelastung geben die Grafiken wieder. Dabei wurde von den am Luftgütevergleich teilnehmenden Städten die Entwicklung der Immissionsbelastung von 1993 bis 2012 aufgetragen.

Nach Analyse der Daten, können folgende Aussagen getroffen werden:

1. Einige Städte und Regionen haben ein dichtes Messstellennetz bezogen auf die Größe des Immissionsgebietes. Beispiele: Berlin, Linz, Wien. Andererseits werden manchmal sehr große Gebiete durch eine geringe Zahl von Messstationen überwacht.
2. Aufgrund dieser Tatsache ist die Vergleichbarkeit einzelner Regionen begrenzt.
3. Die Belastung (Jahresmittelwerte) einzelner Regionen und Städte ist noch immer sehr unterschiedlich.
   Bei einigen Städten kann man erkennen, dass in jenen Situationen, bei denen 1993 relativ hohe Immissionsbelastungen registriert wurden, seitdem oftmals eine deutlich sichtbare Besserung der Immissionssituation eingetreten ist, während in Städten mit niedriger Immissionsbelastung im Vergleich dazu kaum eine Änderung der Luftbelastung eingetreten ist.

Only a part of the provided air quality values has been used for graphical evaluation. The whole data set can be obtained from the overview tables of the annex.

Pollutants compared

The following air pollutants have been compared:

SO_2, CO, NO, NO_2, O_3, fine particulates (PM_{10} and $PM_{2,5}$)

Remark:
TSP has not been evaluated any more due to the fact that in most monitoring networks the TSP measurements are already replaced by monitoring of PM_{10}.

Comparison over a period of years

One can get a good impression of the development of the air pollutant stress by studying the graphics. For this the immission stress for the area of each participating city and region from 1993 through 2012 are plotted.

The following statements can be given when analysing the data:

1. Some cities and regions have - according to the area - a high monitoring network density. Examples: Berlin, Linz, Vienna. On the other hand very large areas are monitored only by a little number of stations.
2. Due to this fact the comparability between regions is limited.
3. The range of the annual mean immission stress still is very different between the viewed cities and regions.
   In some cities it can be seen that where the pollution stress in 1993 was relatively high, there often has been a visible betterment of the immission situation, while in cities with low immission stress compared to other cities and regions there was nearly no change in air pollution.

4. Es zeigt sich, dass in den Städten und Regionen die Schwebstaub-(TSP)-Messungen abgeschaltet wurden. Diese Messungen wurden von Feinstaub (PM_{10}-Messungen) abgelöst. TSP-Messungen wurden daher im vorliegenden Vergleich nicht mehr miteinbezogen.

5. Entwicklung der Langzeitbelastung (Jahresmittelwerte SO_2, Schwebestaub (TSP) (nur bis 2004!), NO, NO_2, CO, und O_3) gegenüber 1993 (PM_{10}: gegenüber 2001):

   SO_2: Alle Regionen *geringer* belastet

   Staub: TSP-Messung in nahezu allen Regionen eingestellt. Wenn vorhanden, ist die Tendenz zu *geringeren* Belastungen (Vergleich nur bis 2004).

   PM_{10}: uneinheitlich, tendenziell *gleich bleibend* oder *geringer belastet*

   NO: uneinheitlich, tendenziell *geringer* belastet

   NO_2: uneinheitlich, tendenziell *gleich bleibend oder geringer* belastet

   CO: alle Regionen *geringer* belastet

   O_3: Belastung tendenziell *gleich bleibend oder leicht erhöht*

4. It can be seen that cities and regions do not monitor TSP any more. These measurements were replaced by monitoring the pollutant PM_{10}. So TSP measurements have not been included in the present report any more.

5. Long term development of the air pollution stress (annual mean values of SO_2, TSP (only until 2004!), NO, NO_2, CO, O_3) in comparison with 1993 (for PM_{10}: comparison with 2001):

   SO_2: All regions *less* stressed

   TSP: Nearly no TSP-measurements any more. If there is still monitoring, regions are *less* stressed in tendency (Comparison only up to 2004).

   PM_{10}: non-uniform, trend is constant or *lower* stressed

   NO: non-uniform, trend of lower stress

   NO_2: non-uniform, trend is constant or *lower* stressed

   CO: all regions trend of *lower* stress

   O_3: trend is constant or *slightly higher* stressed

Quellen für die Immissionsdaten Sources for the immission data

Austria **Bludenz, Dornbirn**	Umweltinstitut des Landes Vorarlberg Montfortstrasse 4 A-6901 Bregenz Austria e-mail: *umweltinstitut@vorarlberg.at* Homepage: http://www.vorarlberg.at/umweltinstitut
Austria ***Graz, Leoben, Donawitz***	Amt der Steiermärkischen Landesregierung Fachabt.15 Energie, Wohnbau, Technik (Ref. für Luftreinhaltung) Landhausgasse 7 A-8010 Graz Austria e-mail: *abteilung15@stmk.gv.at* Homepage: *http://www.umwelt.steiermark.at/*
Austria ***Innsbruck***	Amt der Tiroler Landesregierung Abt. Waldschutz-Luftgüte Bürgerstrasse 36 A-6020 Innsbruck Austria e-mail: *andreas.weber@tirol.gv.at* Homepage: http://www.tirol.gv.at/luft
Austria ***Linz***	Amt der oö. Landesregierung Abt. Umwelt- und Anlagentechnik Goethestrasse 86 A-4020 Linz Austria e-mail: elisabeth.danninger@ooe.gv.at Homepage: *http://www.ooe.gv.at*
Austria **Salzburg, Hallein**	Amt der Salzburger Landesregierung, Umweltschutz Postfach 527 A-5010 Salzburg e-mail: *alexander.kranabetter@salzburg.gv.at* Homepage: *http://www.salzburg.gv.at/*
Austria ***St. Pölten***	Magistrat der Landeshauptstadt St. Pölten Abteilung Umweltschutz Roßmarkt 6 A-3100 St. Pölten Austria e-mail: umweltschutz@st-poelten.gv.at Homepage: http://www.noe.gv.at/Umwelt/Luft.html

Austria ***Vienna***	Magistrat der Stadt Wien, Wiener Umweltschutzabteilung, MA 22 Bereich Luftmessnetz Dresdner Strasse 45 A-1200 Wien Austria e-mail: *roman.augustyn@wien.gv.at* Homepage: *http://www.wien.at/ma22/luftgue.html*
Austria ***Klagenfurt, Villach***	Amt der Kärntner Landesregierung Abt. 8 Kompetenzzentrum Umwelt, Wasser und Naturschutz Flatschacher Strasse 70 A-9020 Klagenfurt e-mail: *abt8.post@ktn.gv.at* Homepage: http://www.ktn.gv.at/198194_DE-Oekologie_und_Monitoring Themenstartseite “Luftreinhaltung”
Belgium ***Brussels***	CELINE-IRCEL Avenue des Arts, 10-11 B-1210 – Bruxelles Belgium e-mail: *pvd@ibgebim.be* Homepage: http://www.irceline.be/
Bulgaria ***Sofia*** *BG-16* *Bulgari* *Hom*	*Executive Environmental Agency* *136 Tzar Boris III Blvd.* *18 Sofia* *a* *e-mail: fonmon@eea.government.bg* *epage: -*
Croatia ***Zagreb***	Institute of Medical Research and Occupational Health Ksaverska cesta 2 HR-10000 Zagreb Croatia e-mail: *vvadjic@imi.hr* Homepage: www.imi.hr
Czech Republic ***Prague***	Czech Hydrometeorological Institute Na Sabatce 17 14306 Praha 4 Czech Republic e-mail: osta@chmi.cz Homepage: http://www.chmi.cz
Denmark ***Copenhagen***	National Environmental Research Institute Atmospheric Environment Frederiksborvej 399 DK-4000 Copenhagen Denmark Homepage: http://www.dmu.dk/en/air/

France ***Lyon***	COPARLY 3 Allée des Sorbiers-Activillage F-69500 Bron France e-mail: demandes@atmo-rhonealpes.org Homepage: *http://www.atmo-rhonealpes.org*
Germany ***Berlin***	Senatsverwaltung für Stadtentwicklung und Umwelt Referat Immissionsschutz, , IX C 63 Brückenstrasse 6 D-10179 Berlin Germany e-mail: efthalia.nulis@SenStadtUm.Berlin.de Homepage: *http://www.berlin.de/sen/umwelt/luftqualitaet/index.shtml*
Germany ***Chemnitz, Dresden,*** ***Leipzig***	Sächsisches Landesamt für Umwelt, Landwirtschaft und Geologie Söbrigener Str. 3a D-01326 Dresden e-mail: *Kornelia.Oelke@smul.sachsen.de* Homepage: http://www.smul.sachsen.de/lfulg
Germany ***Frankfurt, Wiesbaden***	Hessisches Landesamt für Umwelt und Geologie Rheingaustrasse 186 D-65203 Wiesbaden Germany e-mail: baerbel.oehme@hlug.hessen.de, katja.wucher@hlug.hessen.de Homepage: *http://www.hlug.de*
Germany ***Hamburg***	Freie Hansestadt Hamburg, Behörde für Soziales, Familie, Gesundheit und Verbraucherschutz, Institut für Hygiene und Umwelt, Abteilung f. Luftuntersuchungen Marckmannstrasse 129b D-20539 Hamburg Germany e-mail: *dagmar.goemer@hu.hamburg.de* Homepage: *http://www.hamburger-luft.de*
Germany ***Karlsruhe, Mannheim*** **Stuttgart**	Landesanstalt für Umwelt, Messungen und Naturschutz Baden-Württemberg, LUBW Großoberfeld 3 D-76135 Karlsruhe Germany e-mail: *sabrina.krabbe@lubw.bwl.de* Homepage*: http://www.lubw.baden-wuerttemberg.de/*
Germany ***Munich***	Bayerisches Landesamt für Umwelt Bürgermeister-Ulrich-Strasse 160 D-86179 Augsburg Germany e-mail: Andreas.Falb@lfu.bayern.de Homepage: www.lfu.bayern.de

Germany ***Rhine Area, Ruhr Area***	Landesamt für Natur, Umwelt und Verbraucherschutz Nordrhein-Westfalen Wallneyer Strasse 6 D-45133 Essen Germany Homepage: http://www.lanuv.nrw.de/luft/immissionen/ber_trend/berichte.htm
Greece ***Athens, Thessaloniki***	Hellenic Republic Ministry for the environment Directorate of air and noise pollution control Patission 147 GR-11251 Athens Greece e-mail: *air_quality@prv.ypeka.gr* Homepage: www.ypeka.gr
Hungary ***Budapest***	OMSZ (Hungarian Meteorological Service) Air Quality Reference Centre Kitaibel Pál u. 1 H-1024 Budapest Hungary e-mail: puskas.monika@met.hu, gyarmatine.e@met.hu Homepage: www.met.hu www.kvvm.hu/olm/
Italy ***Milan***	ARPA Lombardia - Agenzia Regionale per la Protezione dell'Ambiente della Lombardia Dipartimento di Milano Via Juvara 22 I-20129 Milano Italy e-mail: m.lazzarini@arpalombardia.it Homepage: http://ita.arpalombardia.it/ITA/qaria/doc_RelazAnnualiProv.asp
Latvia ***Riga***	Ministry of Environmental Protection and Regional Development of the Republic of Latvia State limited Liability Company "Latvian Environment, Geology and Meteorology Centre" Air and Climate Division 165 Maskavas str. LV-1019 Riga Latvia e-mail: Tamara.vasiljeva@lvgmc.lv Homepage: http://www.lvgmc.lv
Luxemburg ***Luxemburg***	Administration de l´Environnement, Département Air/Bruit 16, rue Eugène RUPPERT L-2453 Luxemburg e-mail: *Serge.solagna@aev.etat.lu* Homepage: *http://www.environnement.public.lu/index.html*
The Netherlands ***Rotterdam***	DCMR- Environmental Protection Agency ´s-Gravelandseweg 565, Postbox 843 NL- 3100 AV Schiedam The Netherlands e-mail: Andre.snijder@dcmr.nl Homepage: *http://www.dcmr.nl*

Poland ***Warsaw***	WIOS Warszawa ul. Bartycka 110A PL-00-716 Warszawa Poland e-mail: t.klech@wios.warszawa.pl Homepage: *http://www.wios.warszawa.pl*
Portugal ***Lisbon***	Comissão de Coordenação e Desenvolvimento Regional de Lisboa e Vale do Tejo Rua Braamcamp 7 PT-1250-048 Lisboa Portugal e-mail : ambiente@ccdr-lvt.pt Homepage: http://www.qualar.org
Spain ***Barcelona, Madrid***	Ministerio de Agricutura, Alimentación y Medio Ambiente Plaza San Juan de la Cruz s/N. 6^{a} planta. A-602.1 E-28071 Madrid e-mail: *mpallares@magrama.es* Homepage: -
Sweden ***Gothenburg***	Environmental Department Gothenburg Karl Johansgatan 23 S-414 59 Göteborg Sweden e-mail: *maria.holmes@miljo.goteborg.se* Homepage: *http://www.goteborg.se/luften*
Sweden ***Stockholm***	Environment and Health Protection Administration, Slb–analys Box 8136 S-10420 Stockholm Sweden e-mail: *boel@slb.nu* Homepage: *http://www.slb.nu*
Switzerland ***Basel, Zurich***	Bundesamt für Umwelt, Abteilung Luftreinhaltung und Chemikalien CH-3003 Bern Switzerland e-mail: *rudolf.weber@bafu.admin.ch* Homepage: *http://www.bafu.admin.ch/luft/index.html*
U.K. ***Belfast, Birmingham,*** ***Bristol, Edinburgh, Leeds*** ***Liverpool, London***	The Department of the Environment, Food and Rural Affairs Environmental protection Ashdown House, 123 Victoria St London SW 1E 6DE Homepage: *http://www.airquality.co.uk*

Anzahl der Messstellen — Number of monitoring stations

Country	Monitored Area	SO_2	PM_{10}	$PM_{2,5}$	NO	NO_2	CO	O_3
Austria	Bludenz	-	1	-	1	1	-	1
	Dornbirn	-	1	-	1	1	-	-
	Graz	4	3	2	6	6	3	4
	Hallein	2	1	-	2	2	1	1
	Innsbruck	1	2	1	3	3	1	3
	Klagenfurt	1	2	1	2	2	1	2
	Region Leoben	3	1	-	4	4	1	1
	Linz	5	6	3	7	7	5	3
	Salzburg	2	3	2	3	3	2	2
	St. Pölten	2	2	1	2	2	1	2
	Vienna	7	13	6	17	17	4	5
	Villach	0	1	0	1	1	0	0
Belgium	Brussels	7	6	5	10	10	7	7
Bulgaria	Sofia	6	7	2	6	6	4	5
Croatia	Zagreb	6	6	3	-	5	1	5
Czech Republic	Prague	8	20	7	15	19	5	8
Denmark	Copenhagen	1	3	2	3	3	2	2
France	Lyon	3	5	2	7	7	3	3
Germany	Berlin	2	12	5	16	16	2	7
	Chemnitz	-	2	1	2	2	-	1
	Dresden	1	4	3	4	4	-	3
	Frankfurt	2	4	2	4	4	1	2
	Hamburg	5	11	4	17	17	6	6
	Karlsruhe	1	2	2	2	2	1	1
	Leipzig	1	3	2	3	3	-	1
	Mannheim	2	3	2	3	3	1	2
	Munich	1	4	4	5	5	4	3
	Rhine/Ruhr Area	8	21	12	21	21	-	16
	Stuttgart	1	2	2	2	2	1	2
	Wiesbaden	1	3	2	3	3	1	1
Greece	Athens	5	7	2	14	14	7	13
	Thessaloniki	2	5	-	6	6	4	5
Hungary	Budapest	10	12	1	12	12	12	10
Italy	Milan	1	3	1	8	8	4	3
Latvia	Riga	2	3	1	1	3	1	3
Luxemburg	Luxemburg (2010)	2	1	1	2	2	2	2
The Netherlands	Rotterdam	6	3	3	3	3	4	3
Poland	Warsaw	5	3	2	-	5	3	4
Portugal	Lisbon	4	5	2		6	6	4
Spain	Barcelona	3	9	6	6	6	3	4
	Madrid	10	12	6	24	24	10	14

Country	Monitored Area	SO_2	PM_{10}	$PM_{2,5}$	NO	NO_2	CO	O_3
Switzerland	Basel	1	1	1	1	1	-	1
	Zurich	1	1	1	1	1	1	1
Sweden	Gothenburg	3	2	1	2	3	2	2
	Stockholm	1	5	4	-	5	2	1
U.K.	Belfast	1	1	1	1	1	1	1
	Birmingham	2	2	3	1	3	-	3
	Bristol	1	1	1	2	2	1	1
	Edinburgh	1	1	1	1	1	1	1
	Leeds	1	2	2	2	2	1	1
	Liverpool	1	1	1	2	2	1	1
	London	6	7	11	17	17	7	10

Immissionsgebiete und Bevölkerung

Immission area and population

Country	Monitored Area	Immission area [km²]	Population
Austria	Bludenz	3	13 817
	Dornbirn	13	46 521
	Graz	128	265 318
	Hallein	27	20 022
	Innsbruck	105	121 329
	Klagenfurt	120	95 928
	Region Leoben	108	24 645
	Linz	96	193 486
	Salzburg	66	149 760
	St. Pölten	108	52 109
	Vienna	415	1 757 353
	Villach	135	59 646
Belgium	Brussels	161	1.138.854
Bulgaria	Sofia	1 311	1.291 591
Croatia	Zagreb	641	790 017
Czech Republic	Prague	496	1 250 000
Denmark	Copenhagen	88	528.208
France	Lyon	48	445.274
Germany	Berlin	892	3 401 147
	Chemnitz	221	241 210
	Dresden	328	525 105
	Frankfurt	248	697 509
	Hamburg	755	1 810 698
	Karlsruhe	173	296 033
	Leipzig	298	520 538
	Mannheim	145	294 627
	Munich	310	1 380 000
	Rhine/Ruhr Area	5 770	8 213 872
	Stuttgart	207	597 939
	Wiesbaden	204	279 578
Greece	Athens	1 948	3 551 370
	Thessaloniki	129	794 330
Hungary	Budapest	525	1 740 041
Italy	Milan	182	1 324 110
Latvia	Riga	307	659 418
Luxemburg	Luxemburg	51	103 600
The Netherlands	Rotterdam	803	1 200 000
Poland	Warsaw	517	1 715 517

Country	Monitored Area	Immission area [km²]	Population
Portugal	Lisbon	85	550 000
Spain	Barcelona	101	1 611 000
	Madrid	604	3 207 000
Switzerland	Basel	557	501 285
	Zurich	1 086	1 185 214
Sweden	Gothenburg	198	526 054
	Stockholm	48	832 641
U.K.	Belfast	115	280 500
	Birmingham	268	1 085 417
	Bristol	110	432 451
	Edinburgh	262	482 640
	Leeds	552	474 632
	Liverpool	112	465 700
	London	1 572	8 308 000

Übersicht über die Entwicklung der Schadstoffbelastungen 1993 -2012 [1)]

Beurteilungsbasis: Jahresmittelwerte über alle Stationen einer Region

Overview over the development of the stress of air pollutants from 1993 through 2012 [1)]

based on the mean of all annual mean values of a region

Austrian Towns, Cities and Regions

	SO_2			NO			NO_2			CO			O_3		
	Stress in 1993 [2)]	Trend last 5 years	Stress in 2012	Stress in 1993 [2)]	Trend last 5 years	Stress in 2012	Stress in 1993 [2)]	Trend last 5 years	Stress in 2012	Stress in 1993 [2)]	Trend last 5 years	Stress in 2012	Stress in 1993 [2)]	Trend last 5 years	Stress in 2012
Linz		↗			↓			↘			↘		==		
Bludenz		n.d. n.d.		1994	↘			↗		-	n.d. n.d.		1994	==	
Dornbirn		==		1994	==			↘		1998	n.d.	n.d.	-	n.d. n.d.	
Graz		==		1994	↘		==				↘		==		
Hallein		==		2003	↘			↘		==			==		
Innsbruck		↓			↗		==				↘			↑	
Klagenfurt		↓			↗		==				==		==		
Region Leoben		==			↘			↘			==		==		
Salzburg		==		2003	↘		==				↘		==		
St. Pölten	1994	↘		**1994**	↓		1994	↘		1994	↘		1994	==	
Vienna		↗		**1994**	↓			↘			↘			↑	
Villach		↘			↗		==			==				↓	

[1)] TSP measurements are mostly replaced by PM_{10} monitoring (see page 13). So no comparison of TSP has been carried out since 2004. If you are interested in TSP-values until 2005 please refer to the report of 2005 (available via internet, URL http://www.linz.at/umwelt/4109.asp)

[2)] Or year, when data were primarily available

	SO_2			NO			NO_2			CO			O_3		
	Stress in 1993 [3]	Trend last 5 years	Stress in 2012	Stress in 1993 [3]	Trend last 5 years	Stress in 2012	Stress in 1993 [3]	Trend last 5 years	Stress in 2012	Stress in 1993 [3]	Trend last 5 years	Stress in 2012	Stress in 1993 [3]	Trend last 5 years	Stress in 2012
Athens	2007	↓		2007	↓		2007	↓		2007	↘		2007	↗	
Barcelona	1994	==		1994	↘		1994	↘		==			1994	↗	
Basel		↘			==		==				n.d.	n.d.	==		
Belfast		↓		==				↘			==		==		
Berlin		↘			↗		==				==		==		
Birmingham		↘			↓		==				n.d.	n.d.		↘	
Bristol	==				↘			↘			==		==		
Brussels	1995	==		1995	↘		1995	↘			↘		1995	==	
Budapest	1996	==		2003	↓		2003	↘			==		2003	↗	
Chemnitz		n.d.	n.d.		==		==				n.d.	n.d.	==		
Copenhagen		==		1994	n.d.	n.d.	1995	==			↘		1994	↗	
Dresden	==				↘			↓			n.d.	n.d.	==		
Edinburgh		↘			↘		==				==			==	
Frankfurt		↘			↘		==				==		==		
Gothenburg		↘			↑			↘			↗		==		
Hamburg	==				==			↘			==		==		
Karlsruhe		↓		==				==			==			↗	
Leeds	==				↗			↗			↑			==	
Leipzig	==				↗			↗			n.d.	n.d.		↗	
Lisbon	1997	↗	n.d.	2001	==	n.d.	1997	==	n.d.		↘	n.d.	1997	↗	n.d.
Liverpool		↓			↗			↗			↗			==	
London	==			==			==				↘			==	

[3] … or year when data were primarily available

	SO_2			NO			NO_2			CO			O_3		
	Stress in 1993[4)]	Trend last 5 years	Stress in 2012	Stress in 1993 [4)]	Trend last 5 years	Stress in 2012	Stress in 1993 [4)]	Trend last 5 years	Stress in 2012	Stress in 1993 [4)]	Trend last 5 years	Stress in 2012	Stress in 1993 [4)]	Trend last 5 years	Stress in 2012
Luxemburg	1996	n.d. n.d.		1996	n.d.	n.d	1996	-	n.d.	1996	n.d.	n.d.	1996	n.d.	n.d.
Lyon		↓		==			==			1994	↘		1994	↗	
Madrid	1994	↓		1999	==		1994	↓		1994	==		1994	↗	
Mannheim		↘			==		==				==			↗	
Milan	1994	↘		1994	==		1994	==		1994	↗		1994	==	
Munich		==			↘			↘			↘		==		
Prague	2007	==		2007	==		2007	↘		2007	↗		2007	↗	
Riga	1999	↘		2007	==		1999	↗		2002	==		1999	↗	
Rhine/Ruhr Area		↓			↘			↘			n.d.	n.d.	==		
Rotterdam	1995	↓		1995	↘		1995	==		2003	↘		1995	==	n.d.
Sofia	1999	↘	n.d.	2003	n.d.	n.d.	1999	↘	n.d.	1999	↘	n.d.	1999	↑	n.d.
Stockholm		==		1994	n.d.	n.d.	1994	==		1994	↘		==		
Stuttgart	2007	↘		2008	==		2007	==		2007	↘		2007	==	
Thessaloniki	2007	↘		2007	↘		2007	↘		2007	==		2007	==	
Warsaw	1995	==		2001	↗		1995	↗		1995	==		1995	==	
Wiesbaden		↘		==			==				↘		==		
Zagreb	==			n.d. n.d.		n.d.	1994	==		2005	n.d.		1999	↗	
Zurich		↘			==			↘			↘		==		

Legend: Slight stressed (SO_2 < 15, TSP < 30, NO < 30, NO_2 < 30, CO < 1000, O_3 < 30 µg/m³)

Medium stressed (SO_2 < 30, TSP < 60, NO < 60, NO_2 < 60, CO < 2000, O_3 < 60 µg/m³)

Highly stressed (SO_2 > 30, TSP > 60, NO > 60, NO_2 > 60, CO > 2000, O_3 > 60 µg/m³)

n.d. no data

↘ Slight stress decrease

↓ Strong stress decrease

== Constant stress

↗ Slight stress increase

↑ Strong stress increase

[4] … or year when data were primarily available

	PM10		
	Stress in 2002 [5]	Stress in 2012 [6]	Trend 2008-2012
Linz			==
Bludenz	2005		==
Dornbirn			==
Graz			==
Hallein			==
Innsbruck			==
Klagenfurt			==
Region Leoben	2003		↘
Salzburg			↘
St. Pölten			↑
Vienna			↗
Villach			↘
Athens	2007		↘
Barcelona			↓
Basel			↓
Belfast			==
Berlin			==
Birmingham			==
Bristol			==
Brussels			↘
Budapest	2004		↘
Chemnitz			==
Copenhagen			↘
Dresden			↘
Edinburgh			==
Frankfurt			==

	PM10		
	Stress in 2002 [5]	Stress in 2012 [6]	Trend 2008-2012
Gothenburg			==
Hamburg			==
Karlsruhe			↘
Leeds			↘
Leipzig			==
Lisbon		n.d.	↗
Liverpool			==
London			==
Luxemburg		n.d.	n.d.
Lyon			==
Madrid			==
Mannheim			==
Milan			==
Munich			==
Prague	2007		==
Riga			==
Rhine/Ruhr Area			↗
Rotterdam			↘
Sofia		n.d.	==
Stockholm			↘
Stuttgart	2007		==
Thessaloniki	2007		↘
Warsaw			↗
Wiesbaden			↗
Zagreb			==
Zurich			==

Legend:

- Slightly stressed (PM_{10} < 20 µg/m³)
- Medium stressed (PM_{10} < 40 µg/m³)
- Highly stressed (PM_{10} > 40 µg/m³)
- n.d. No data

[5] If values of 2002 are not available, data of the year mentioned are compared.
[6] If values of 2012 are not available, data of the year mentioned are compared.

Anzahl der Tage mit Überschreitungen des PM_{10}-Tagesmittelwertes von 50 µg/m³ in den Jahren 2001 bis 2012 [7)]

Beurteilungsbasis: Anzahl der Überschreitungen an der höchstbelasteten Station eines Messgebietes (einschließlich verkehrsbelasteter Stationen) [8)]

Number of days with exceedances of the PM_{10} daily mean of 50 µg/m³ 2001 through 2012 [9)]

based on the number of exceedances at the peak stressed monitoring station of a region (including traffic stressed stations) [10)]

	PM_{10} number of days >50 µg/m³											
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Linz	62	66	80	46	68	71	41	47	30	45	45	25
Bludenz	-	-	-	-	13	45	16	13	12	17	14	11
Dornbirn	-	-	38	21	22	40	18	20	14	21	13	10
Graz	159	131	131	117	127	113	76	73	57	69	78	49
Hallein	-	28	49	26	27	50	20	13	20	29	19	18
Innsbruck	-	50	61	52	55	83	46	28	26	29	46	23
Klagenfurt	36	58	74	80	82	79	42	33	34	43	46	27
Region Leoben	26	7	42	29	36	49	36	25	19	20	31	3
Salzburg	-	34	62	34	39	56	25	34	37	41	31	17
St. Pölten	-	-	58	79	87	57	23	20	23	38	39	22
Vienna	-	57	95	54	92	108	48	39	40	87	62	35
Villach	-	24	35	25	29	45	10	9	17	7	18	2
Athens	-	-	-	-	-	-	178	163	122	99	101	40
Barcelona	-	86	-	47	74	100	97	72	94	23	43	42
Basel	11	22	23	16	15	24	12	6	10	11	8	4
Belfast	16	7	33	8	5	7	5	7	3	10	10	7
Berlin	60	91	117	62	74	71	30	24	39	46	54	31
Birmingham	2	1	5	4	5	9	18	10	7	8	18	17
Bristol	7	1	9	12	4	6	15	15	7	4	12	8
Brussels	52	153	163	127	67	56	56	66	66	45	87	55
Budapest	-	-	-	178	160	162	117	96	71	84	86	60
Chemnitz	41	20	35	12	59	65	27	19	32	34	39	28
Copenhagen	-	59	91	-	-	68	60	59	59	18	46	29
Dresden	53	36	53	27	78	49	27	35	42	40	46	22
Edinburgh	3	8	2	0	3	2	6	0	3	0	0	2
Frankfurt	42	44	51	19	48	24	33	22	36	26	42	19
Gothenburg	1	10	12	2	7	13	3	4	0	0	21	11
Hamburg	33	43	62	20	45	31	26	18	15	26	46	12

- No Data

---

7 Bei den Werten wurden bereits die Korrekturfaktoren berücksichtigt. Diese sind aus den Tabellen im Anhang zu ersehen.

8 Nähere Details zur Unterscheidung zwischen verkehrsbelasteten Stationen und sonstigen urbanen Messstationen siehe Tabellen am Ende des Berichtes bzw. diverse grafische Auswertungen.

9 For the number of exceedances the correction factors already have been considered. One can refer to the tables at the end of the report.

10 For details in order to distinguish between traffic stressed stations and other urban monitoring stations see tables at the end of the report and the graphical evaluations.

	PM10											
	number of days >50 µg/m³											
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Karlsruhe	6	33	33	25	22	34	16	10	20	23	18	8
Leeds	3	3	9	4	15	10	11	8	16	11	26	18
Leipzig	109	63	92	49	82	74	40	40	51	49	69	39
London	28	29	61	107	121	157	124	157	47	22	57	23
Lisbon	230	222	183	147	180	145	154	82	92	90	113	-
Liverpool	4	2	1	14	5	8	11	12	6	2	8	4
Lyon	-	83	124	71	153	-	142	79	39	81	93	69
Madrid	-	98	-	121	159	181	123	65	35	18	41	22
Mannheim	25	44	36	41	43	20	26	12	23	24	27	23
Milan	148	177	137	139	152	149	132	115	106	85	132	107
Munich	64	75	123	59	107	92	53	60	52	65	48	27
Prague	-	-	-	-	-	-	132	84	48	71	68	73
Riga	57	74	105	160	88	244	148	126	46	31	11	25
Rhine/Ruhr Area	40	48	58	38	21	-	71	68	70	54	62	41
Rotterdam	98	103	123	54	30	31	26	12	12	12	-	16
Sofia	-	-	225	178	162	-	195	199	106	134	134	-
Stockholm	101	113	80	80	80	74	75	77	65	46	58	39
Stuttgart	-	-	-	-	-	-	110	14	19	40	42	15
Thessaloniki	-	-	-	-	-	-	152	155	80	96	87	92
Warsaw	-	-	89	184	162	192	136	133	148	151	129	90
Wiesbaden	15	35	19	11	18	32	20	8	13	5	25	8
Zagreb	-	-	-	75	89	134	108	116	61	73	101	87
Zurich	18	23	38	23	15	39	17	11	11	12	11	7

- No Data

Anzahl der Überschreitungen des 1h-Grenzwertes für NO_2 von 200 µg/m³ in den Jahren 2004 bis 2012

Beurteilungsbasis: Anzahl der Überschreitungen an der höchstbelasteten Station eines Messgebietes

Number exceedances of the NO_2 1h mean value of 200 µg/m³ in 2004 through 2012
based on the number of exceedances at the peak stressed monitoring station of a region

	NO_2 number of 1 h mean values >200 µg/m³								
	2004	2005	2006	2007	2008	2009	2010	2011	2012
Linz	0	1	4	4	1	5	3	6	7
Bludenz	0	0	0	0	0	0	0	0	0
Dornbirn	-	0	0	0	0	0	0	0	0
Graz	0	0	4	0	0	0	1	0	0
Hallein	0	0	1	3	0	0	0	0	0
Innsbruck	0	0	4	0	0	1	0	0	3
Klagenfurt	-	1	1	1	0	0	1	1	1
Region Leoben	0	0	0	0	0	0	0	0	0
Salzburg	0	0	2	1	2	4	3	0	0
St. Pölten	0	0	0	0	1	0	0	0	0
Vienna	8	24	26	11	17	4	7	5	0
Villach	0	0	0	0	0	0	0	0	0
Athens	-	-	-	192	56	35	8	1	0
Barcelona	13	-	18	22	13	9	0	12	5
Basel	0	0	0	0	0	0	0	0	0
Belfast	0	4	5	0	3	0	0	0	0
Berlin	-	-	-	6	0	8	6	3	5
Birmingham	0	2	0	0	3	0	7	4	0
Bristol	0	22	13	8	5	11	3	0	0
Brussels	24	90	2	2	6	1	1	3	2
Budapest	1	25	19	9	1	0	1	3	4
Chemnitz	1	0	0	1	0	2	0	2	0
Copenhagen	-	-	-	-	-	-	-	-	0
Dresden	0	0	0	0	0	0	0	0	0
Edinburgh	0	0	0	0	6	0	0	0	0
Frankfurt	0	10	3	6	2	16	5	8	5

- No Data

	NO_2								
	number of 1 h mean values >200 µg/m³								
	2004	2005	2006	2007	2008	2009	2010	2011	2012
Gothenburg	2	0	7	1	1	0	3	8	1
Hamburg	0	0	26	19	30	29	24	10	2
Karlsruhe	5	0	0	0	3	3	4	2	8
Leeds	0	0	0	0	8	0	1	0	0
Leipzig	1	39	0	0	0	0	0	0	0
Liverpool	0	458	0	0	0	0	0	0	0
Lisbon	52	-	80	39	20	69	21	37	-
London	542	139	686	458	822	486	539	229	143
Luxemburg	-	267	-	-	-	-	0	-	-
Lyon	35	0	-	139	66	28	181	150	66
Madrid	83	-	208	267	119	150	76	103	52
Mannheim	0	69	0	0	0	0	1	1	0
Milan	47	1	123	-	241	101	25	132	99
Munich	11	0	103	69	56	95	192	50	27
Prague	-	0	-	1	106	98	56	51	4
Riga	0	0	0	0	0	0	0	0	0
Rhine/Ruhr Area	0	24	-	0	0	0	1	0	0
Rotterdam	10	3	2	0	0	0	0	-	0
Sofia	7	450	-	24	155	95	30	55	-
Stockholm	0	3	1	3	1	0	3	1	0
Stuttgart	-	-	-	5	9	22	6	6	3
Thessaloniki	-	3	-	3	1	0	0	0	0
Warsaw	0	0	5	17	0	0	1	5	1
Wiesbaden	0	0	2	3	1	7	1	3	2
Zagreb	0	0	0	0	0	0	0	0	0
Zurich	0	0	0	0	0	0	0	0	0

- No Data

Luftgütevergleich

2012

Jahresmittelwerte (Gebietsmittel)

Comparison of The Air Quality

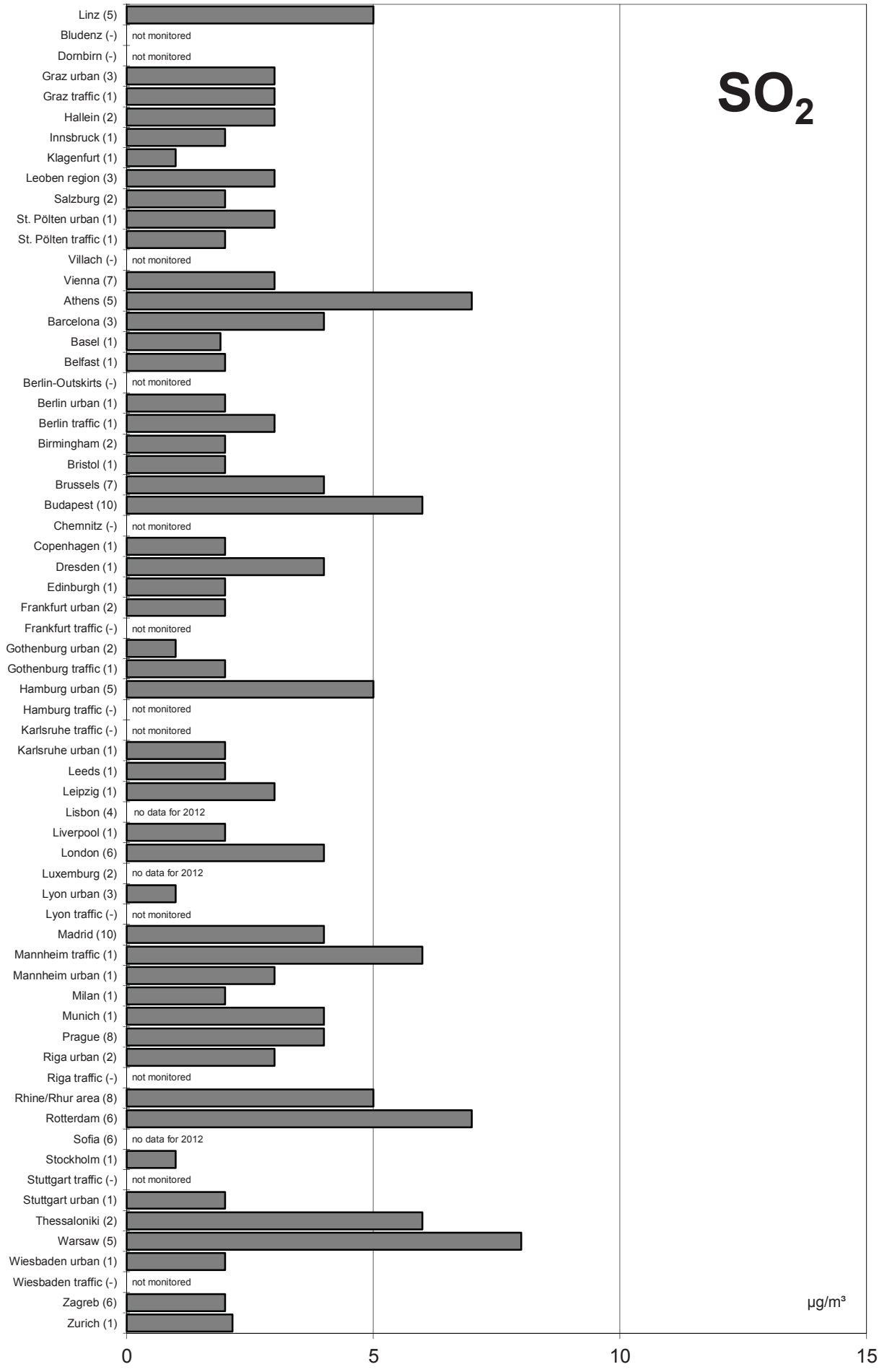
2012

Annual Mean Values

Comparison of The Air Quality in 2012

annual mean values (mean of all monitoring stations of the city/region)

(in parentheses: number of monitoring stations)



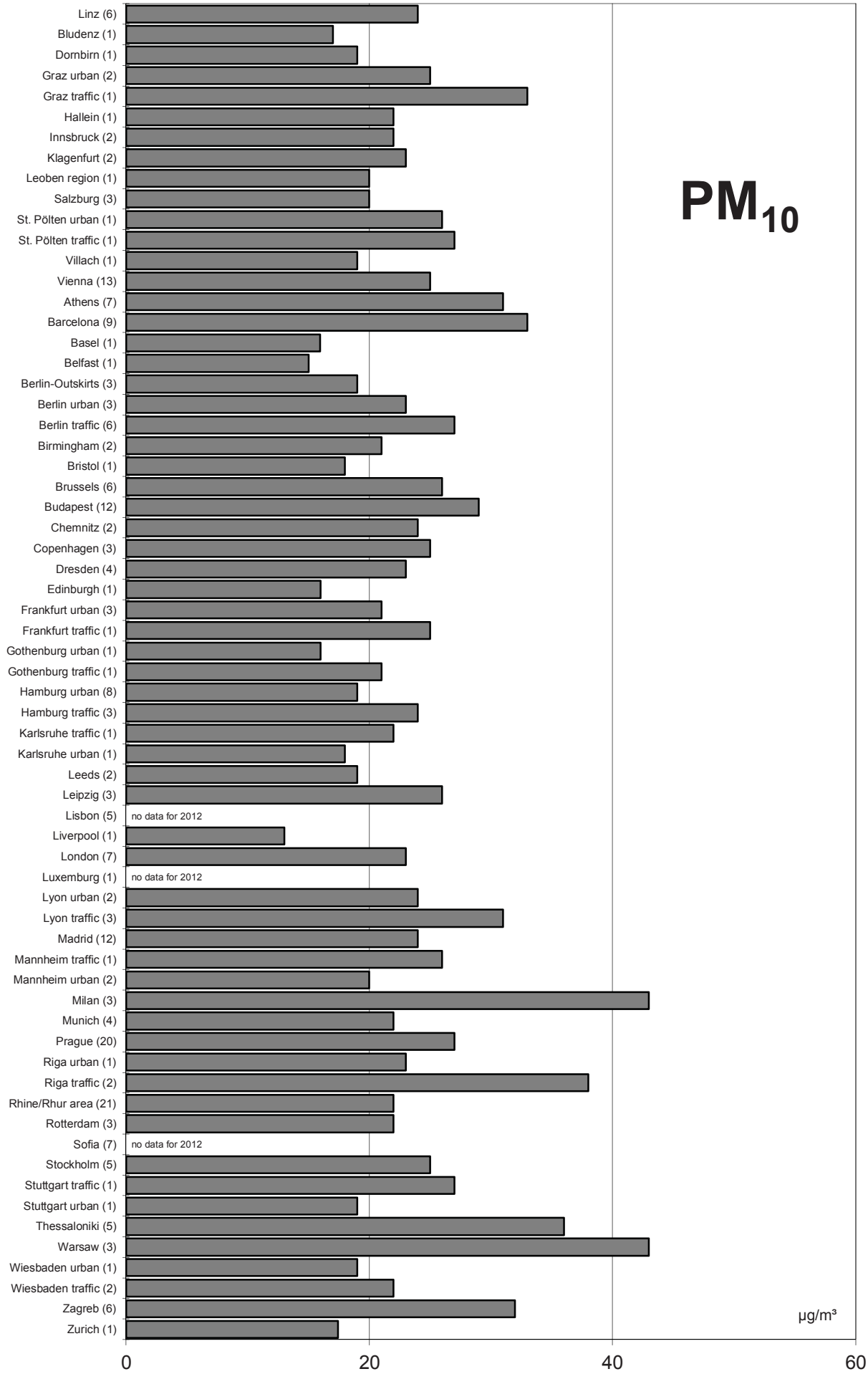
*) traffically influenced monitoring stations

**) no data

Comparison of The Air Quality in 2012

annual mean values (mean of all monitoring stations of the city/region)

(in parentheses: number of monitoring stations)



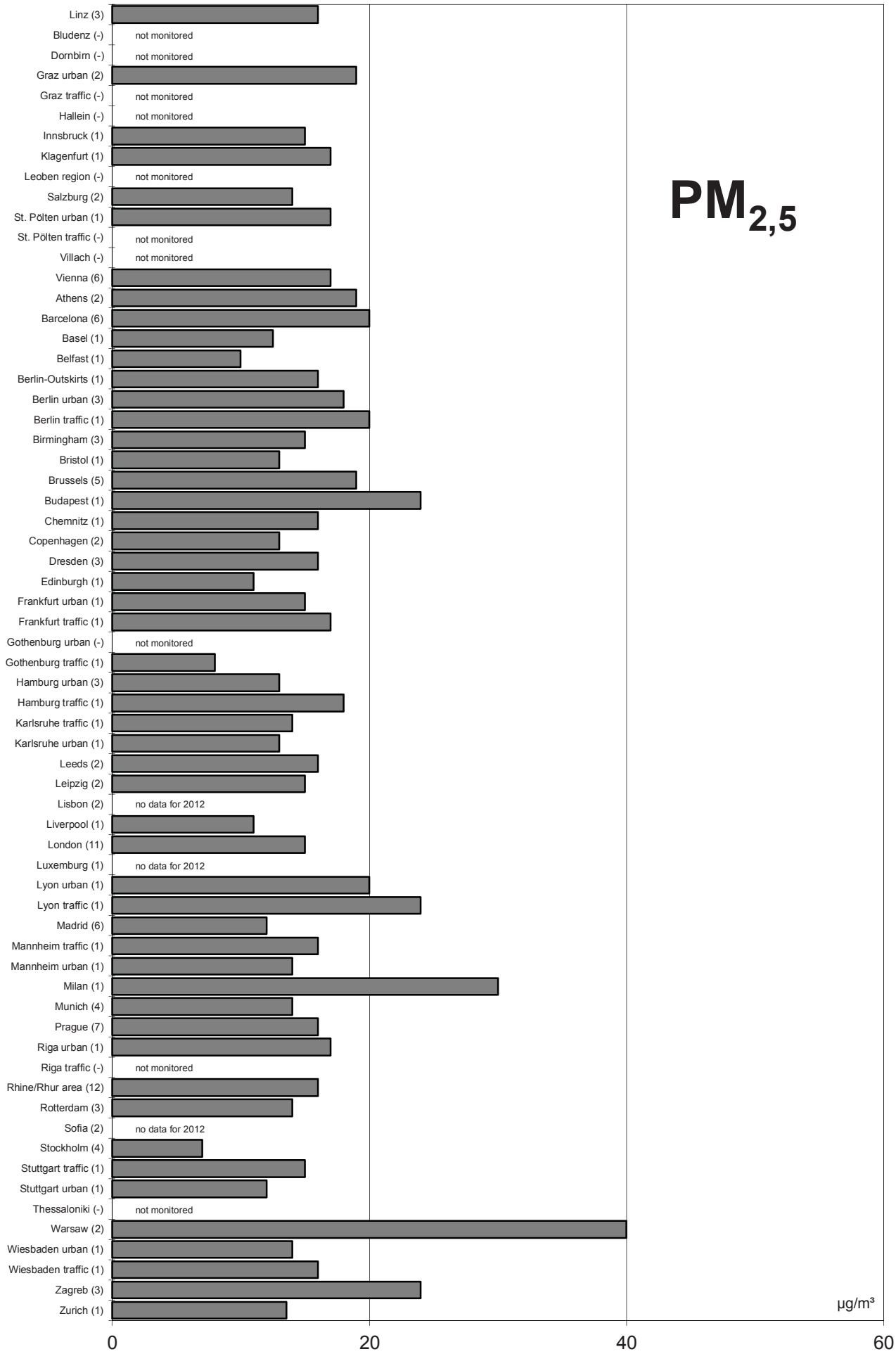
*) traffically influenced monitoring stations

**) no data

Comparison of The Air Quality in 2012

annual mean values (mean of all monitoring stations of the city/region)

(in parentheses: number of monitoring stations)



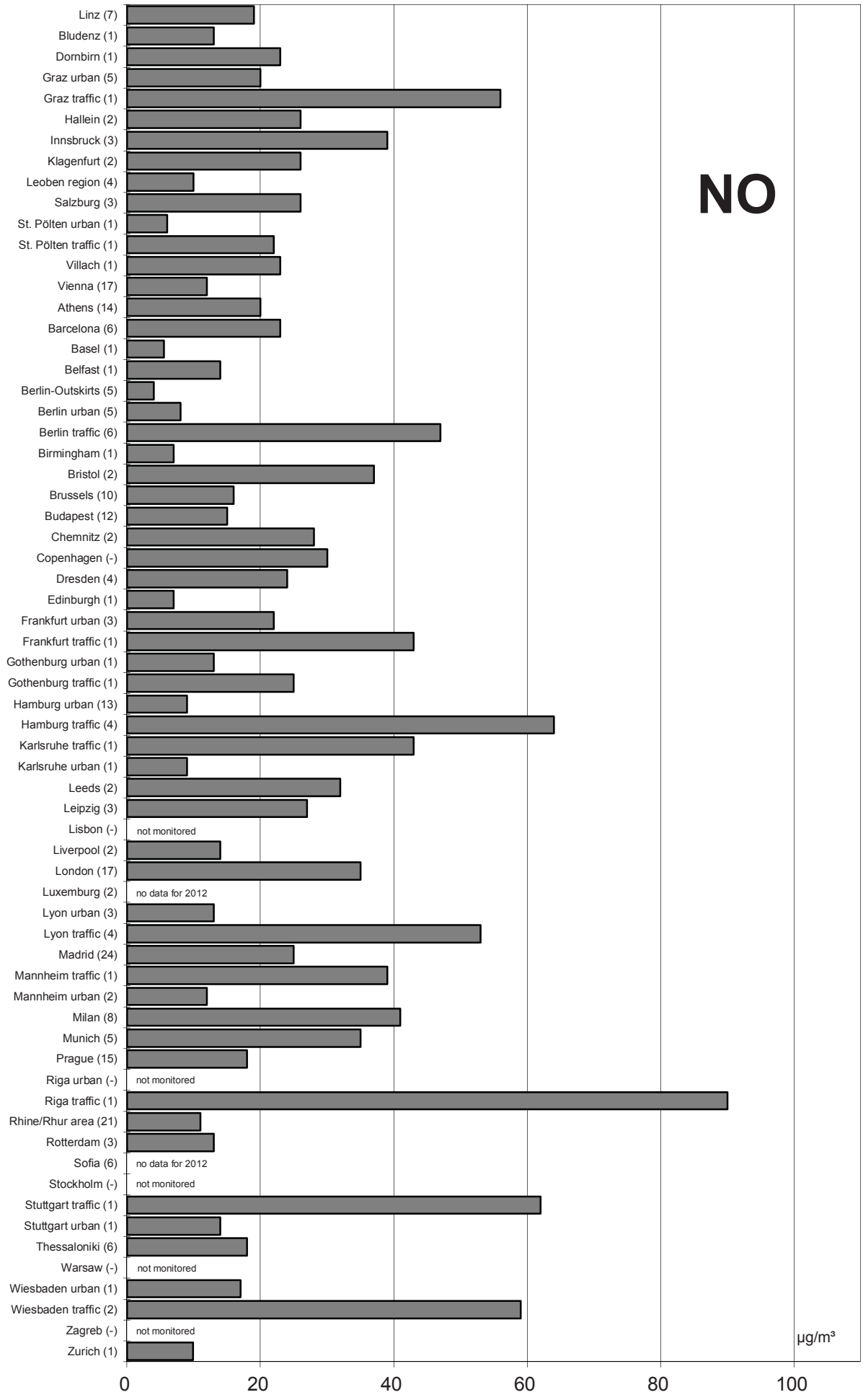
*) traffically influenced monitoring stations

**) no data

Comparison of The Air Quality in 2012

annual mean values (mean of all monitoring stations of the city/region)

(in parentheses: number of monitoring stations)



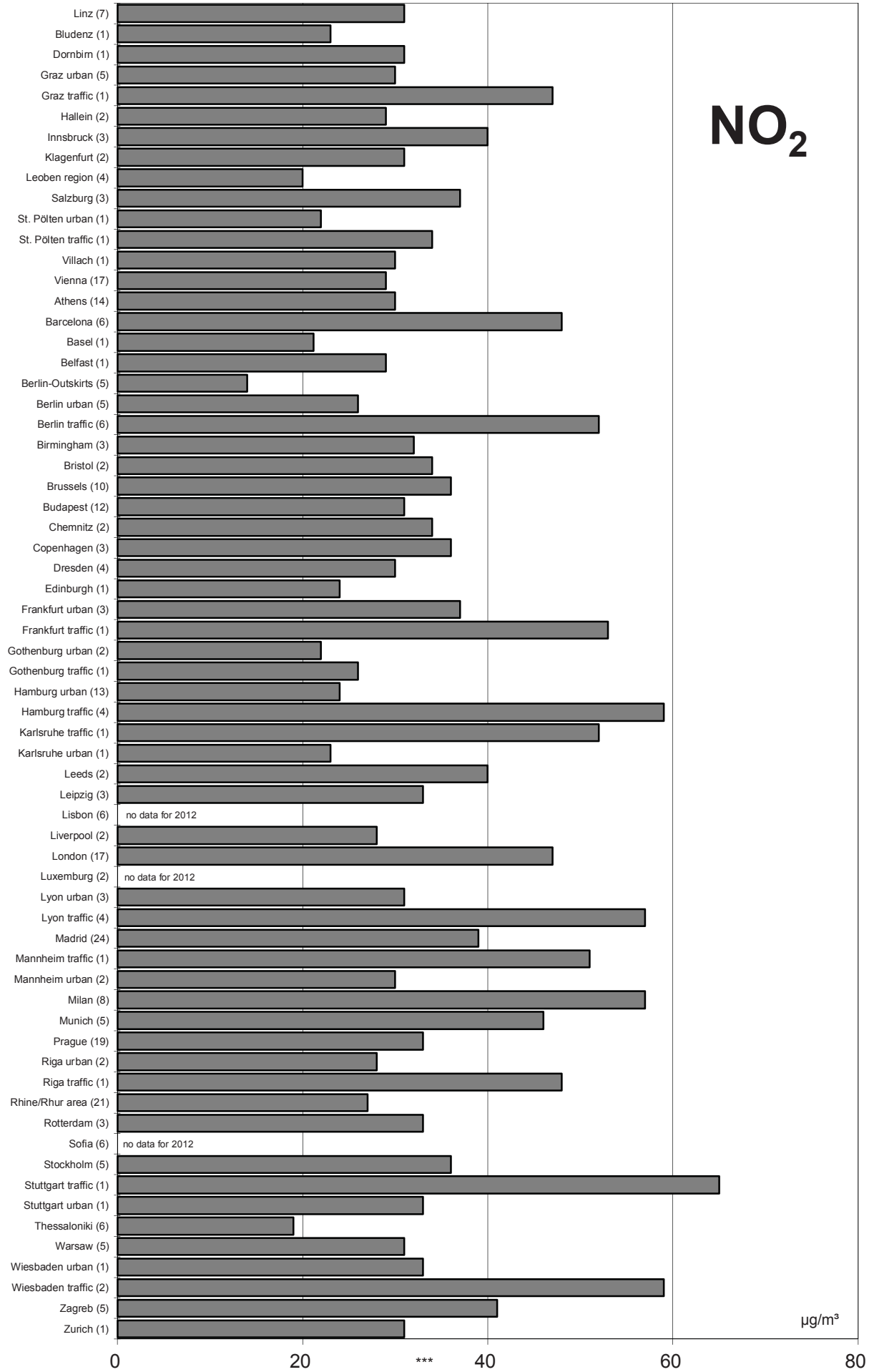
*) traffically influenced monitoring stations

**) no data

Comparison of The Air Quality in 2012

annual mean values (mean of all monitoring stations of the city/region)

(in parentheses: number of monitoring stations)



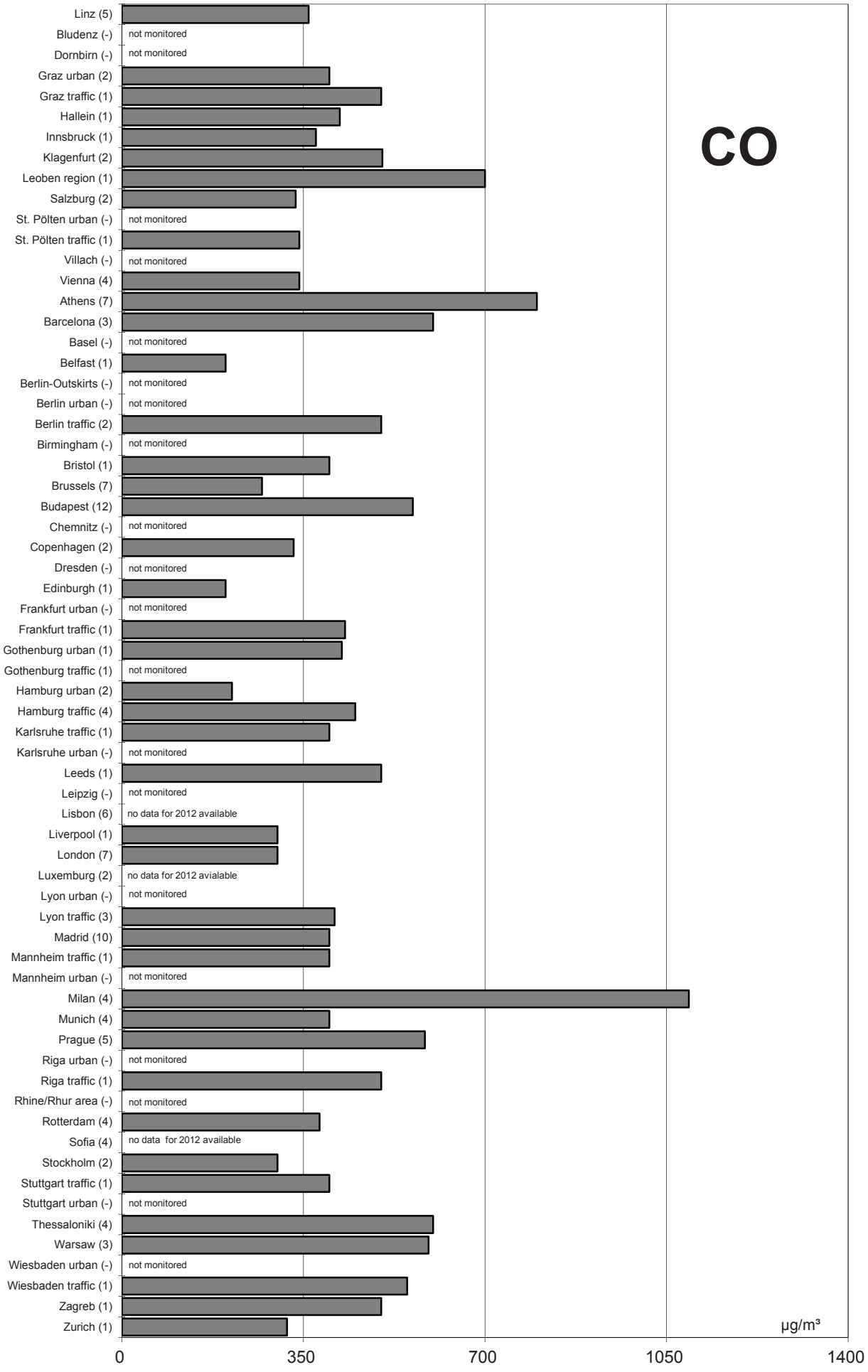
*) traffically influenced monitoring stations

**) no data

Comparison of The Air Quality in 2012

annual mean values (mean of all monitoring stations of the city/region)

(in parentheses: number of monitoring stations)



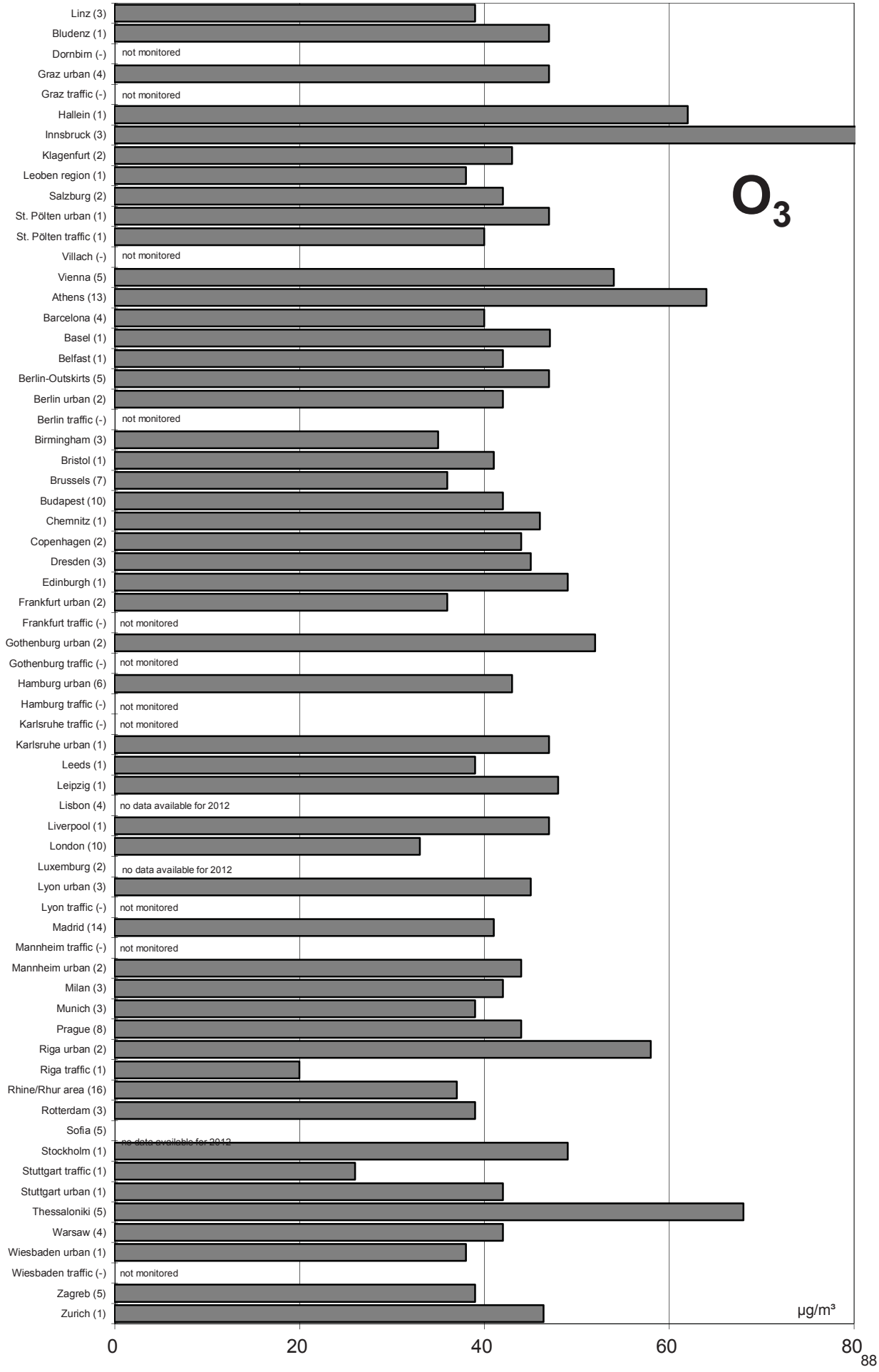
*) traffically influenced monitoring stations

**) no data

Comparison of The Air Quality in 2012

annual mean values (mean of all monitoring stations of the city/region)

(in parentheses: number of monitoring stations)



88

*) traffically influenced monitoring stations

**) no data

Luftgütevergleich

2012

max. Tagesmittelwerte

Comparison of The Air Quality

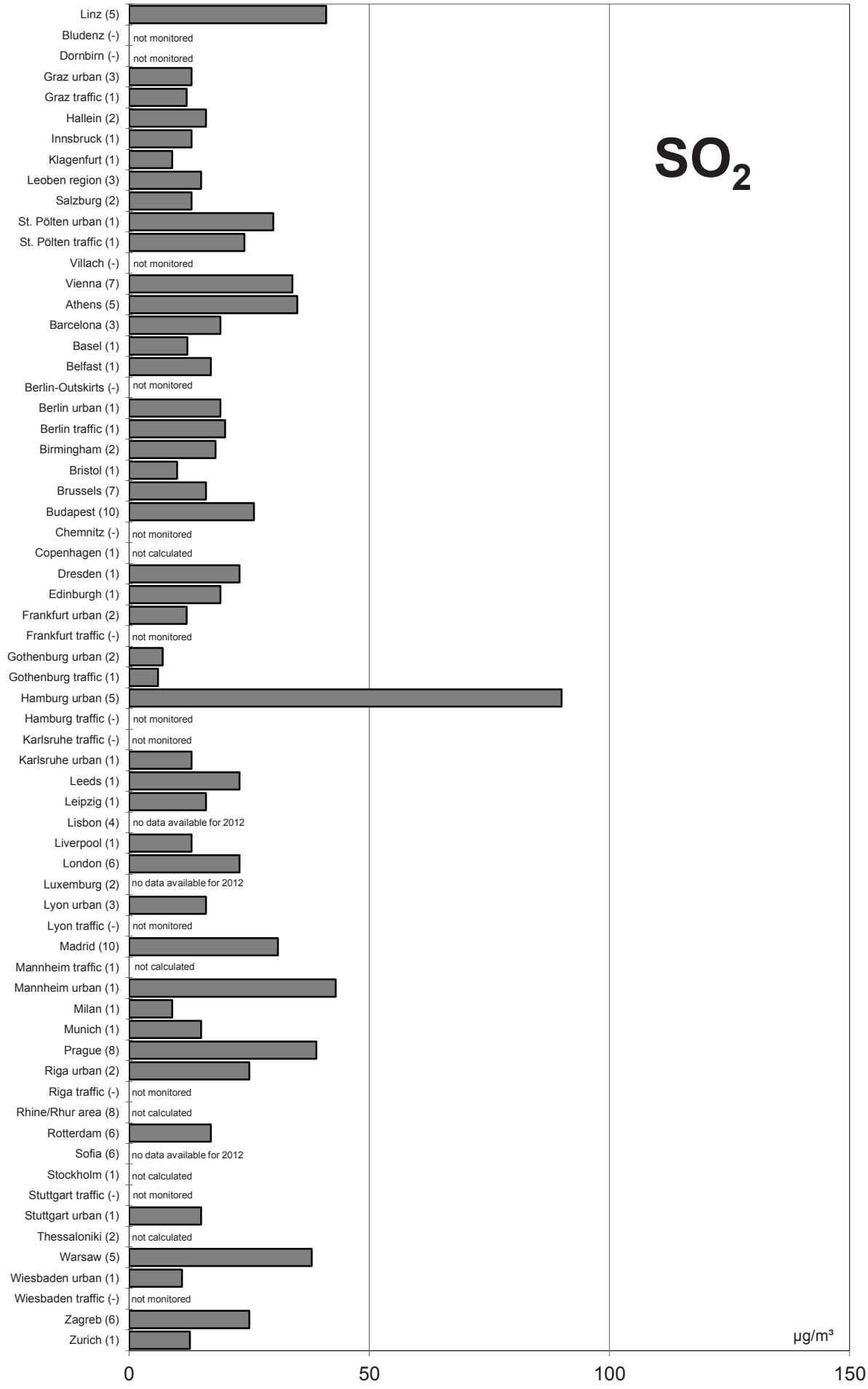
2012

Max. Daily Mean Values

Comparison of The Air Quality in 2012

max. daily mean values (max. stressed monitoring station)

(in parentheses: number of monitoring stations)

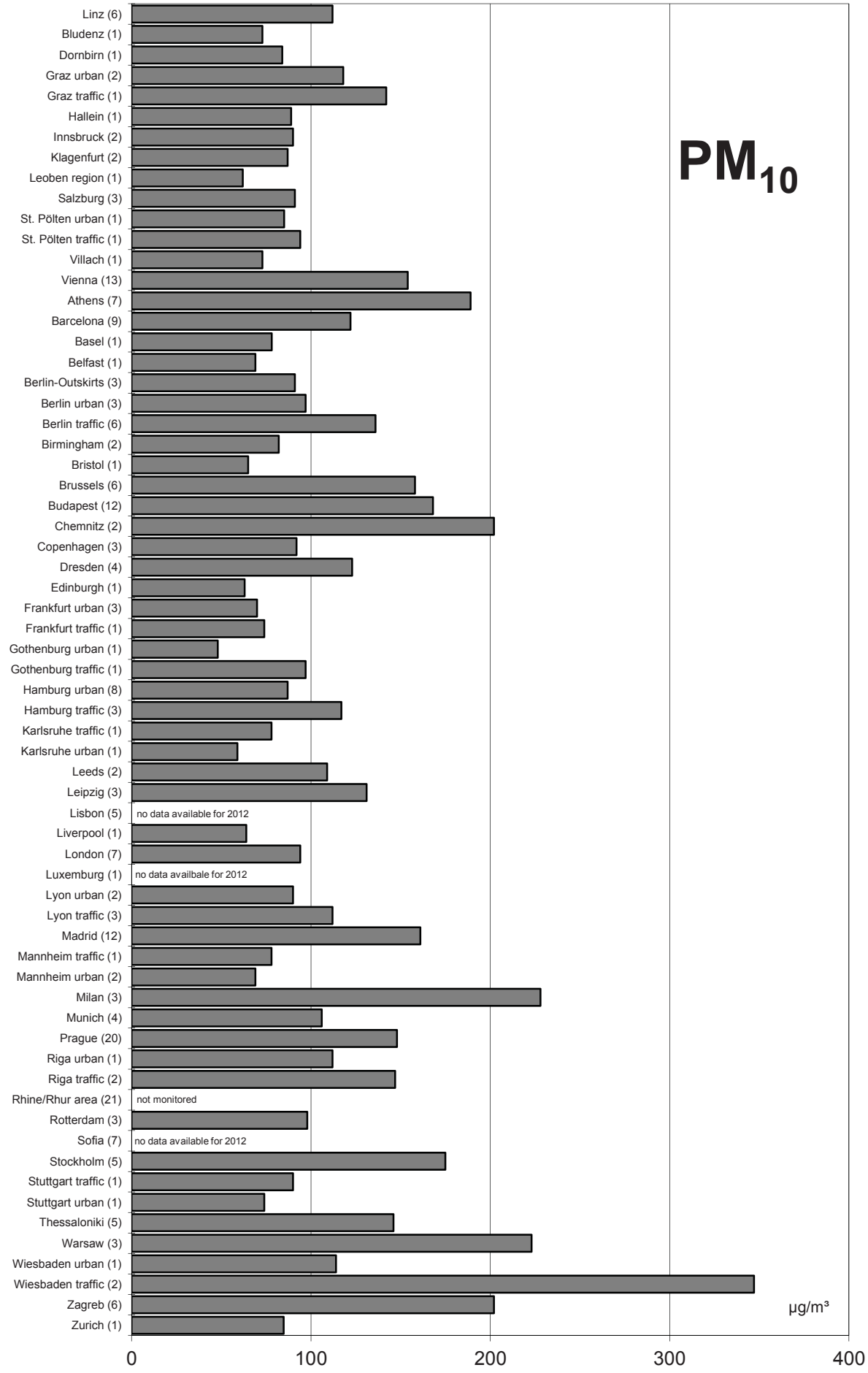


*) traffically influenced monitoring stations
**) no data

Comparison of The Air Quality in 2012

max. daily mean values (max. stressed monitoring station)

(in parentheses: number of monitoring stations)

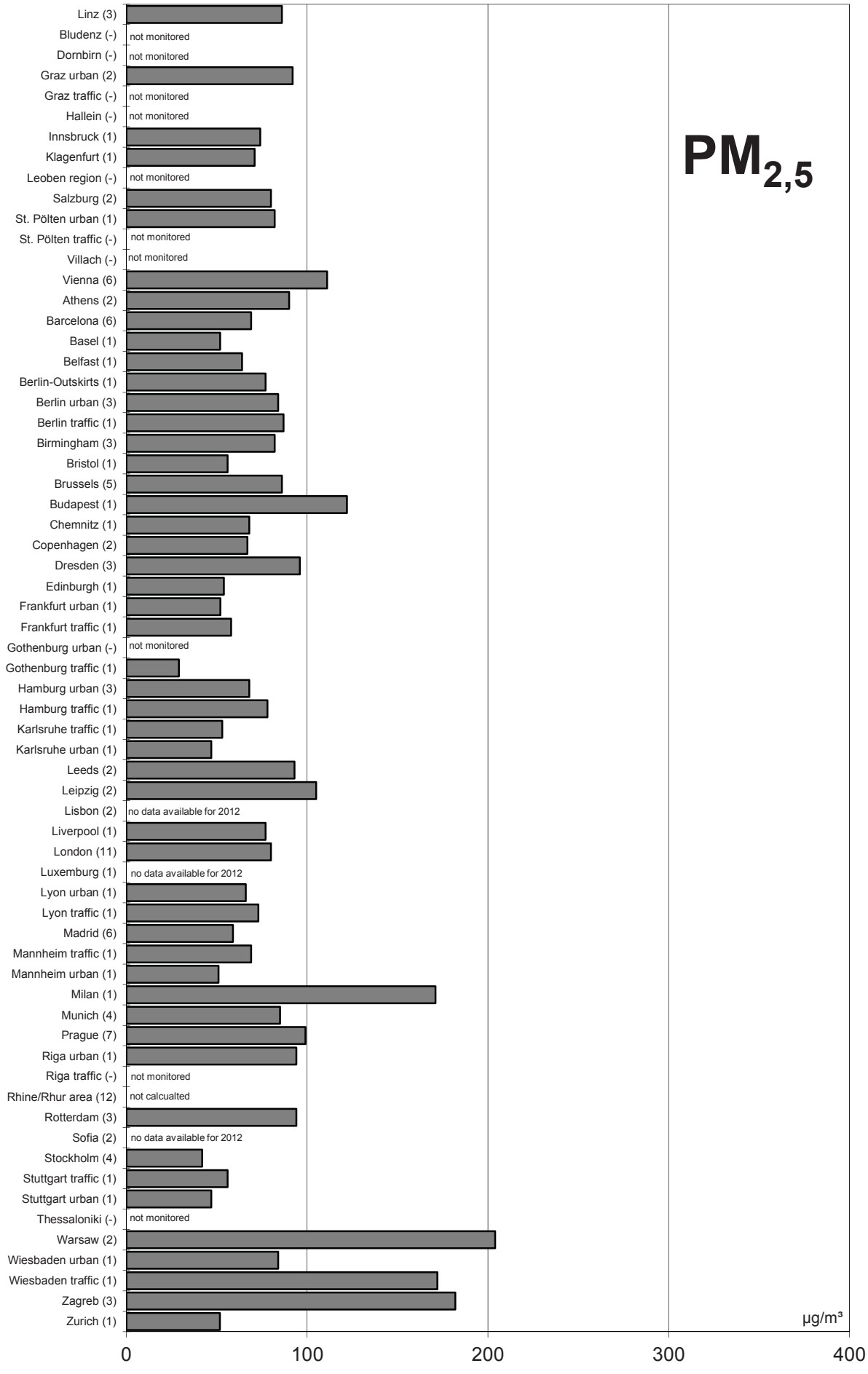


*) traffically influenced monitoring stations
**) no data

Comparison of The Air Quality in 2012

max. daily mean values (max. stressed monitoring station)

(in parentheses: number of monitoring stations)

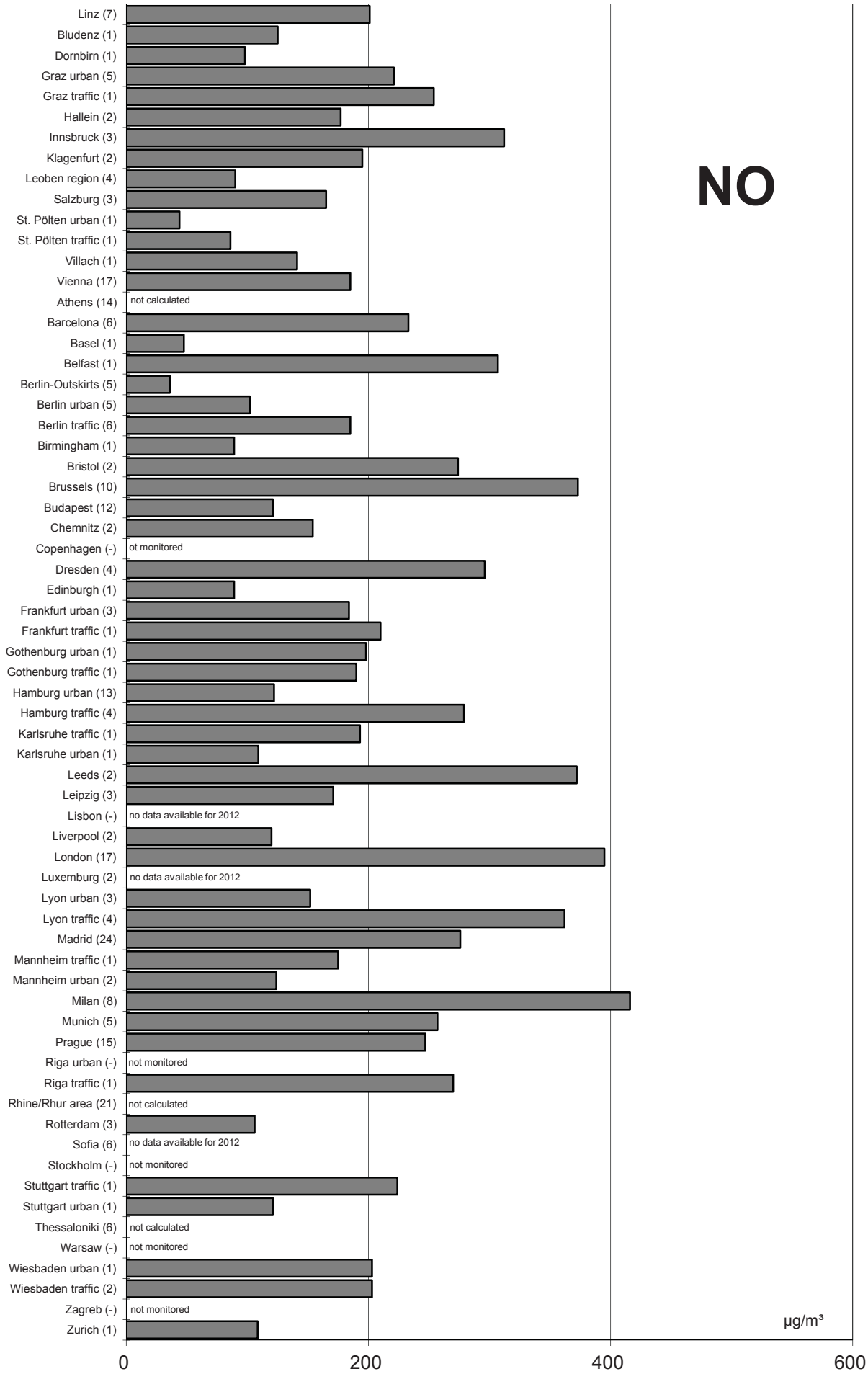


*) traffically influenced monitoring stations
**) no data

Comparison of The Air Quality in 2012

max. daily mean values (max. stressed monitoring station)

(in parentheses: number of monitoring stations)

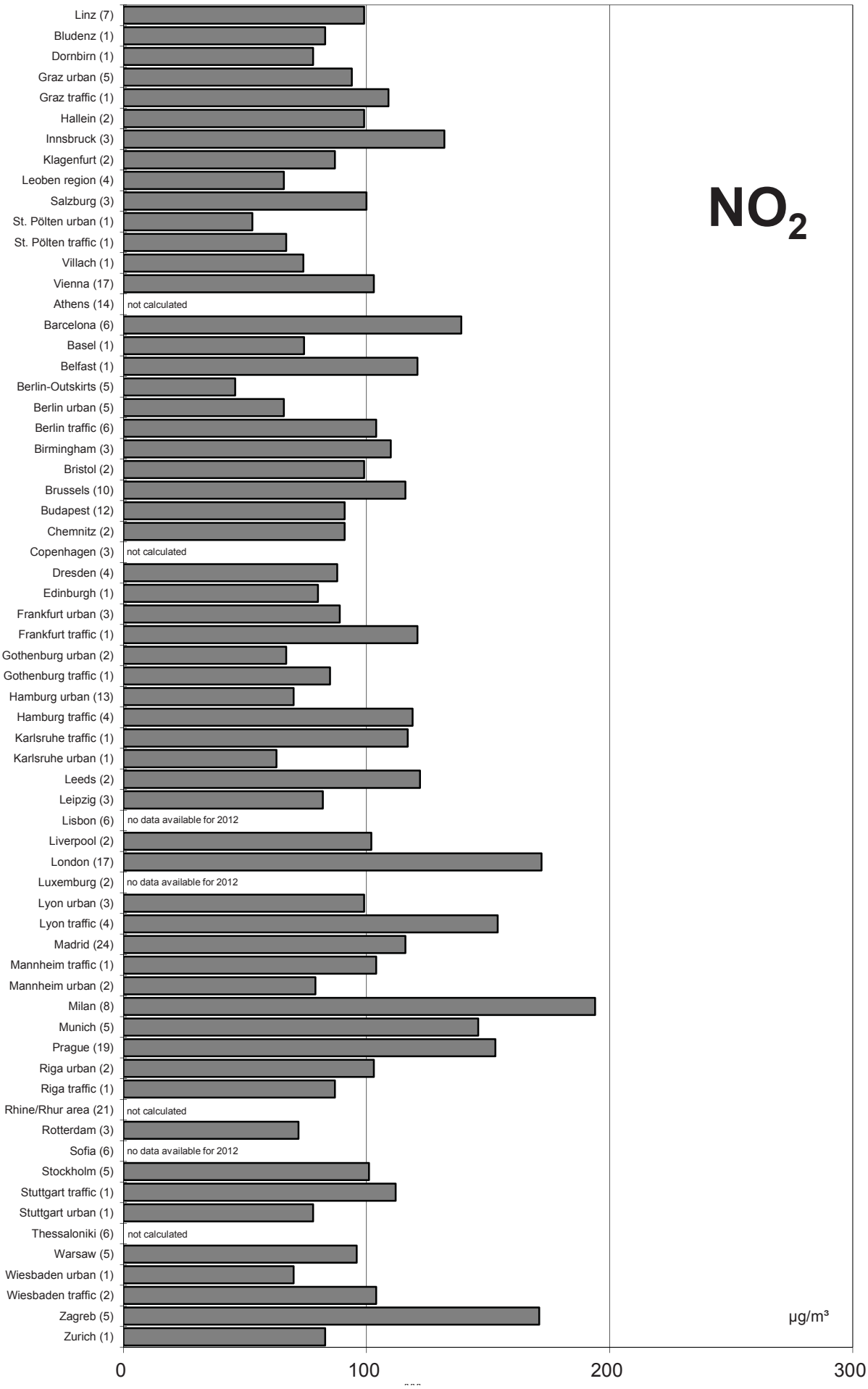


*) traffically influenced monitoring stations
**) no data

Comparison of The Air Quality in 2012

max. daily mean values (max. stressed monitoring station)

(in parentheses: number of monitoring stations)

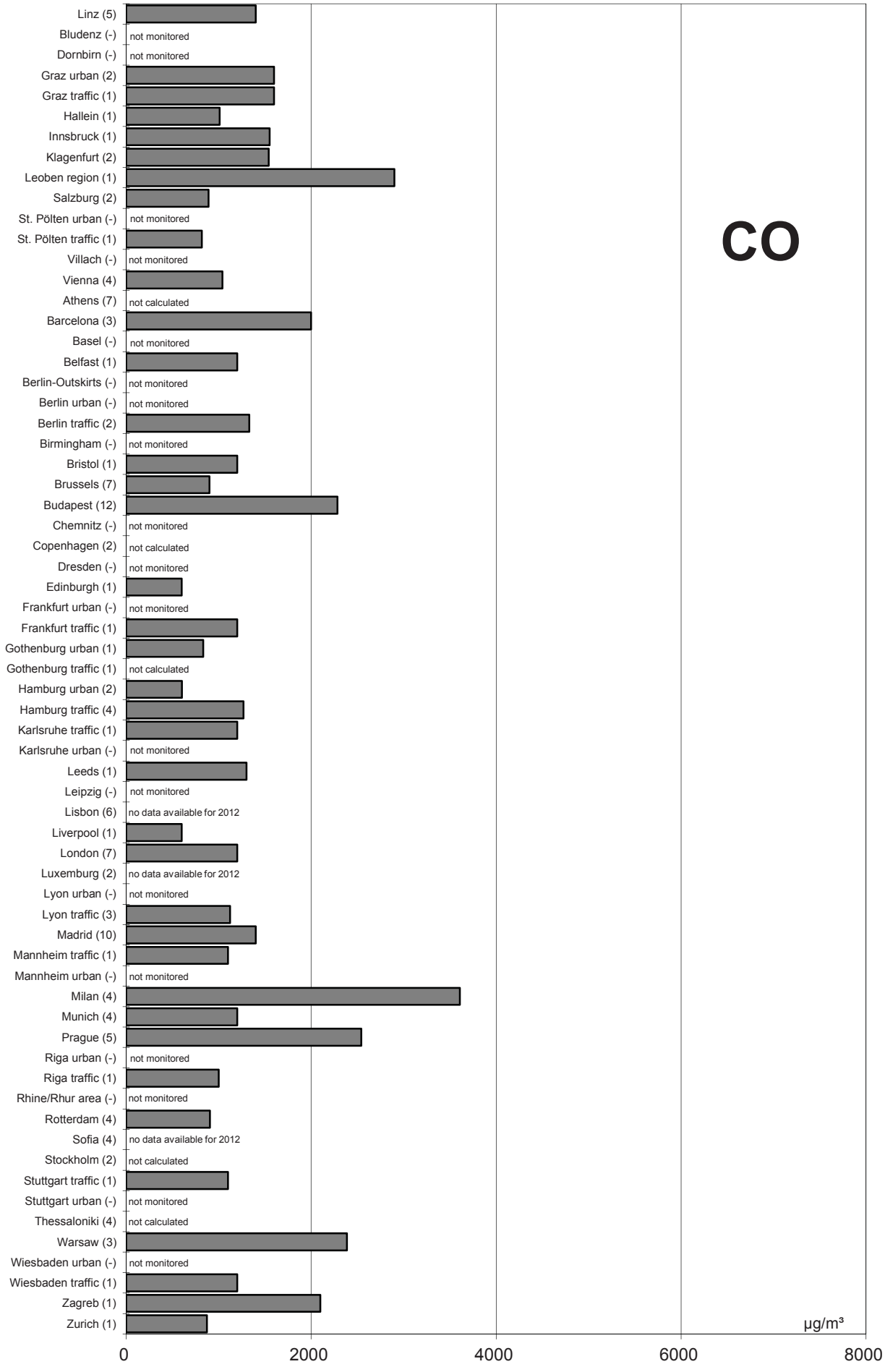


*) traffically influenced monitoring stations
**) no data

Comparison of The Air Quality in 2012

max. daily mean values (max. stressed monitoring station)

(in parentheses: number of monitoring stations)

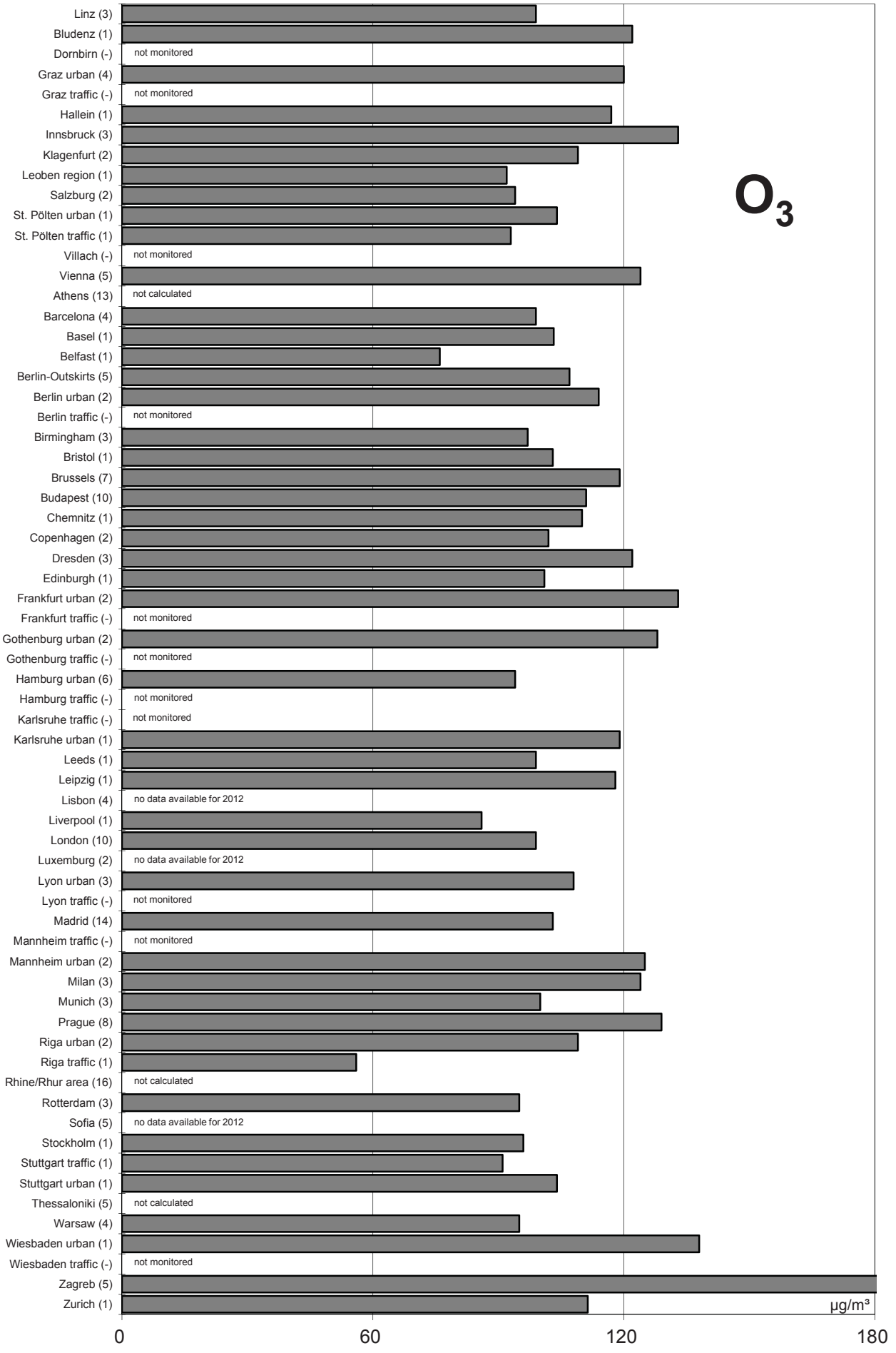


*) traffically influenced monitoring stations
**) no data

Comparison of The Air Quality in 2012

max. daily mean values (max. stressed monitoring station)

(in parentheses: number of monitoring stations)



*) traffically influenced monitoring stations
**) no data

Luftgütevergleich

2012

max. 1h-Mittelwerte

Comparison of The Air Quality

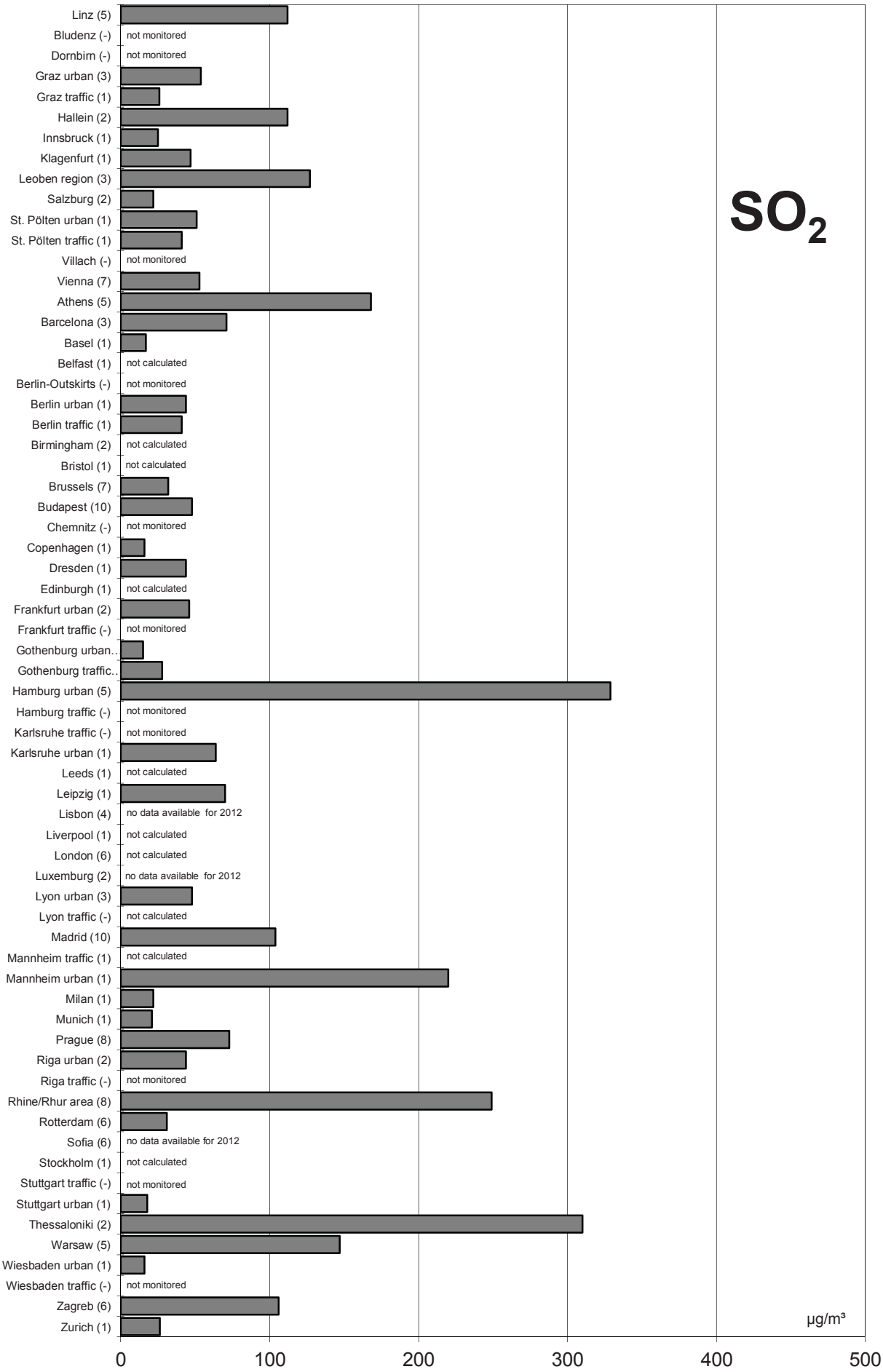
2012

Max. 1h-Mean Values

Comparison of The Air Quality in 2012

max. 1h mean values (max. stressed monitoring station)

(in parentheses: number of monitoring stations)

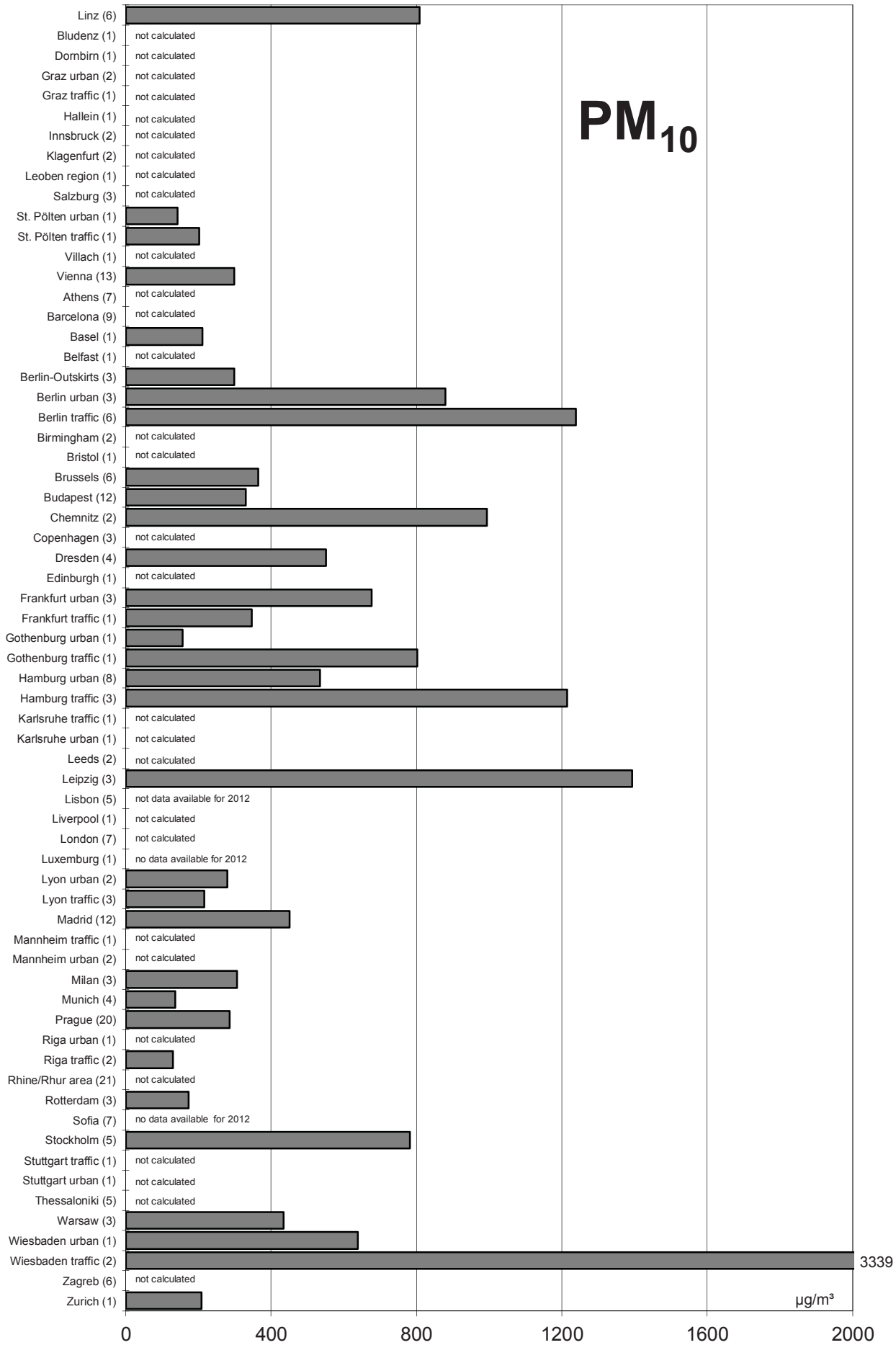


*) traffically influenced monitoring stations
**) no data

Comparison of The Air Quality in 2012

max. 1h mean values (max. stressed monitoring station)

(in parentheses: number of monitoring stations)

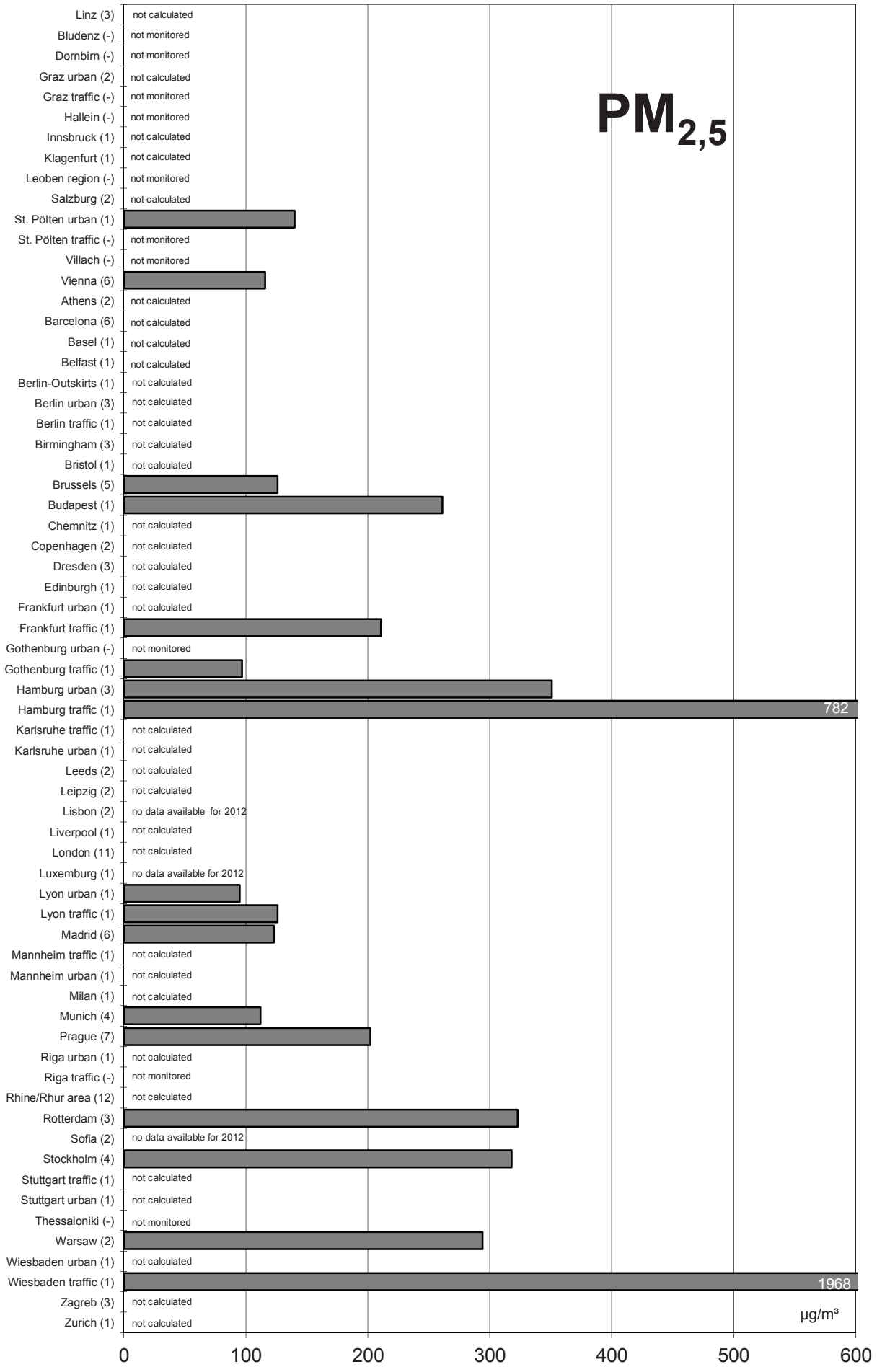


*) traffically influenced monitoring stations
**) no data

Comparison of The Air Quality in 2012

max. 1h mean values (max. stressed monitoring station)

(in parentheses: number of monitoring stations)

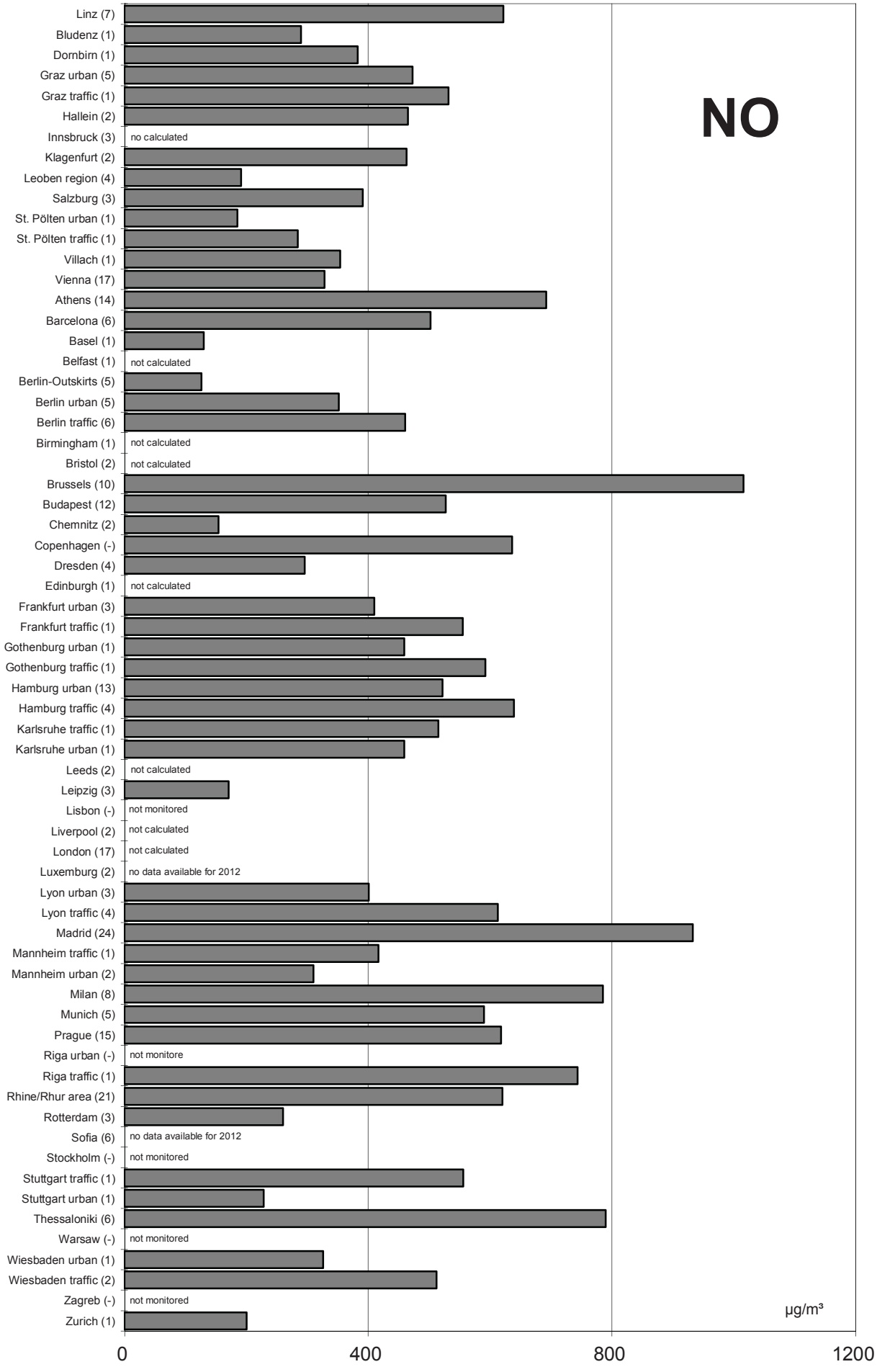


*) traffically influenced monitoring stations
**) no data

Comparison of The Air Quality in 2012

max. 1h mean values (max. stressed monitoring station)

(in parentheses: number of monitoring stations)

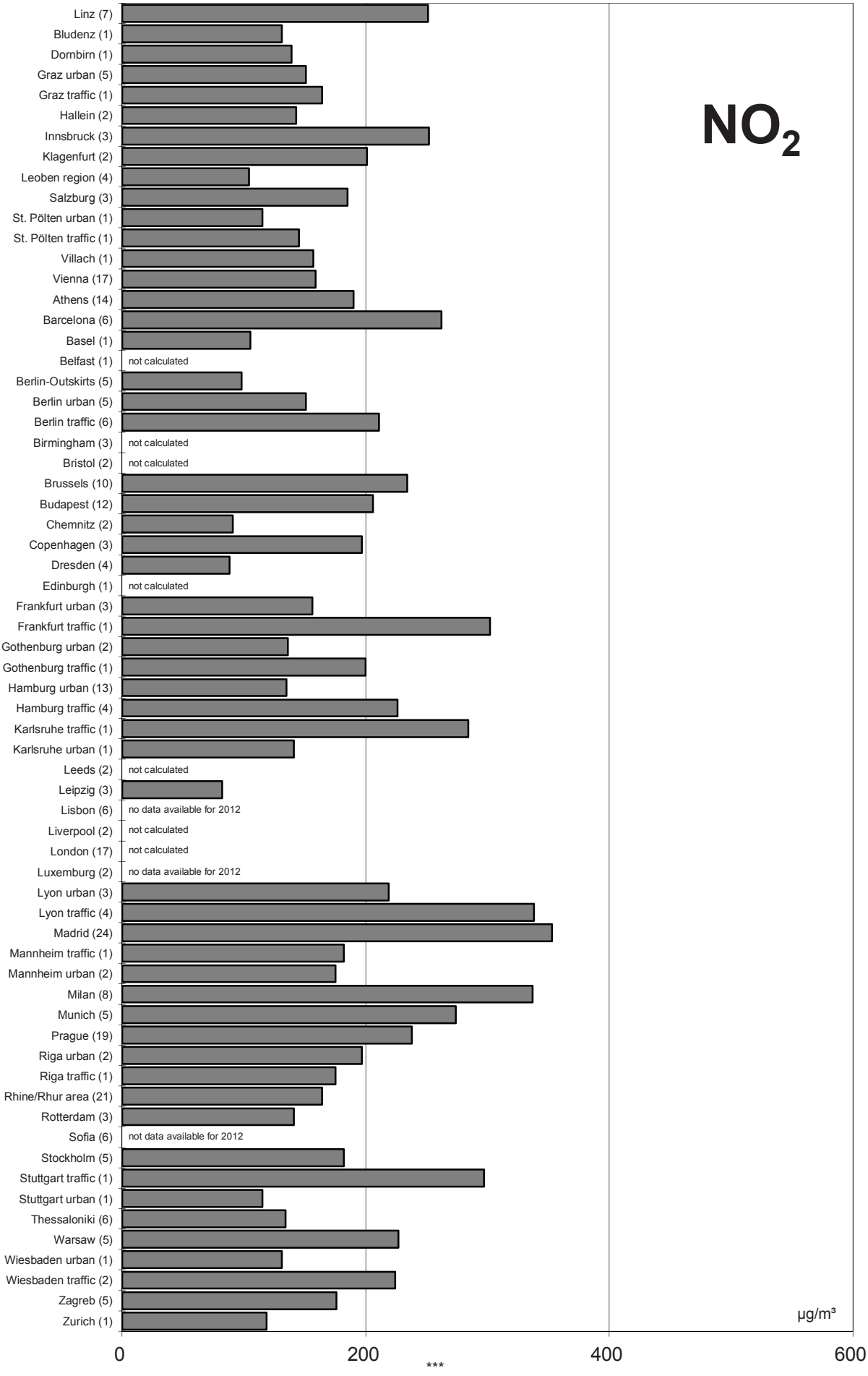


*) traffically influenced monitoring stations
**) no data

Comparison of The Air Quality in 2012

max. 1h mean values (max. stressed monitoring station)

(in parentheses: number of monitoring stations)

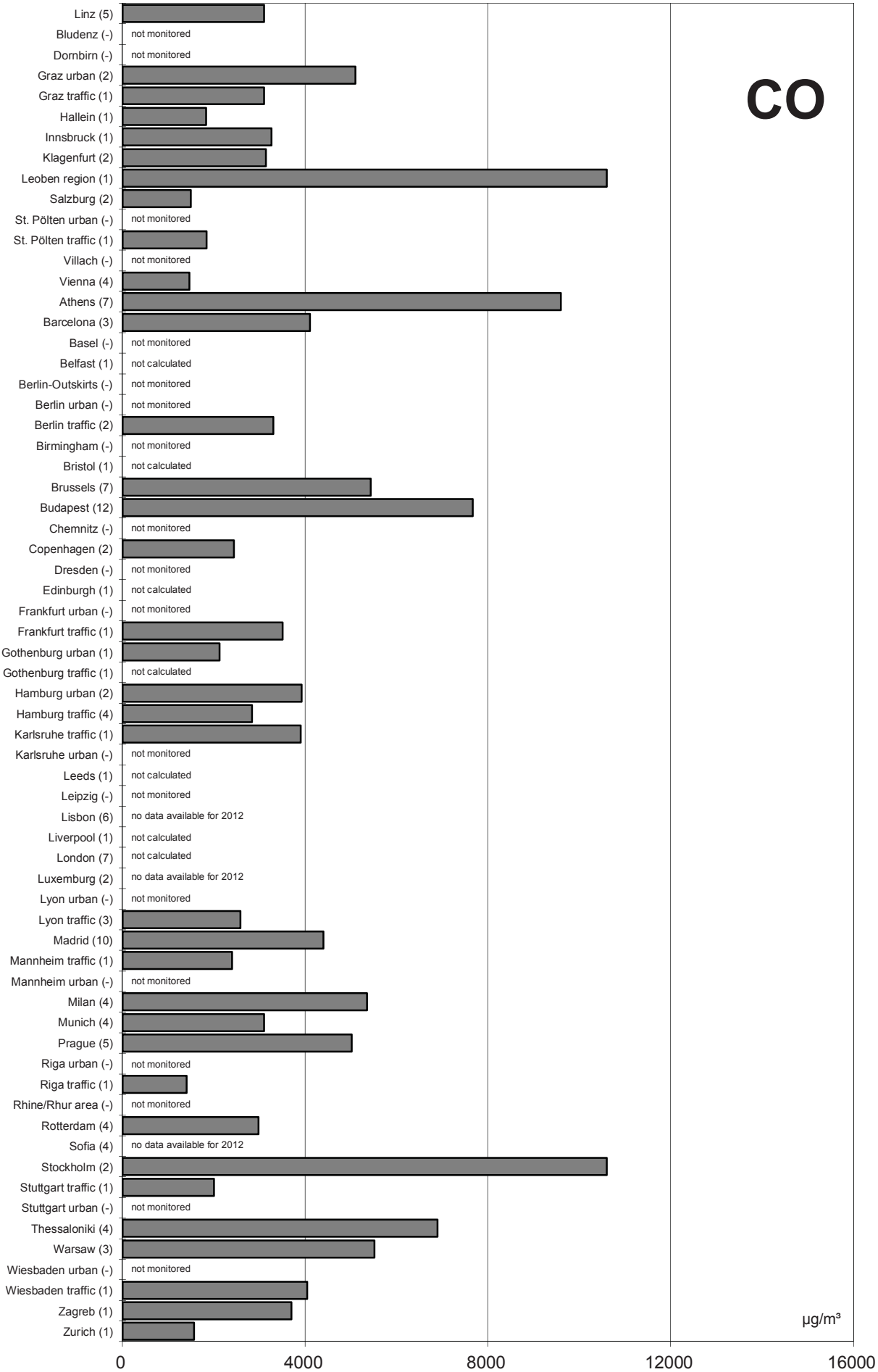


*) traffically influenced monitoring stations
**) no data

Comparison of The Air Quality in 2012

max. 1h mean values (max. stressed monitoring station)

(in parentheses: number of monitoring stations)

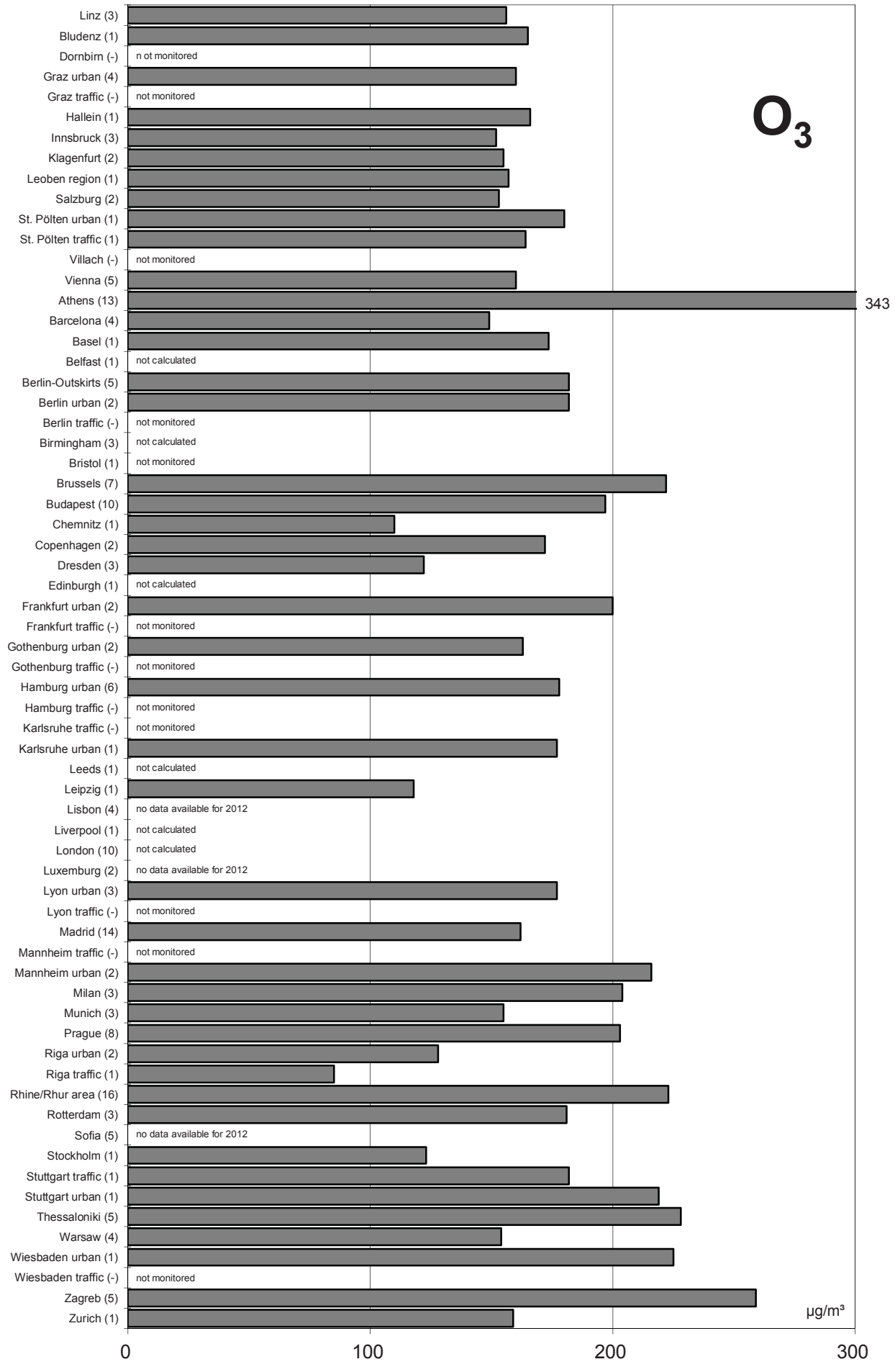


*) traffically influenced monitoring stations
**) no data

Comparison of The Air Quality in 2012

max. 1h mean values (max. stressed monitoring station)

(in parentheses: number of monitoring stations)



*) traffically influenced monitoring stations
**) no data

Jahresvergleich

1992 - 2012

Jahresmittelwerte

Comparison of The Air Quality Over The Years

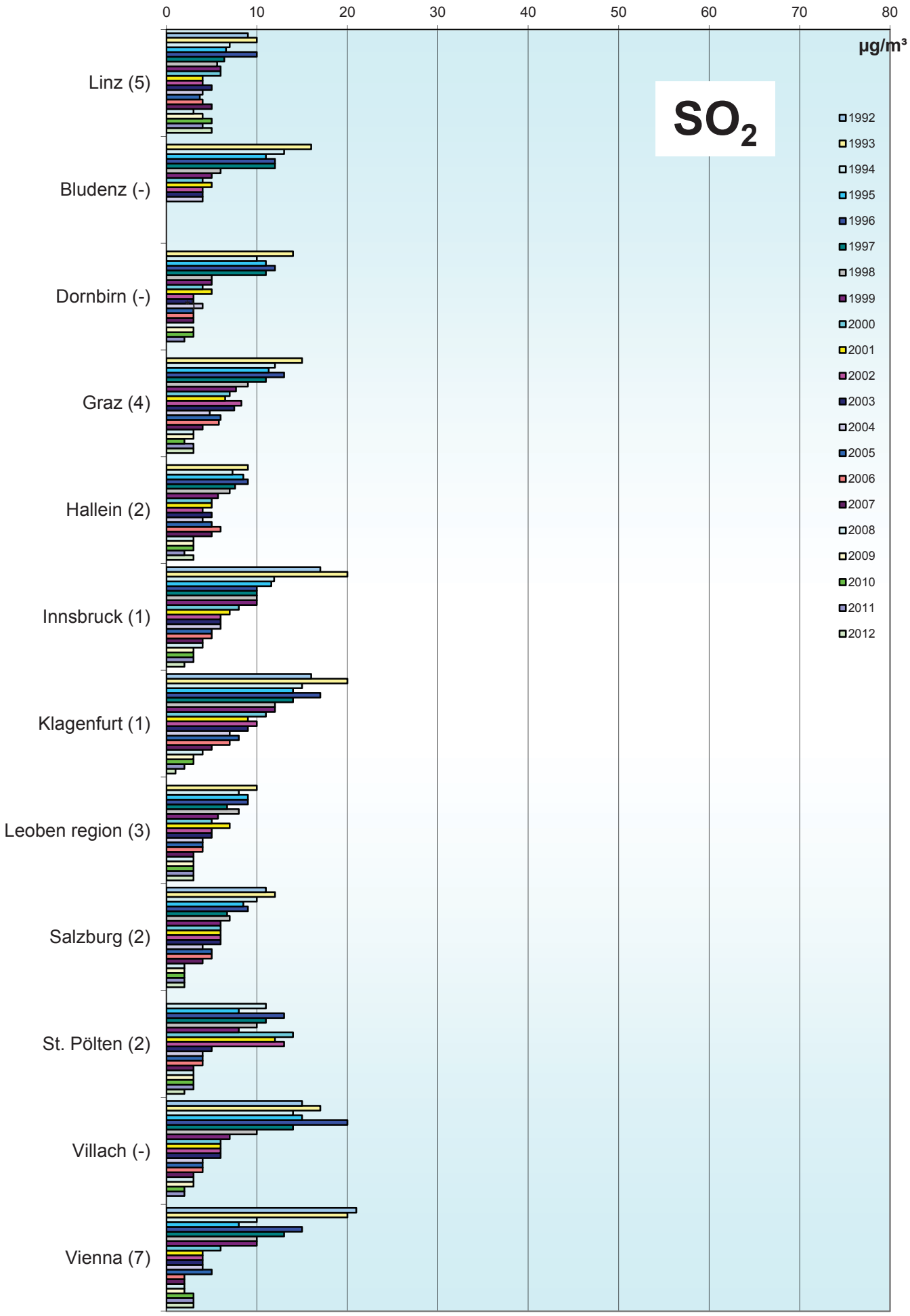
1992 - 2012

Annual Mean Values

Comparison of The Air Quality 1992 - 2012

Annual mean values (mean of all monitoring stations)

in parentheses: number of monitoring stations

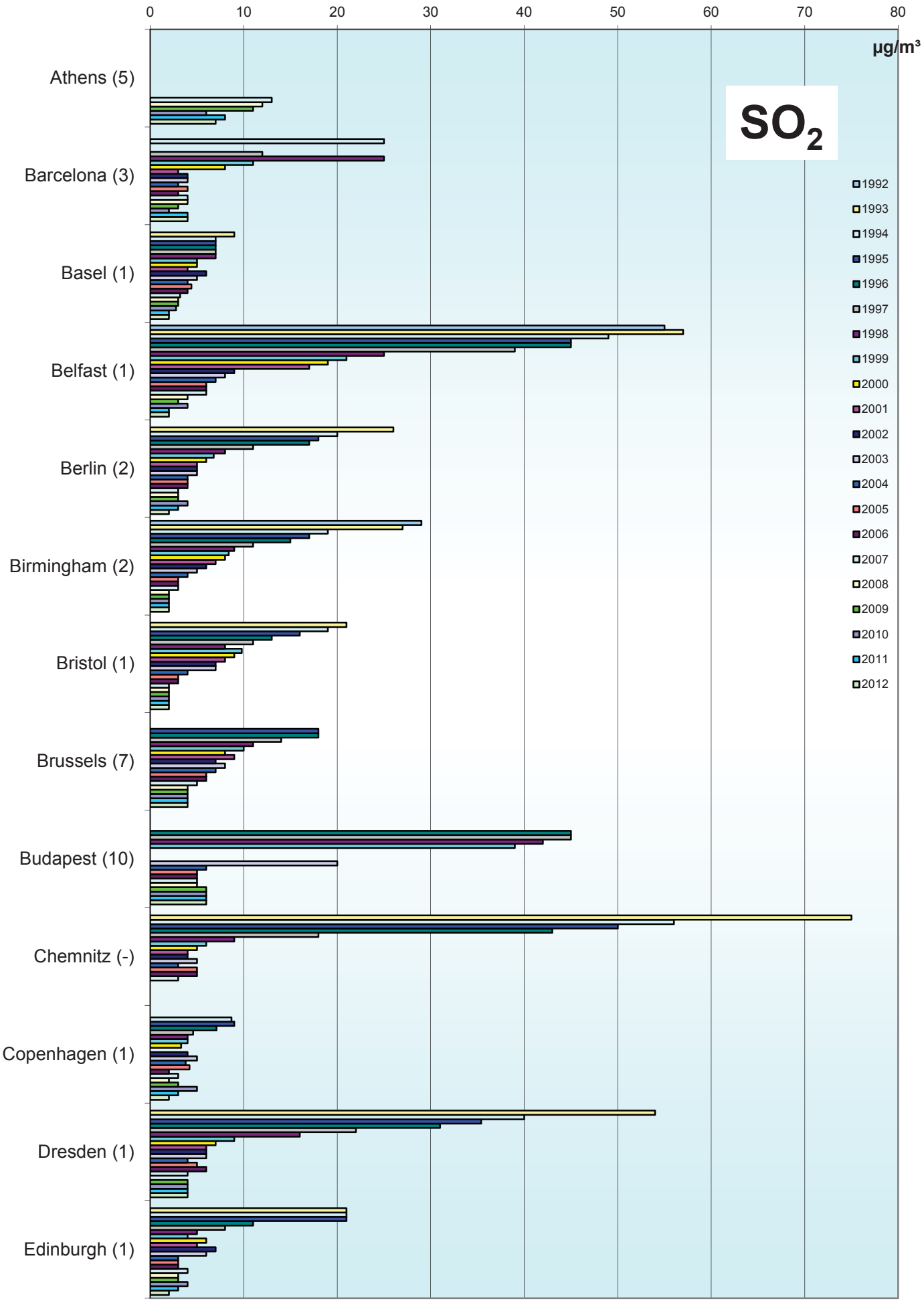


*) data of the year 2008 are not used for the comparison, because the street near the measurment point was closed for 11 months

Comparison of The Air Quality 1992 - 2012

Annual mean values (mean of all monitoring stations)

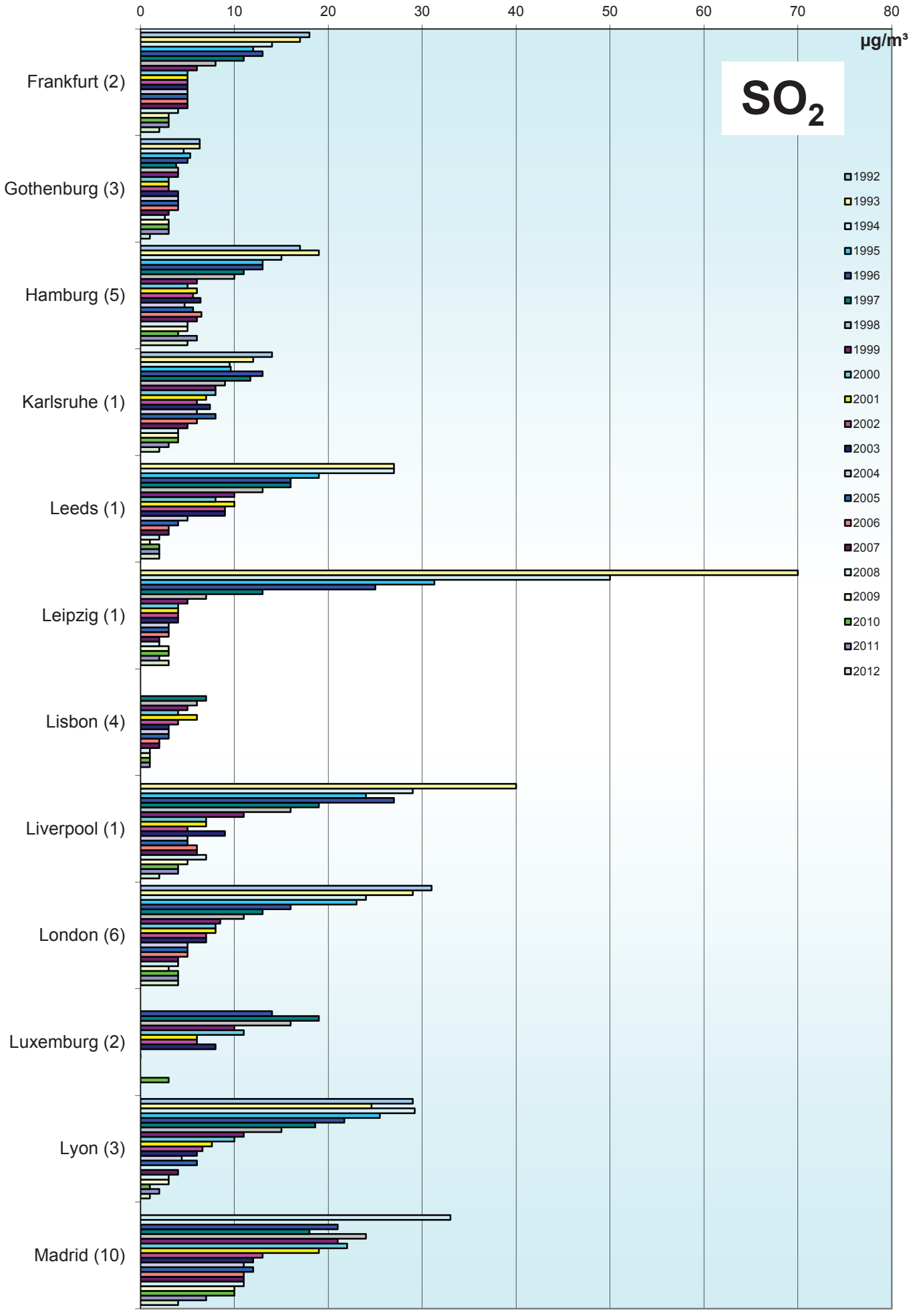
in parentheses: number of monitoring stations



Comparison of The Air Quality 1992 - 2012

Annual mean values (mean of all monitoring stations)

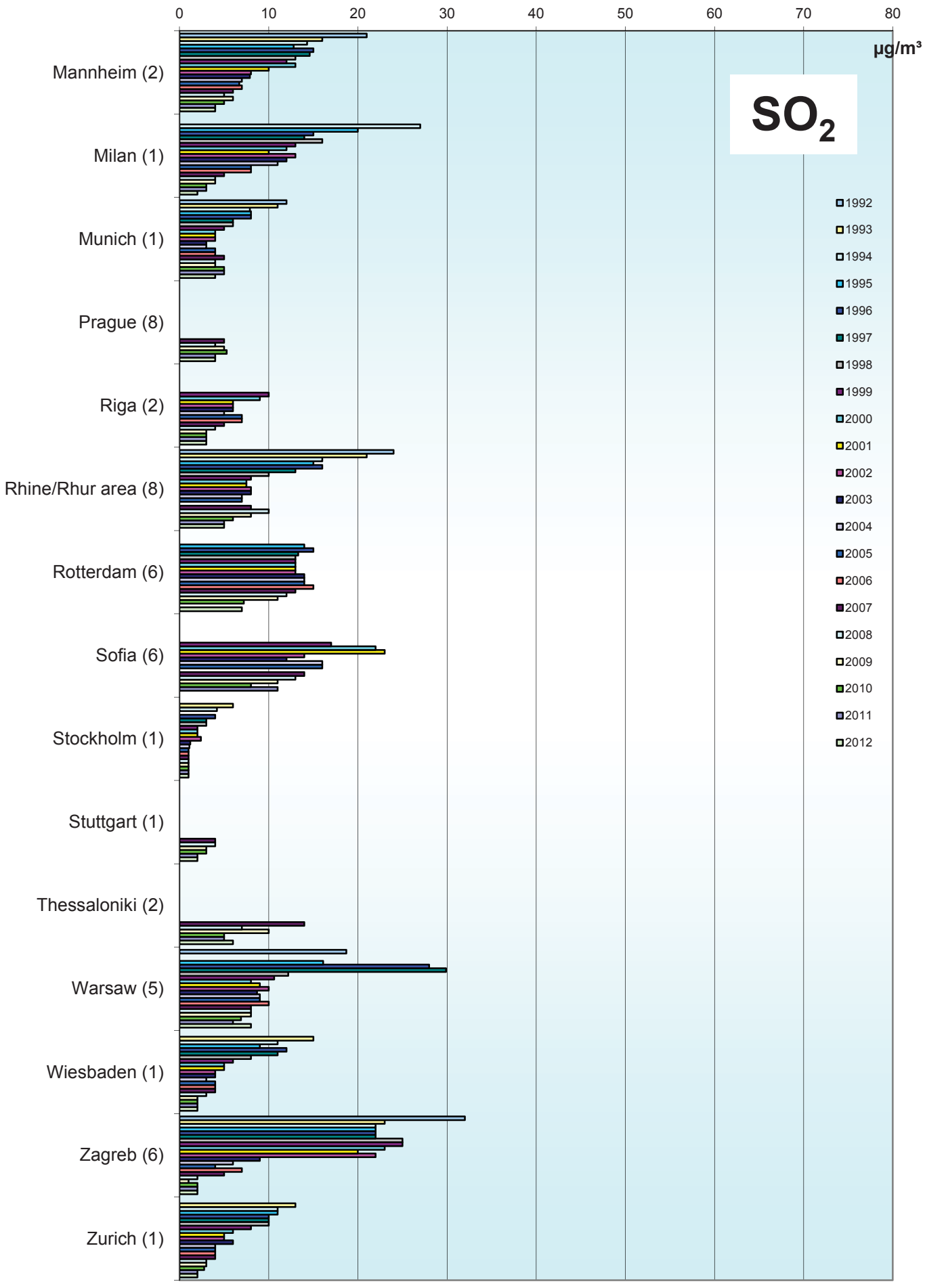
in parentheses: number of monitoring stations



Comparison of The Air Quality 1992 - 2012

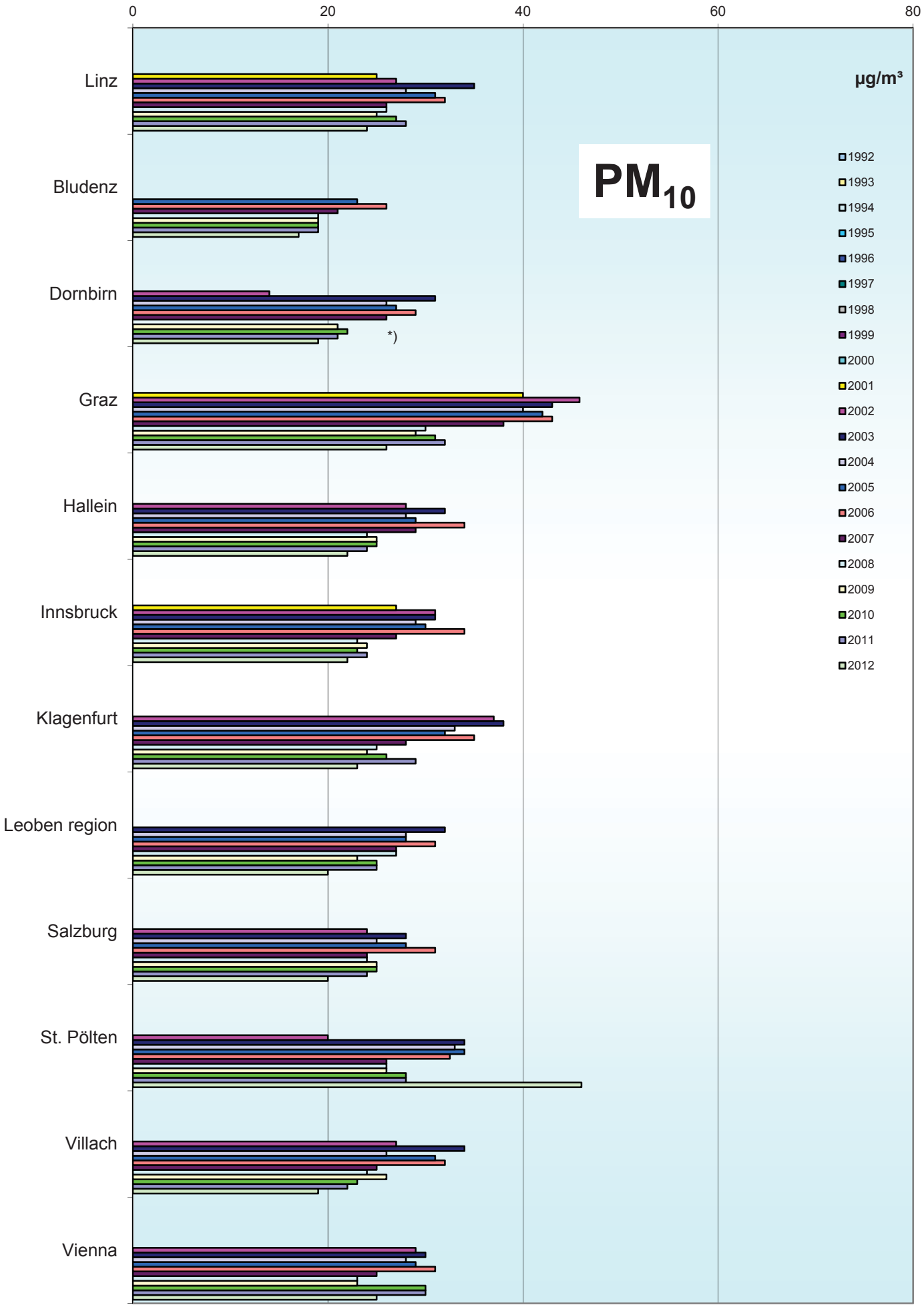
Annual mean values (mean of all monitoring stations)

in parentheses: number of monitoring stations



Comparison of The Air Quality 1992 - 2012

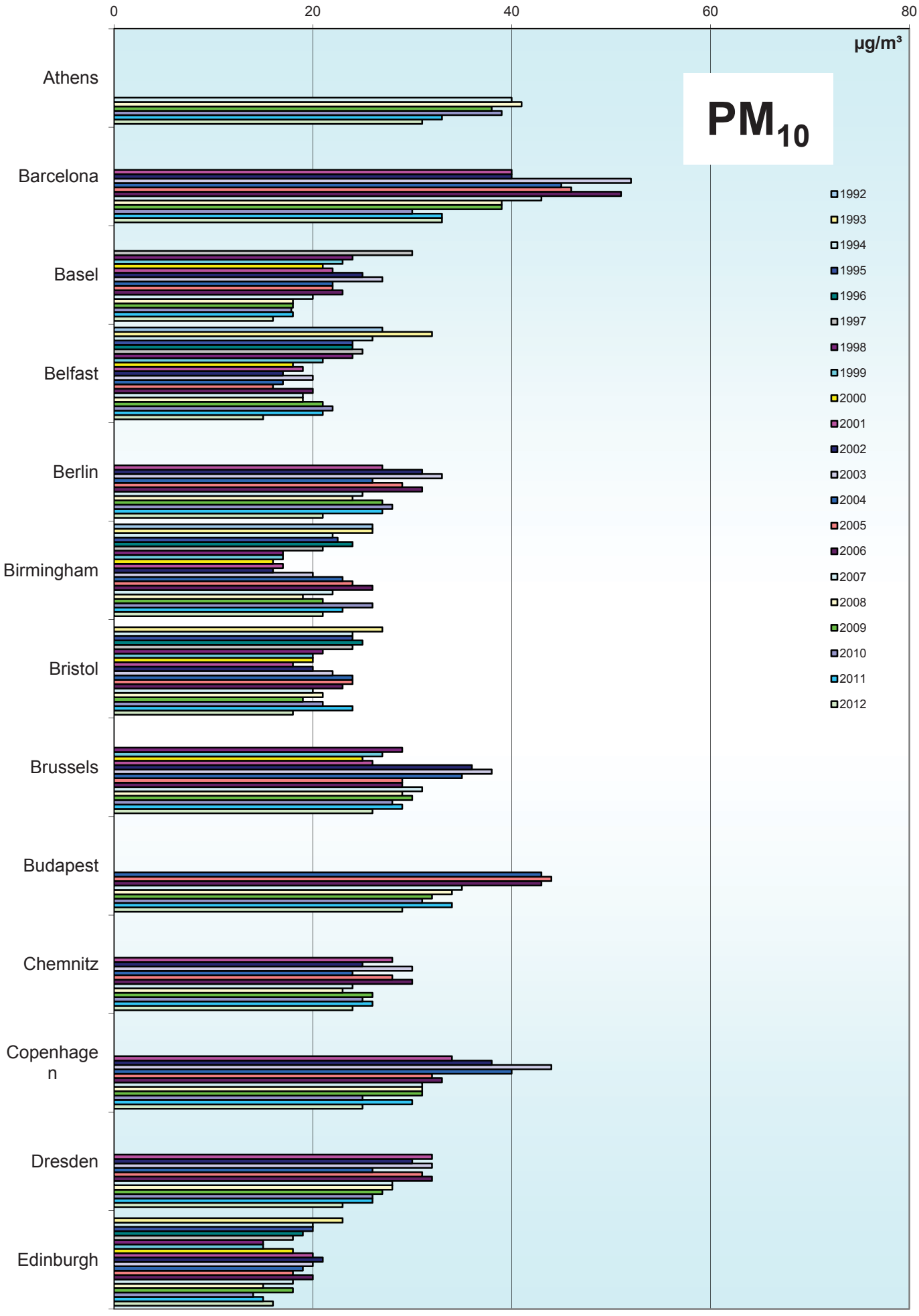
Annual mean values (mean of all monitoring stations)



*) data of the year 2008 are not used for the comparison, because the street near the measurment point was closed for 11 months

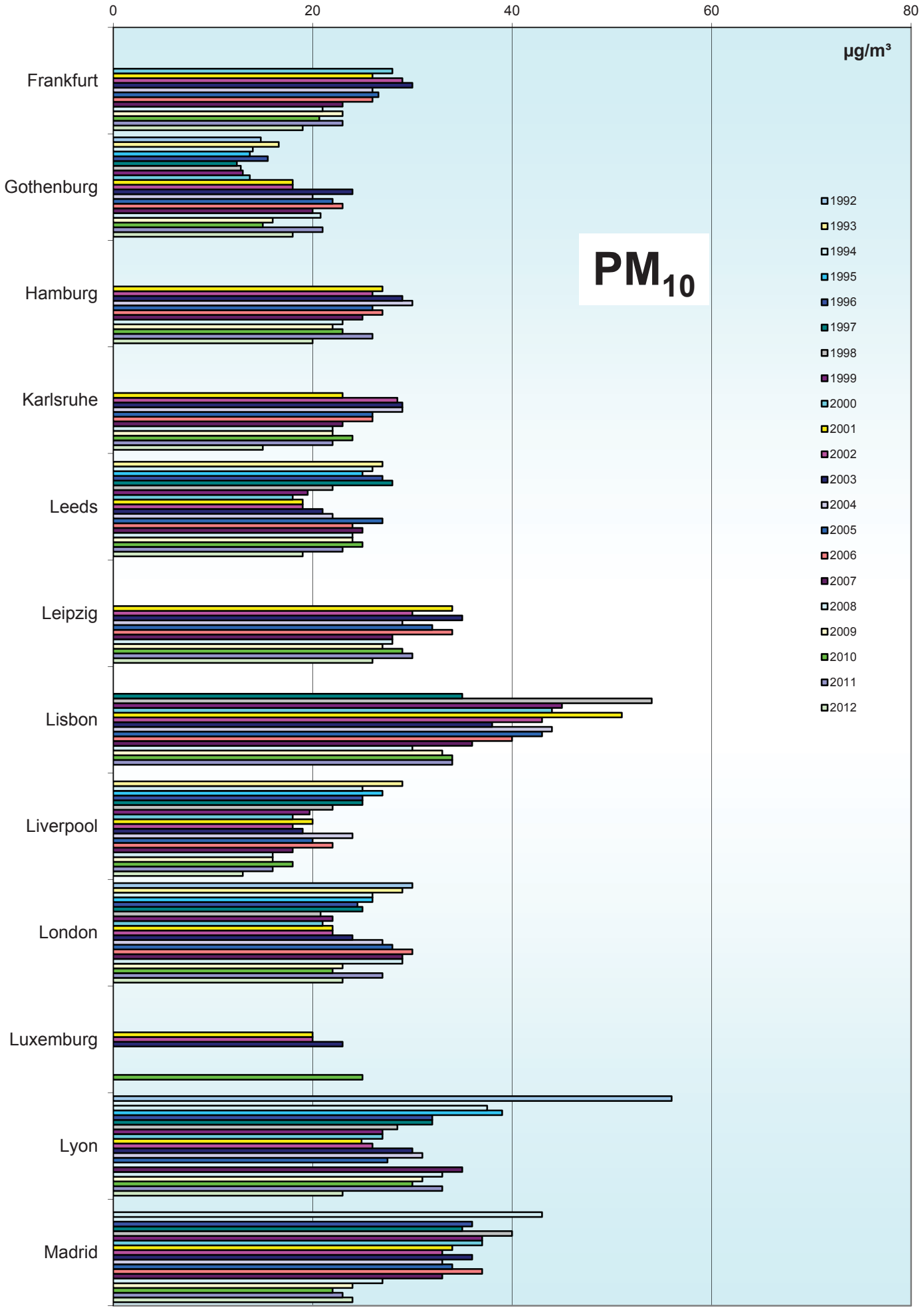
Comparison of The Air Quality 1992 - 2012

Annual mean values (mean of all monitoring stations)



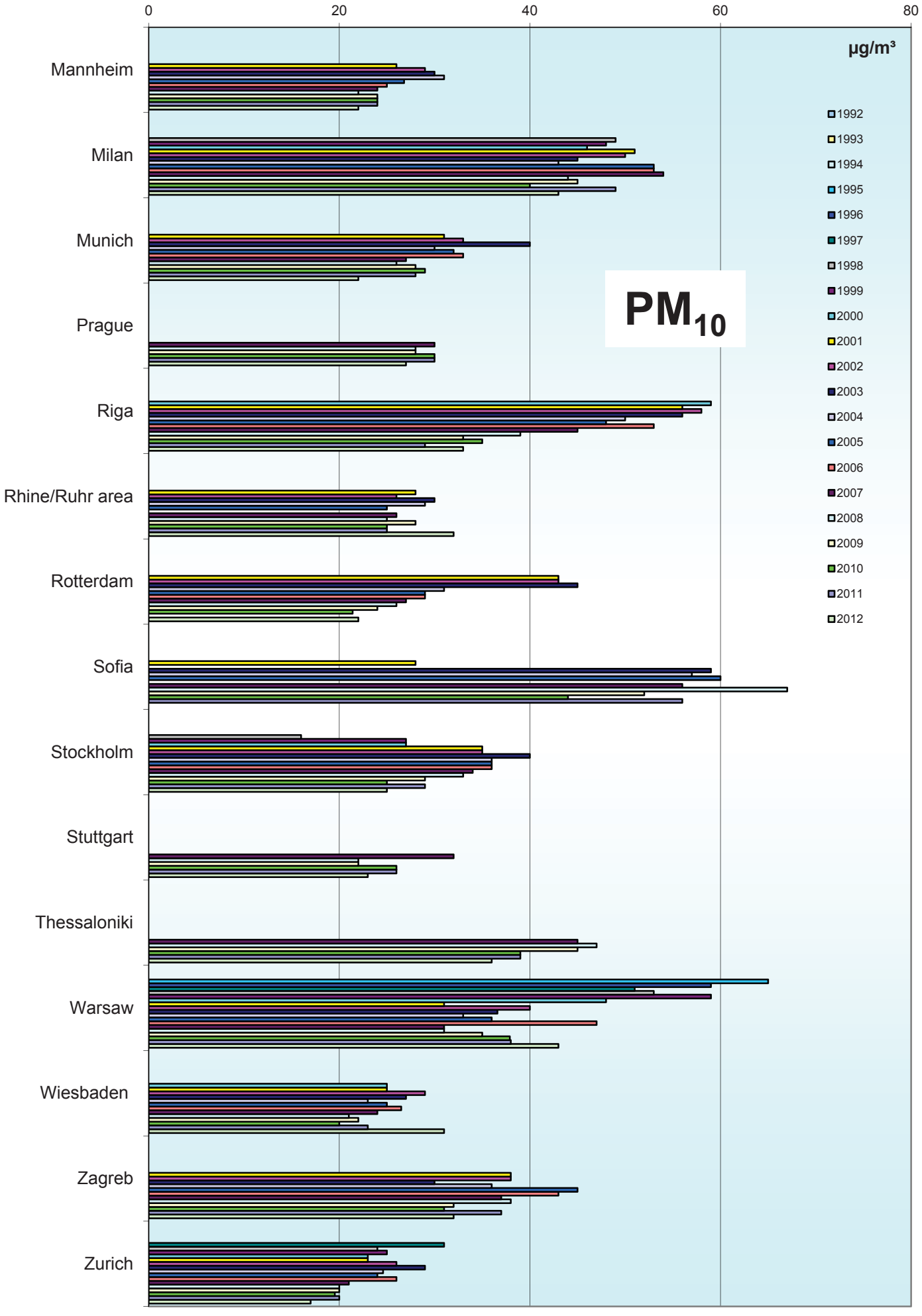
Comparison of The Air Quality 1992 - 2012

Annual mean values (mean of all monitoring stations)



Comparison of The Air Quality 1992 - 2012

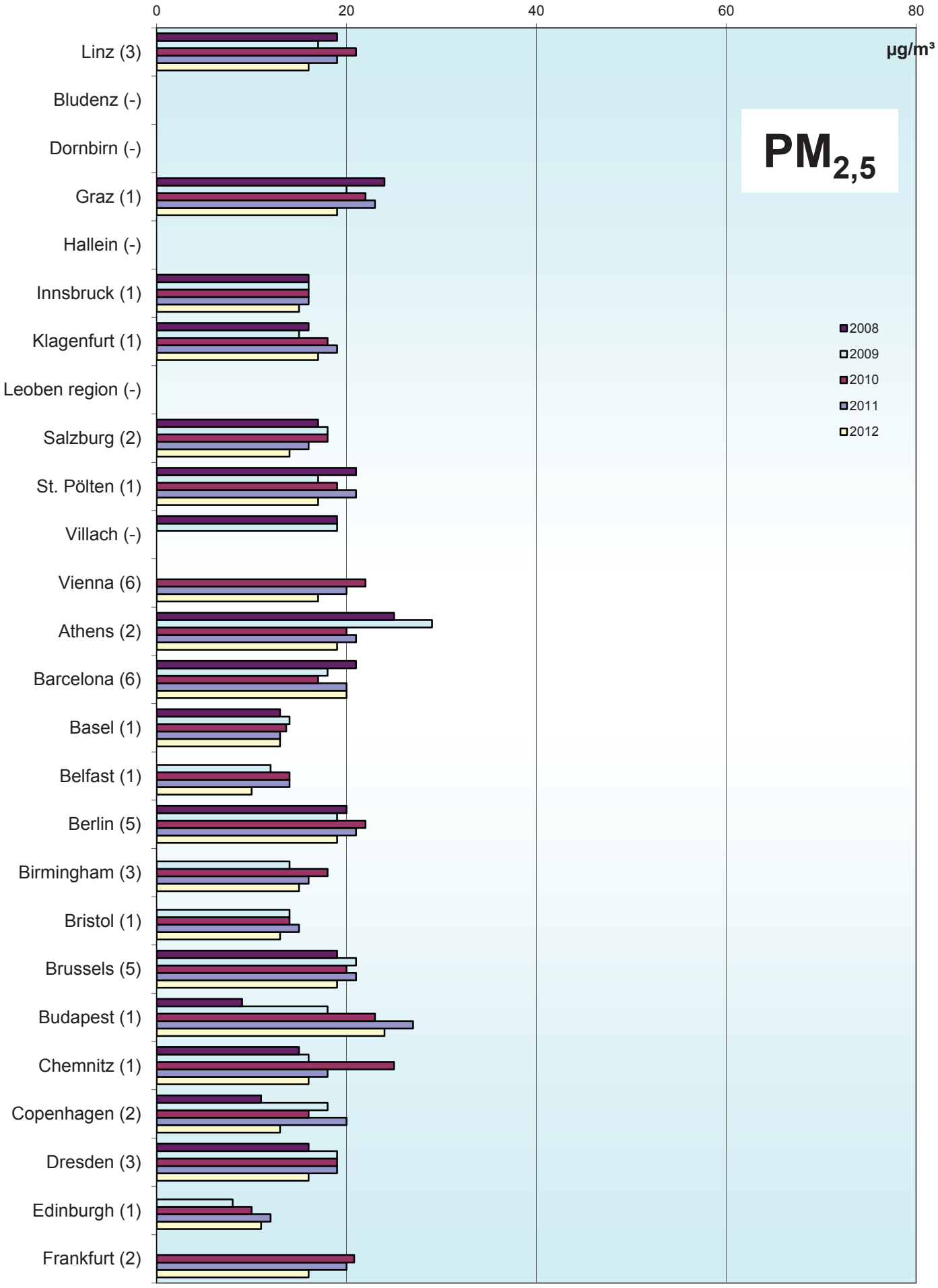
Annual mean values (mean of all monitoring stations)



Comparison of The Air Quality 2008 - 2012

Annual mean values (mean of all monitoring stations)

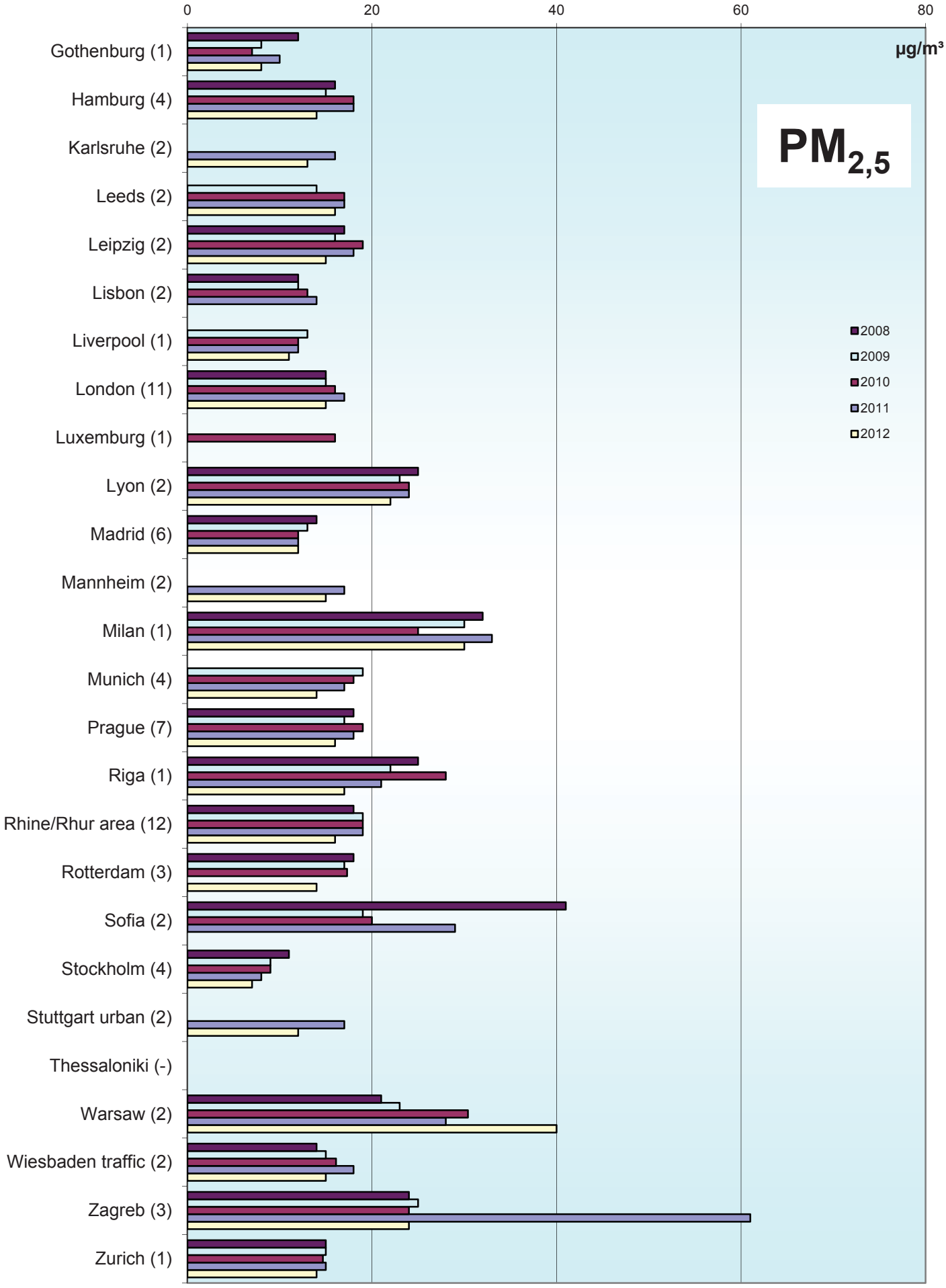
in parentheses: number of monitoring stations



Comparison of The Air Quality 2008 - 2012

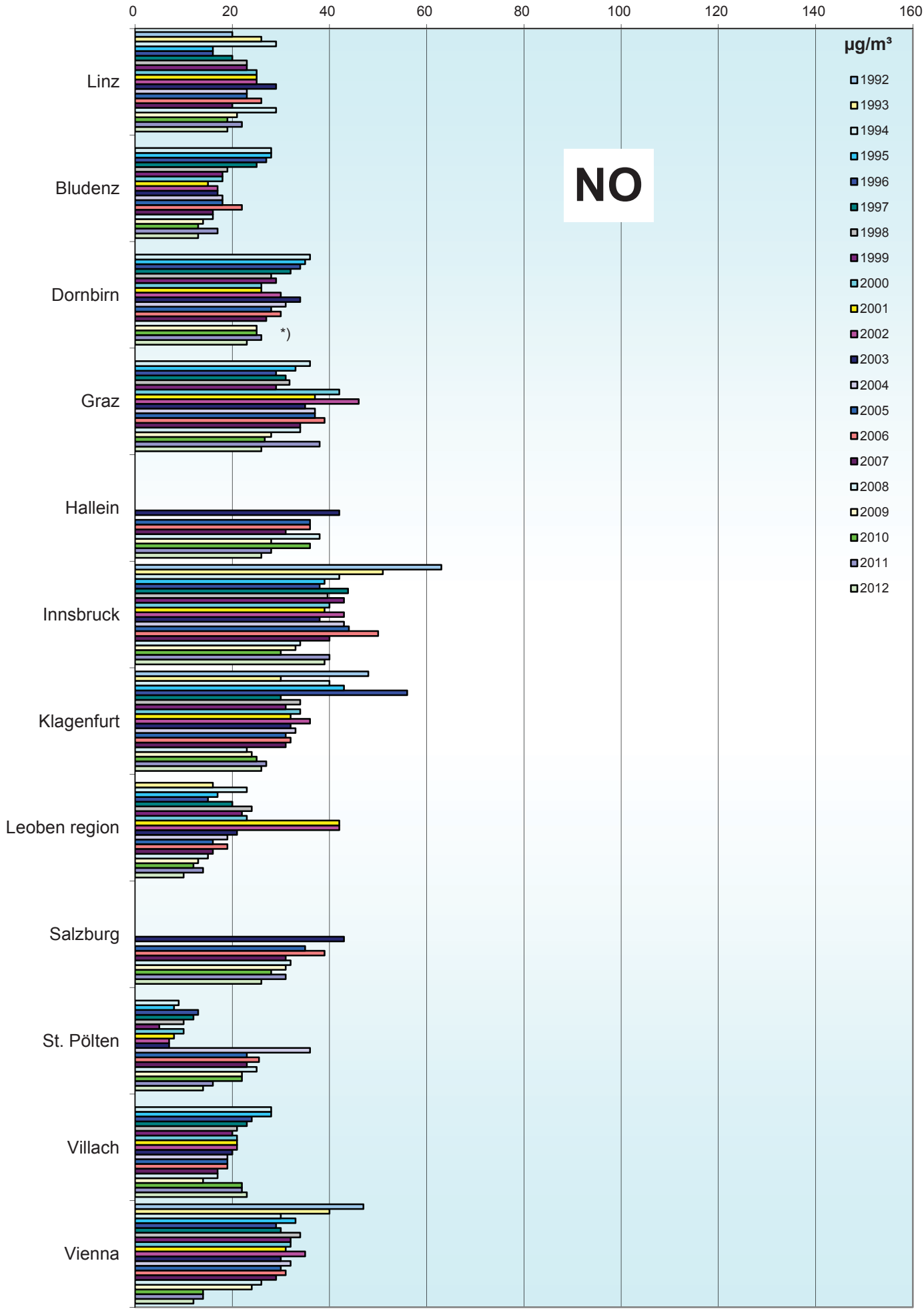
Annual mean values (mean of all monitoring stations)

in parentheses: number of monitoring stations



Comparison of The Air Quality 1992 - 2012

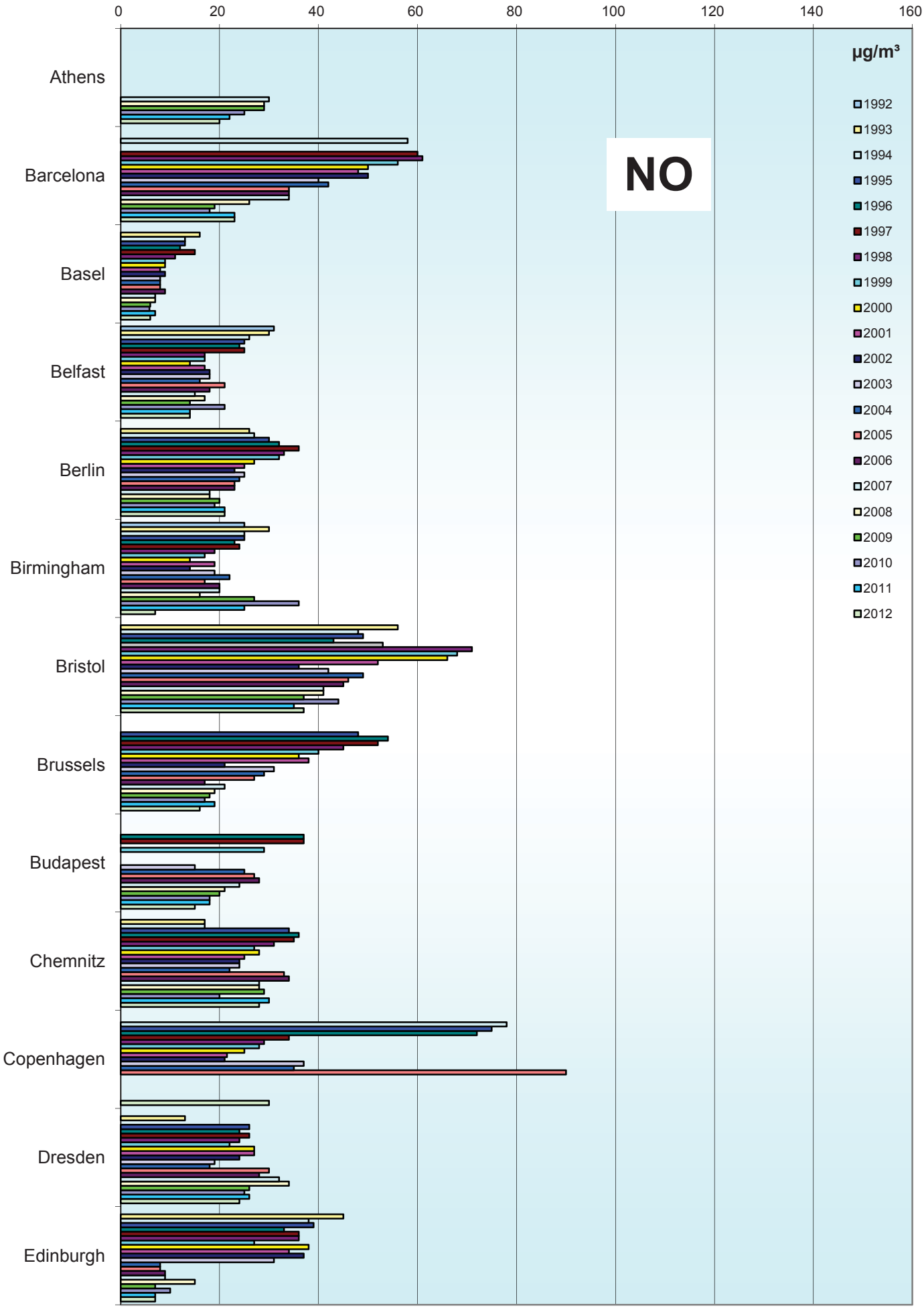
Annual mean values (mean of all monitoring stations)



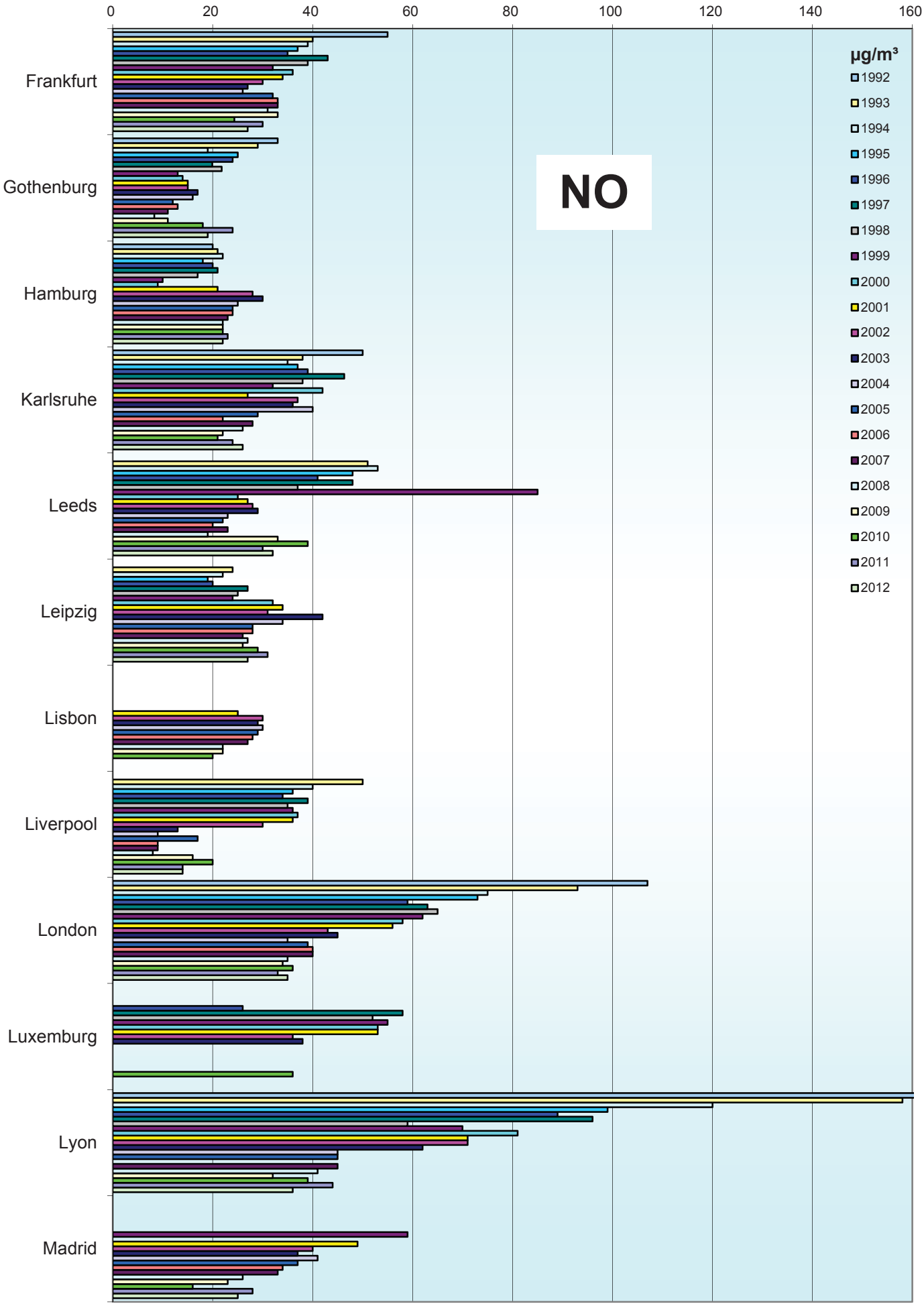
*) data of the year 2008 are not used for the comparison, because the street near the measurment point was closed for 11 months

Comparison of The Air Quality 1992 - 2012

Annual mean values (mean of all monitoring stations)

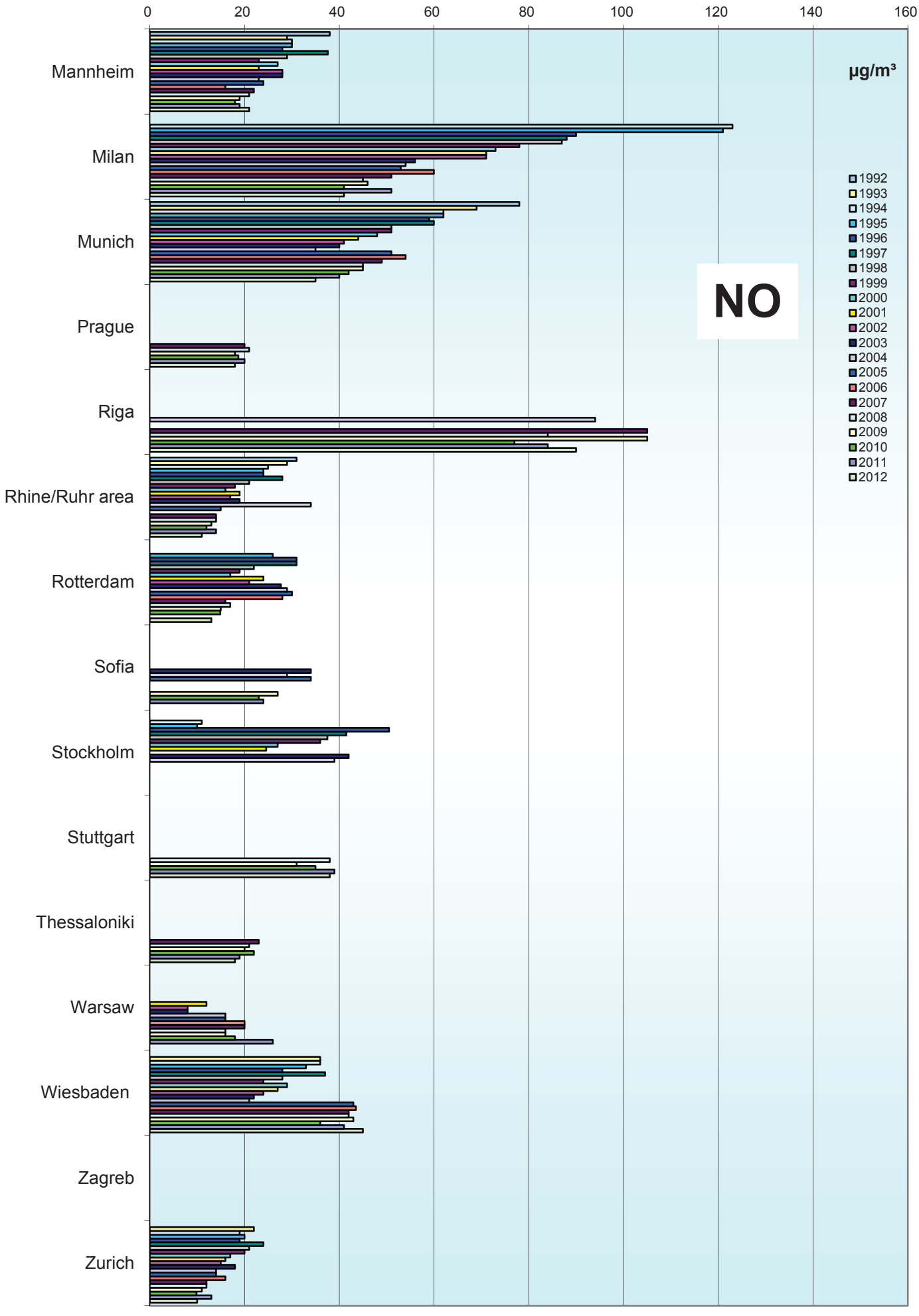


Comparison of The Air Quality 1992 - 2012
Annual mean values (mean of all monitoring stations)



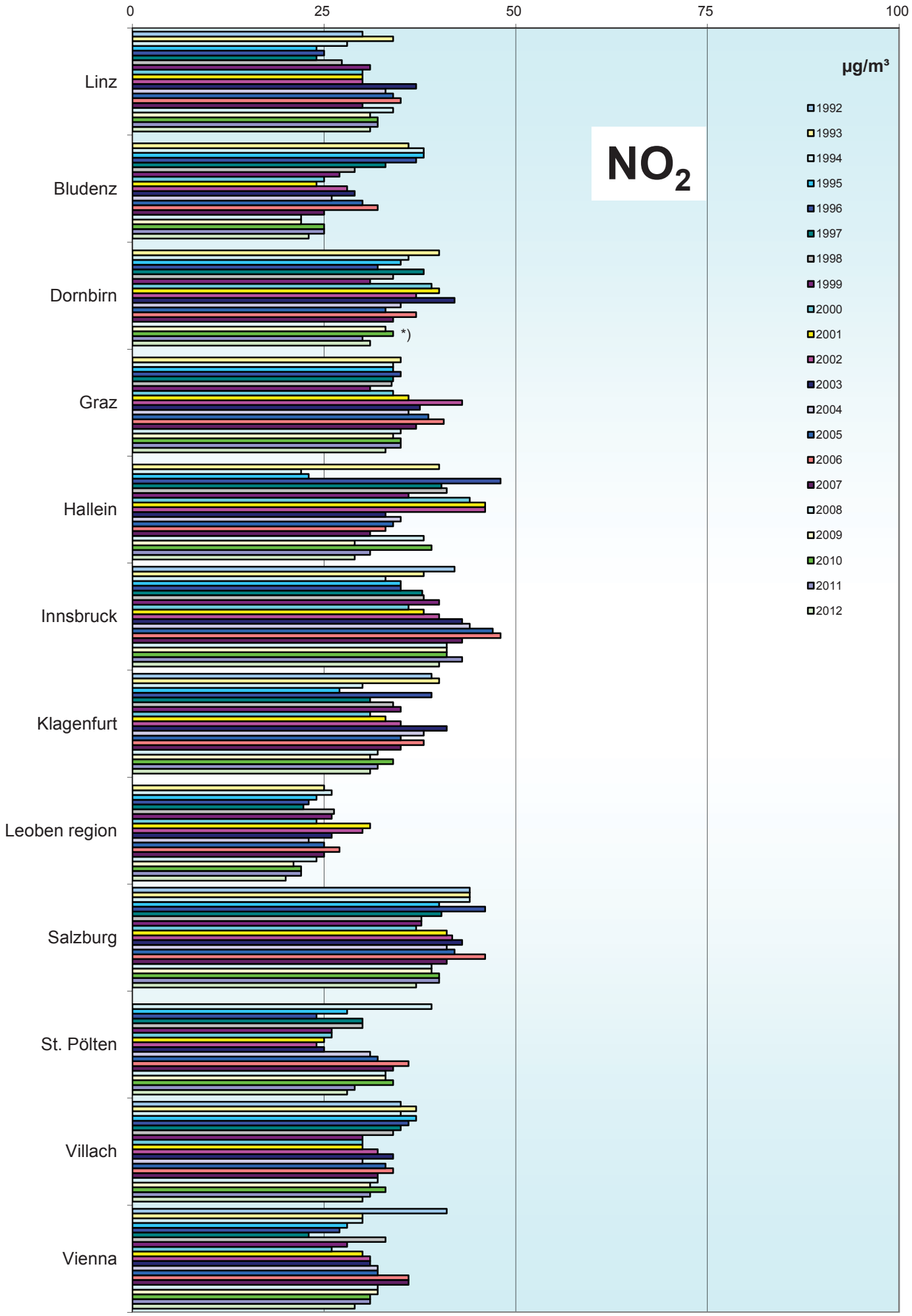
Comparison of The Air Quality 1992 - 2012

Annual mean values (mean of all monitoring stations)



Comparison of The Air Quality 1992 - 2012

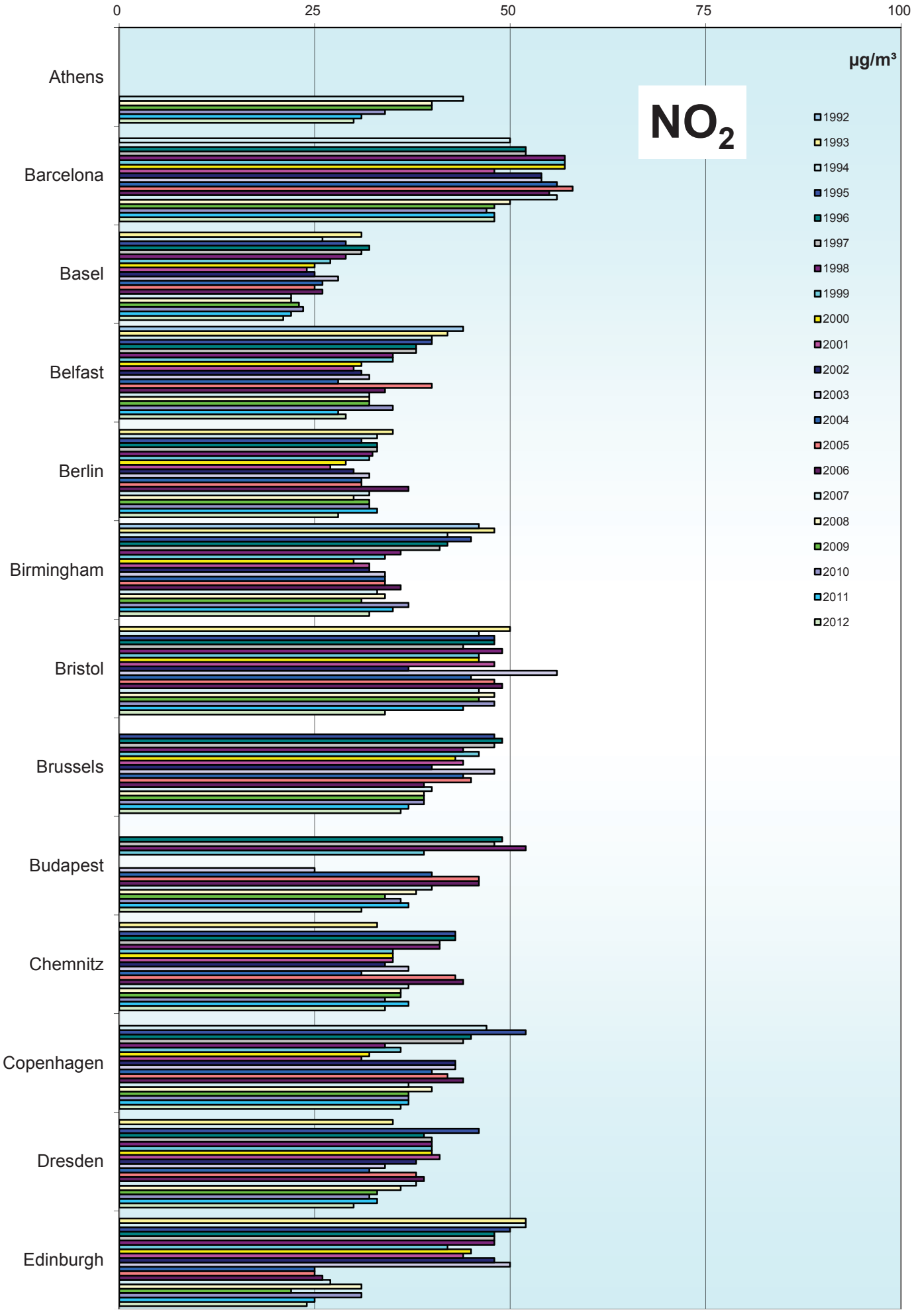
Annual mean values (mean of all monitoring stations)



*) data of the year 2008 are not used for the comparison, because the street near the measurment point was closed for 11 months

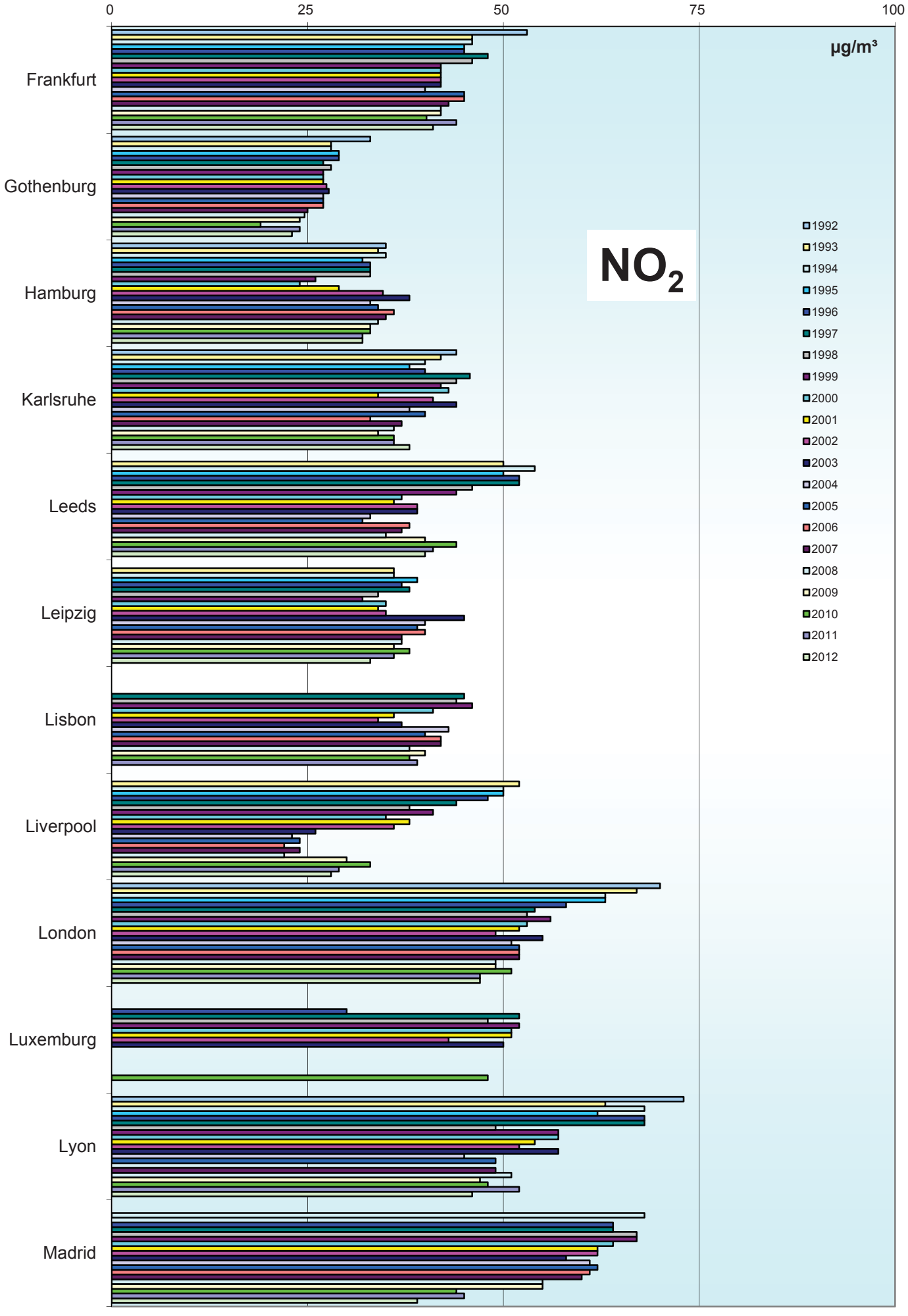
Comparison of The Air Quality 1992 - 2012

Annual mean values (mean of all monitoring stations)



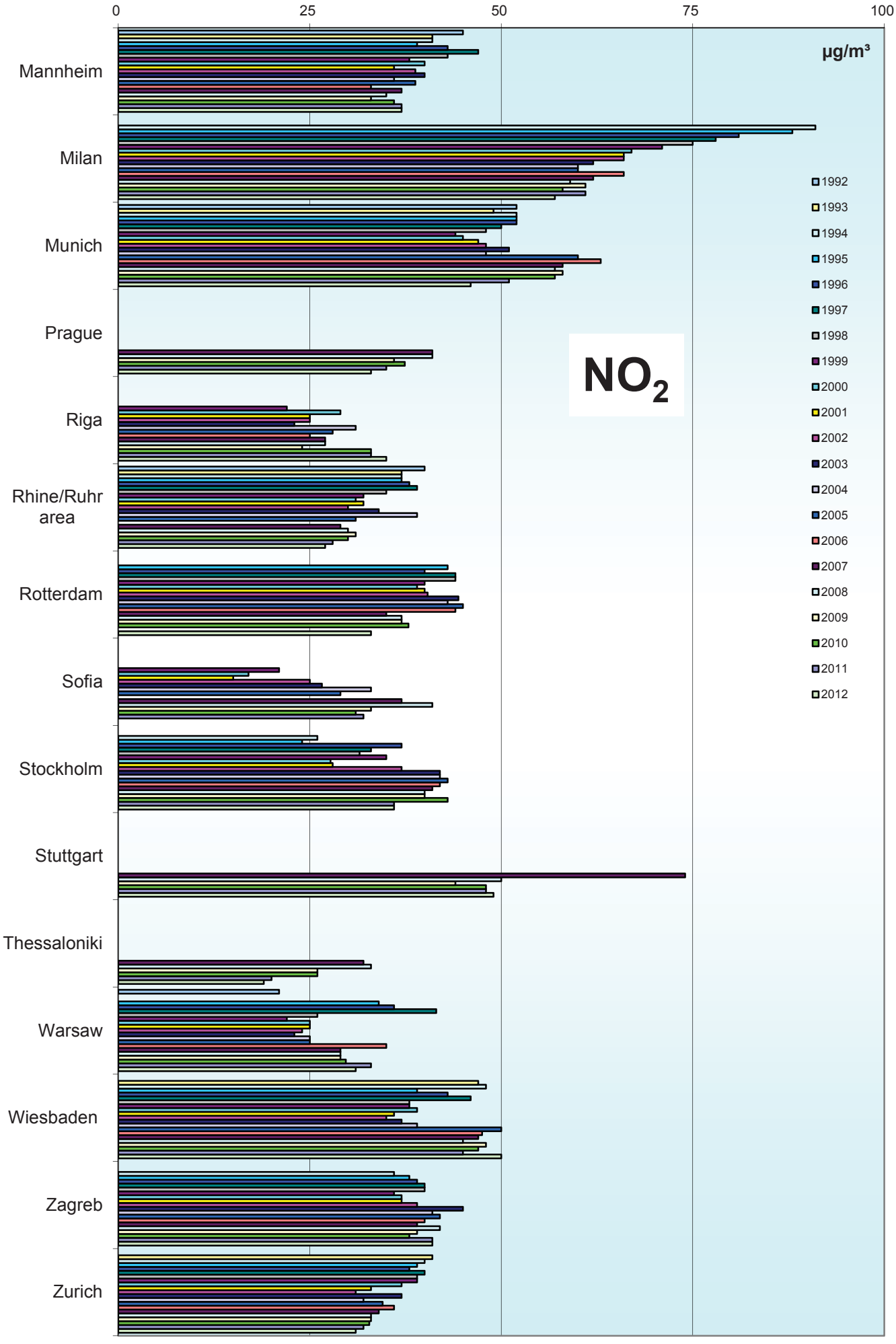
Comparison of The Air Quality 1992 - 2012

Annual mean values (mean of all monitoring stations)

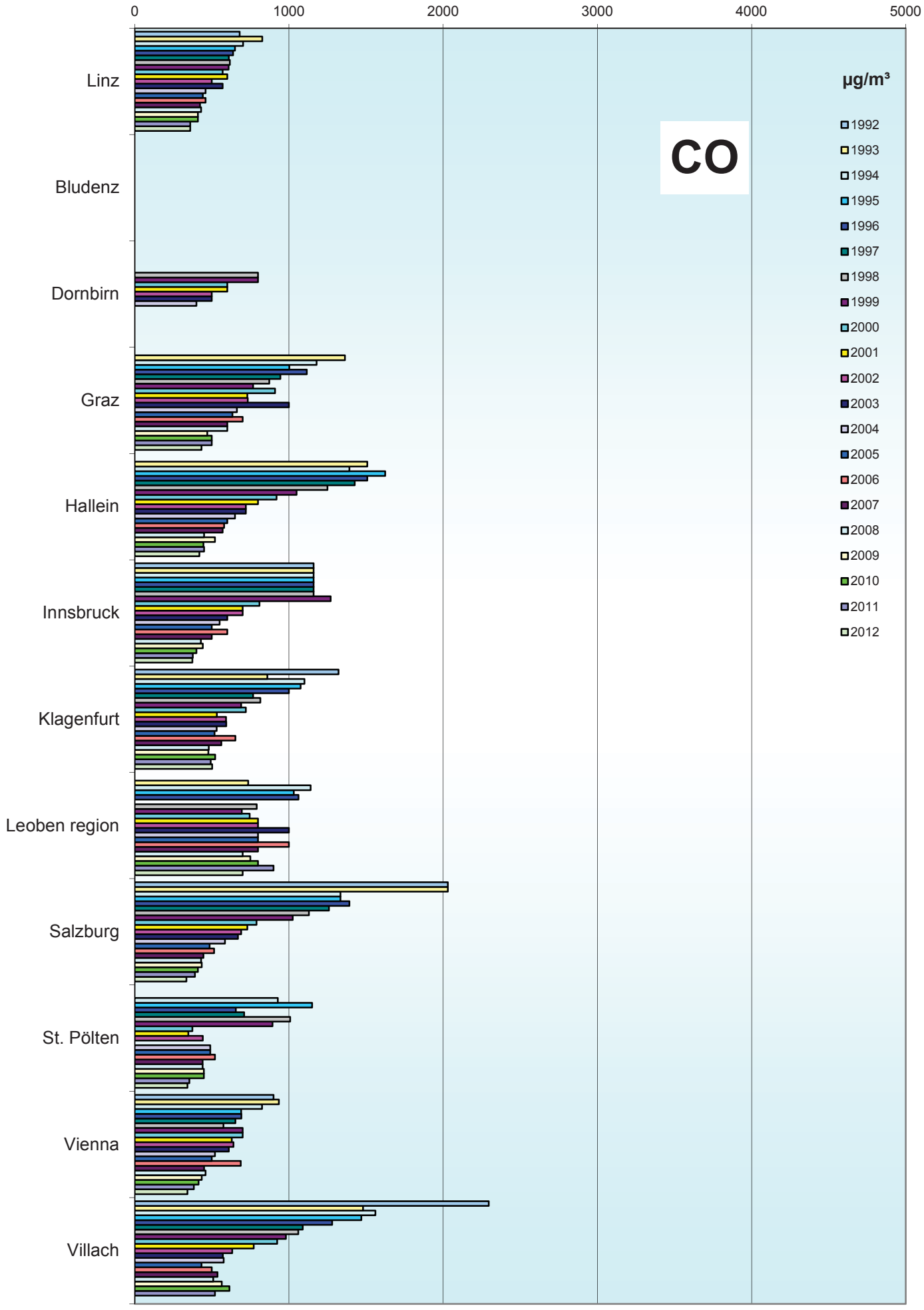


Comparison of The Air Quality 1992 - 2012

Annual mean values (mean of all monitoring stations)

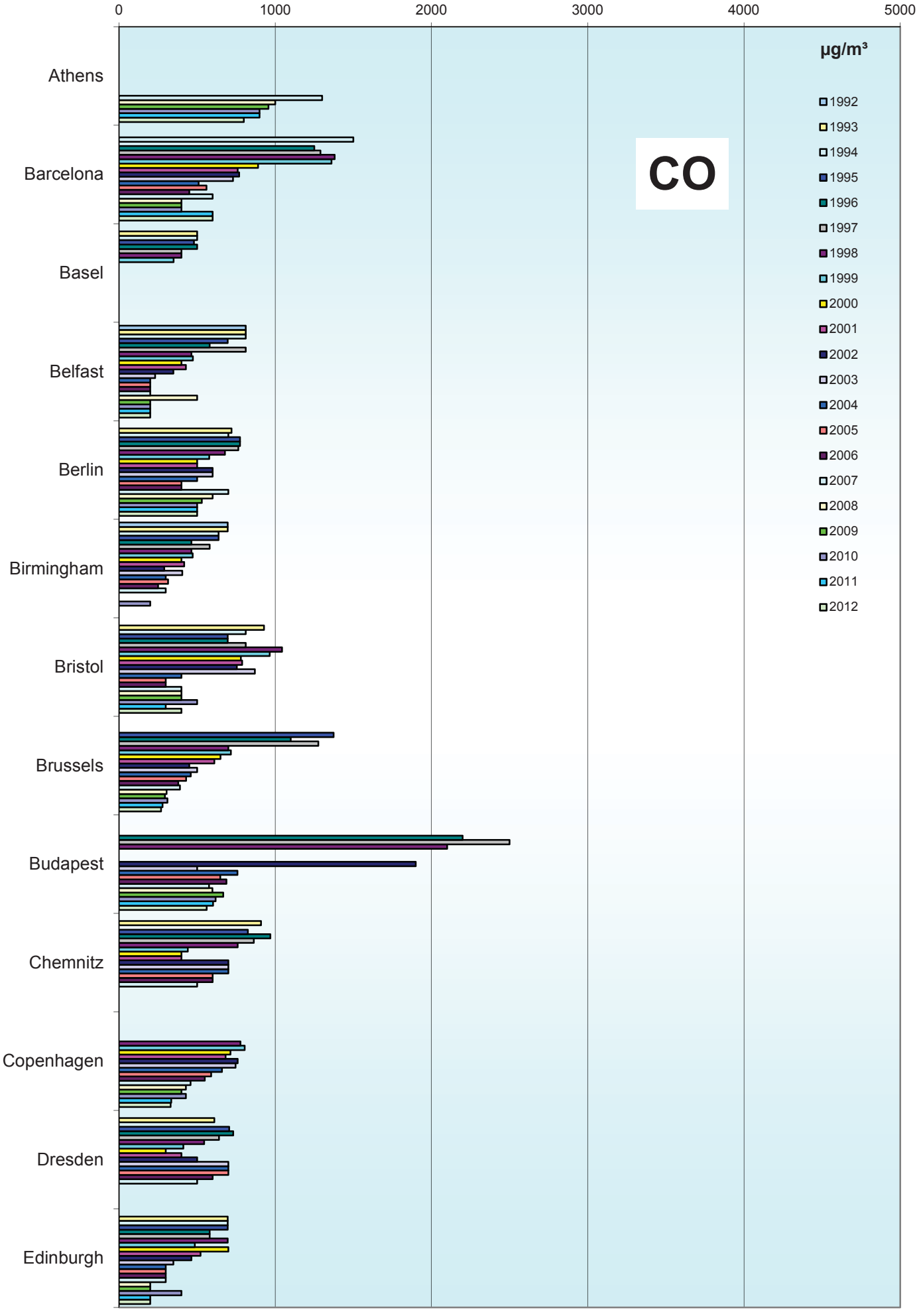


Comparison of The Air Quality 1992 - 2012
Annual mean values (mean of all monitoring stations)



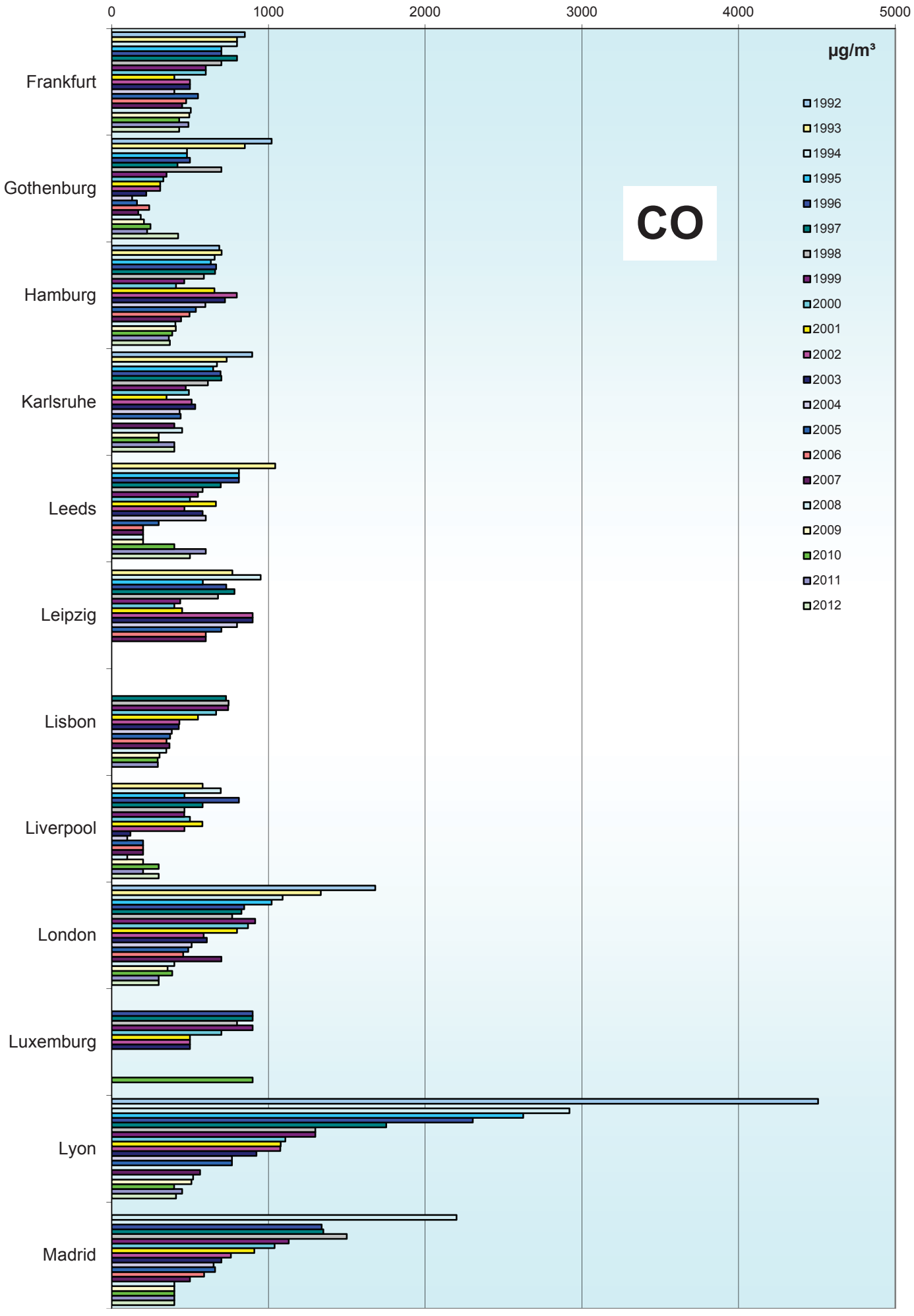
Comparison of The Air Quality 1992 - 2012

Annual mean values (mean of all monitoring stations)



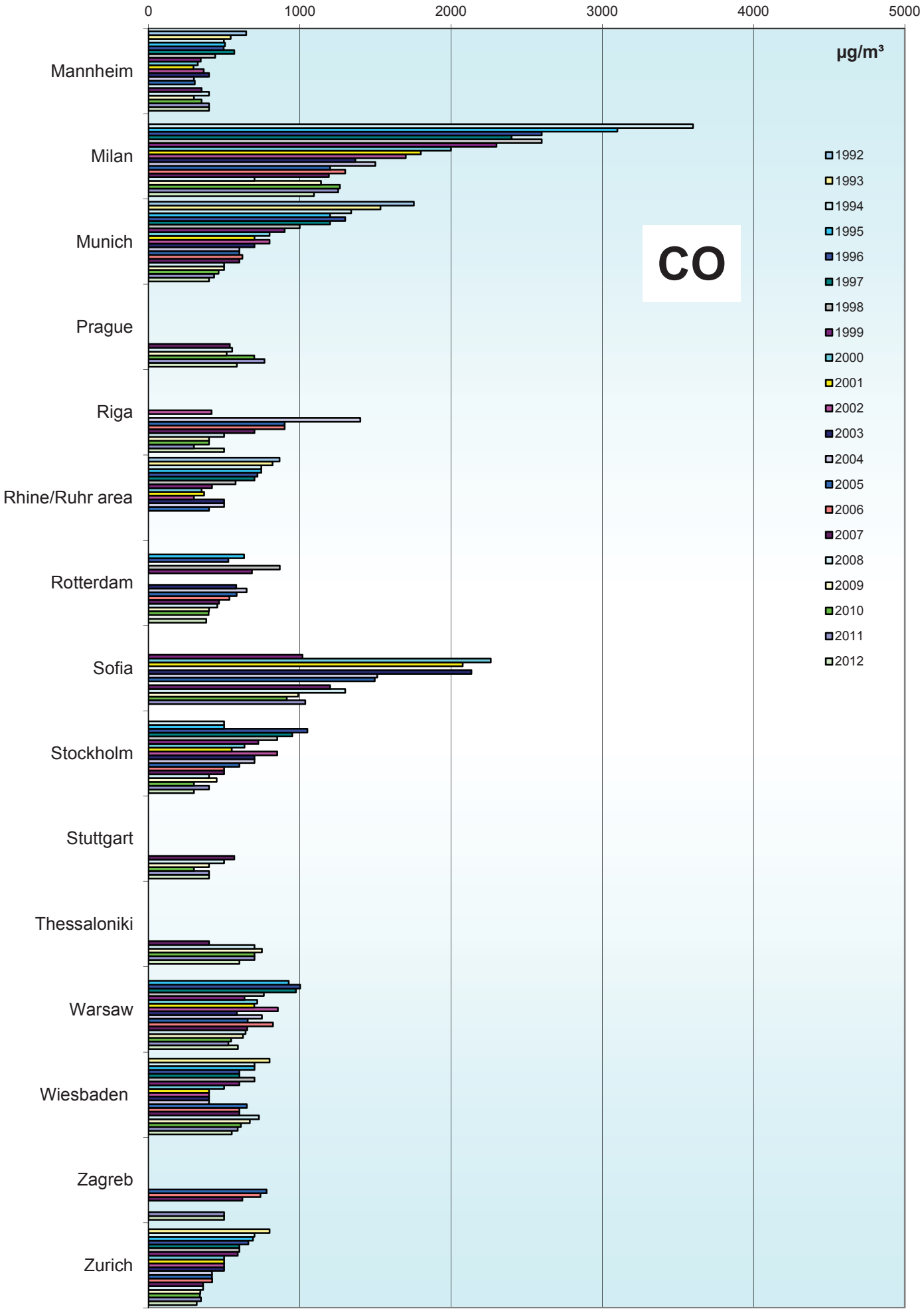
Comparison of The Air Quality 1992 - 2012

Annual mean values (mean of all monitoring stations)



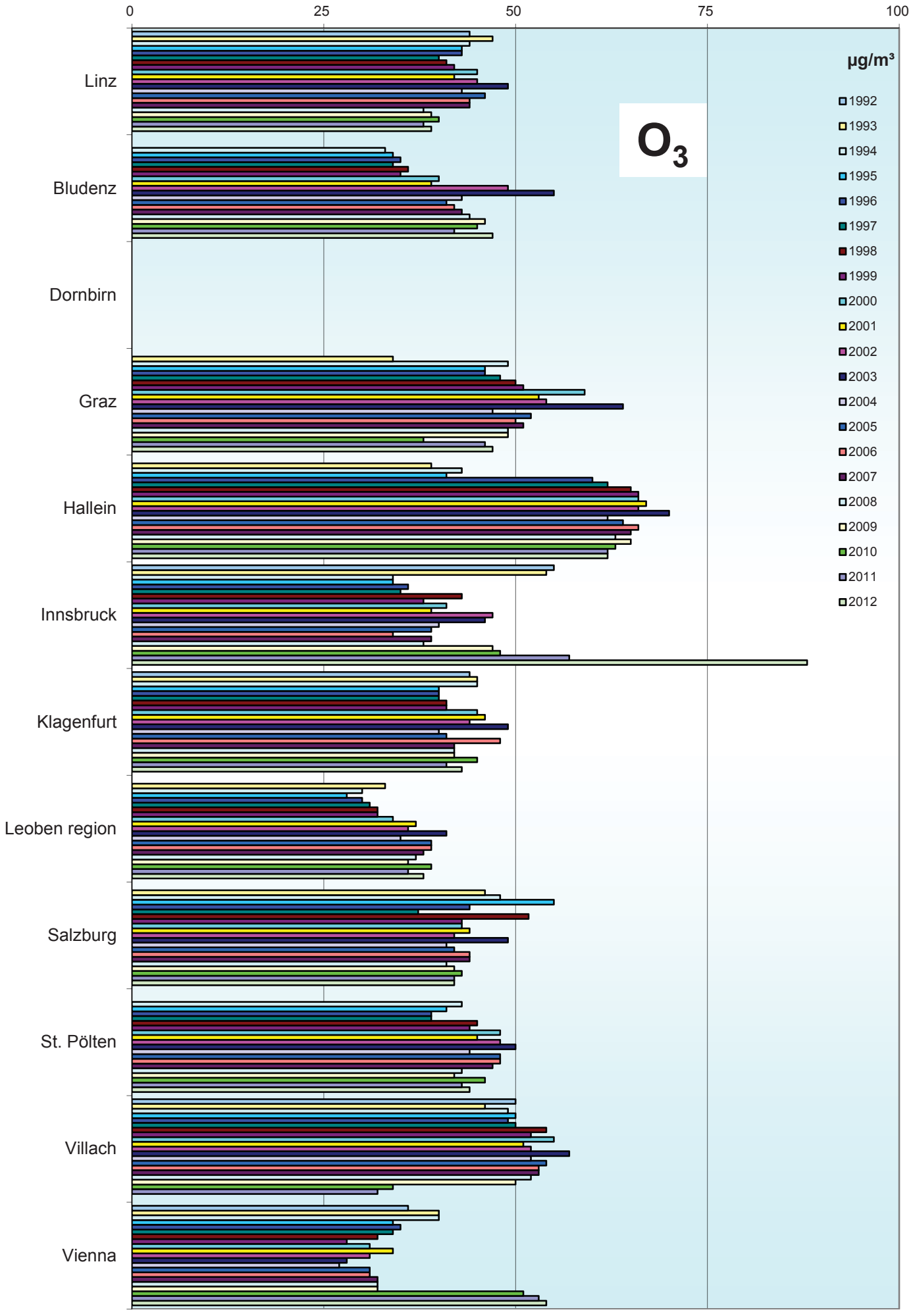
Comparison of The Air Quality 1992 - 2012

Annual mean values (mean of all monitoring stations)



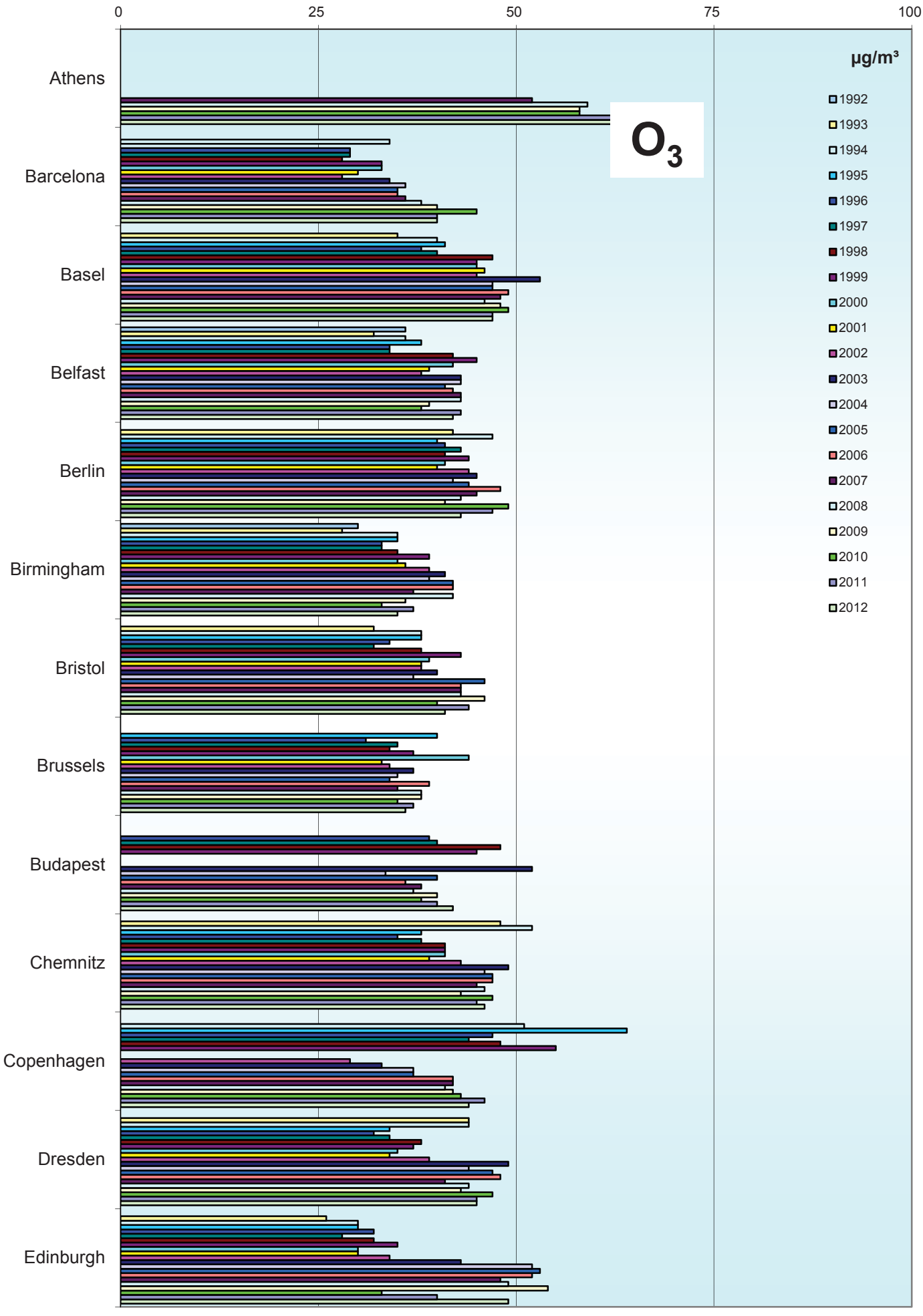
Comparison of The Air Quality 1992 - 2012

Annual mean values (mean of all monitoring stations)



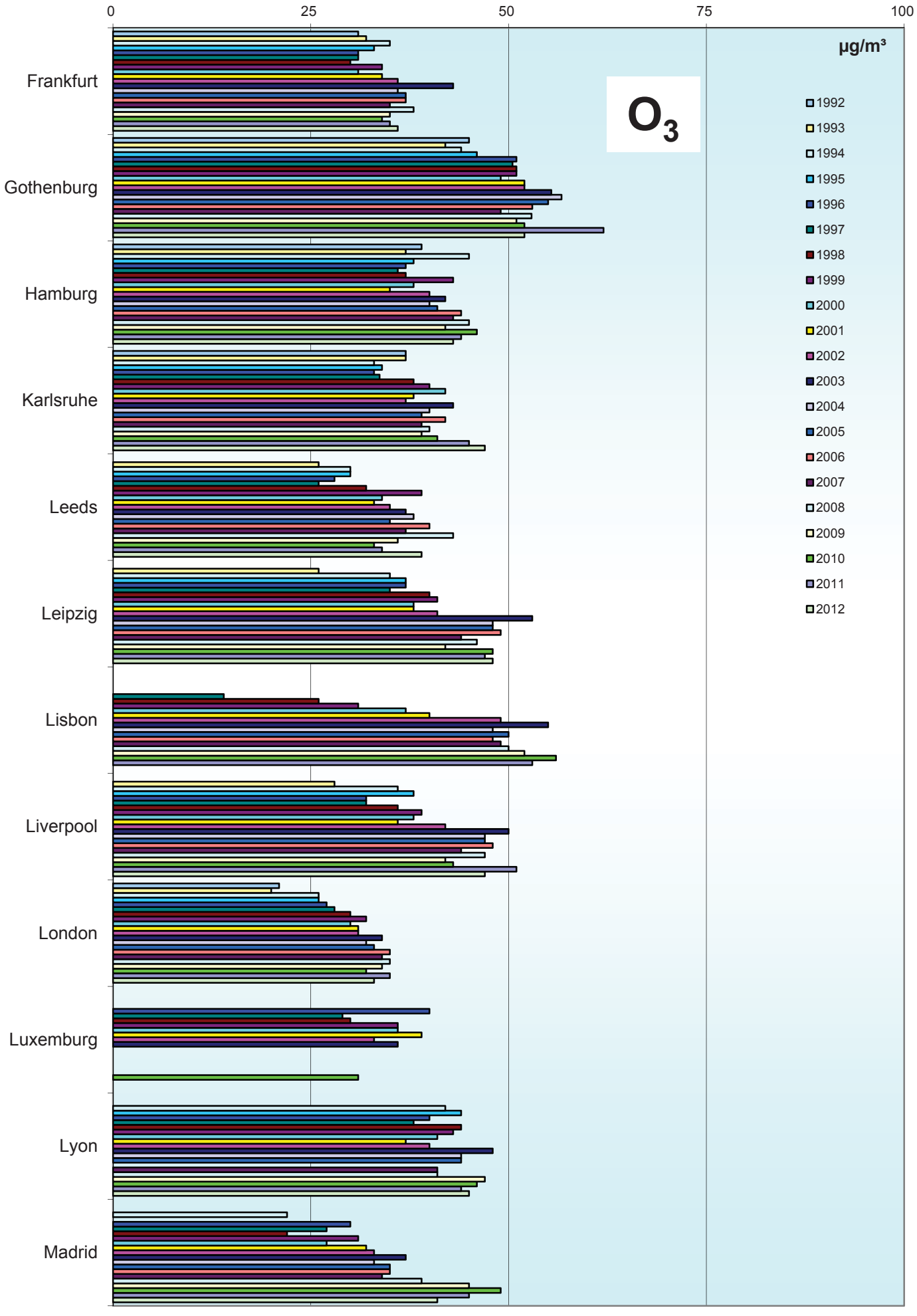
Comparison of The Air Quality 1992 - 2011

Annual mean values (mean of all monitoring stations)



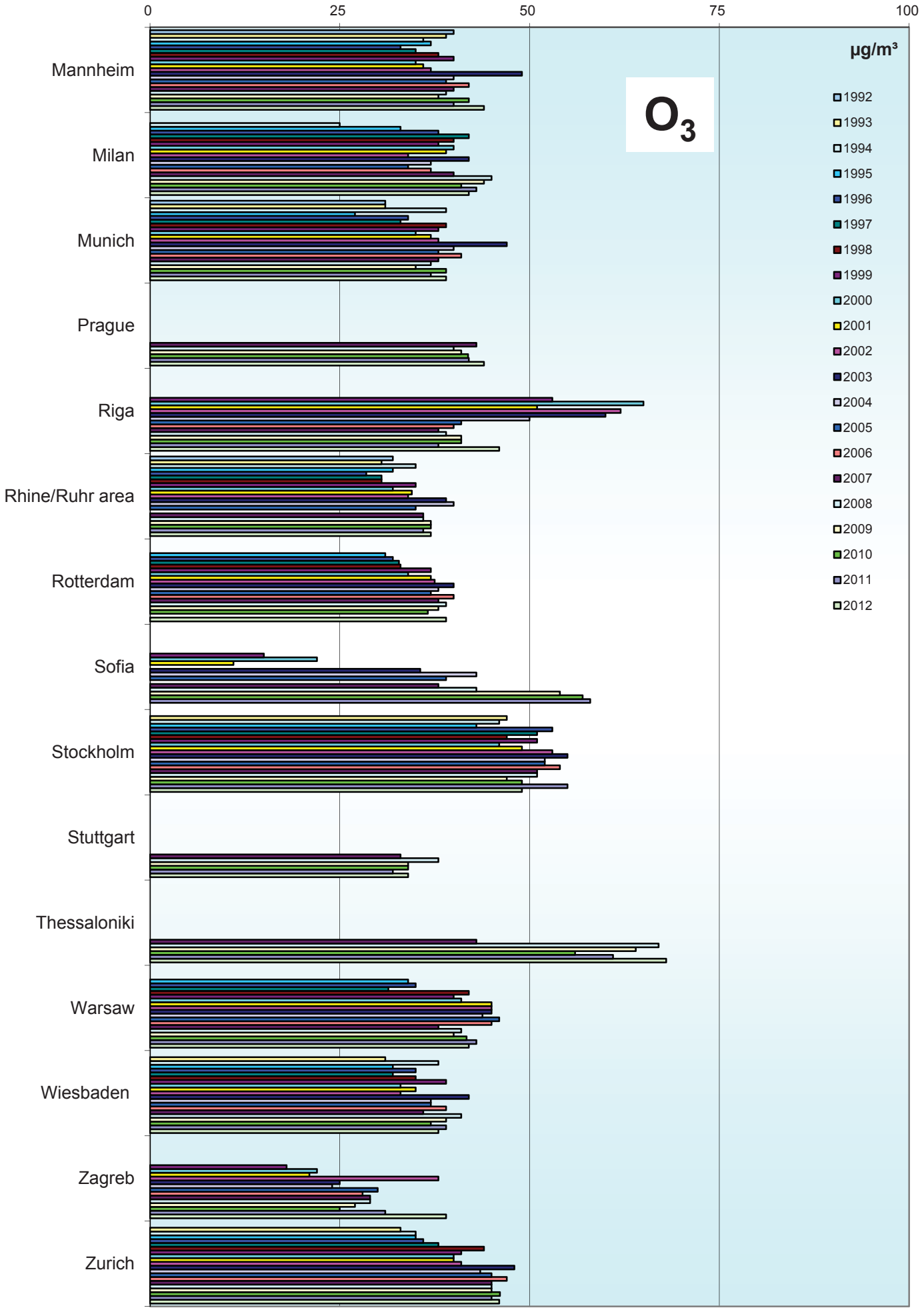
Comparison of The Air Quality 1992 - 2011

Annual mean values (mean of all monitoring stations)



Comparison of The Air Quality 1992 - 2011

Annual mean values (mean of all monitoring stations)



Jahresvergleich

1992 - 2012

max. Tagesmittelwerte

Comparison of The Air Quality Over The Years

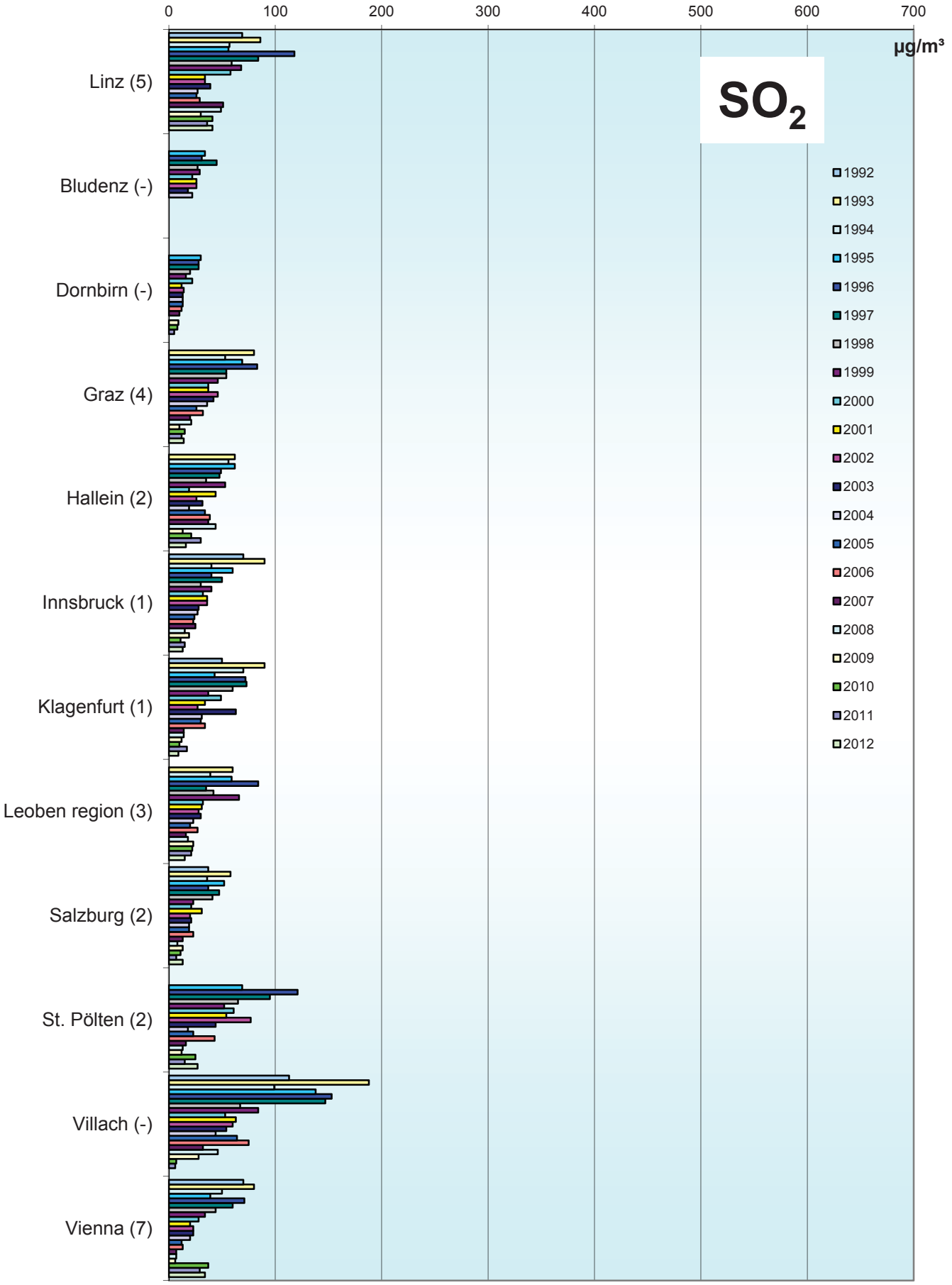
1992 - 2012

Max. Daily Mean Values

Comparison of The Air Quality 1992 - 2012

max. daily mean values (peak-stressed monitoring station)

in parentheses: number of monitoring stations

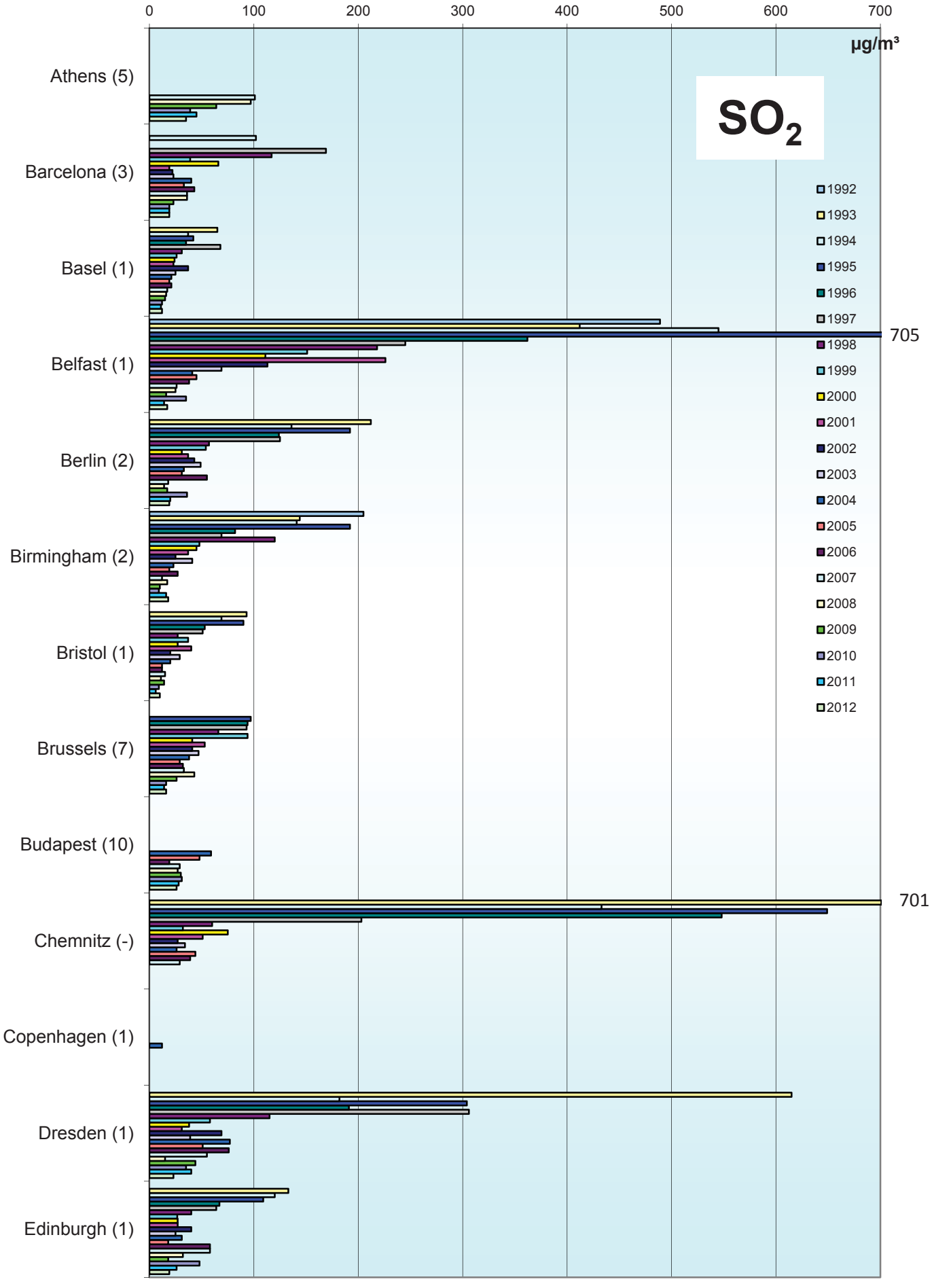


*) data of the year 2008 are not used for the comparison, because the street near the measurment point was closed for 11 months

Comparison of The Air Quality 1992 - 2012

max. daily mean values (peak-stressed monitoring station)

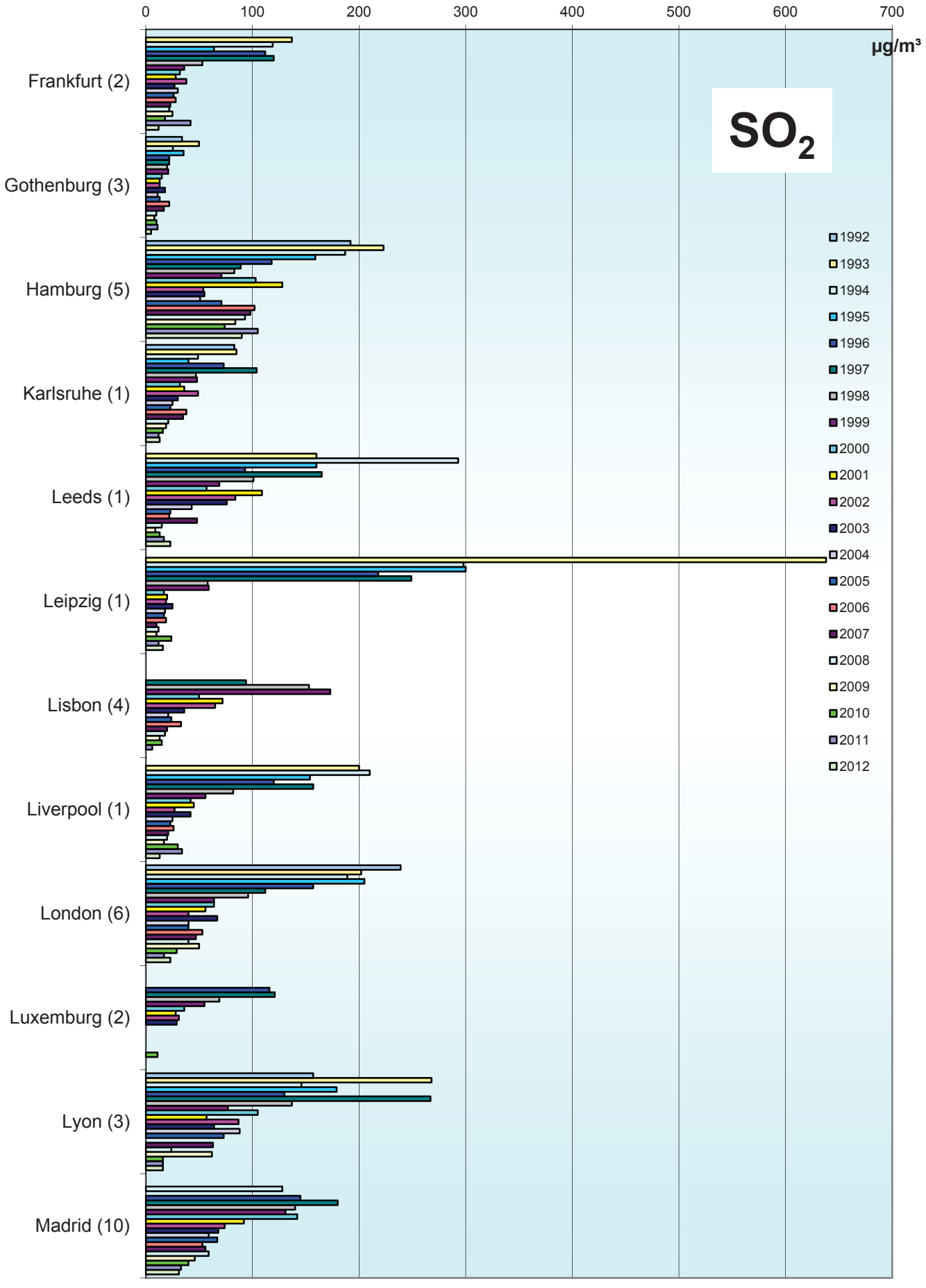
in parentheses: number of monitoring stations



Comparison of The Air Quality 1992 - 2012

max. daily mean values (peak-stressed monitoring station)

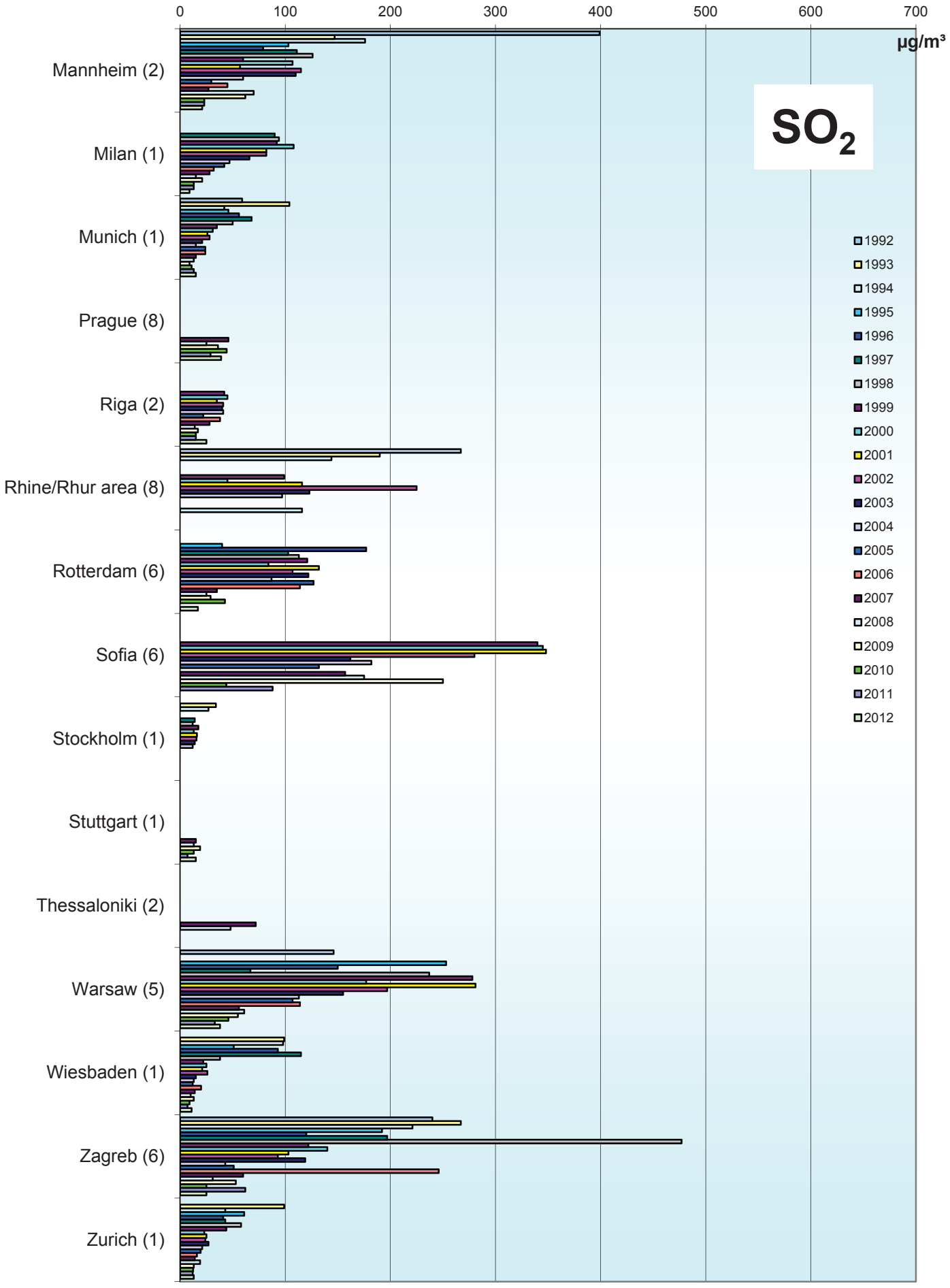
in parentheses: number of monitoring stations



Comparison of The Air Quality 1992 - 2012

max. daily mean values (peak-stressed monitoring station)

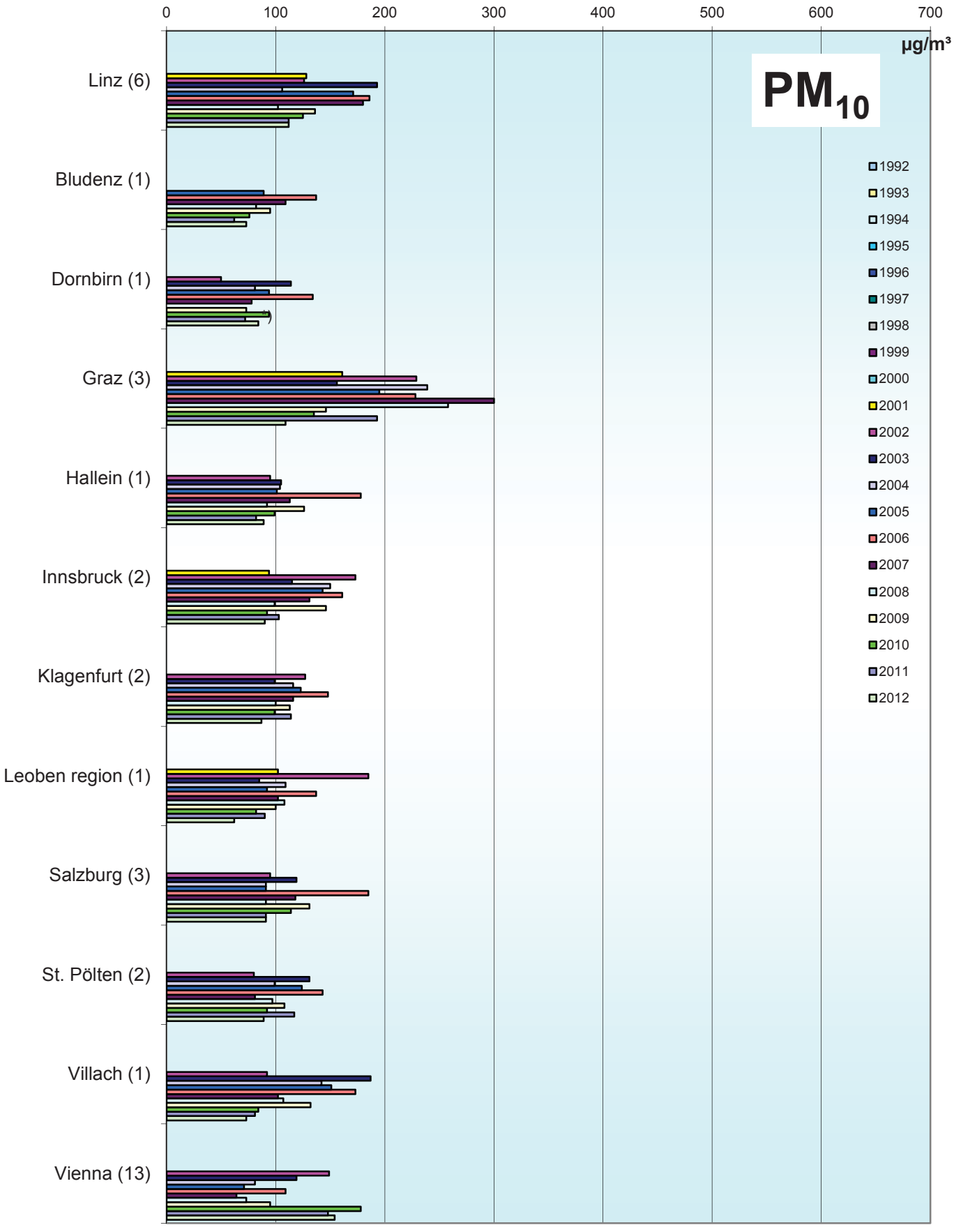
in parentheses: number of monitoring stations



Comparison of The Air Quality 1992 - 2012

max. daily mean values (peak-stressed monitoring station)

in parentheses: number of monitoring stations

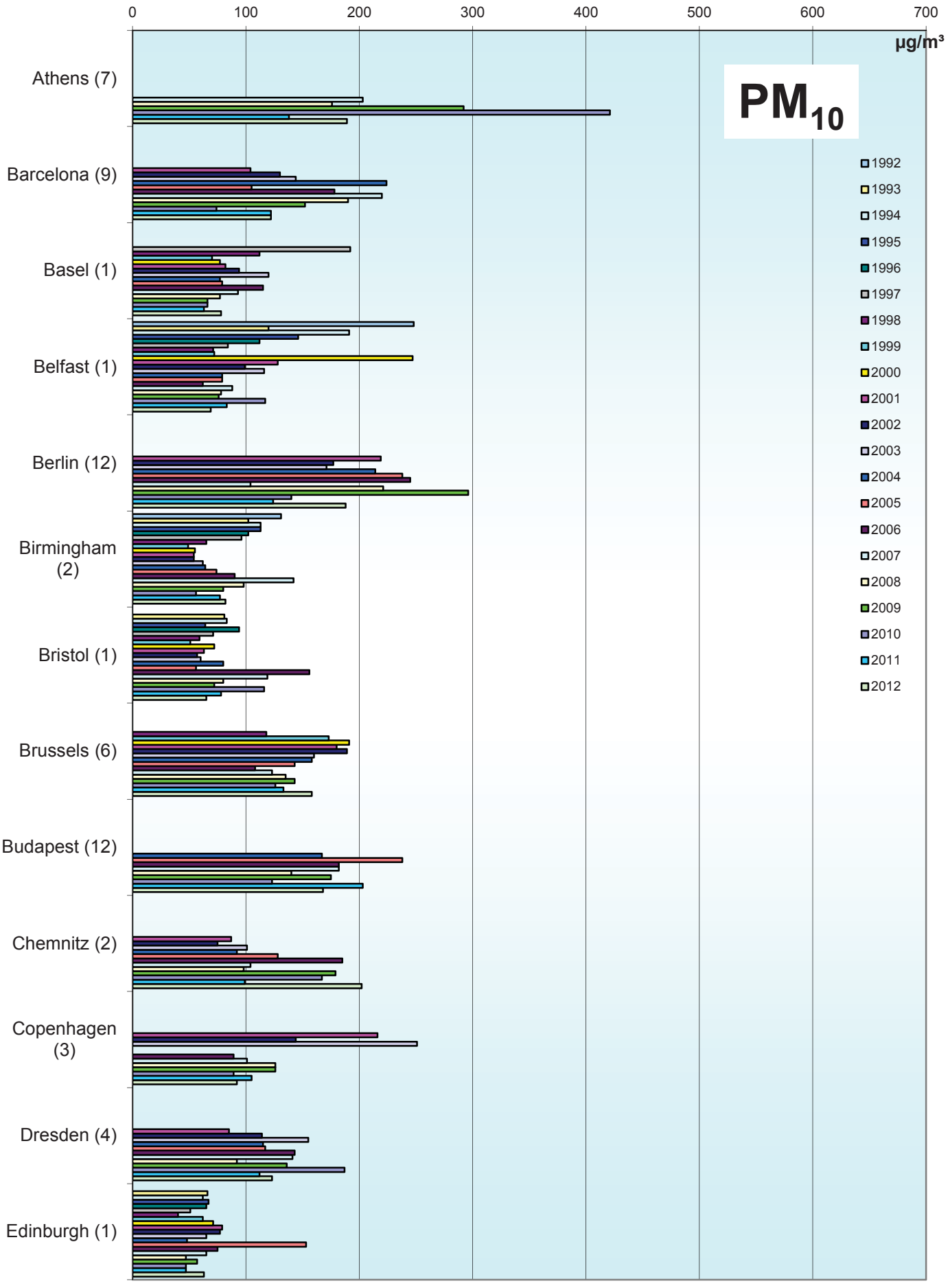


*) data of the year 2008 are not used for the comparison, because the street near the measurment point was closed for 11 months

Comparison of The Air Quality 1992 - 2012

max. daily mean values (peak-stressed monitoring station)

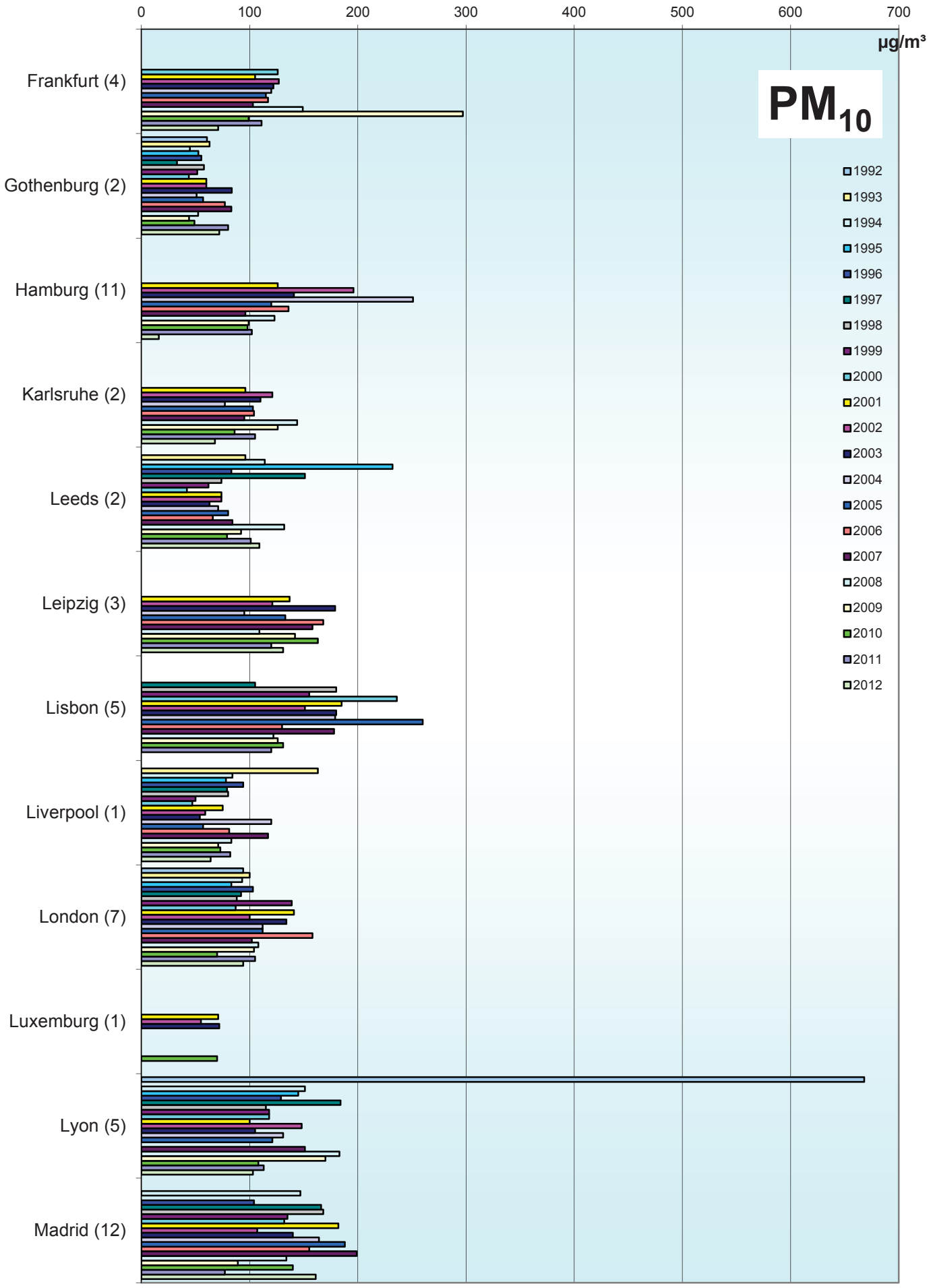
in parentheses: number of monitoring stations



Comparison of The Air Quality 1992 - 2012

max. daily mean values (peak-stressed monitoring station)

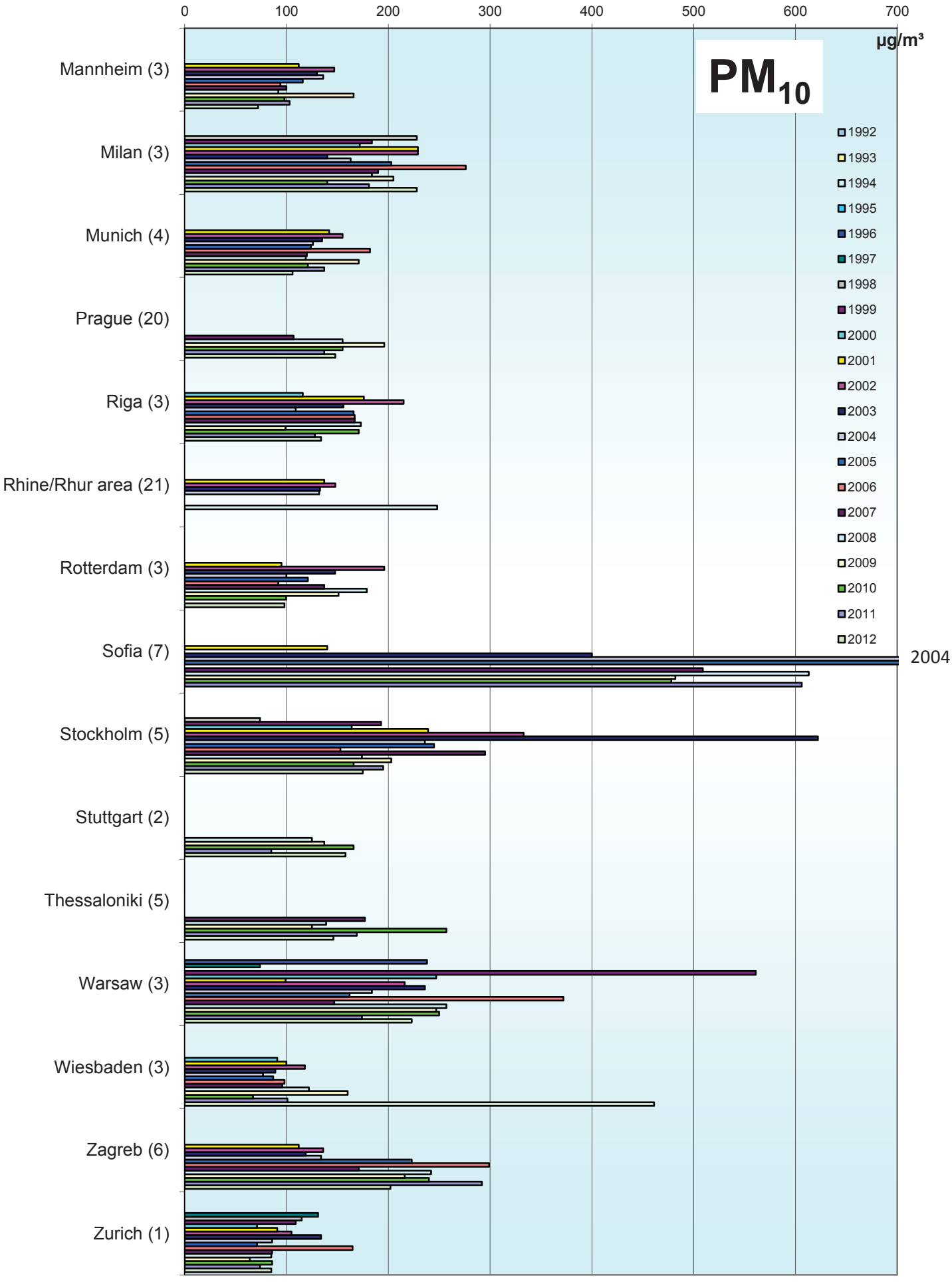
in parentheses: number of monitoring stations



Comparison of The Air Quality 1992 - 2012

max. daily mean values (peak-stressed monitoring station)

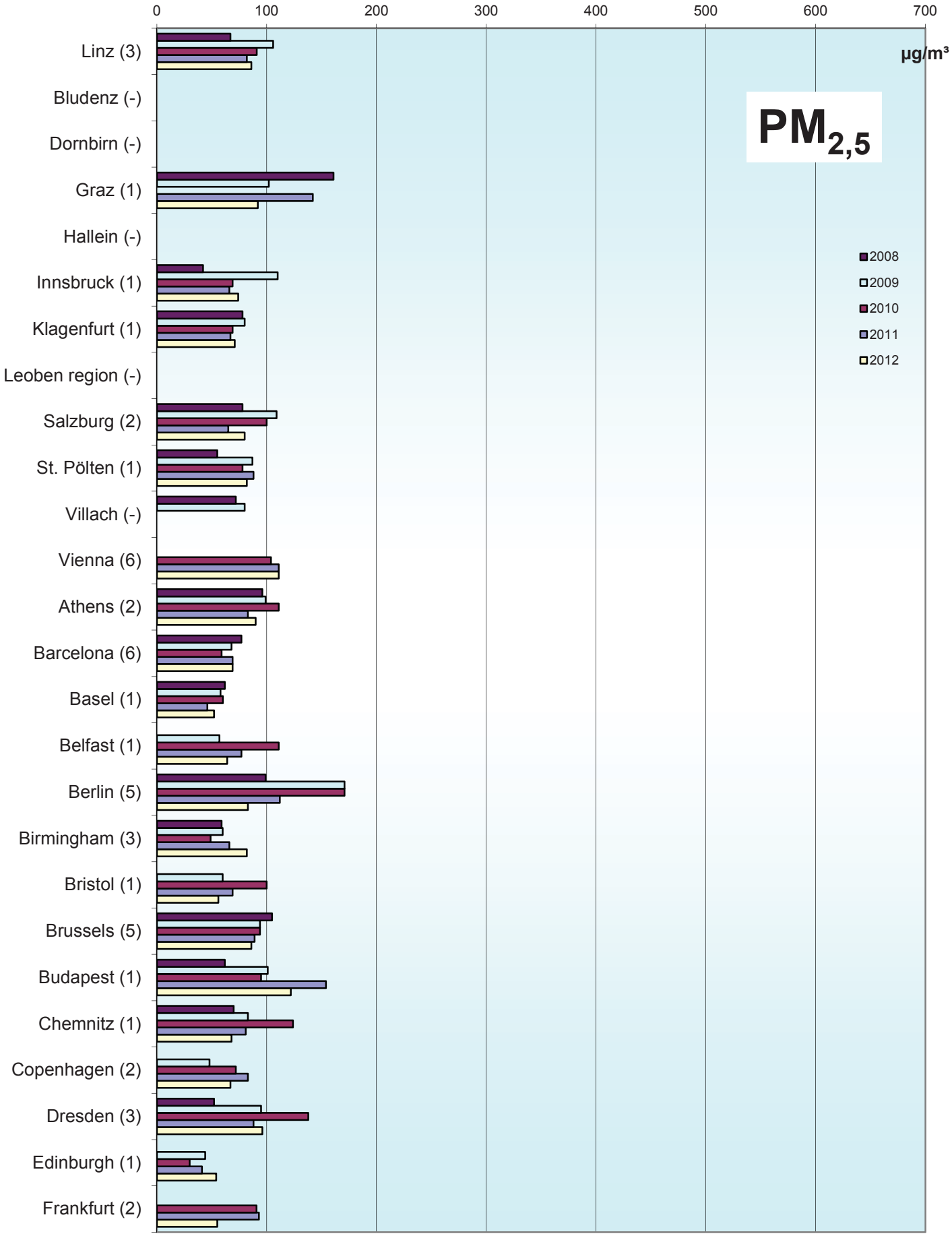
in parentheses: number of monitoring stations



Comparison of The Air Quality 2008 - 2012

max. daily mean values (peak-stressed monitoring station)

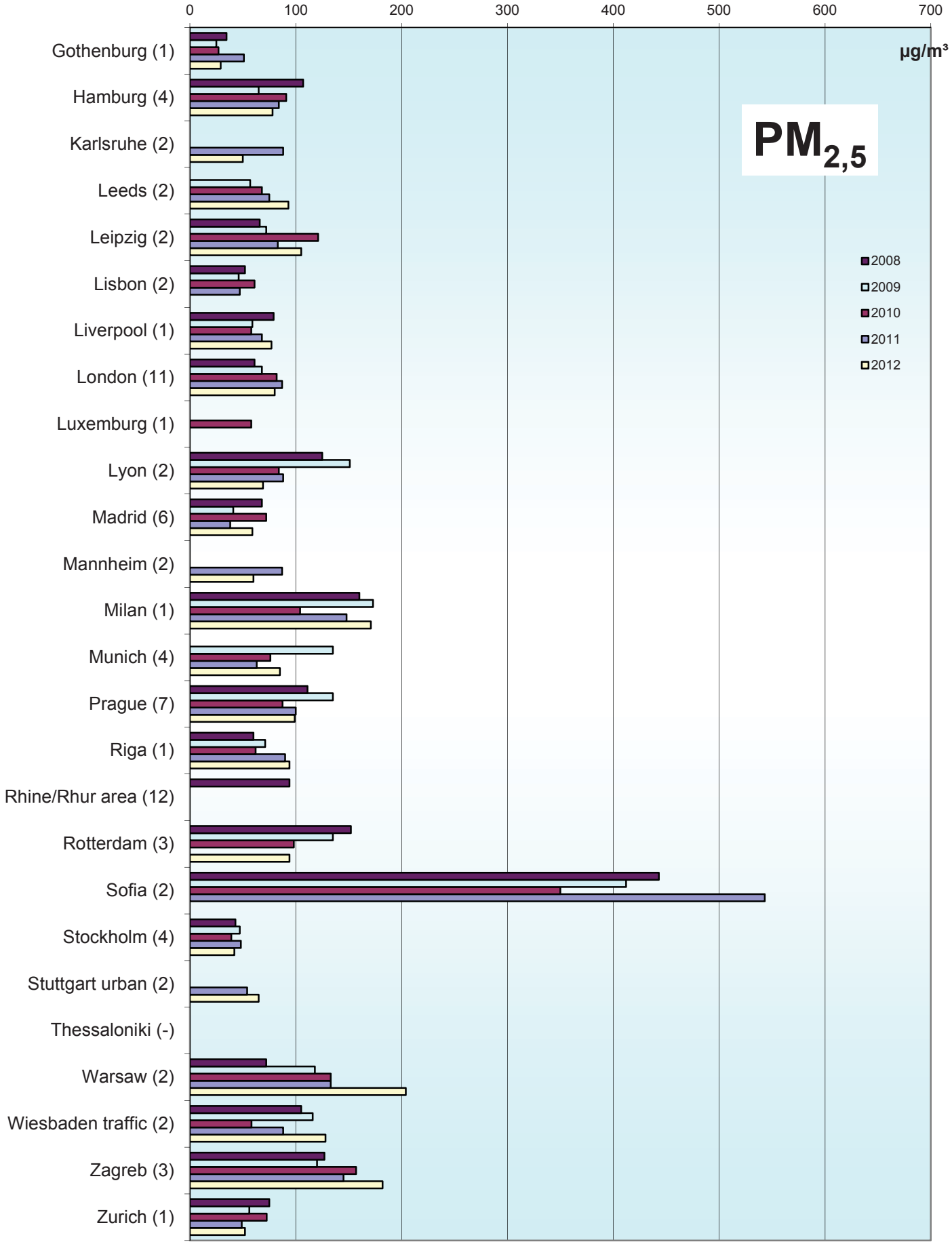
in parentheses: number of monitoring stations



Comparison of The Air Quality 2008 - 2012

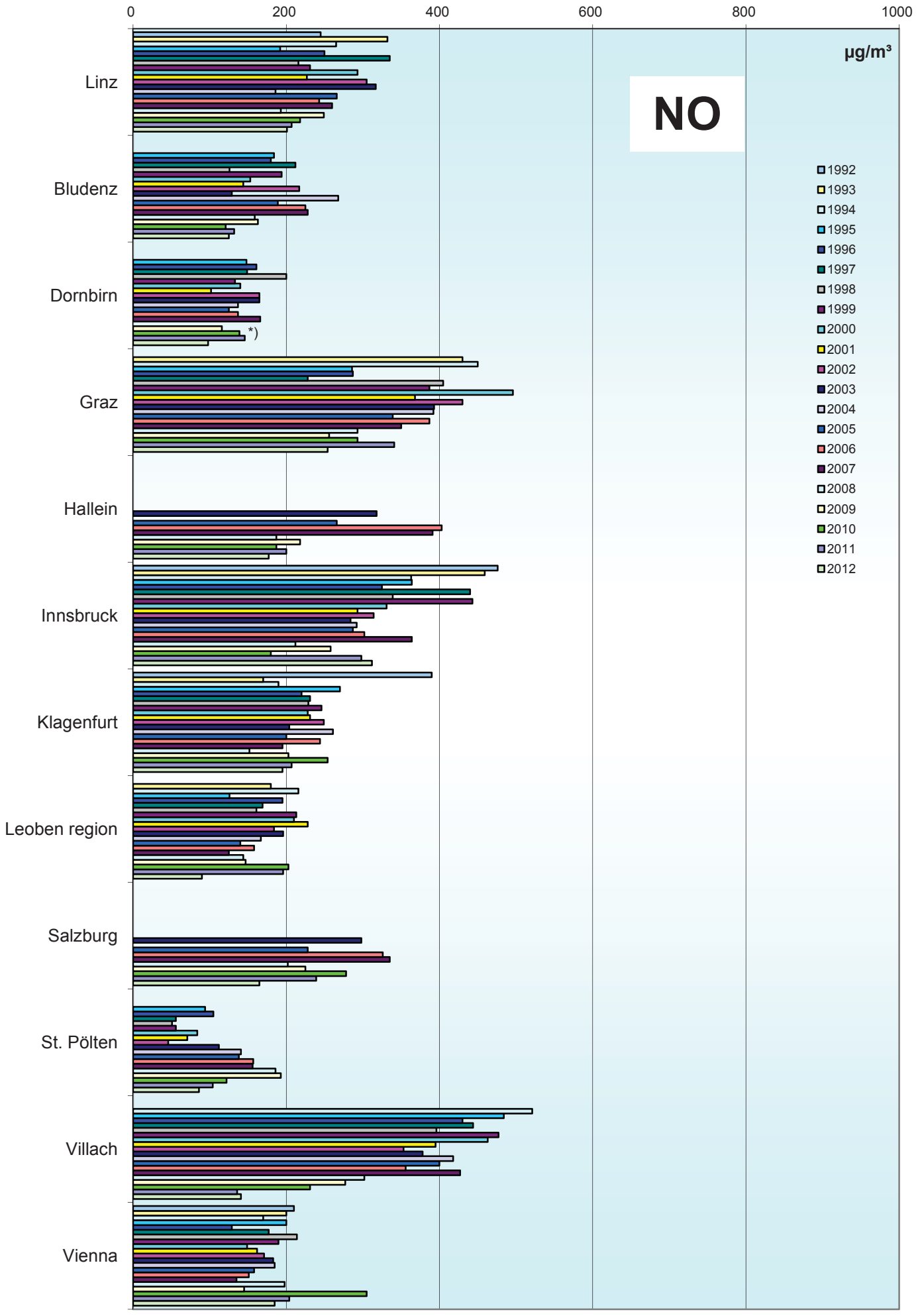
max. daily mean values (peak-stressed monitoring station)

in parentheses: number of monitoring stations



Comparison of The Air Quality 1992 - 2012

max. daily mean values (peak-stressed monitoring station)

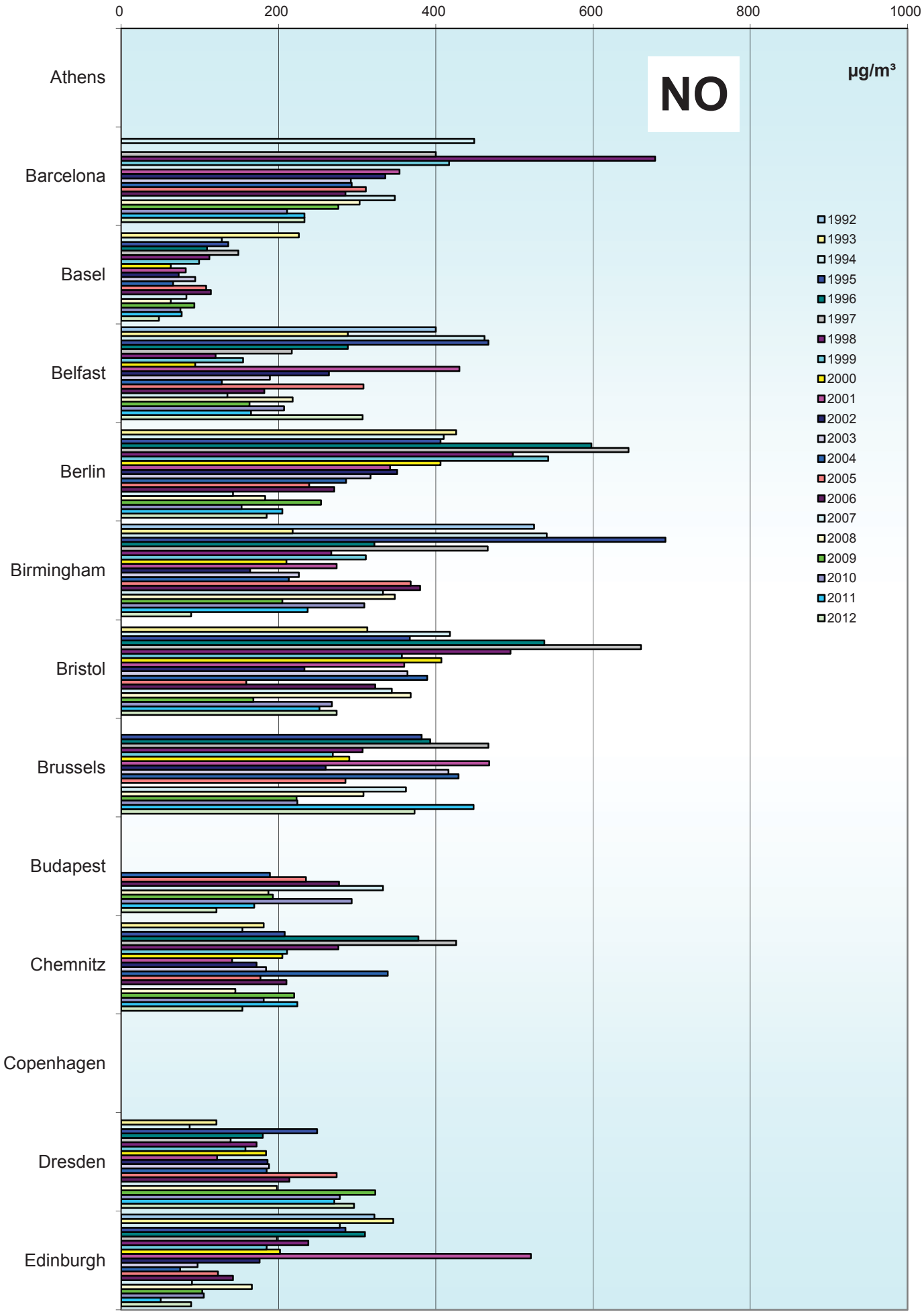


*) data of the year 2008 are not used for the comparison, because the street near the measurment point was closed for 11 months

Magistrat Linz - Umwelt- und Technik-Center

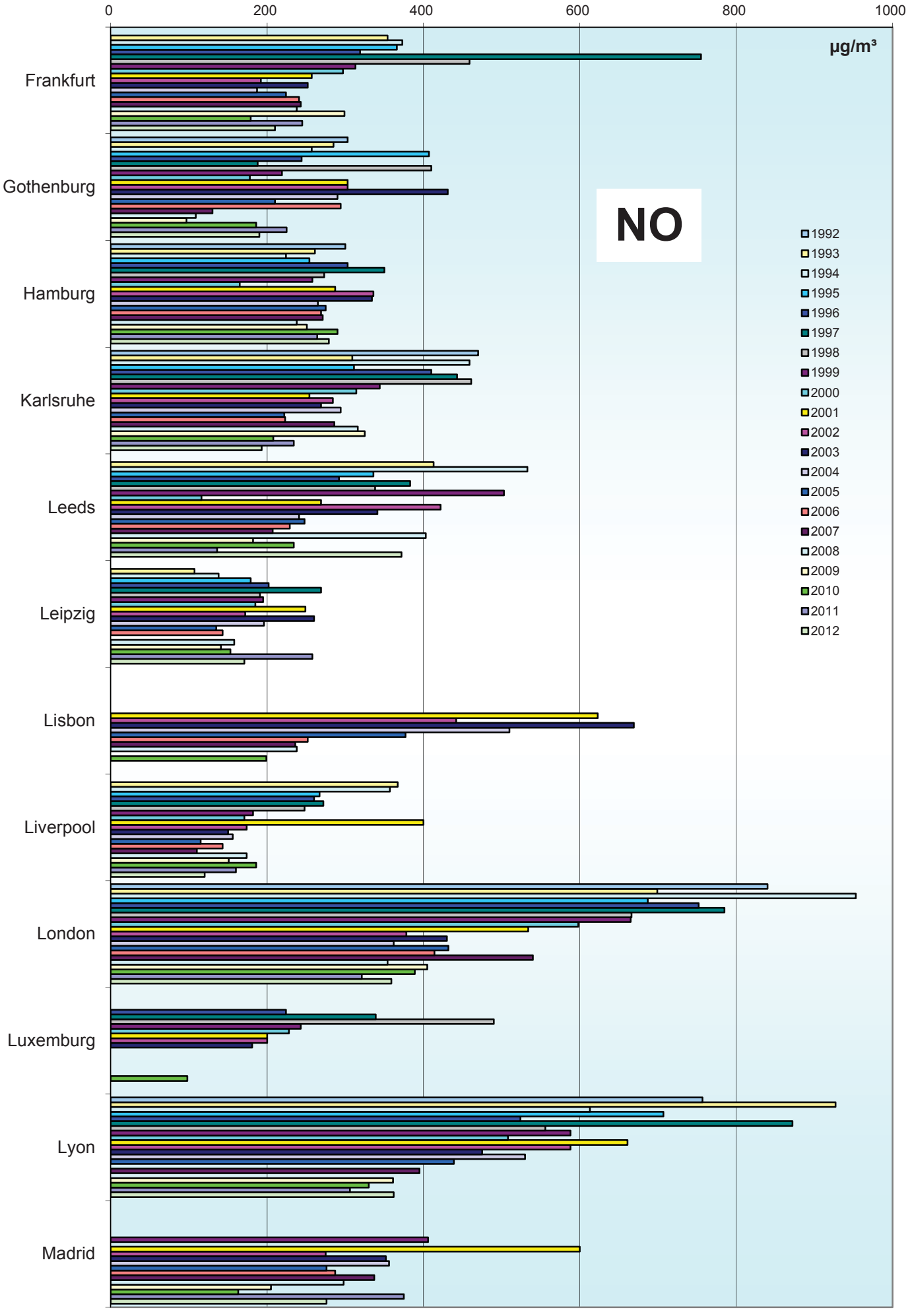
Comparison of The Air Quality 1992 - 2012

max. daily mean values (peak-stressed monitoring station)



Comparison of The Air Quality 1992 - 2012

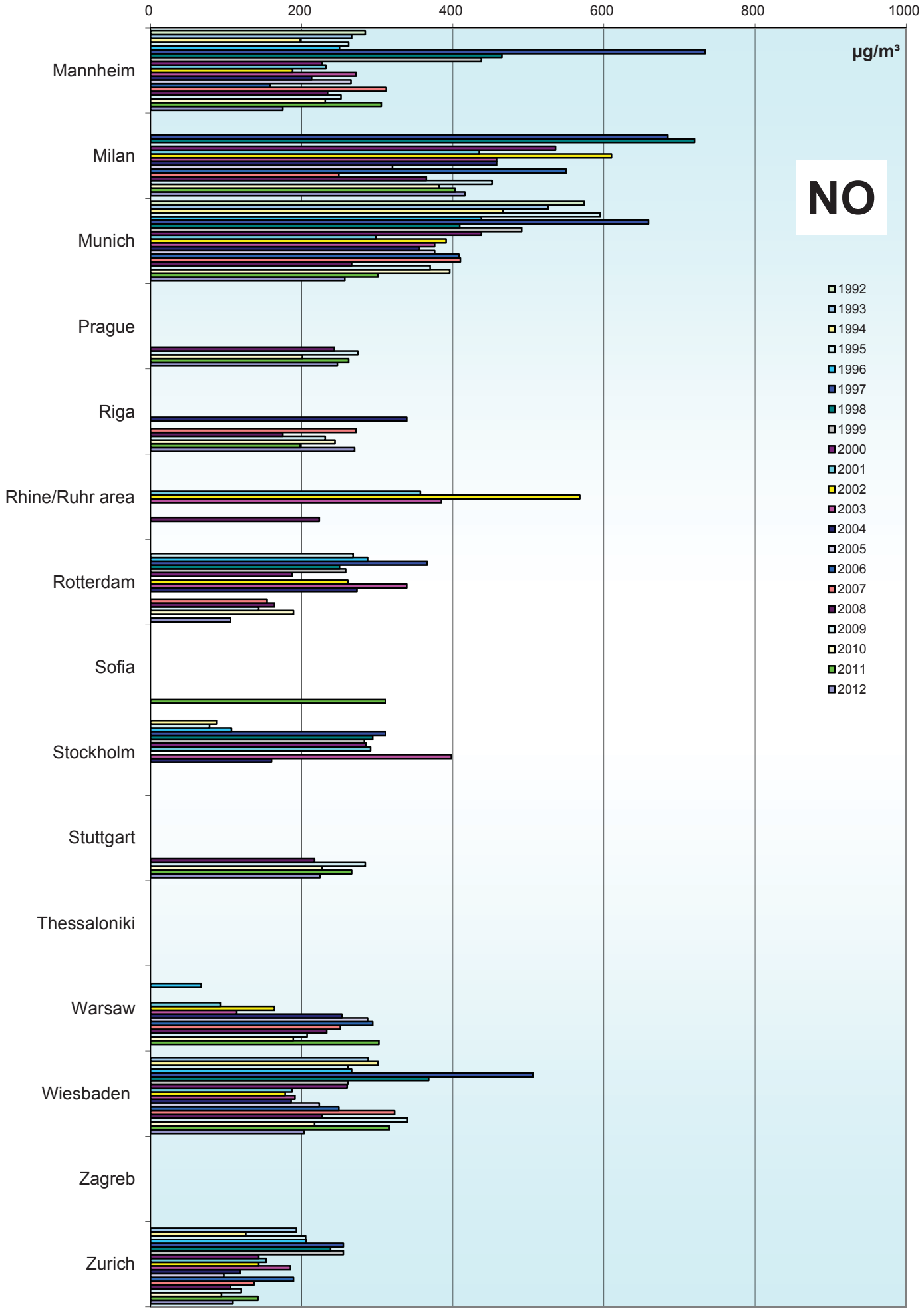
max. daily mean values (peak-stressed monitoring station)



Magistrat Linz - Umwelt- und Technik-Center

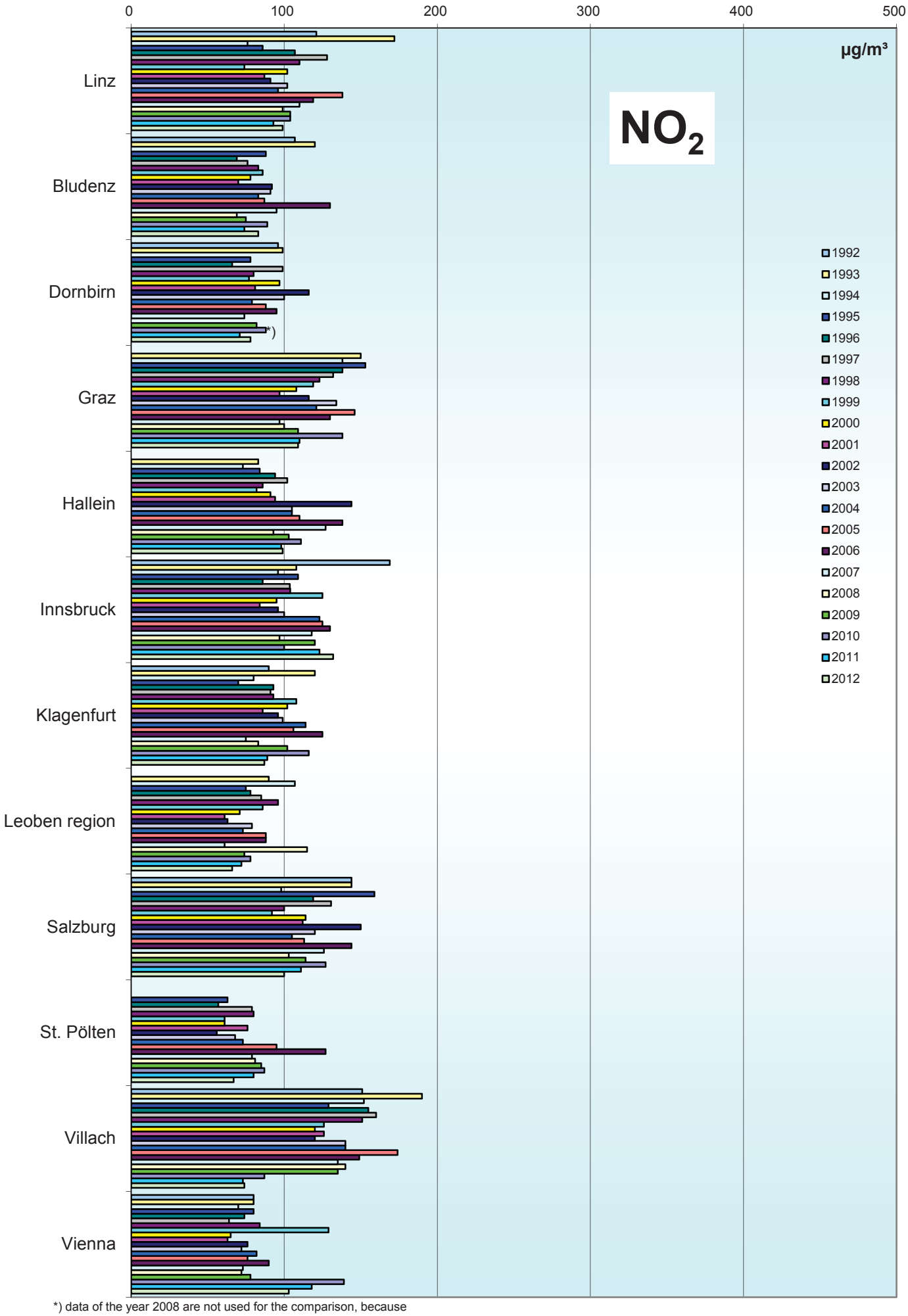
Comparison of The Air Quality 1992 - 2012

max. daily mean values (peak-stressed monitoring station)



Comparison of The Air Quality 1992 - 2012

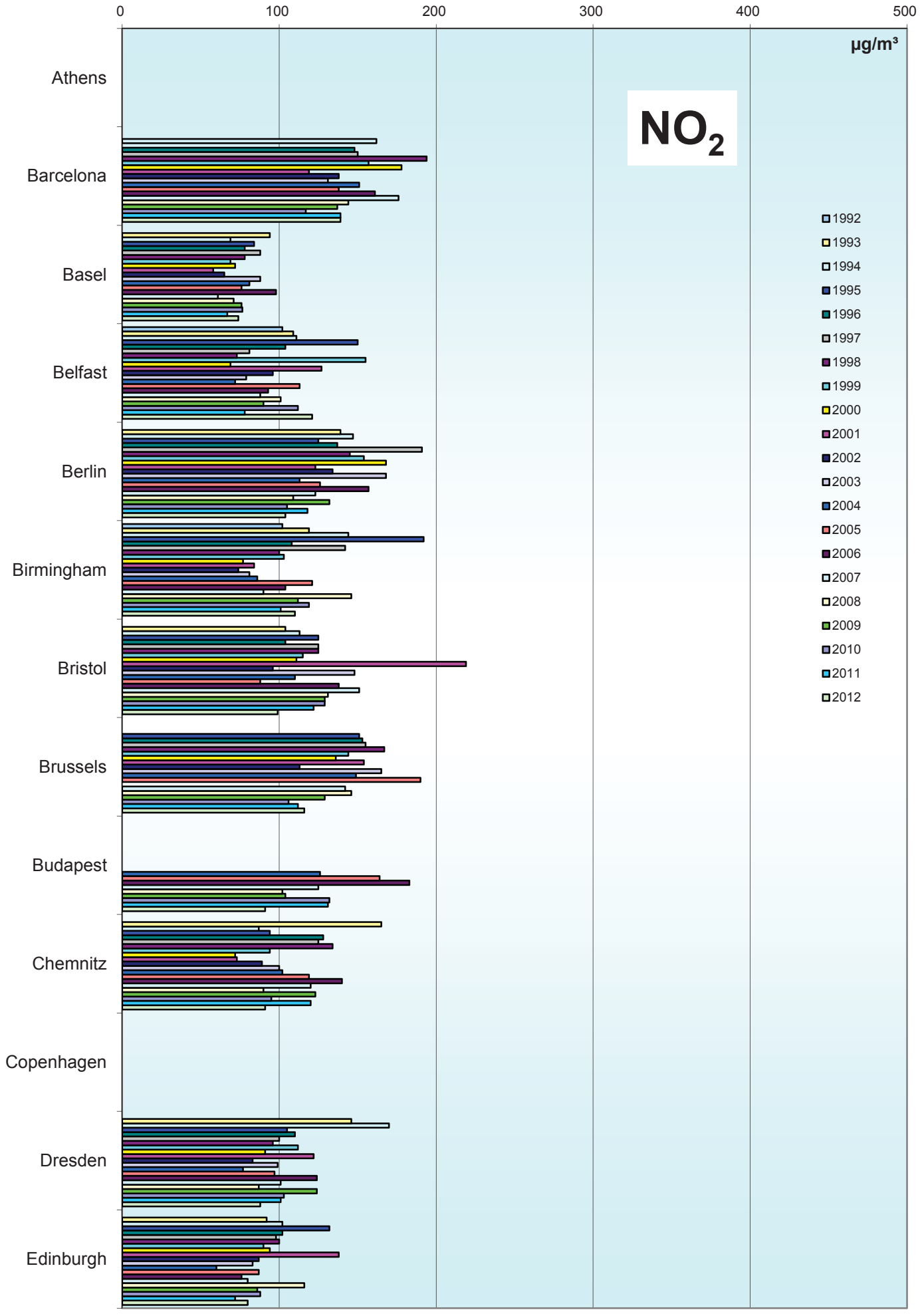
max. daily mean values (peak-stressed monitoring station)



*) data of the year 2008 are not used for the comparison, because the street near the measurment point was closed for 11 months

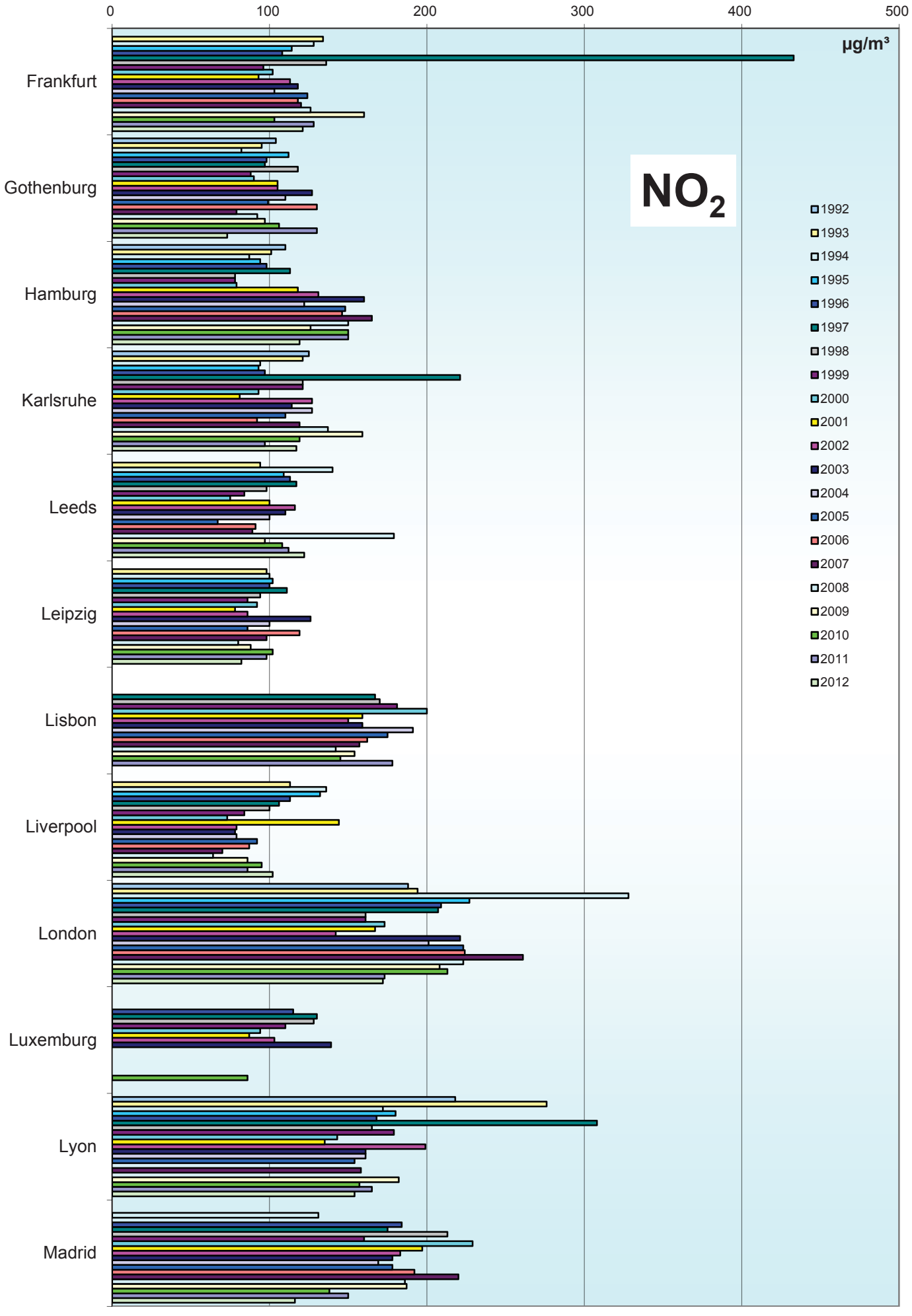
Comparison of The Air Quality 1992 - 2012

max. daily mean values (peak-stressed monitoring station)



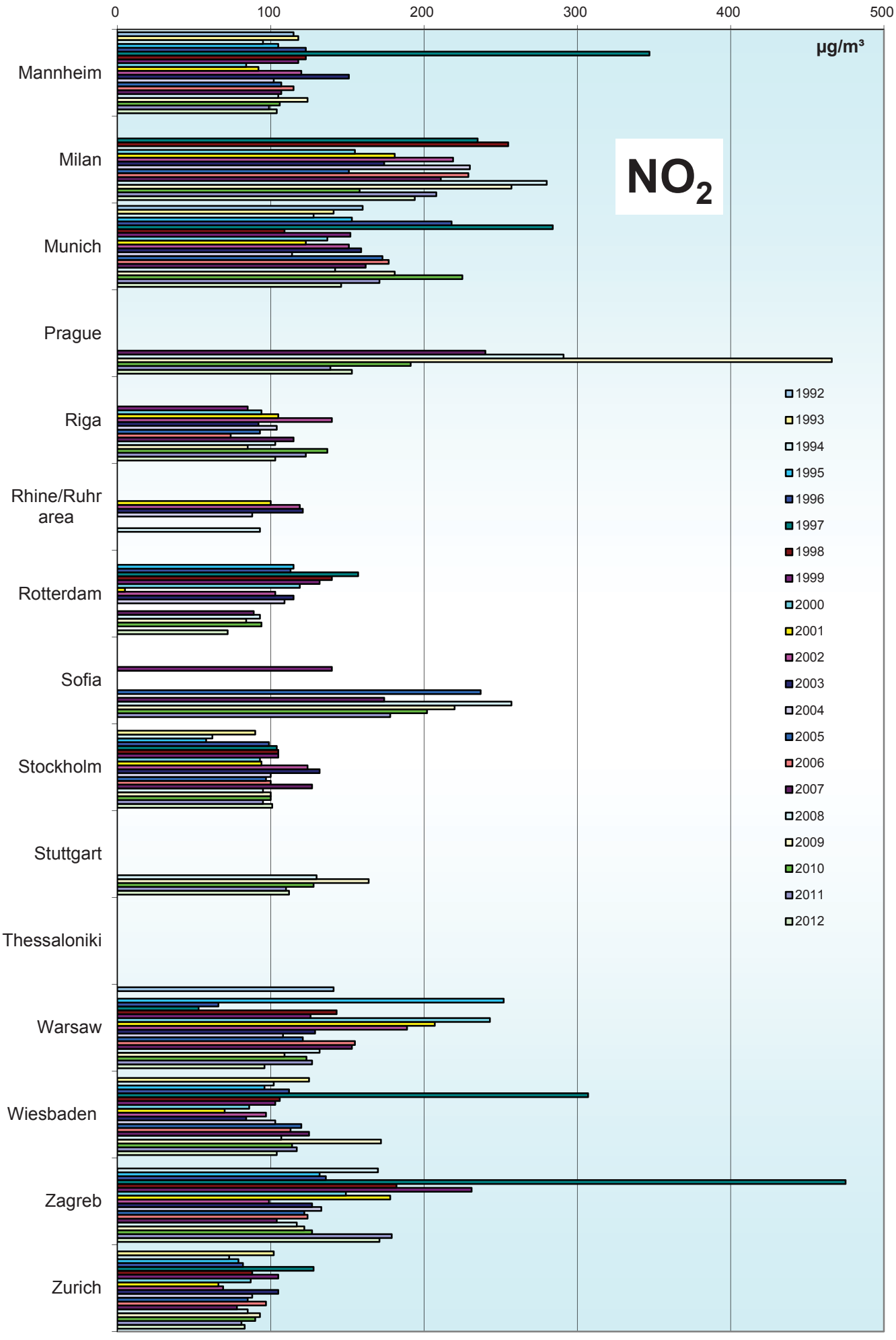
Comparison of The Air Quality 1992 - 2012

max. daily mean values (peak-stressed monitoring station)



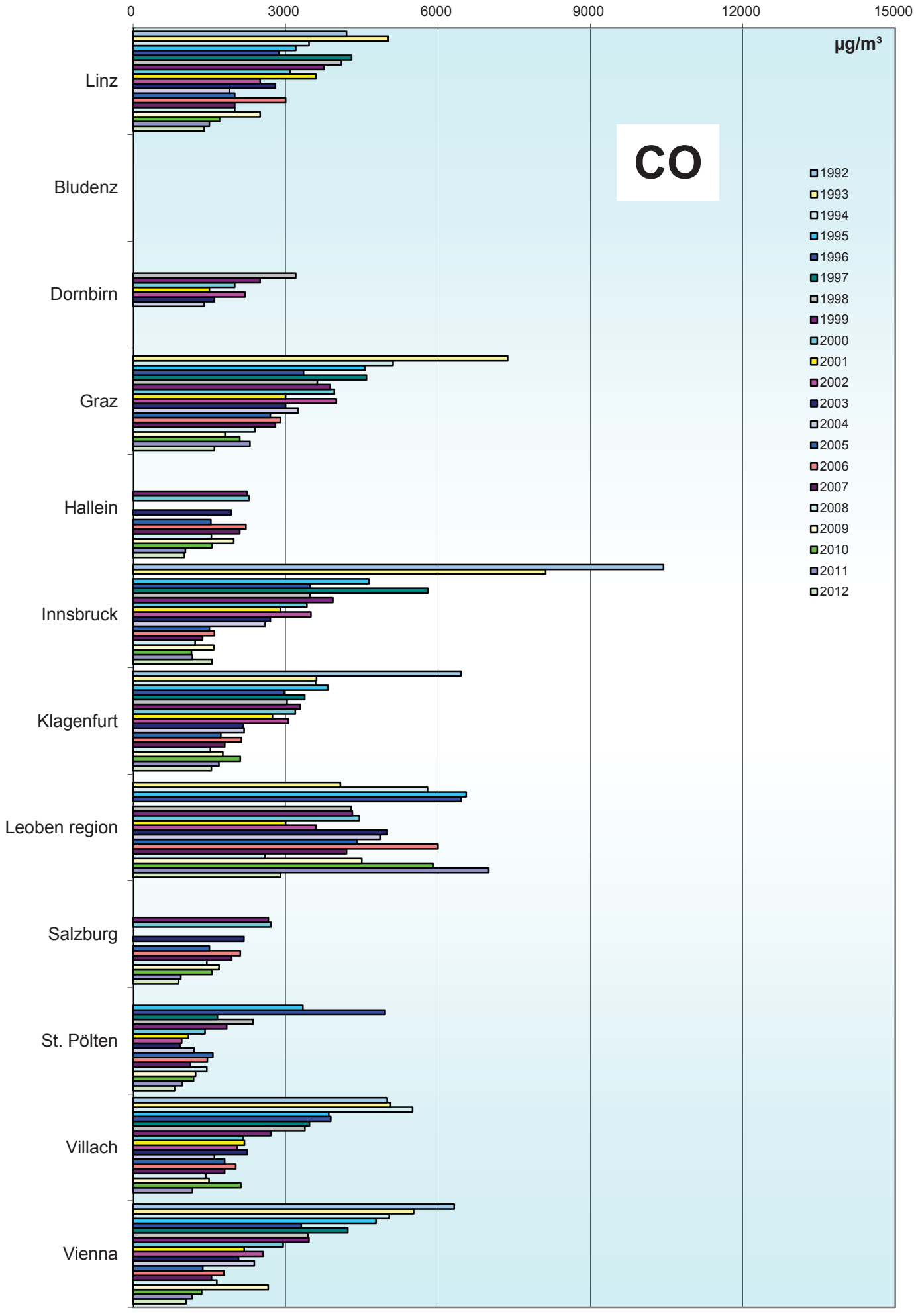
Comparison of The Air Quality 1992 - 2012

max. daily mean values (peak-stressed monitoring station)



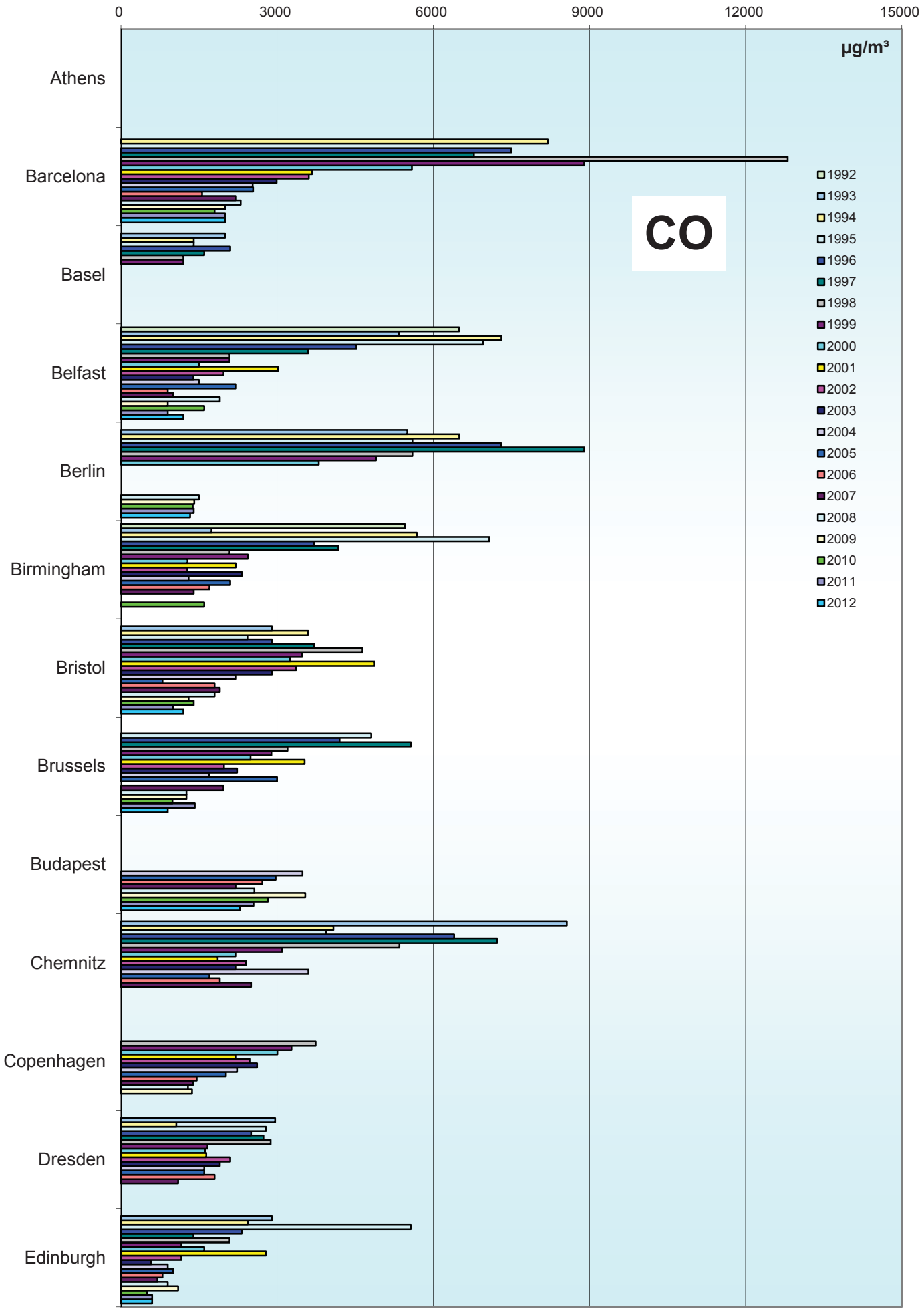
Comparison of The Air Quality 1992 - 2012

max. daily mean values (peak-stressed monitoring station)



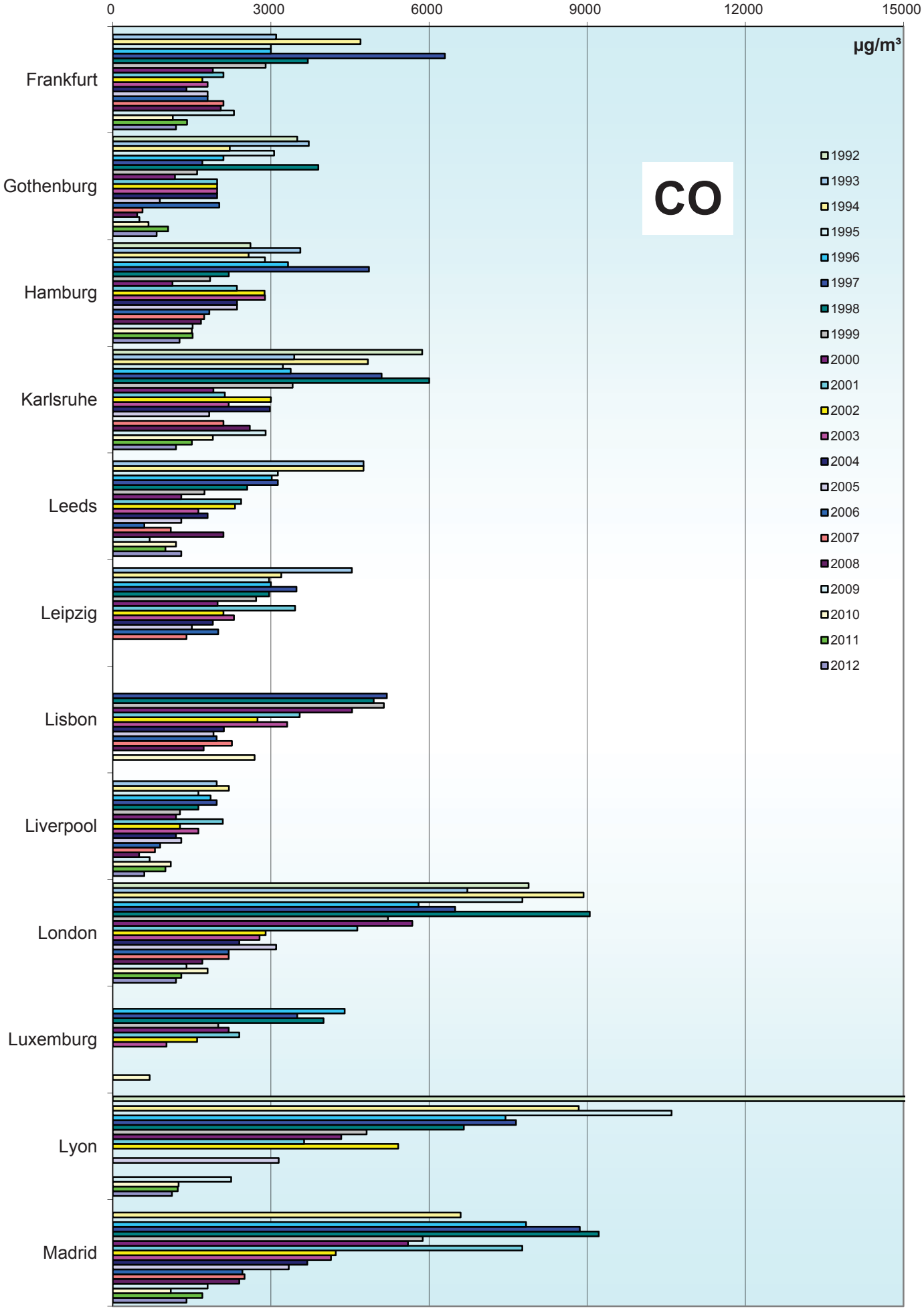
Comparison of The Air Quality 1992 - 2012

max. daily mean values (peak-stressed monitoring station)



Comparison of The Air Quality 1992 - 2012

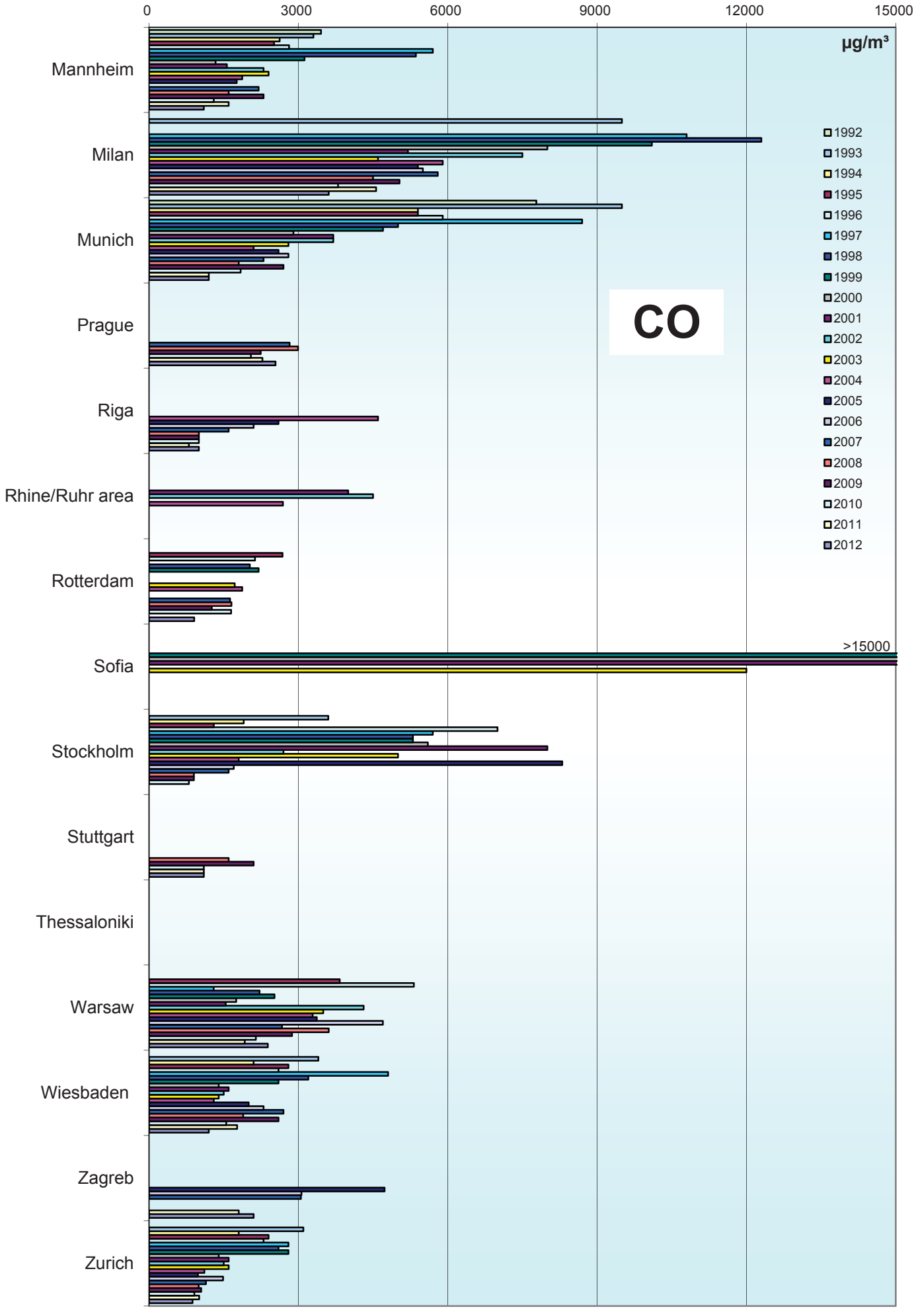
max. daily mean values (peak-stressed monitoring station)



1124

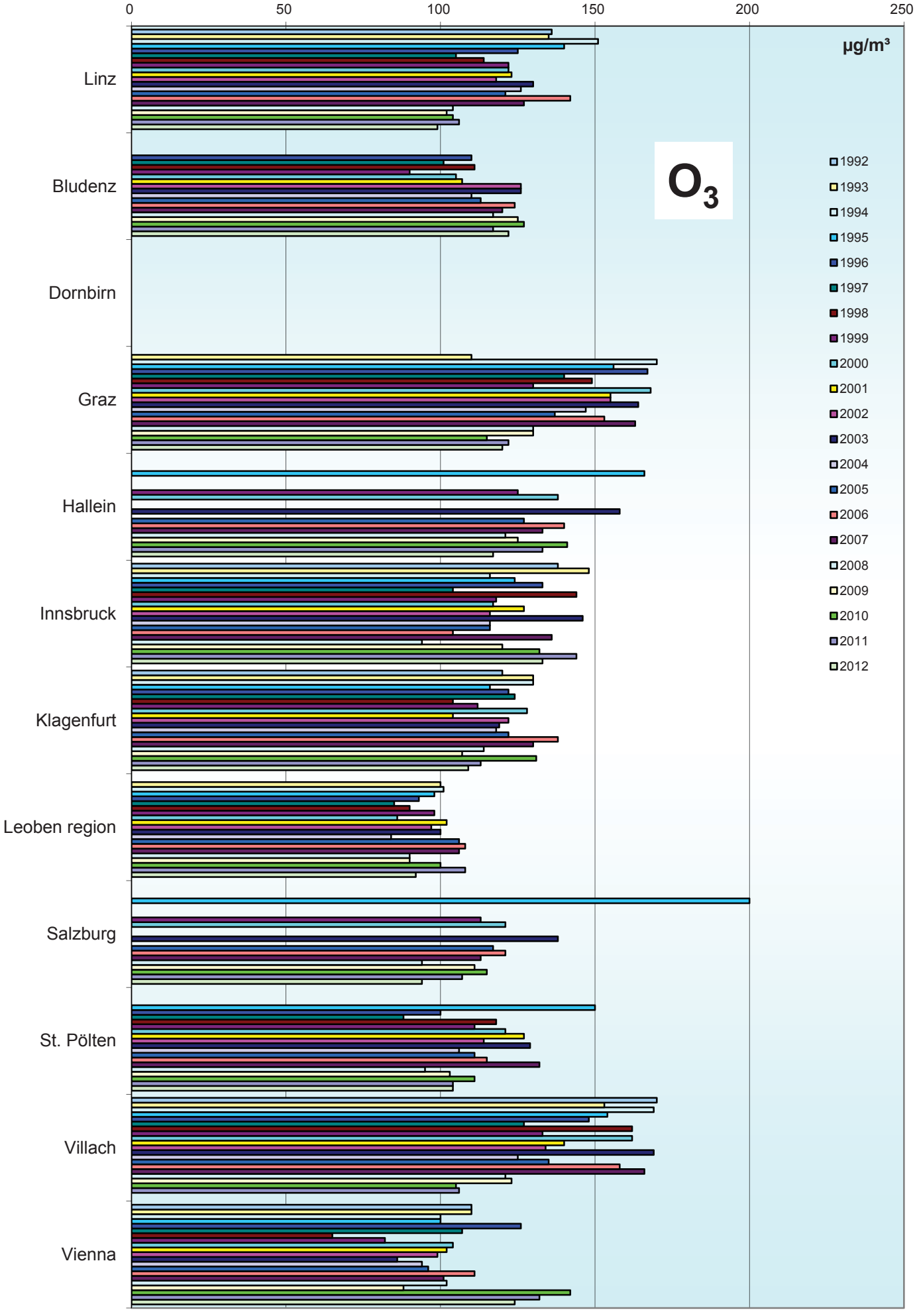
Comparison of The Air Quality 1992 - 2012

max. daily mean values (peak-stressed monitoring station)



Comparison of The Air Quality 1992 - 2012

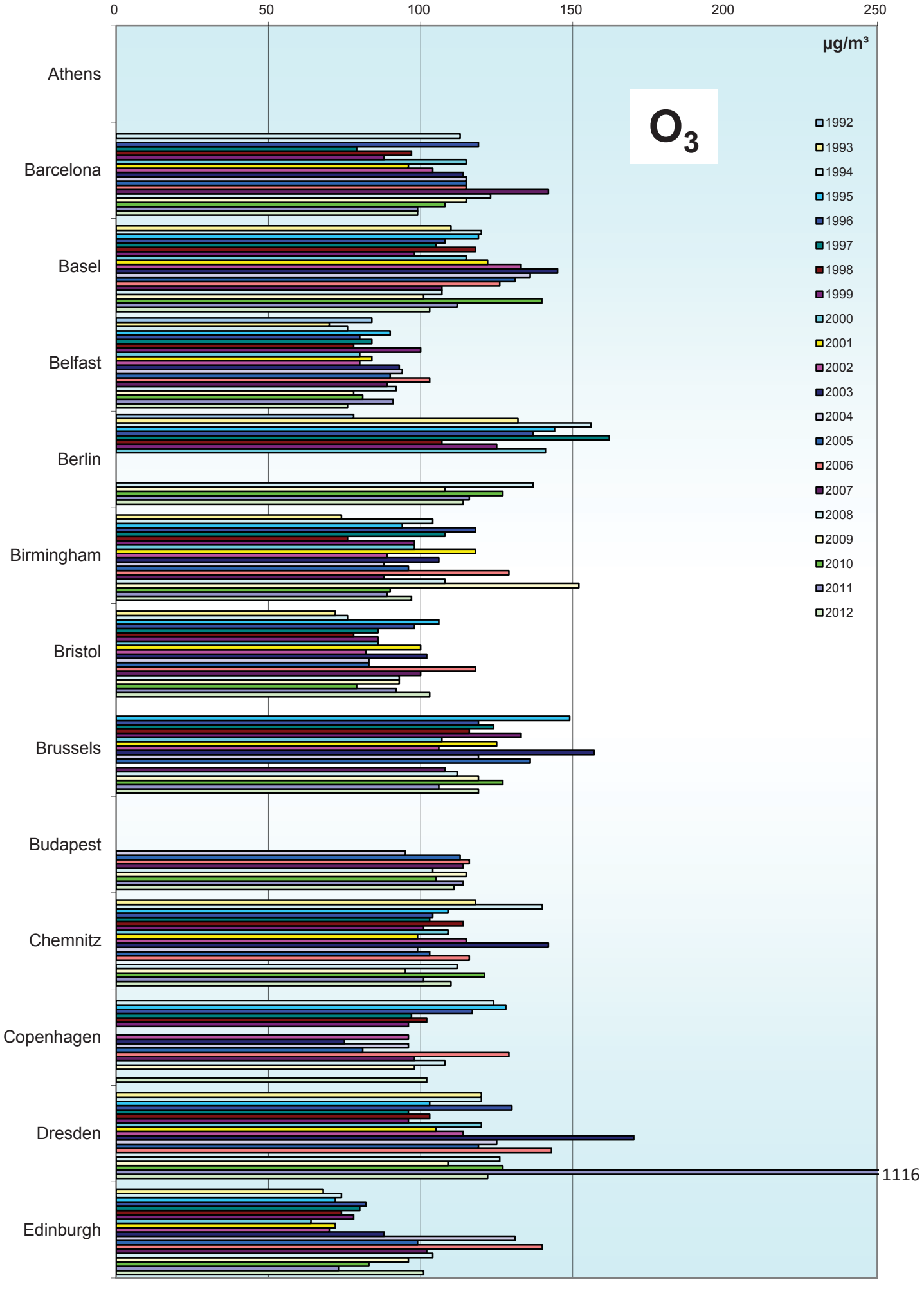
max. daily mean values (peak-stressed monitoring station)



Magistrat Linz - Umwelt- und Technik-Center

Comparison of The Air Quality 1992 - 2012

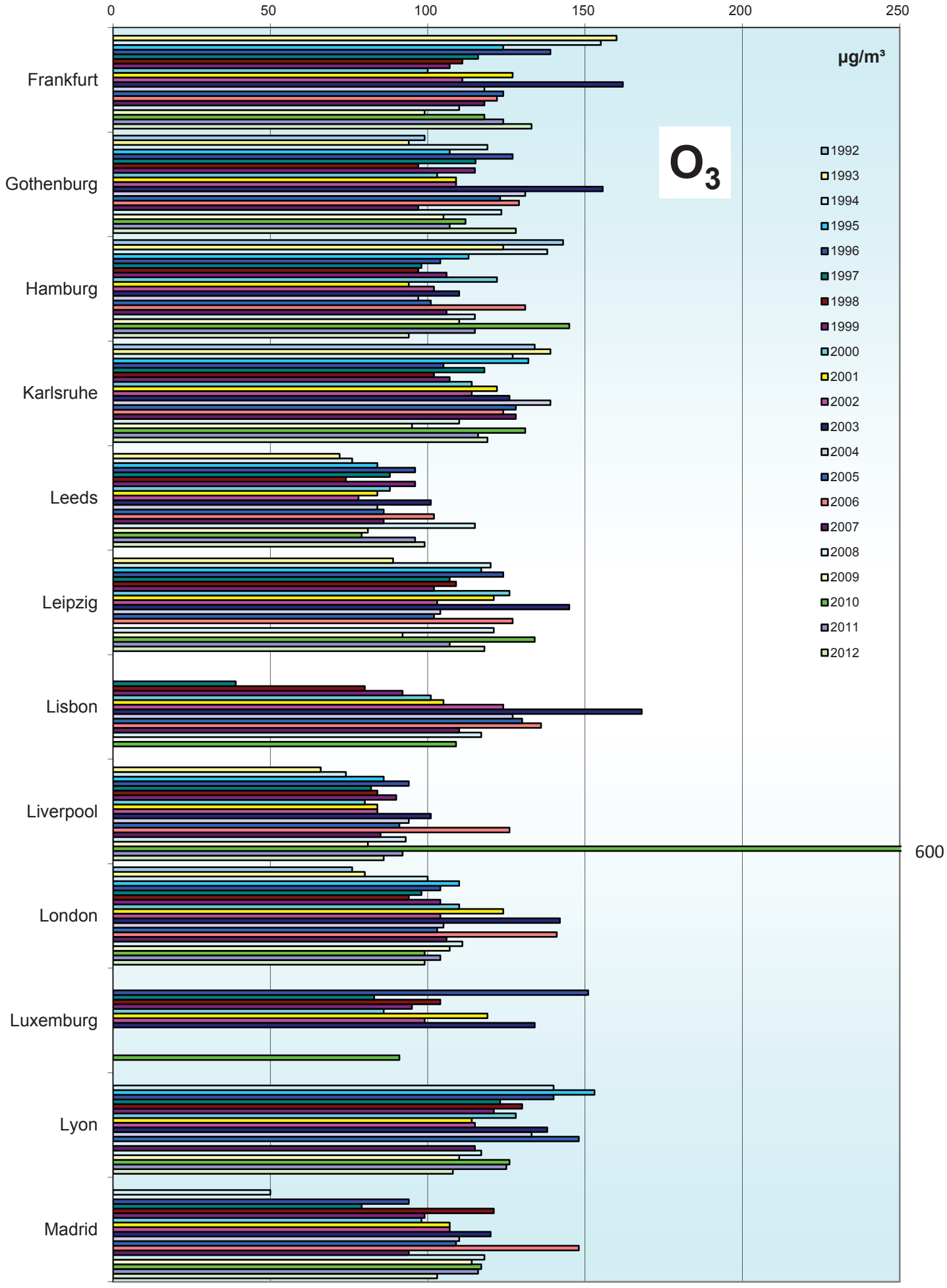
max. daily mean values (peak-stressed monitoring



Magistrat Linz - Umwelt- und Technik-Center

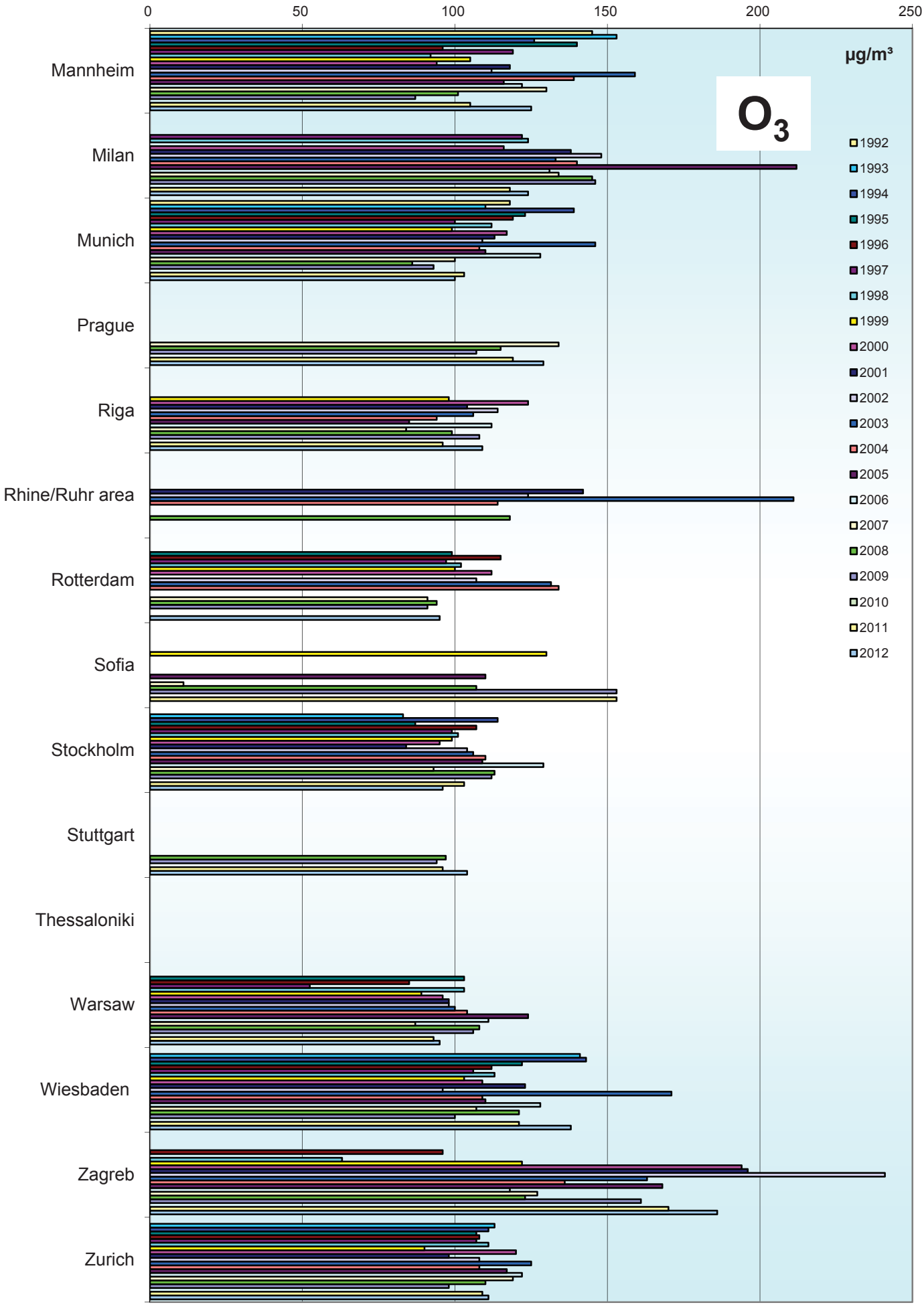
Comparison of The Air Quality 1992 - 2012

max. daily mean values (peak-stressed monitoring station)



Comparison of The Air Quality 1992 - 2012

max. daily mean values (peak-stressed monitoring station)



Jahresvergleich

1993 - 2012

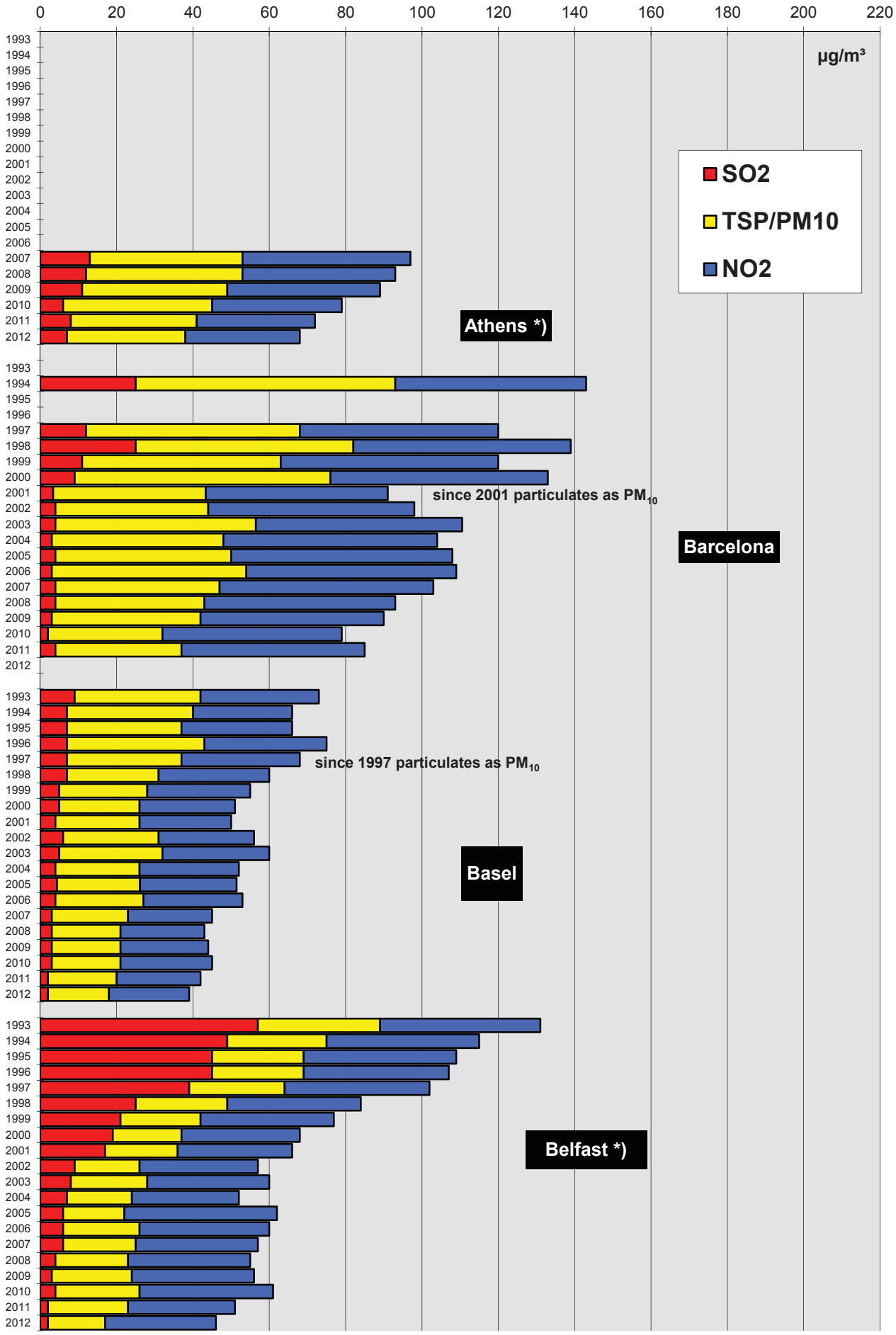
Jahresmittelwerte, Σ SO_2, TSP/PM10, NO_2

Comparison Of The Air Quality

1993 - 2012

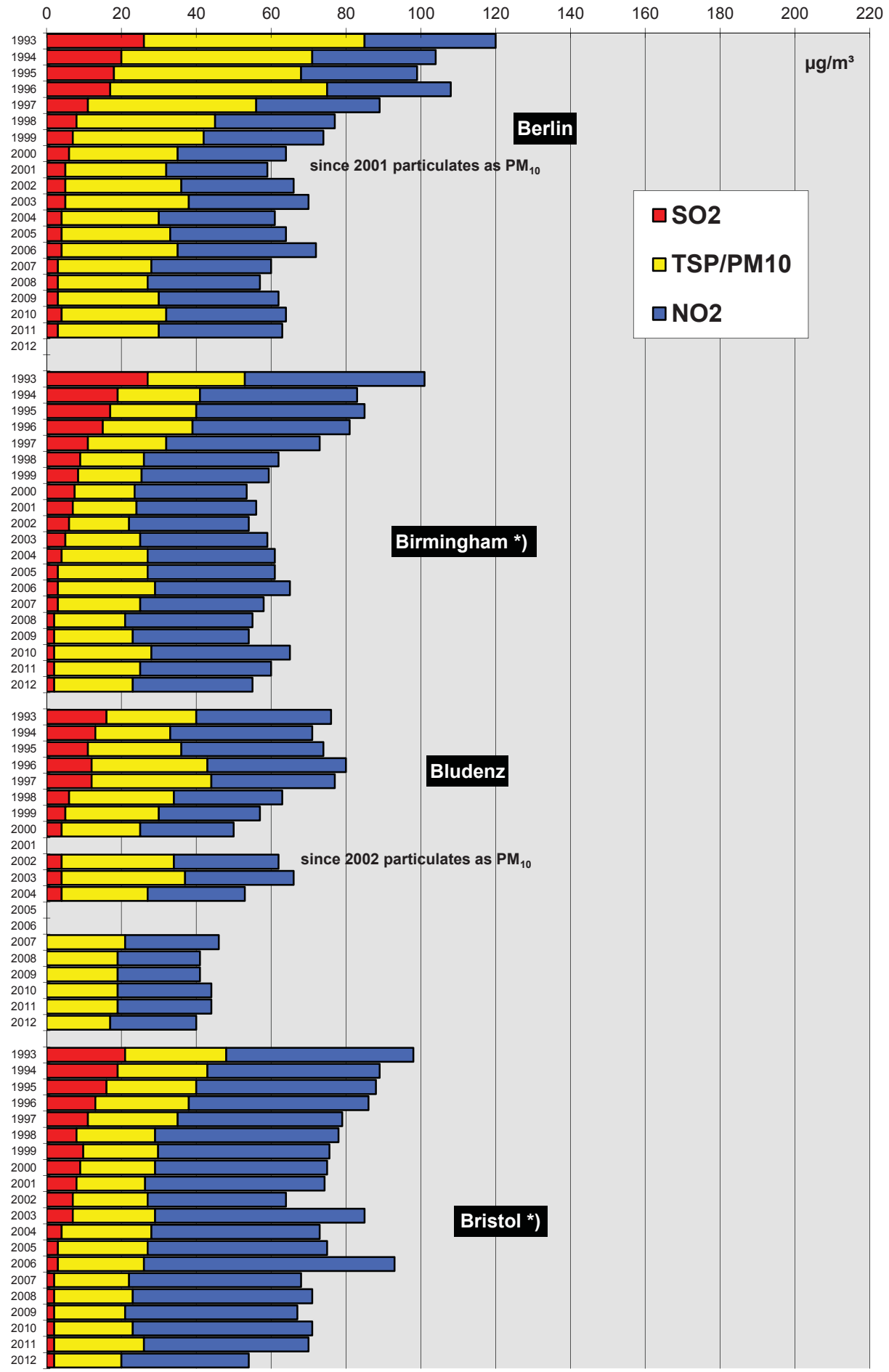
Annual Mean Values, Σ SO_2, TSP/PM10, NO_2

Comparison Of The Air Quality 1993-2012
Development of the annual mean values, Σ SO_2, TSP/PM_{10}, NO_2
(mean of all monitoring stations)



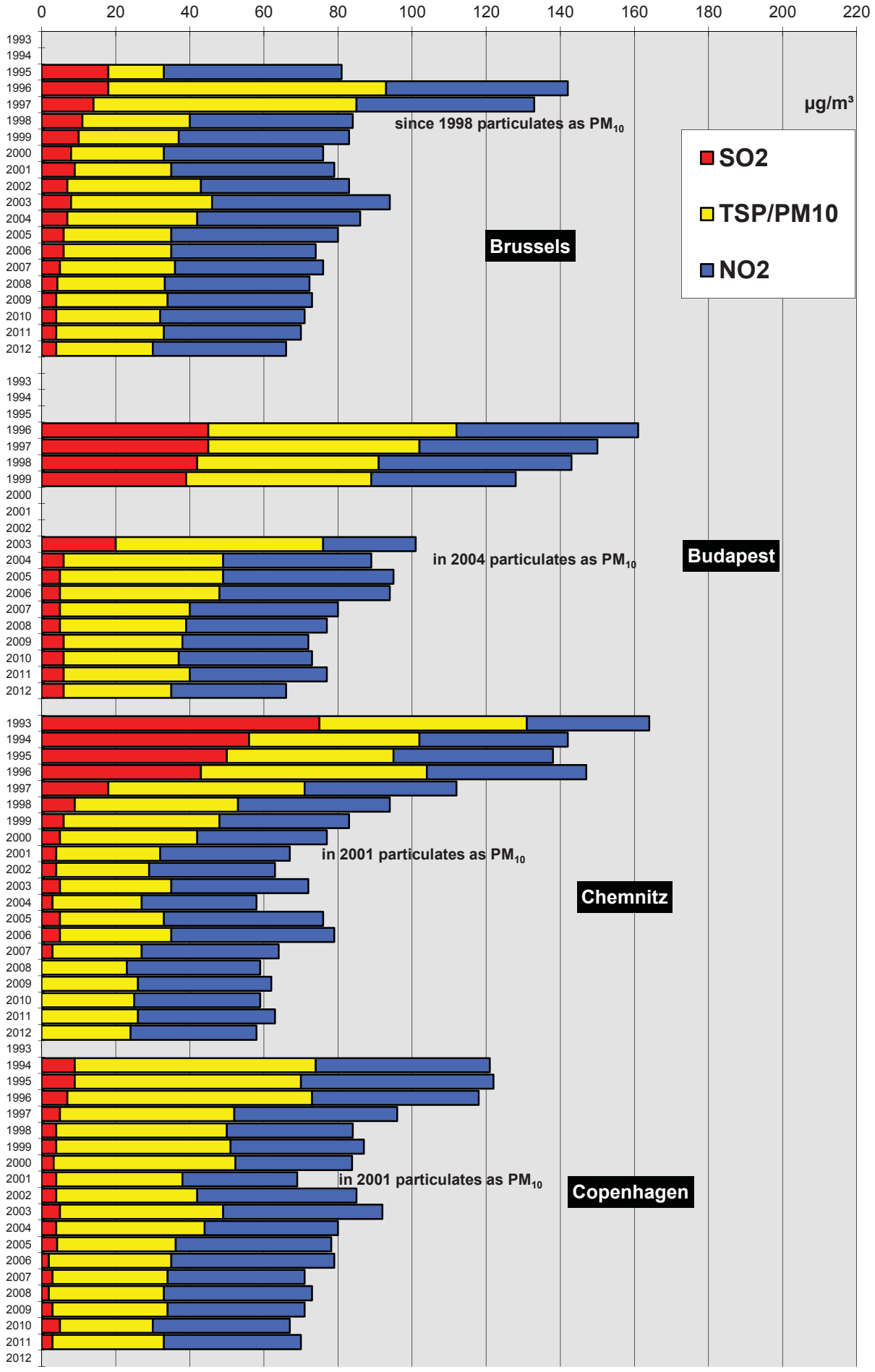
*) particulates calculated as PM_{10}

Comparison Of The Air Quality 1993-2012
Development of the annual mean values, Σ SO_2, TSP/PM_{10}, NO_2
(mean of all monitoring stations)

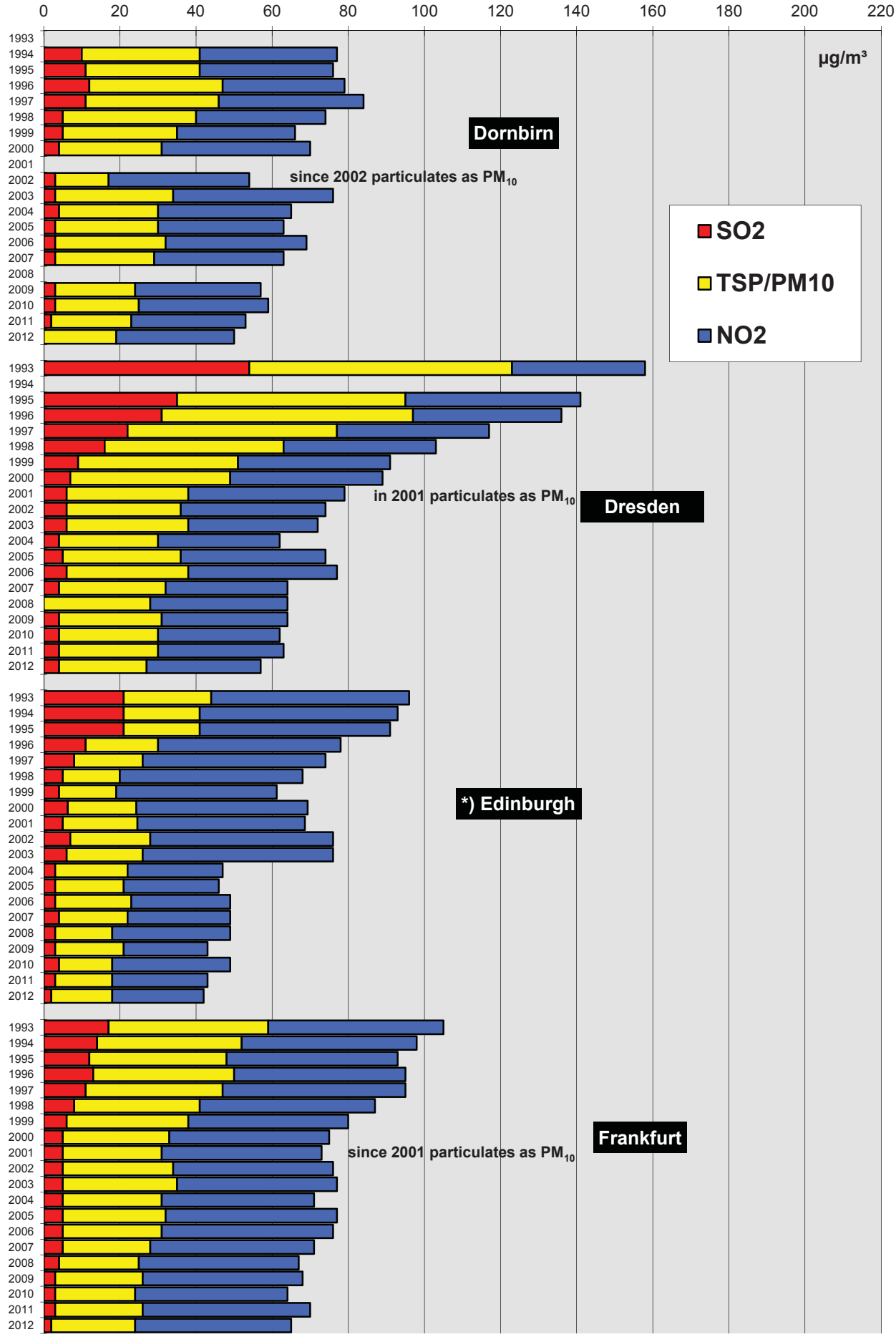


*) particulates calculated as PM_{10}

Comparison Of The Air Quality 1993-2012
Development of the annual mean values, Σ SO_2, TSP/PM_{10}, NO_2
(mean of all monitoring stations)

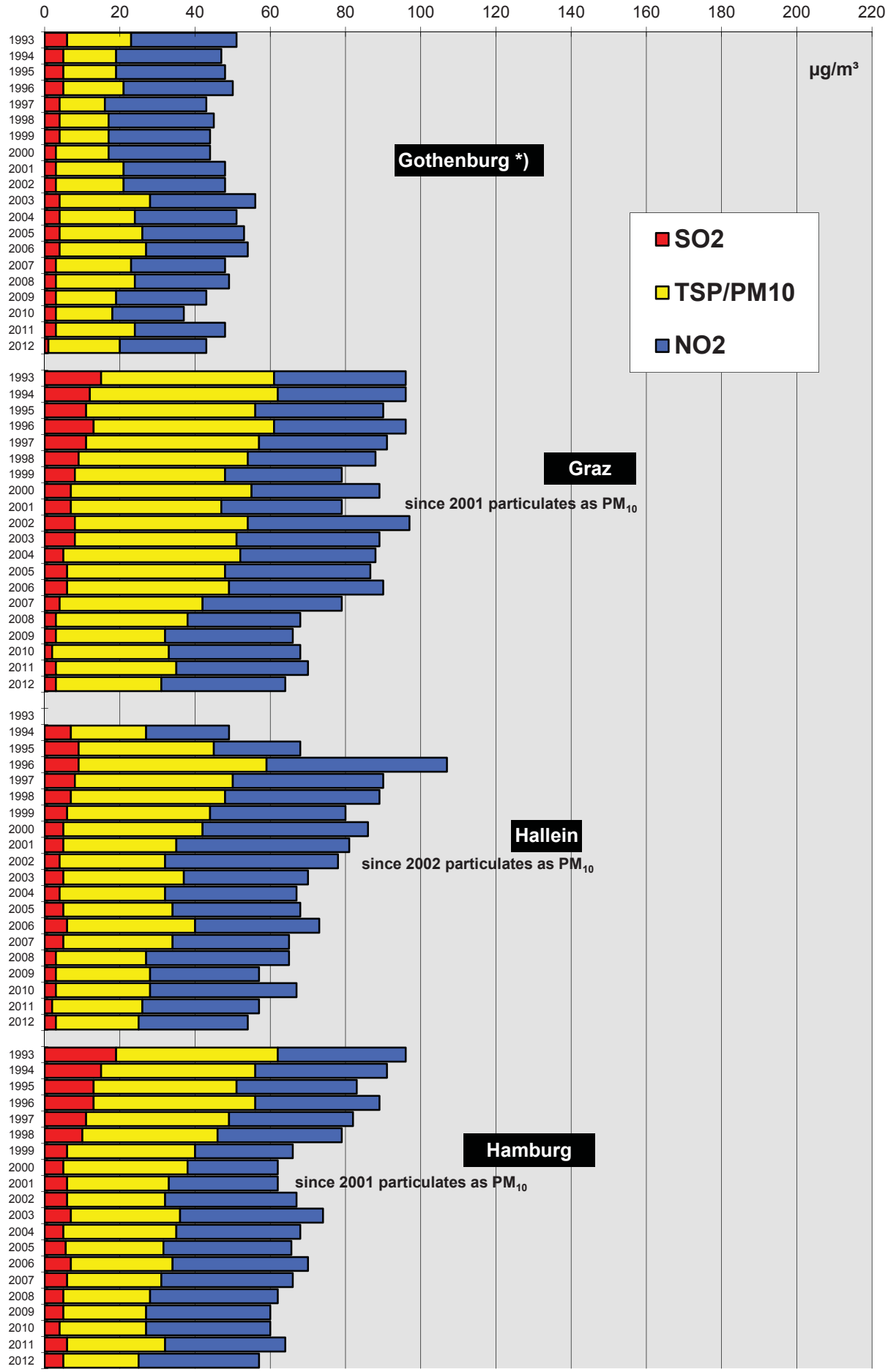


Comparison Of The Air Quality 1993-2012
Development of the annual mean values, Σ SO_2, TSP/PM_{10}, NO_2
(mean of all monitoring stations)



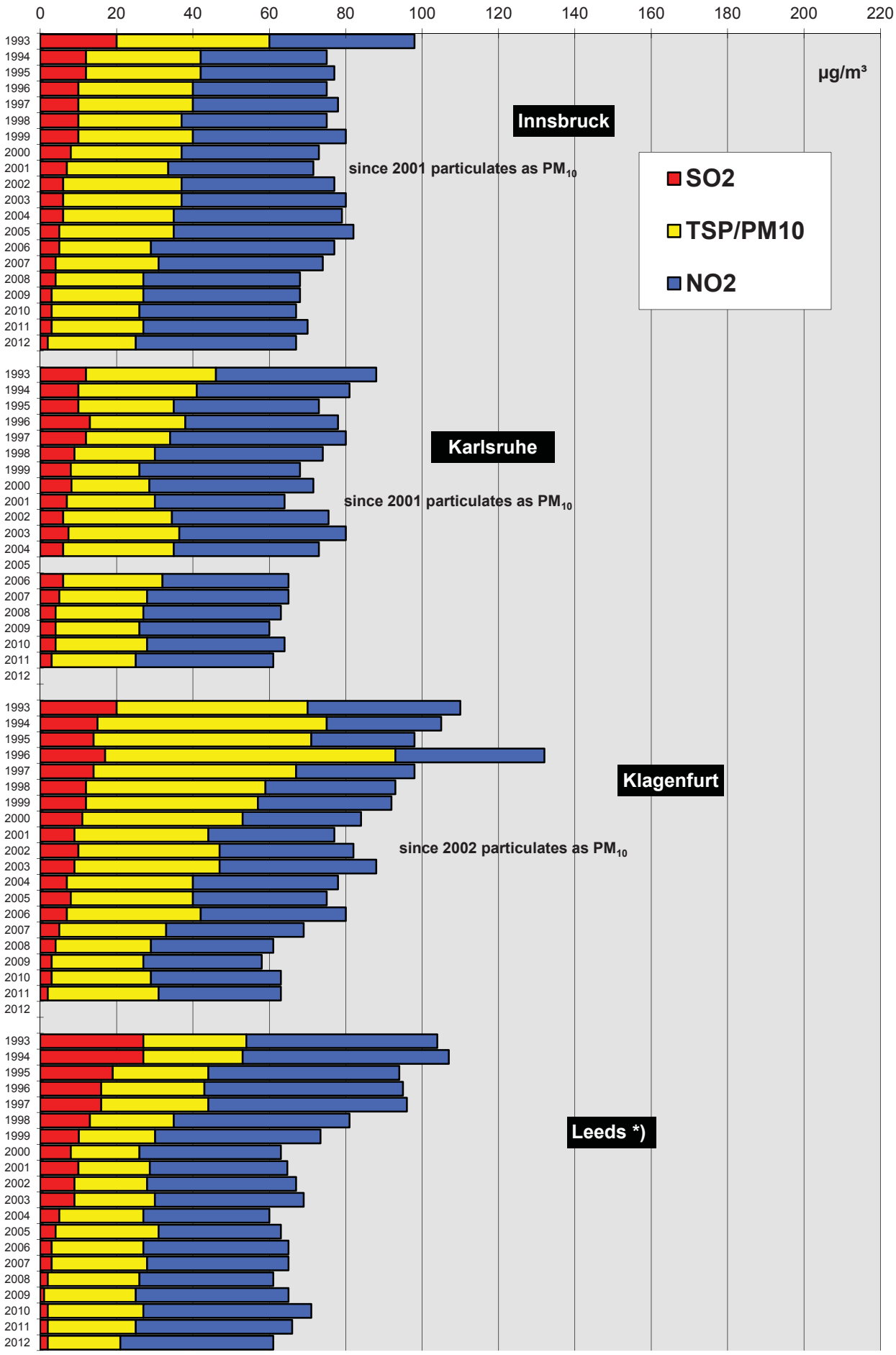
*) particulates calculated as PM_{10}

Comparison Of The Air Quality 1993-2012
Development of the annual mean values, Σ SO_2, TSP/PM_{10}, NO_2
(mean of all monitoring stations)



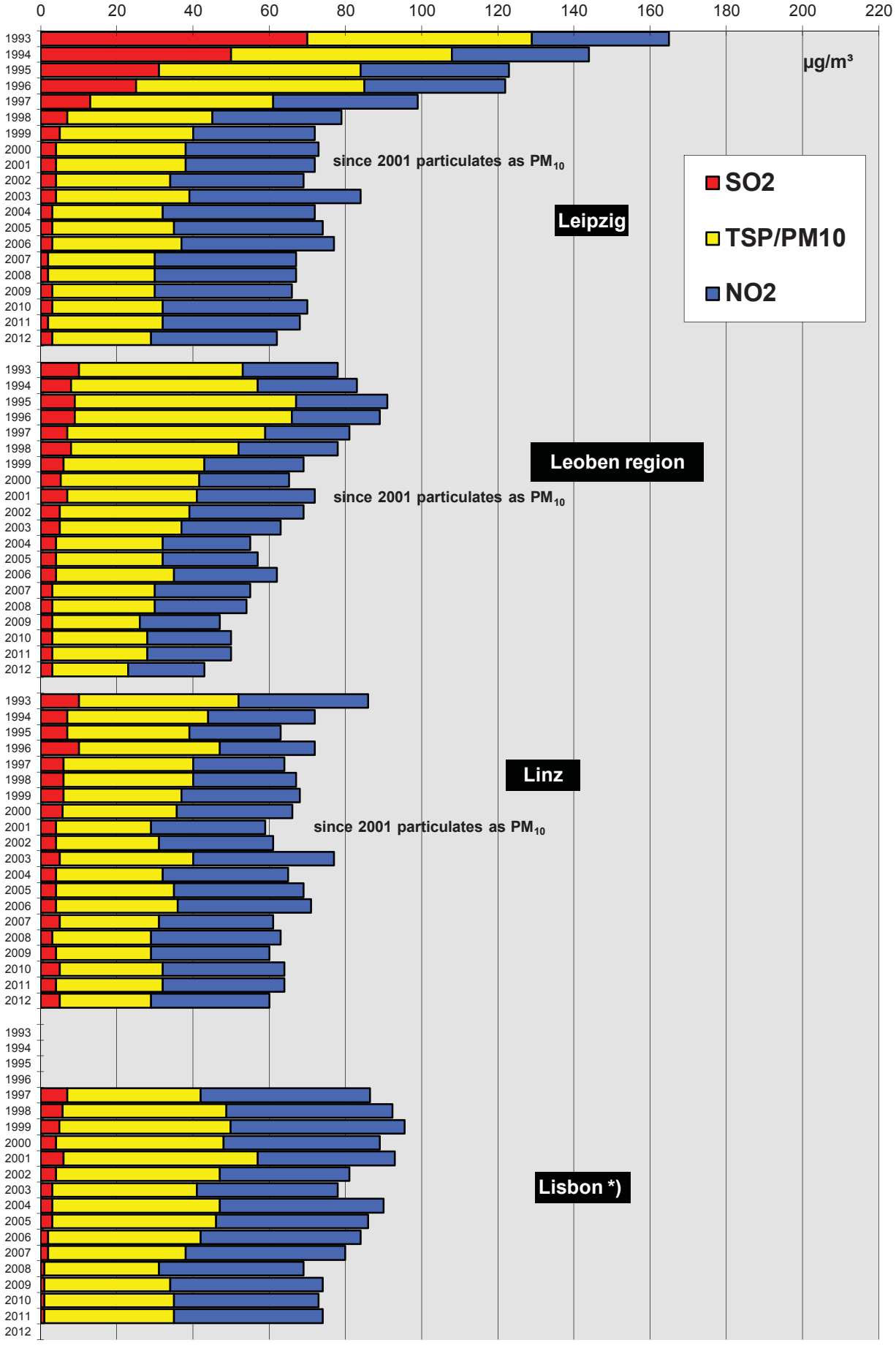
*) particulates calculated as PM_{10}

Comparison Of The Air Quality 1993-2012
Development of the annual mean values, Σ SO_2, TSP/PM_{10}, NO_2
(mean of all monitoring stations)

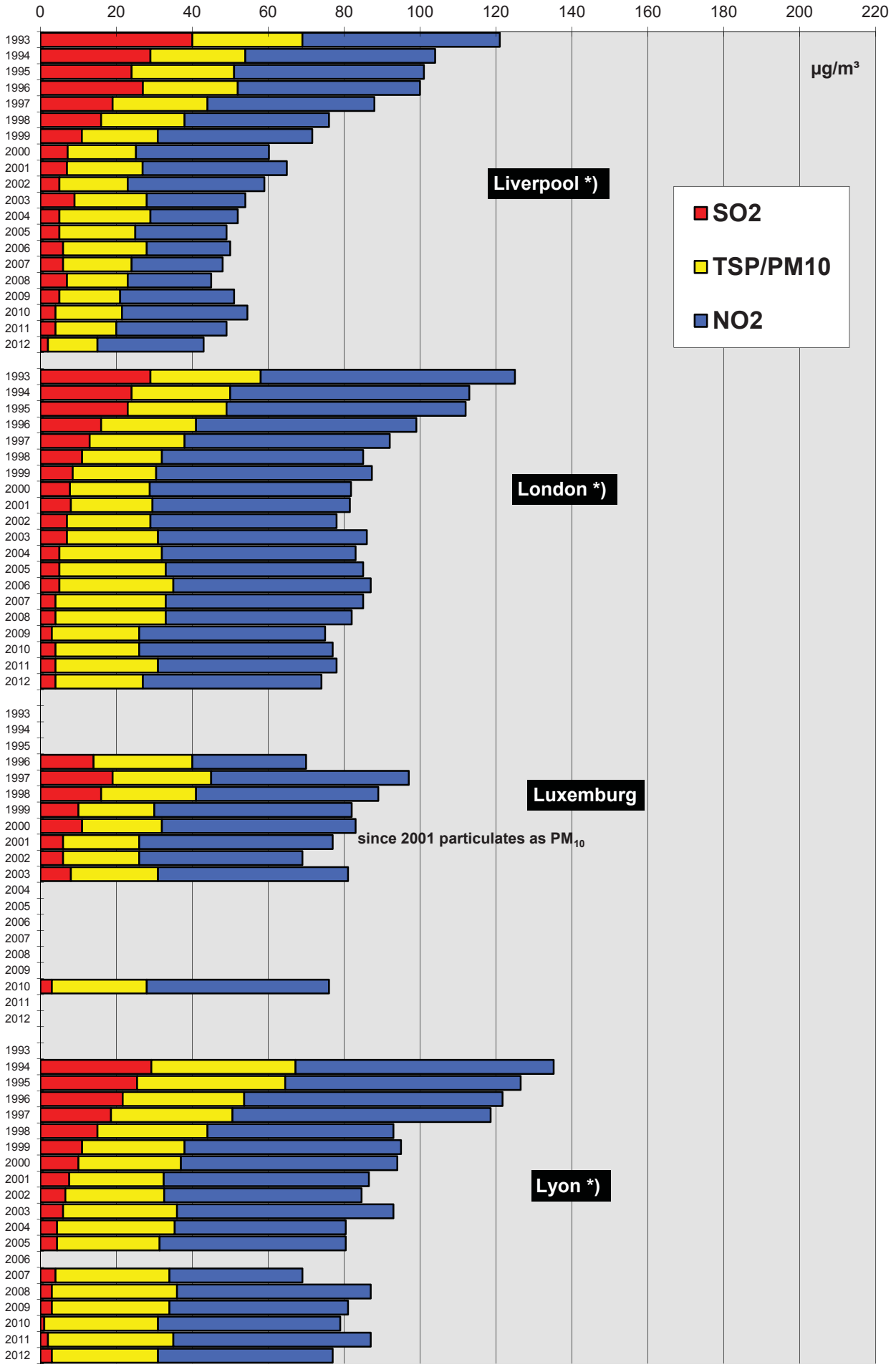


*) particulates calculated as PM_{10}

Comparison Of The Air Quality 1993-2012
Development of the annual mean values, Σ SO_2, TSP/PM_{10}, NO_2
(mean of all monitoring stations)

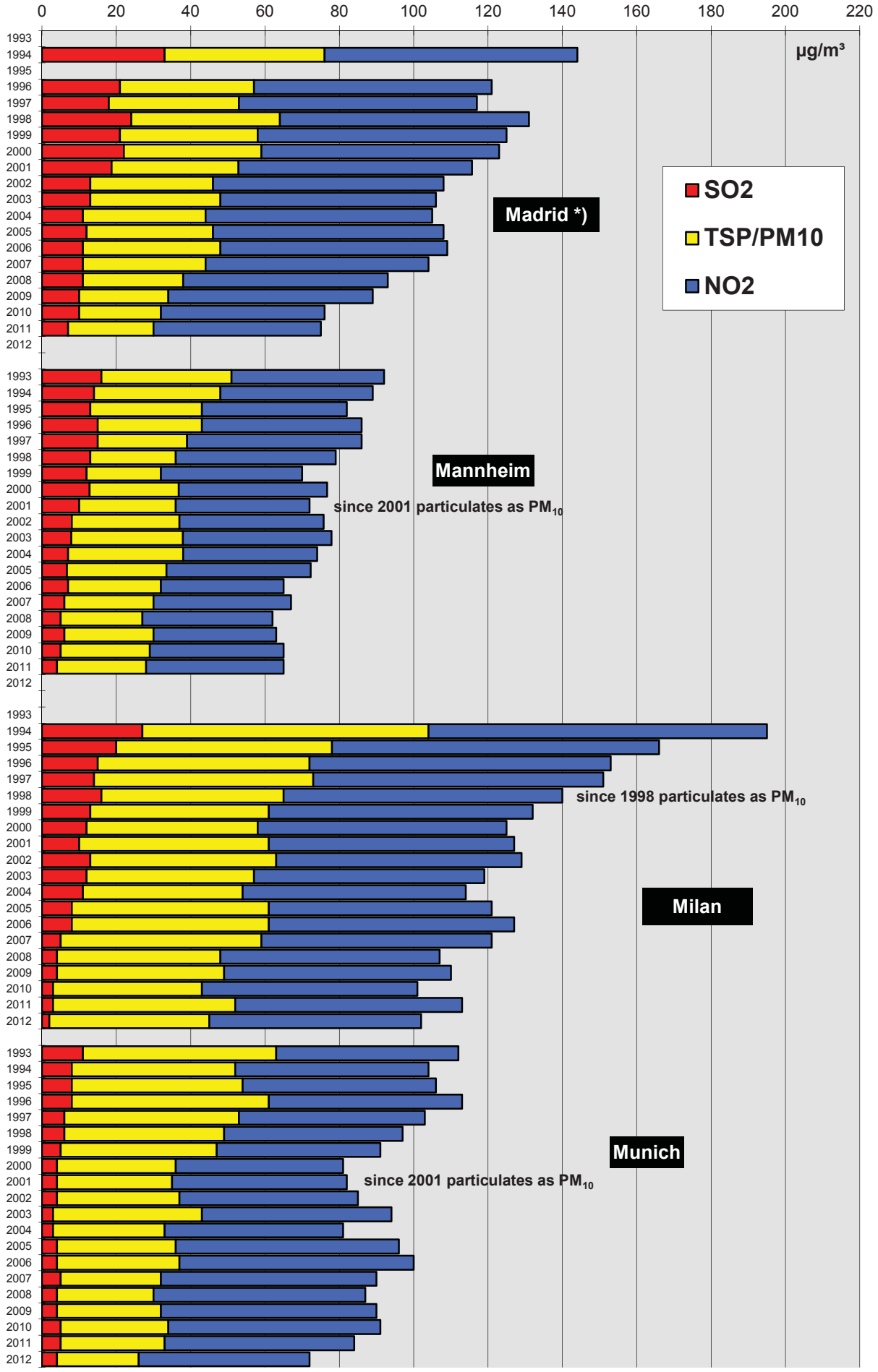


Comparison Of The Air Quality 1993-2012
Development of the annual mean values, Σ SO_2, TSP/PM_{10}, NO_2
(mean of all monitoring stations)



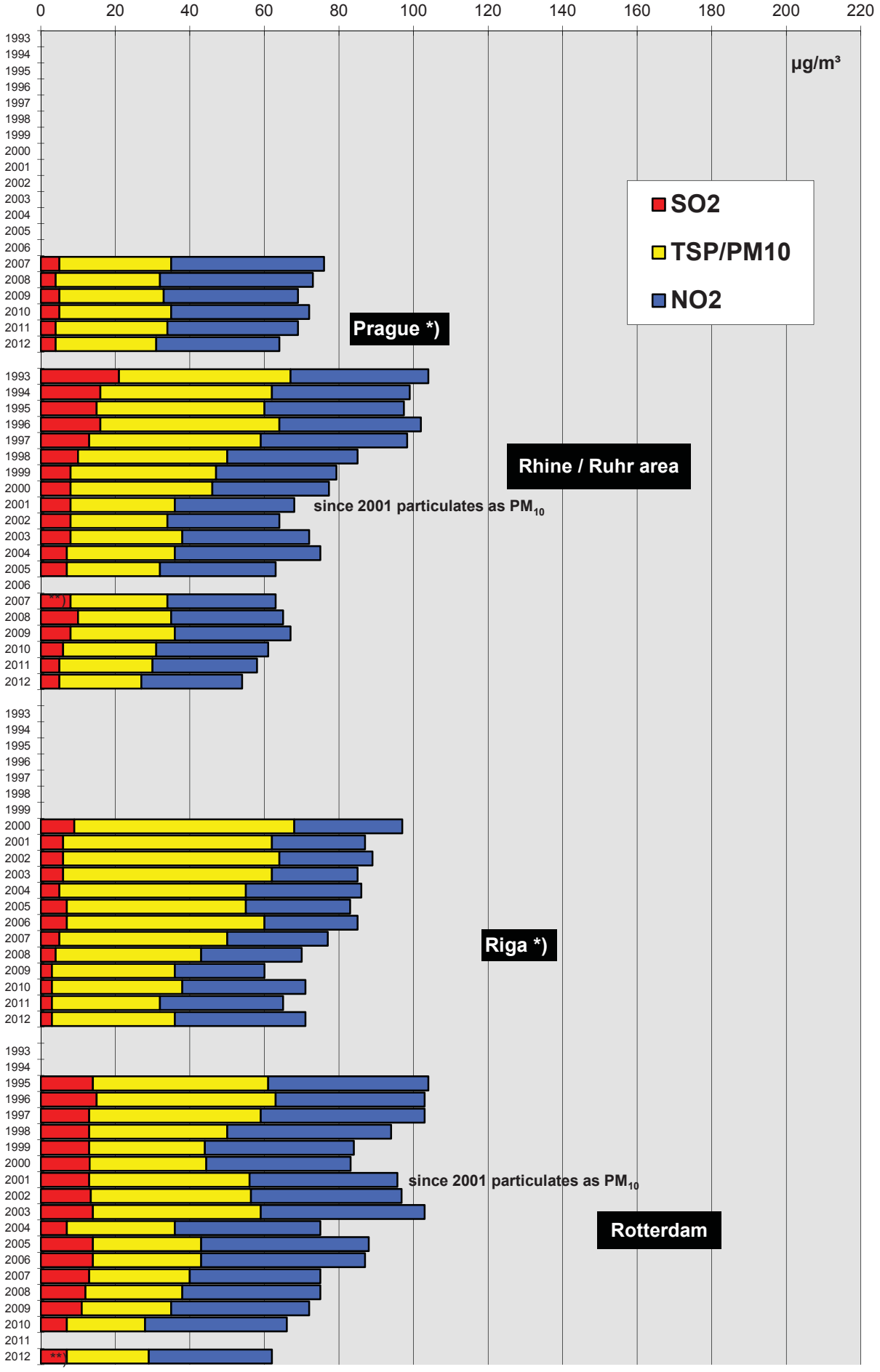
*) particulates calculated as PM_{10}

Comparison Of The Air Quality 1993-2012
Development of the annual mean values, Σ SO_2, TSP/PM_{10}, NO_2
(mean of all monitoring stations)



*) particulates calculated as PM_{10}

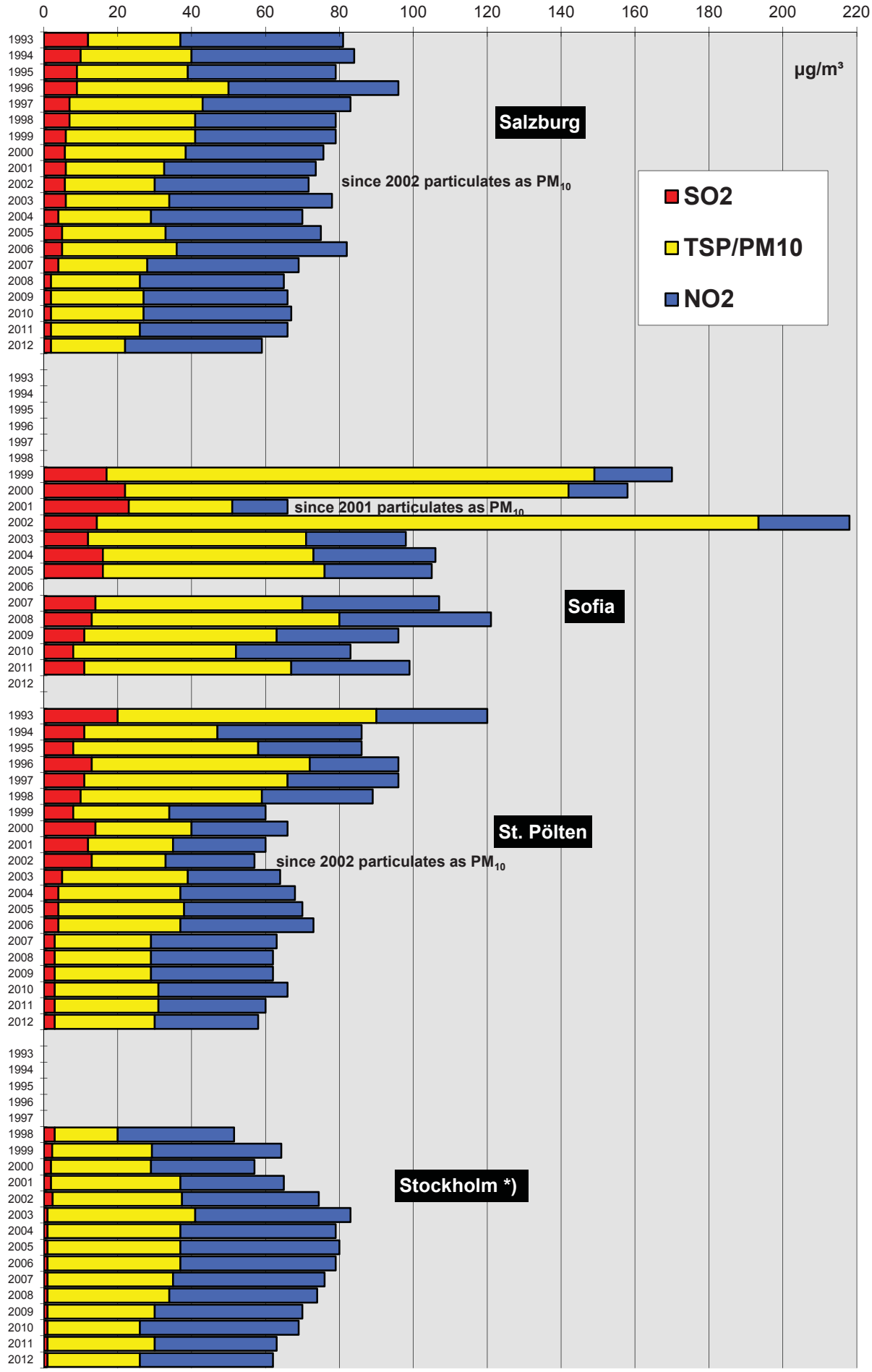
Comparison Of The Air Quality 1993-2012
Development of the annual mean values, Σ SO_2, TSP/PM_{10}, NO_2
(mean of all monitoring stations)



*) particulates calculated as PM_{10}

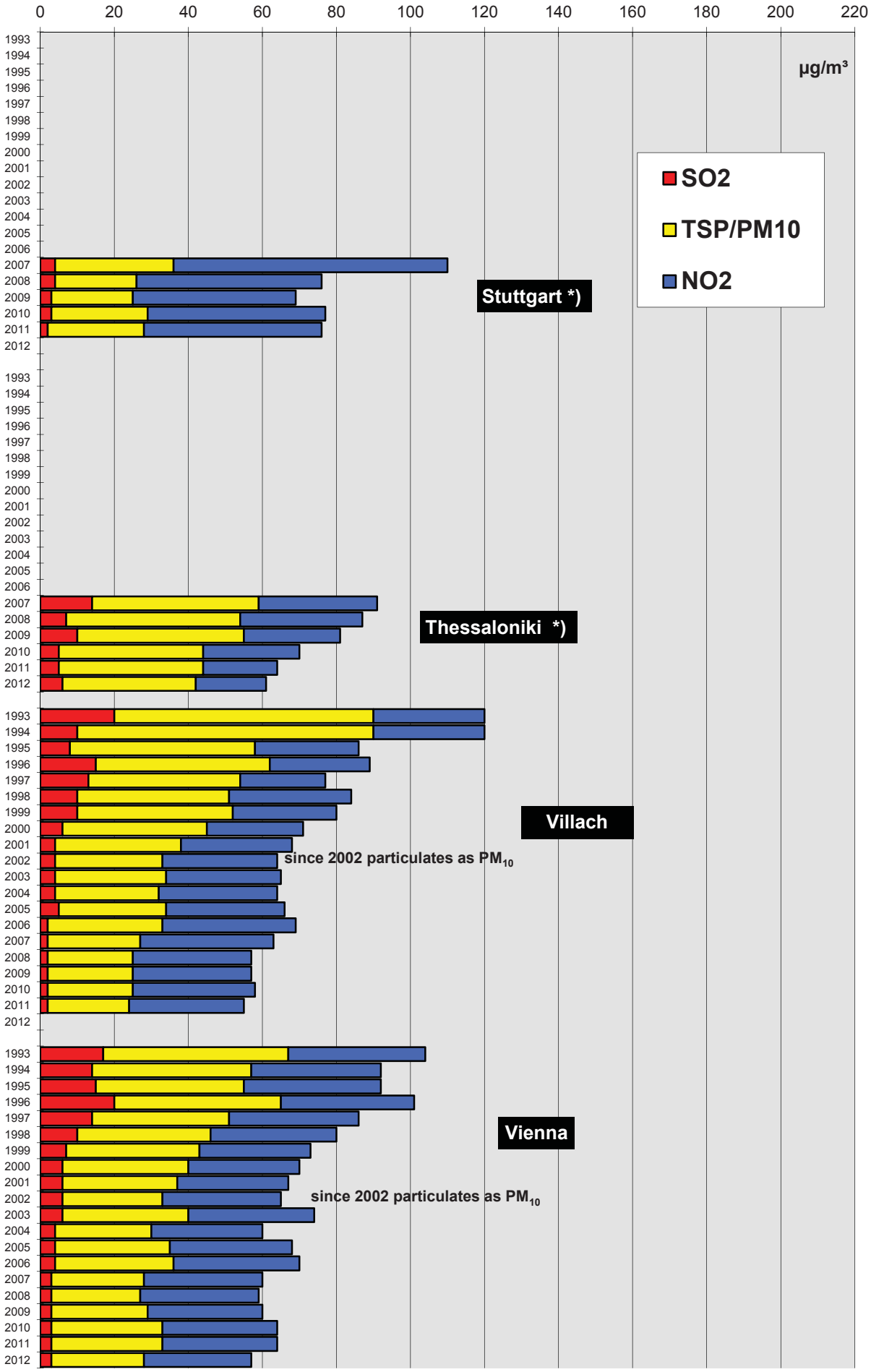
**) No data

Comparison Of The Air Quality 1993-2012
Development of the annual mean values, Σ SO_2, TSP/PM_{10}, NO_2
(mean of all monitoring stations)



*) particulates calculated as PM_{10}

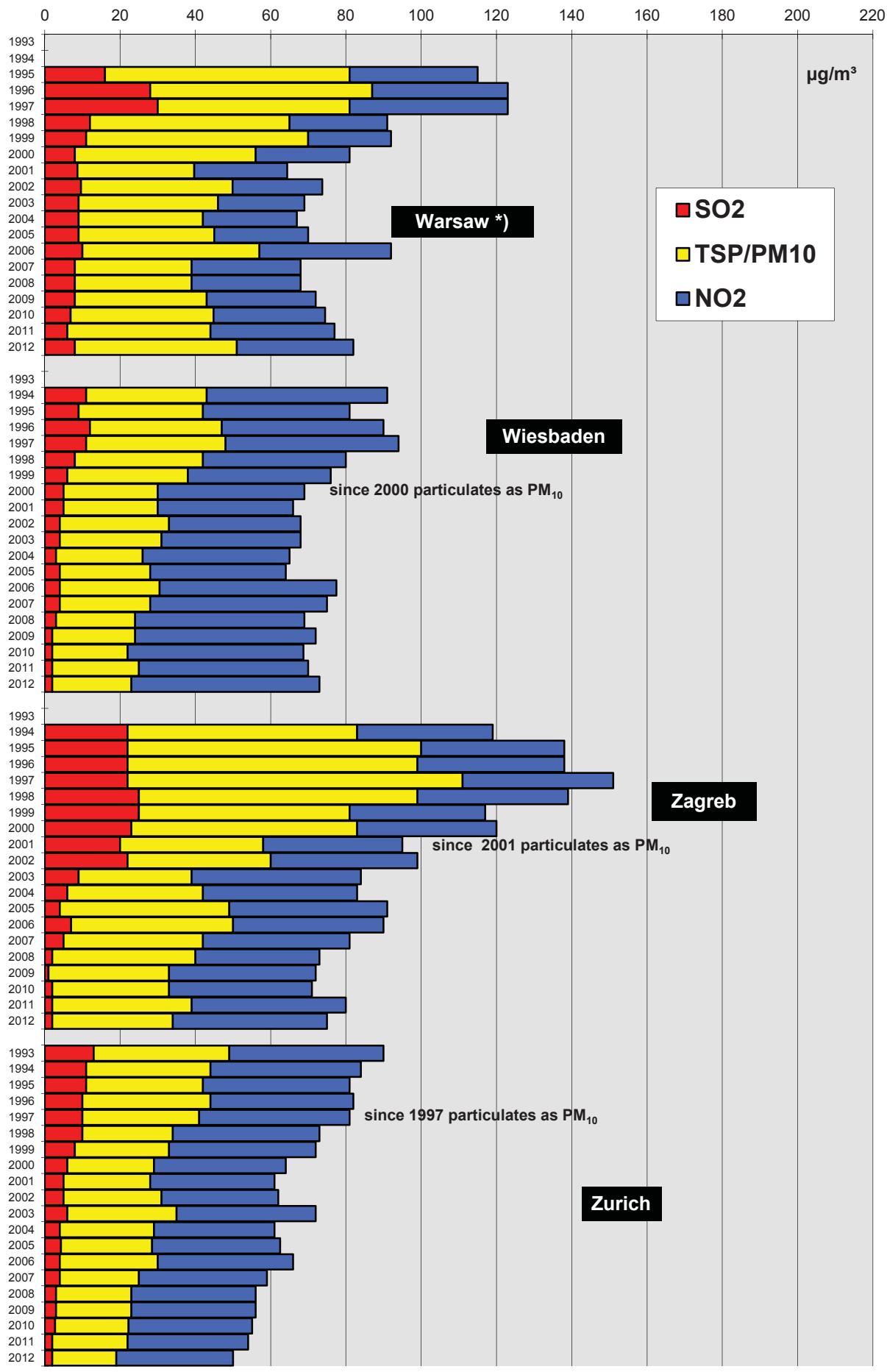
Comparison Of The Air Quality 1993-2012
Development of the annual mean values, Σ SO_2, TSP/PM_{10}, NO_2
(mean of all monitoring stations)



*) particulates calculated as PM_{10}

Comparison Of The Air Quality 1993-2012

Development of the annual mean values, Σ SO_2, TSP/PM_{10}, NO_2 (mean of all monitoring stations)



*) particulates calculated as PM_{10}

Luftgütekennzahlen 2012

der einzelnen

Vergleichsregionen

Immission Reference Values 2012

Of All Compared Regions

Comparison of The Air Quality in 2012

Athens

immission area: 1 948 km^2 population: 3 551 370

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	5	7	16	35		168		23
PM_{10}	7	31	65	189				100
$PM_{2,5}$	2	19	28	90				46
NO	14	20	140			692		263
NO_2	14	30	84			190		127
CO	7	800	2100			9600		4300
O_3	13	64	130			343		144

PM_{10}	Monitoring method(s) used:	β-attenuation
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	N/A
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if appliccable):	40
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	0

[1] arithmetic mean value of all monitoring stations of the affected area
[2] max. value of all monitoring stations of the affected area

Comparison of The Air Quality in 2012

Barcelona

immission area: 101 km^2 population: 1 611 000

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]**	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]***
SO_2	3	4	9	19	45	71	-	20
PM_{10} (A)	9	33	55	122	-	-	-	71
$PM_{2,5}$ (A)	6	20	30	69	-	-	-	44
NO	6	23	68	233	463	502	-	232
NO_2	6	48	84	139	215	262	-	137
CO	3	600	900	2000	3500	4100	-	2000
O_3	4	40	63	99	132	149	-	108

PM_{10}	Monitoring method(s) used:	gravimetrically
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	N/A
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if applicable):	48 (E)
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	5 (F)

Comments:

(A) Gravimetric method
(B) Static average (not moving average)
(C) Maximum 98 percentile of hourly values, except PM_{10} and $PM_{2.5}$, daily mean values
(D) Station: ID_BARCELONA, 42 exceedances after subtraction of natural contribution
(E) Exceedances after subtraction of natural contribution
(F) Station: IJ-BARCELONA (GRACIA-SANT GERVASI)

Area and population of the municipalities of Barcelona (not metropolitan areas)
Minimum data capture of 75%, except for gravimetric PM_{10} and $PM_{2.5}$ with a minimum data capture of 45%

[1] arithmetic mean value of all monitoring stations of the affected area
[2] max. value of all monitoring stations of the affected area

Comparison of The Air Quality in 2012

Basel

immission area: 557 km^2 population: 501 285

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	1	1.90	5.77	12.12	15.95	16.83	29.68	13.49
PM_{10}	1	15.97	32.40	78.10	139.94	210.68	235.41	78.10
$PM_{2,5}$	1	12.50	24.86	51.90	-	-	-	-
NO	1	5.54	12.05	47.64	117.52	129.88	155.18	69.01
NO_2	1	21.20	41.00	74.31	96.03	105.24	105.77	86.54
CO	-	-	-	-	-	-	-	-
O_3	1	47.10	73.05	103.22	167.09	173.61	180.04	156.64

PM_{10}	Monitoring method(s) used:	β-Meter-measurements, calibrated with gravimetrical measurements every 4 days
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	1
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if applicable):	4
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	0

Belfast

immission area: 115 km^2 population: 280 500

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	1	2	4	17				8
PM_{10}	1	15	24	69				45
$PM_{2,5}$	1	10	19	64				38
NO	1	14	43	307				92
NO_2	1	29	48	121				69
CO	1	200	300	1200				500
O_3	1	42	66	76				88

PM_{10}	Monitoring method(s) used:	TEOM (FDMS)
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	?
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if applicable):	7
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	0

[1] arithmetic mean value of all monitoring stations of the affected area
[2] max. value of all monitoring stations of the affected area

Comparison of The Air Quality in 2012

Berlin (outskirt stations)

immission area: 892 km^2 population: 3 375 200

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	-	-	-	--	--	-	-	--
PM_{10}	3	19	33	91	-	299	-	50
$PM_{2,5}$ (a)	1	16	23	77	-	-	-	46
NO	5	4	7	36	-	126	-	26
NO_2	5	14	23	46	-	98	-	45
CO	-	-	-	-	-	-	-	-
O_3	5	47	73	107	-	182	-	112

PM_{10}	Monitoring method(s) used:	PM_{10} Beta-absorption; PM_{10} Light Scattering
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	1,21; (1,0 x M1b) + 3,2
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if applicable):	7
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	0

(a) $PM_{2,5}$: mean or max. values from daily values (gravimetric measurment)

Berlin (urban stations)

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	1	2	4	19	-	44	-	12
PM_{10}	3	23	28	97	-	879 (b)	-	61
$PM_{2,5}$ (a)	3	18	26	84	-	-	-	52
NO	5	8	17	102	-	352	-	56
NO_2	5	26	33	66	-	151	-	66
CO	-	-	-	-	-	-	-	-
O_3	2	42	72	114	-	182	-	110

PM_{10}	Monitoring method(s) used:	PM_{10} Beta-absorption; PM_{10} Light Scattering
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	1,21; (1,0 x M1b) + 3,2
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if applicc.):	15
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	0

(a) $PM_{2,5}$: mean or max. values from daily values (gravimetric measurment)
(b) Max. 1h mean caused by New Year's Eve fireworks

[1] arithmetic mean value of all monitoring stations of the affected area
[2] max. value of all monitoring stations of the affected area

Comparison of The Air Quality in 2012

Berlin (traffic stations)

immission area: 892 km^2 population: 3 401 147f

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	1	3	4	20	-	41	-	12
PM_{10}	6	27	-	136	-	1239 (b)	-	65
$PM_{2,5}$ (a)	1	20	29	87	-	-	-	52
NO	6	47	63	185	-	461	-	180
NO_2	6	52	57	104	-	211	-	111
CO	2	500	610	1330	-	3300	-	1100
O_3	-	-	-	-	-	-	-	-

PM_{10}	Monitoring method(s) used:	PM_{10} Beta-absorption; PM_{10} Light Scattering
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	1,21; (1,0 x M1b) + 3,2
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if applicable):	31
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	5

(a) $PM_{2,5}$: mean or max. values from daily values (gravimetric measurment)
(b) Max. 1h mean caused by New Year's Eve fireworks

Birmingham

immission area: 268 km^2 population: 1 085 417

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	2	2	3	18				6
PM_{10}	2	21	35	82				63
$PM_{2,5}$	3	15	35	82				60
NO	1	7	12	89				36
NO_2	3	32	58	110				88
CO	-	-	-	-				-
O_3	3	35	58	97				70

PM_{10}	Monitoring method(s) used:	TEOM (FDMS)
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	?
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if applicable):	17
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	0

[1] arithmetic mean value of all monitoring stations of the affected area
[2] max. value of all monitoring stations of the affected area

Comparison of The Air Quality in 2012

Bludenz

immission area: 3 km^2 population: 13 817

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	-	-	-	-	-	-	-	-
PM_{10}	1	17	37	73	-	-	-	54
$PM_{2,5}$	-	-	-	-	-	-	-	-
NO	1	13	39	125	267	290	293	106
NO_2	1	23	42	83	123	131	132	76
CO	-	-	-	-	-	-	-	-
O_3	1	47	80	122	158	165	169	123

PM_{10}	Monitoring method(s) used:	gravimetrically
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	N/A
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if	11
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	0

Bristol

immission area: 110 km^2 population: 432 451

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	1	2	2	10				5
PM_{10}	1	18	26	65				510
$PM_{2,5}$	1	13	25	56				47
NO	2	37	96	274				160
NO_2	2	34	96	99				93
CO	1	400	600	1200				900
O_3	1	41	58	103				75

PM_{10}	Monitoring method(s) used:	TEOM (FDMS)
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	?
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if	8
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	0

[1] arithmetic mean value of all monitoring stations of the affected area
[2] max. value of all monitoring stations of the affected area

Comparison of The Air Quality in 2012

Brussels

immission area: 161 km^2 population: 1 138 854 (01.2012)

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per day, hour [µg/m³]
SO_2	7	4.4	8	16		32	36	12 (daily)
PM_{10}	6	26.3	62	158		364	379	94 (daily)
$PM_{2,5}$	5	18.8	39.4	86.3		126.0	131.4	61.7 (daily)
NO	10	16.3	52	373		1016	1099	183 (1Hr)
NO_2	10	35.9	59	116		234	288	97 (1Hr)
CO	7	270	450	900		5430	5860	730 (1Hr)
O_3	7	36.4	61	119		222	222	106 (1Hr)

PM_{10}	Monitoring method(s) used:	TEOM-FDMS (both for PM_{10} and $PM_{2,5}$)
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	1
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if appliccable):	55
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	2

Budapest

immission area: 525 km^2 population: 1 740 041

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	10	5,8	11,0	26,0	40.8	47,9	-	19,8
PM_{10}	12	29	60	168	229	330	-	120
$PM_{2,5}$	1	24	40	122	150	261	-	90
NO	12	14,6	60,2	121,3	384,1	526,7	-	157,6
NO_2	12	30,9	62,1	90,7	213,7	205,7	-	102,5
CO	12	561	1022	2285	4108	7664	-	1834
O_3	10	41,6	78,7	111,3	184	196,7	-	141,1

PM_{10}	Monitoring method(s) used:	β-absorption
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	1.1
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if appliccable):	60
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	4

[1] arithmetic mean value of all monitoring stations of the affected area
[2] max. value of all monitoring stations of the affected area

Comparison of The Air Quality in 2012

Chemnitz

immission area: 221 km^2 population: 241 210

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	0	-	-	-	-	-	-	-
PM_{10}	2	24	41	202	840	994	994	90
$PM_{2,5}$	1	16	30	68	-	-	-	-
NO	2	28	82	154	154	154	50	197
NO_2	2	34	52	91	91	91	145	106
CO	0	-	-	-	-	-	-	-
O_3	1	46	73	110	110	110	178	116

PM_{10}	Monitoring method(s) used:	gravimetrically (High-Volume-Sampler, micro balance)
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	depending on station and
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if applicable):	28
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	0

Comments:
*Equivalent factors for the PM_{10} – monitoring method:

station	PM_{10}-HVS	PM_{10}-TEOM
Chemnitz-Leipziger Straße	1.10	1.20 + f (temperature, humidity)
Chemnitz-Mitte	1.05	1.10 + f (temperature, humidity)
Chemnitz-Nord	1,10	1.14 + f (temperature, humidity)

The measurement of SO_2 on station “Chemnitz-Mitte” stopped on 1.1.2008.
The measurement of all components on station “Chemnitz-Nord” stopped on 1.1.2012.

[1] arithmetic mean value of all monitoring stations of the affected area
[2] max. value of all monitoring stations of the affected area

Comparison of The Air Quality in 2012

Copenhagen

immission area: 88 km^2 population: 528 208

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	1	2 ++)		-	-	16	-	7
PM_{10}	3	25		92	-	-	-	68
$PM_{2,5}$	2	13		67	-	-	-	37 +)
NO	3	30		-	-	636	-	227
NO_2	3	36	-	-	-	197	-	126
CO	2	331		-	-	2443	-	831
O_3	2	44		102	156	173	-	101

PM_{10}	Monitoring method(s) used:	Gravimetically , TEOM
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	?
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if 141pplicable):	29
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	0

+) derived from daily mean ++) winter period

Dornbirn

immission area: 13 km^2 population: 46 527

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	-	-	-	-	-	-	-	-
PM_{10}	1	19	40	84	-	-	-	57
$PM_{2,5}$	-	-	-	-	-	-	-	-
NO	1	23	45	98	257	383	447	117
NO_2	1	31	46	78	122	139	147	81
CO	-	-	-	-	-	-	-	-
O_3	-	-	-	-	-	-	-	-

PM_{10}	Monitoring method(s) used:	gravimetrically
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	1
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if applicable):	10
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	0

[1] arithmetic mean value of all monitoring stations of the affected area
[2] max. value of all monitoring stations of the affected area

Comparison of The Air Quality in 2012

Dresden

immission area: 328 km^2 population: 525 105

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	1	4	8	23	39	44	44	17
PM_{10}	4	23	46	123	399	551	551	92
$PM_{2,5}$	3	16	32	96	-	-	-	-
NO	4	24	100	296	296	296	713	256
NO_2	4	30	53	88	88	88	188	113
CO	-	-	-	-	-	-	-	-
O_3	3	45	81	122	122	122	194	120

PM_{10}	Monitoring method(s) used:	Gravimetrically (High-Volume-Sampler, micro balance)
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	depending on station and
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if applicable):	22
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	0

Comments:

*Equivalent factors for the PM_{10} – monitoring method:

station	PM_{10}-HVS	PM_{10}-TEOM
Dresden-Bergstr.	1.10	1.20 + f (temperature, humidity)
Dresden-Nord.	1.10	1.14 + f (temperature, humidity)
Dresden-Winckelmannstr.	1.00	1.00 + f (temperature, humidity)
Dresden-Wahnsdorf	1.05	1.00 + f (temperature, humidity)

The measurement of CO (station Dresden-Nord) and SO_2 (station Radebeul-Wahsdorf) stopped on 1.1.2008.

[1] arithmetic mean value of all monitoring stations of the affected area
[2] max. value of all monitoring stations of the affected area

Comparison of The Air Quality in 2012

Edinburgh (St. Leonhards)

immission area: 262 km^2 population: 482 640

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	1	2	4	19				8
PM_{10}	1	16	26	63				40
$PM_{2,5}$	1	11	20	54				33
NO	1	7	12	89				36
NO_2	1	24	33	80				62
CO	1	200	300	600				500
O_3	1	49	72	101				88

PM_{10}	Monitoring method(s) used:	TEOM (FDMS)
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	?
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if applicable):	2
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	0

[1] arithmetic mean value of all monitoring stations of the affected area
[2] max. value of all monitoring stations of the affected area

Comparison of The Air Quality in 2012

Frankfurt (urban stations)

immission area: 248 km^2 population: 697 509

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	2	1,8	4,1	11,6	26,1	45,8	55,1	9,6
PM_{10}	3	20,6	31,2	69,9	340,4**	676,5**	740,2**	61,2
$PM_{2,5}$	1*	15,1	25,0	52,3	-	-	-	
NO	3	21,8	51,7	183,5	283,6	410,0	436,3	143,8
NO_2	3	36,6	51,9	88,7	145,2	155,8	175,5	88,7
CO	0	-	-	-	-	-	-	-
O_3	2	35,6	66,7	133,3	195,4	199,8	202,4	115,1

PM_{10}	Monitoring method(s) used:	ß-absorption + nephelometer
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	-
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if appliccable):	11
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	0

Comments: * = monitoring method: gravimetrically
** = value is form 1.1.2012 (New Year's Eve fire works)

Frankfurt (traffic station)

immission area: 248 km^2 population: 697 509

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	0	-	-	-	-	-	-	-
PM_{10}	1	25,0	36,0	74,3	214,8**	347,4**	450,0**	68,5
$PM_{2,5}$	1	16,5	26,7	57,7	143,4**	211,0	280,3**	19,3
NO	1	42,9	71,8	210,0	437,0	554,8	555,5	189,9
NO_2	1	52,7	63,6	120,8	263,1	301,9	311,2	113,7
CO	1	430	540	1200	2780	3510	3660	1170
O_3	0	-	-	-	-	-	-	-

PM_{10}	Monitoring method(s) used:	nephelometer with ß-absorption
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	-
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if appliccable):	19
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	5

Comment: ** = value registered Jan. 1 2012 (due to New Years Eve fire works)

[1] arithmetic mean value of all monitoring stations of the affected area
[2] max. value of all monitoring stations of the affected area

Comparison of The Air Quality in 2012

Gothenburg (traffic station)

immission area: 72 164* km^2 population: 526 054

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile year [µg/m³]
SO_2	1	2,0	3,1	6,4	15,9	27,5		5,4
PM_{10}	1	21,0	30,9	97,4	409,8	801,7		74,3
$PM_{2,5}$	1	7,6	9,3	28,8	38,7	96,8		20,6
NO	1	24,7	48,9	189,6	501,0	592,3		118,1
NO_2	1	25,5	38,2	84,7	177,9	200,4		85,1
CO**	1							
O_3***	0							

PM_{10}	Monitoring method(s) used:	TEOM
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	+19% + 1.15
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if applicable):	11
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	1

Comments:

* According to the Gothenburg annual book of statistics the area of Gothenburg is 72 164 square kilometres. This is divided into land area (45 023 km^2) and aquatic area (27 141 km^2) excluding territorial sea.

** Coverage of CO has been too poor (63 percent) to report at street level this year.

*** Ozone is not measured at street level.

[1] arithmetic mean value of all monitoring stations of the affected area

[2] max. value of all monitoring stations of the affected area

Comparison of The Air Quality in 2012

Gothenburg (background)

immission area: 72 164* km^2 population: 526 054

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile year [µg/m³]
SO_2**	2	1,3	3,0	6,6	12,9	15,3		4,9
PM_{10}**	1	15,6	23,0	48,4	117,7	155,9		44,5
$PM_{2,5}$***	-	-	-	-	-	-		-
NO	1	12,6	30,5	197,5	406,7	458,7		114,9
NO_2	2	21,9	32,5	67,3	123,8	135,7		66,4
CO**	1	424	635	832	1746	2122		831
O_3**	2	52,0	76,7	127,5	141,6	163,1		108,5

PM_{10}	Monitoring method(s) used:	TEOM
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	+19%+1,15
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if applicable):	0
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	0

Comments:

* According to the Gothenburg annual book of statistics the area of Gothenburg is 72 164 square kilometres. This is divided into land area (45 023 km^2) and aquatic area (27 141 km^2) excluding territorial sea.

** Somewhat poor data coverage (between 80 and 90 percent).

*** PM2.5 is no longer measured at the background station.

[1] arithmetic mean value of all monitoring stations of the affected area

[2] max. value of all monitoring stations of the affected area

Comparison of The Air Quality in 2012

Graz (urban stations)

immission area: 128 km^2 population: 265 318

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	3	3	7	13	22	54	56	10
PM_{10}*	6	25	48	118	-	-	-	27**
$PM_{2,5}$*	2	19	37	92	-	-	-	62**
NO	5	20	80	221	409	473	510	219
NO_2	5	30	49	94	128	151	151	92
CO	2	400	900	1600	2800	5100	9800	1600
O_3	4	47	89	120	153	160	163	124

PM_{10}	Monitoring method(s) used:	continuously / gravimetrically*
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	N/A
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if applicable):	34*
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	0

Comments:

Max. 3h-mean value = moving average, Max 1h-mean value = static average

* PM_{10}: gravimetric monitoring method

** Max. 98-Percentile per year is calculated from daily mean values

[1] arithmetic mean value of all monitoring stations of the affected area
[2] max. value of all monitoring stations of the affected area

Graz (traffically influenced Don Bosco)

immission area: 128 km^2 population: 265 318

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³] ***	max. 1h mean value [2] [µg/m³] ****	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	1	3	4	12	20	26	29	9
PM_{10}*	1	33	55	142	-	-	-	87**
$PM_{2,5}$	-	-	-	-	-	-	-	-
NO	1	56	117	254	544	532	760	289
NO_2	1	47	64	109	151	164	200	110
CO	1	500	800	1600	2800	3100	3200	1500
O_3	-	-	-	-	-	-	-	-

PM_{10}	Monitoring method(s) used:	continuously, gravimetrically*
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	1
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if applicable):	49 *
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	-

Comments:

* PM_{10}: gravimetric monitoring method

** Max. 98-Percentile per year is calculated from daily mean values.

*** Max 3h-mean value = moving average,

**** Max 1h-mean value = static average

[1] arithmetic mean value of all monitoring stations of the affected area

[2] max. value of all monitoring stations of the affected area

Comparison of The Air Quality in 2012

Hallein

immission area: 27 km^2 population: 20 022

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	2	3,15	4,7	16,2	81,1	112,1	123,4	11,2
PM_{10}	1	22,4	48	89,4				
$PM_{2,5}$	0							
NO	2	26,4	88	177,4	399	464,5	542	215
NO_2	2	28,5	69	99	132	143	165	100
CO	1	420	680	1010	1580	1830	3180	1090
O_3	1	62	88	117	162	166	167	121

PM_{10}	Monitoring method(s) used:	Digitel
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	---
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if applicable):	18 **
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	0

Comments:

** PM_{10} – exeedances of limit values: 2 Days due to winter services on the streets
The „Winterstreuverordnung (BGBl. II Nr.131/2012)“ regulates the deduction of PM_{10} - exeedances of limit values caused by winter services like road salt and grit. In 2012 there are deducted two days on station “Hallein B159”.

[1] arithmetic mean value of all monitoring stations of the affected area
[2] max. value of all monitoring stations of the affected area

Comparison of The Air Quality in 2012

Hamburg (area monitoring stations)

immission area: 755 km^2 population: 1 810 698

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	5	5	15	90	189	329	386	57
PM_{10}	8	19	31	87	414	535	574	61
$PM_{2,5}$	3	13	20	68	273	351	404	42
NO	13	9	29	122	428	522	589	114
NO_2	13	24	44	70	115	135	135	77
CO	2	212	313	603	1566	3918	7307	555
O_3	6	43	68	94	168	178	182	104

PM_{10}	Monitoring method(s) used:	TEOM (7 stations), β-absorption (Sharp) (1 station)
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	1
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if appliccable):	8
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	0

Hamburg (traffic stations)

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile peryear [µg/m³]
SO_2	-	-	-	-	-	-	-	-
PM_{10}	3	24	35	117	801	1215	1644	66
$PM_{2,5}$	1	18	24	78	484	782	956	47
NO	4	64	126	279	524	639	716	333
NO_2	4	59	75	119	197	226	234	149
CO	4	450	653	1268	2204	2837	4235	1403
O_3	-	-	-	-	-	-	-	-

PM_{10}	Monitoring method(s) used:	β-absorption (1 stations); TEOM (3 stations)
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	1
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if appliccable):	12
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	2

[1] arithmetic mean value of all monitoring stations of the affected area
[2] max. value of all monitoring stations of the affected area

Comparison of The Air Quality in 2012

Innsbruck

immission area: 105 km^2 population: 121 329

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	1	2	5	13	23	25	26	8
PM_{10}	2	22	54	90				
$PM_{2,5}$	1	15	35	74				
NO	2	39	84	312			707	199
NO_2	2	40	69	132	246	252	262	103
CO	1	374	742	1552	2957	3264	3310	1032
O_3	3	88	107	133	151	152	153	126

PM_{10}	Monitoring method(s) used:	gravimetrically (Digitel HVS)
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	1
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if applicable):	23
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	3

[1] arithmetic mean value of all monitoring stations of the affected area
[2] max. value of all monitoring stations of the affected area

Comparison of The Air Quality in 2012

Karlsruhe (urban station) immission area: 173 km² population: 296 033*

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	1	2	-	13	-	64	-	-
PM_{10}	1	18	31	59	-	-	-	-
$PM_{2,5}$	1	13	25	47	-	-	-	-
NO	1	9	-	109	-	459	-	-
NO_2	1	23	-	63	-	141	-	-
CO	-	-	-	-	-	-	-	-
O_3	1	47	-	119	-	177	-	-

PM_{10}	Monitoring method(s) used:	gravimetrically
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	N/A
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if applicable):	4
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	0

Comment: * 2012; source: Statistisches Landesamt Baden-Württemberg

Karlsruhe (traffic station) immission area: 173 km² population: 297 488*

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	-	-	-	-	-	-	-	-
PM_{10}	1	22	36	78	-	-	-	-
$PM_{2,5}$	1	14	27	53	-	-	-	-
NO	1	43	-	193	-	515	-	-
NO_2	1	52	-	117	-	284	-	-
CO	1	400	-	1200	-	3900	-	-
O_3	-	-	-	-	-	-	-	-

PM_{10}	Monitoring method(s) used:	gravimetrically
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	N/A
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if applicable):	8
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	1

Comments: * 2012; source: Statistisches Landesamt Baden-Württemberg

[1] arithmetic mean value of all monitoring stations of the affected area
[2] max. value of all monitoring stations of the affected area

Comparison of The Air Quality in 2012

Klagenfurt

immission area: 120 km^2 population: 95 928

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	1	1	4	9	32	47	51	7
PM_{10}	2	23	44	87	-	-	-	-
$PM_{2,5}$	1	17	32	71	-	-	-	-
NO	2	26	83	195	399	463	485	192
NO_2	2	31	58	87	140	201	229 *)	97
CO	1	502	880	1541	2629	3141	3914	1513
O_3	2	43	82	109	151	155	156	123

PM_{10}	Monitoring method(s) used:	continuously (Sharp 5030)
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	--
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if appliccable):	20 (27)**)
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	1

Comments: *) The high value (1-HMW>200µg/m³) is caused by road works close to the monitoring station.

**) In Parentheses: Including the contribution of salt strewing

[1] arithmetic mean value of all monitoring stations of the affected area
[2] max. value of all monitoring stations of the affected area

Comparison of The Air Quality in 2012

Leeds

immission area: 552 km^2 population: 474 632

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	1	2	3	23				9
PM_{10}	2	19	37	109				64
$PM_{2,5}$	2	16	28	93				45
NO	2	32	65	372				129
NO_2	2	40	54	122				87
CO	1	500	600	1300				800
O_3	1	39	67	99				77

PM_{10}	Monitoring method(s) used:	TEOM (FDMS)
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	?
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if	18
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	0

[1] arithmetic mean value of all monitoring stations of the affected area
[2] max. value of all monitoring stations of the affected area

Comparison of The Air Quality in 2012

Leipzig

immission area: 298 km^2 population: 520 838

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	1	3	5	16	34	70	70	11
PM_{10}	3	26	45	131	670	1393	1393	91
$PM_{2,5}$	2	15	33	105				
NO	3	27	78	171	171	171	547	186
NO_2	3	33	53	82	82	82	220	97
CO								
O_3	1	48	73	118	118	118	179	117

PM_{10}	Monitoring method(s) used:	gravimetrically (High-Volume-Sampler, micro balance)
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	depending on station*
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if applicable):	39
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	0

Comments:

*Equivalent factors for the PM_{10} – monitoring method:

station	PM_{10}-HVS	PM_{10}-TEOM
Leipzig-Lützner Str.	1.10	1.20 + f (temperature, humidity)
Leipzig-Mitte	1.10	1.14+ f (temperature, humidity)
Leipzig-West	1.05	1.00+ f (temperature, humidity)

The measurement of CO in “Leipzig Mitte” is stopped on 1.1.2008.

[1] arithmetic mean value of all monitoring stations of the affected area
[2] max. value of all monitoring stations of the affected area

Comparison of The Air Quality in 2012

Leoben (Leoben, Donawitz, Göß)

immission area: 108 km^2 population: 24 645

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	3	3	6	15	64	127	161	19
PM_{10} *	1	20	27	62	-	-	-	45**
$PM_{2,5}$	-	-	-	-	-	-	-	-
NO	4	10	34	90	154	191	222	89
NO_2	4	20	38	66	102	104	108	69
CO	1	700	900	2900	6500	10600	11800	3400
O_3	1	38	65	92	157	157	157	115

PM_{10}	Monitoring method(s) used:	continuously, gravimetrically*
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	1
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if appliccable):	3 *
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	0

Comments:

Max 3h-mean value = moving average, Max 1h-mean value = static average

* PM_{10}: gravimetrically monitoring method

** Max. 98-Percentile per year is calculated from daily mean values.

[1] arithmetic mean value of all monitoring stations of the affected area
[2] max. value of all monitoring stations of the affected area

Comparison of The Air Quality in 2012

Linz

immission area: 96 km^2 population: 193 486

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	5	5	17	41	75	112	203	44
PM_{10}	6	24	47	112	401	808	814	83
$PM_{2,5}$	3	16	35	86				
NO	7	19	82	201	510	622	649	191
NO_2	7	31	55	99	233	251	253	123
CO	5	360	650	1400	3000	3100	3900	1600
O_3	3	39	67	99	153	156	159	120

PM_{10}	Monitoring method(s) used:	gravimetrically and continuously
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	1 / 1.2
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if	25
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	7

Lisbon

immission area: 85 km^2 population: 550 000

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2								
PM_{10}								
$PM_{2,5}$								
NO								
NO_2								
CO								
O_3								

No Data for 2012!

PM_{10}:	Monitoring method(s) used:	Beta-absorption, TEOM
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if applicable):	
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	

[1] arithmetic mean value of all monitoring stations of the affected area
[2] max. value of all monitoring stations of the affected area

Comparison of The Air Quality in 2012

Liverpool

immission area: 112 km^2 population: 465 700

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	1	2	5	13				9
PM_{10}	1	13	23	64				44,7
$PM_{2,5}$	1	11	19	77				41,3
NO	2	14	33	120				79
NO_2	2	28	47	102				74
CO	1	300	300	600				500
O_3	1	47	66	86				82

PM_{10}	Monitoring method(s) used:	TEOM (FDMS)
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if applicable):	4
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	0

London

immission area: 1 572 km^2 population: 8 308 000

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	6	4	11	23				18
PM_{10}	7	23	47	94				72
$PM_{2,5}$	11	15	35	80				60
NO	17	35	215	395				303
NO_2	17	47	110	172				143
CO	7	300	800	1200				1100
O_3	10	33	63	99				79

PM_{10}	Monitoring method(s) used:	GRAV EQ, TEOM (FDMS)
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	?
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if	23
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	143

[1] arithmetic mean value of all monitoring stations of the affected area
[2] max. value of all monitoring stations of the affected area

Comparison of The Air Quality in 2012

Lyon (urban site)

immission area: 47,9 km^2 population: 445 274

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	3	1	-	16	-	48	-	11
PM_{10}	2	24	-	90	-	279	-	73
$PM_{2,5}$	1	20	-	66	-	95	-	59
NO	3	13	-	152	-	401	-	134
NO_2	3	31	-	99	-	219	-	92
CO	-	-	-	-	-	-	-	-
O_3	3	45	-	108	-	177	-	115

PM_{10}	Monitoring method(s) used:	TEOM
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	FDMS
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if applicable):	23
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	3

Lyon (traffic site)

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	-	-	-	-	-	-	-	-
PM_{10}	3	31	-	112	-	216	-	101
$PM_{2,5}$	1	24	-	73	-	126	-	66
NO	4	53	-	362	-	613	-	328
NO_2	4	57	-	154	-	338	-	180
CO	3	410	-	1124	-	2586	-	1095
O_3	-	-	-	-	-	-	-	-

PM_{10}	Monitoring method(s) used:	TEOM
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	FDMS
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if applicable):	69*
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	66*

Comment: * station near a highway

[1] arithmetic mean value of all monitoring stations of the affected area
[2] max. value of all monitoring stations of the affected area

Comparison of The Air Quality in 2012

Madrid

immission area: 604 km^2 population: 3 207 000

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]*	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year** [µg/m³]
SO_2	10	4	17	31	89	104	-	38
PM_{10}	12	24	51	161	280	451	-	109
$PM_{2,5}$	6	12	18	59	89	123	-	42
NO	24	25	141	276	782	933	-	319
NO_2	24	39	81	116	271	353	-	158
CO	10	400	900	1400	3400	4400	-	1500
O_3	14	41	73	103	156	162	-	113

PM_{10}	Monitoring method(s) used:	Oscillating microbalance
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	1,29 (summer); 0,85 (winter); 1,07 (autumn-spring)
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if applicable):	22 ***
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	52 ****

Comments:

* Static average (not moving average)
** Maximum 98 percentile of 1-hour values
*** Station: Castellana; 16 exceedances after subtraction of natural contribution/ P90.4=51
**** Station: Barrio del Pilar

Area and population of the municipalities of Madrid (not metropolitan areas)

Minimum data capture of 75%

In 2010, Madrid Air Quality Network has been restructured in order to meet the new obligations of Directive 2008/50/EC, Due to this fact, the number of stations have changed significantly

[1] arithmetic mean value of all monitoring stations of the affected area
[2] max. value of all monitoring stations of the affected area

Comparison of The Air Quality in 2012

Mannheim (urban station)

immission area: 145 km^2 population: 294 627*

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	1	3	--	14	-	114	-	-
PM_{10}	2	19,5	31	69	-	-	-	-
$PM_{2,5}$	1	14	25	51	-	-	-	-
NO	2	12	-	124	-	310	-	-
NO_2	2	29,5	-	79	-	175	-	-
CO	-	-	-	-	-	-	-	-
O_3	2	43,5	-	125	-	216	-	-

PM_{10}	Monitoring method(s) used:	Gravimetrically
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	N/A
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if applicable):	9
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	0

Mannheim (traffic station)

immission area: 145 km^2 population: 314 931*

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2 **	1	6	-	29	-	104	-	-
PM_{10}	1	26	28	78	-	-	-	-
$PM_{2,5}$	1	16	26	69	-	-	-	-
NO	1	39	-	175	-	417	-	-
NO_2	1	51	-	104	-	182	-	-
CO	1	400	-	1100	-	2400	-	-
O_3	-	-	-	-	-	-	-	-

PM_{10}	Monitoring method(s) used:	Gravimetrically
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	N/A
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if applicable):	23
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	0

Comments:
* 2012: source: Statistisches Landesamt Baden-Württemberg
** SO_2 emitter is near the monitoring station MA-Nord

[1] arithmetic mean value of all monitoring stations of the affected area
[2] max. value of all monitoring stations of the affected area

Comparison of The Air Quality in 2012

Milan

immission area: 182 km^2 population: 1 324 110

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year* [µg/m³]
SO_2	1	2		9		22		8
PM_{10}	3	43		228		306		122
$PM_{2,5}$	1	30		171		n.a.		92
NO	8	41		416		785		300
NO_2	8	57		194		337		184
CO	4	1093		3609		5354		3075
O_3	3	42		124		204		149

PM_{10}	Monitoring method(s) used:	Beta attenuation
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	1
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if	107
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	99

Comments: * SO_2, PM_{10}, $PM_{2,5}$: Max 98-percentile per year of daily mean value
NO, NO_2, CO, O_3: Max 98-percentile per year of 1 h mean value

[1] arithmetic mean value of all monitoring stations of the affected area
[2] max. value of all monitoring stations of the affected area

Comparison of The Air Quality in 2012

Munich

immission area: 310 km^2 population: 1 380 000

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	1	4	7	15	20	21	22	8
PM_{10}	4	22	51	106	126	136	145	65
$PM_{2,5}$	4	14	35	85	102	112	118	46
NO	5	35	117	257	548	590	679	292
NO_2	5	46	90	146	230	274	280	167
CO	4	400	700	1200	2200	3100	3600	1200
O_3	3	39	72	100	152	155	158	113

PM_{10}	Monitoring method(s) used:	β-absorption / Oscillating micro balance / nephelometer + β-absorption
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	1,25 / 1,0
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if	27
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	27

Comments:

PM_{10} / $PM_{2,5}$: The values from Jan. 1 2012 are not considered, because of very high single data due to fireworks during the New Year's Eve. But these values are included when calculating the number of violations of the daily mean limiting standard.

[1] arithmetic mean value of all monitoring stations of the affected area
[2] max. value of all monitoring stations of the affected area

Comparison of The Air Quality in 2012

Prague

immission area: 496 km^2 population: 1 250 000

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile from daily mean per year [µg/m³] **
SO_2	8	4.2	14.8	38.9	–	73.2	–	22.1
PM_{10}	20	26.7	48.5	148.0	–	286.0	–	86.8
$PM_{2,5}$	7	16.4	38.2	98.5	–	202.0	–	69.3
NO	15	17.7	81.1	246.6	–	617.9	–	142.9
NO_2	19	32.5	67.3	153.0	–	238.2	–	100.4
CO	5	583.9	1214.1	2541.2	–	5012.6	–	1664.6
O_3	8	44.2	81.5	129.0	–	203.3	–	100.7

PM_{10}	Monitoring method(s) used:	5 x gravimetrically, 14 x radiometrically, 1 x optoelectronically
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	1.0 *
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if appliccable):	73
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	4

Comments:

** Max. 98-Percentiles of all monitoring stations are calculated from daily means.

* The correction factor for the PM_{10} and $PM_{2.5}$ measured data from the database = 1. The correction factor built in the PM_{10} and $PM_{2.5}$ analyzer (beta absoption) is set to the value 1.3.

[1] arithmetic mean value of all monitoring stations of the affected area
[2] max. value of all monitoring stations of the affected area

Comparison of The Air Quality in 2012

Riga (urban station)

immission area: 307 km^2 population: 659 418

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	2	3.2	7.9	24.5	36.1	43.6	48.4	10.7
PM_{10}	1	22.8	41.1	111.6	-	-	-	57.6
$PM_{2,5}$	1	17.3	23.7	94.1	-	-	-	49.2
NO	-	-	-	-	-	-	-	-
NO_2	2	27.8	49.7	102.5	171.9	197.3	213.5	92.2
CO	-	-	-	-	-	-	-	-
O_3	2	58.4	87.5	109.2	121.2	128.1	131.0	110.9

PM_{10}	Monitoring method(s) used:	beta absorption
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	1.0
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if applicable):	0
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	0

Comments: *98-percentiles:* SO_2, NO_2, CO, Ozone: 98%-value of the hour's means
98-percentiles: PM_{10}: 98%-value of the daily means

Riga (traffic station)

immission area: 307 km^2 population: 659 418

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	-	-	-	-	-	-	-	-
PM_{10}	2	37.5	61.3	147.1	113.3	129.8	130.8	91.6
$PM_{2,5}$	-	-	-	-	-	-	-	-
NO	1	90.1	125.7	270.1	524.1	744.0	779.5	295.1
NO_2	1	48.4	58.9	87.3	132.0	174.5	175.7	111.6
CO	1	500.0	700.0	1000.0	1100.0	1400.0	1400.0	900.0
O_3	1	20.4	30.6	55.8	83.5	85.4	85.5	57.8

PM_{10}	Monitoring method(s) used:	beta absorption
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	1.0
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if applicable):	25
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	0

[1] arithmetic mean value of all monitoring stations of the affected area
[2] max. value of all monitoring stations of the affected area

Comments: *98-percentiles:* SO_2, NO_2, PM_{10}, CO, Ozone: 98%-value of the hour's means
98-percentiles: $PM_{2,5}$: 98%-value of the daily means

Comparison of The Air Quality in 2012

Rhine/Ruhr area

immission area: 5 770 km^2 population: 8 213 872

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	8	5	-	-	-	249	-	26
PM_{10}	21	22	-	-	-	-	-	-
$PM_{2,5}$	12	16	-	-	-	-	-	-
NO	21	11	-	-	-	620	-	88
NO_2	21	27	-	-	-	164	-	66
CO	-	-	-	-	-	-	-	-
O_3	16	37	-	-	-	223	-	107

PM_{10}	Monitoring method(s) used:	1) Beta-absorption 2) Oscillating micro balance 3) gravimetrically
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	1
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if applicable):	41
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	0

Comment: Traffic stations are not included in the calculation.

Rotterdam

immission area: 803 km^2 population: 1 200 000

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	6	6.5	7.7	17.1	-	31	-	15.4
PM_{10}	3	21.8	34.6	97.5	-	173	-	61.6
$PM_{2,5}$	3	14.2	25.9	94.0	-	323	-	51.2
NO	3	12.5	23.2	106	-	260	-	81.6
NO_2	3	32.9	43.7	72.1	-	141	-	75.6
CO	4	381	460	906	-	2978	-	829
O_3	3	38.8	59.0	94.9	-	181	-	93.9

PM_{10}	Monitoring method(s) used:	TEOM SES and BAM
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	0.92
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if applicable):	16

[1] arithmetic mean value of all monitoring stations of the affected area
[2] max. value of all monitoring stations of the affected area

NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	0

Comparison of The Air Quality in 2012

Salzburg

immission area: 66 km² population: 149 760

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	2	1,95	4,7	13	19,8	21,9	36,6	6,6
PM_{10}	3	19,8	45,3	90,5				
$PM_{2,5}$	2	14	34,3	79,7				
NO	3	26	92,3	165	311	391	430	208
NO_2	3	37	73	100	159	185	191	116
CO	2	335	610	890	1320	1500	1810	940
O_3	2	42	72	94	149	153	154	114

PM_{10}	Monitoring method(s) used:	Digitel and SHARP
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	---
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if applicable):	17
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	0

Sofia

immission area: 1 344 km² population: 1 291 591

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2								
PM_{10}								
$PM_{2,5}$								
NO								
NO_2								
CO								
O_3								

No Data received for 2012

PM_{10}	Monitoring method(s) used:	β-absorption (6 stations), gravimetric (1 station)
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if applicable):	
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	

[1] arithmetic mean value of all monitoring stations of the affected area
[2] max. value of all monitoring stations of the affected area

Comparison of The Air Quality in 2012

St. Pölten, urban station

immission area: 108 km^2 population: 52 109

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	1	3	8	30	43	51	54	11
PM_{10}	1	26	41	85	131	142	148	71
$PM_{2,5}$	1	17	36	82	129	140	146	63
NO	1	6	13	44	138	185	199	42
NO_2	1	22	33	53	96	115	124	59
CO	-	-	-	-	-	-	-	-
O_3	1	47	71	104	174	180	183	121

PM_{10}	Monitoring method(s) used:	oscillating micro balance
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	1.3
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if applicable):	17
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	0

St. Pölten, traffically influenced

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	1	2	7	24	35	41	43	11
PM_{10}	1	27	44	94	133	202	302	77
$PM_{2,5}$	-	-	-	-	-	-	-	-
NO	1	22	37	86	216	284	388	115
NO_2	1	34	43	67	125	145	161	84
CO	1	342	512	817	1277	1843	3340	792
O_3	1	40	62	93	160	164	167	109

PM_{10}	Monitoring method(s) used:	oscillating micro balance
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	1.3
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if applicable):	22
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	0

[1] arithmetic mean value of all monitoring stations of the affected area
[2] max. value of all monitoring stations of the affected area

Comparison of The Air Quality in 2012

Stockholm

immission area (inner city): 48 km^2 population (inner city): 308 920
area (Stockholm): 220 km^2 population (Stockholm): 832 641

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per hour/daily [µg/m³]
SO_2	1	0.9	2.2					
PM_{10}	5	24.6	63	175		782*		
$PM_{2,5}$	4	6.9	10.9	42		318		
NO	-							
NO_2	5	36,2	48.5	101		182		111/83
CO	2	300	400			10600		
O_3	1	49	72	96		123		

PM_{10}	Monitoring method(s) used:	TEOM
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	1.19 + 1.15
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if applicable):	39
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	0

Comments: * Dust from housrenovation, second max= 563
all stations are situated in the innercity of Stockholm; SO_2: roof level, Diffusive samplers - only per month PM_{10}, $PM_{2,5}$, NO_2, CO: street level, O_3: roof level

Stuttgart (urban station)

immission area: 207 km^2 population: 597 939*

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	1	2	-	15	-	18	-	-
PM_{10}	1	19	35	74	-	-	-	-
$PM_{2,5}$	1	12	30	47	-	-	-	-
NO	1	14	-	121	-	228	-	-
NO_2	1	33	-	78	-	115	-	-
CO	-	-	-	-	-	-	-	-
O_3	1	42	-	104	-	219	-	-

PM_{10}	Monitoring method(s) used:	gravimetrically
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	N/A
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if applicable):	7
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	0

Comment: * 2012; source: Statistisches Landesamt Baden-Württemberg

[1] arithmetic mean value of all monitoring stations of the affected area
[2] max. value of all monitoring stations of the affected area

Comparison of The Air Quality in 2012

Stuttgart (traffic station)

immission area: 207 km² population: 597 939*

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	-	-	-	-	-	18	-	-
PM_{10}	1	27	44	90	-	-	-	-
$PM_{2,5}$	1	15	28	56	-	-	-	-
NO	1	62	-	224	-	556	-	-
NO_2	1	65	-	112	-	297	-	-
CO	1	400	-	1100	-	2000	-	-
O_3	1	26	-	91	-	182	-	-

PM_{10}	Monitoring method(s) used:	gravimetrically
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	N/A
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if applicable):	15
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	3

Comments:

* 2012; source: Statistisches Landesamt Baden-Württemberg

** The max. 1h-mean value of NO_2 is measured by the station „Stuttgart Arnulf-Klett Platz“. The value 473 µg/m³ exceeds the alert thresholds. But there was no exceedance because you have to measure 400 µg/m³ over three consecutive hours at locations representative of air quality over at least 100 km² or an entire zone or agglomerativon, whichever is the smaller.

Thessaloniki

immission area: 129 km² population: 794 330

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per hour [µg/m³]
SO_2	2	6				310		28
PM_{10}	5	36		146				57
$PM_{2,5}$								
NO	6	18				790		216
NO_2	6	19				134		78
CO	4	600				6900		3100
O_3	5	68				228		168

PM_{10}	Monitoring method(s) used:	β-attenuation
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	1
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if applicable):	92
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	0

[1] arithmetic mean value of all monitoring stations of the affected area

[2] max. value of all monitoring stations of the affected area

Comparison of The Air Quality in 2012

Vienna

immission area: 415 km^2 population: 1 757 353

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 99,9 Percentile 3h-mean value [2] [µg/m³]	max. 99,9 Percentile 1h-mean value [2] [µg/m³]	max. 99,9 Percentile 1/2h-mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	7	3	12	34	53	53	59	22
PM_{10}	13	25	45	154	258	298	347	91
$PM_{2,5}$	6	17	35	111	122	116	115	62
NO	17	12	85	185	296	328	338	212
NO_2	17	29	62	103	149	159	163	129
CO	4	342	582	1041	1384	1464	1510	895
O_3	5	54	97	124	159	160	161	131

PM_{10}	Monitoring method(s) used:	5 Stations gravimetric and continuous, 8 Stations only continuous (including equivalent factor)
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if appliccable):	35 (station Gerichtsgasse)
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	0

Comments:

PM_{10} – equivalence functions für 2012 depending on the monitoring method:

PM_{10}-monitoring station	Valid from/to	Type of monitor	Calibration funktion
Tfromorstraße	to 28.3.	Eberline FH62 I/R	$y_{equivalent} = (y_{roh} + 1,43) / 0,8$
Tfromorstraße	from 28.3.	Grimm EDM-180	$y_{equivalent} = 0,955 * y_{roh} + 0,945$
AKH	to 29.3.	Eberline FH62 I/R	$y_{equivalent} = (y_{roh} + 1,43) / 0,8$
AKH	from 29.3.	Grimm EDM-180	$y_{equivalent} = 0,955 * y_{roh} + 0,945$
Belgradplatz	from 1.1.	Grimm EDM-180	$y_{equivalent} = 0,955 * y_{roh} + 0,945$
Laaer Berg	to 28.3.	Eberline FH62 I/R	$y_{equivalent} = (y_{roh} + 1,43) / 0,8$
Laaer Berg	from 28.3.	Grimm EDM-180	$y_{equivalent} = 0,955 * y_{roh} + 0,945$
Kaiser-Ebersdorf	from 1.1.	Grimm EDM-180	$y_{equivalent} = 0,955 * y_{roh} + 0,945$
Rinnböckstraße	from 1.1.	Eberline FH62 I/R	$y_{equivalent} = (y_{roh} + 1,43) / 0,8$
Gaudenzdorf	from 1.1.	Eberline FH62 I/R	$y_{equivalent} = (y_{roh} + 1,43) / 0,8$
Kendlerstraße	to 29.3.	Eberline FH62 I/R	$y_{equivalent} = (y_{roh} + 1,43) / 0,8$

[1] arithmetic mean value of all monitoring stations of the affected area
[2] max. value of all monitoring stations of the affected area

Kendlerstraße	from 29.3.	Grimm EDM-180	$y_{equivalent} = 0{,}955 * y_{roh} + 0{,}945$
Schafberg	from 1.1.	Eberline FH62 I/R	$y_{equivalent} = (y_{roh} + 1{,}43) / 0{,}8$
Gerichtsgasse	from 1.1.	Eberline FH62 I/R	$y_{equivalent} = (y_{roh} + 1{,}43) / 0{,}8$
Lobau	to 28.3.	Eberline FH62 I/R	$y_{equivalent} = (y_{roh} + 1{,}43) / 0{,}8$
Lobau	from 28.3.	Grimm EDM-180	$y_{equivalent} = 0{,}955 * y_{roh} + 0{,}945$
Stadlau	from 1.1.	Grimm EDM-180	$y_{equivalent} = 0{,}955 * y_{roh} + 0{,}945$
Liesing-Gewerbegebiet	from 1.1.	Grimm EDM-180	$y_{equivalent} = 0{,}853 * y_{roh} + 0{,}55$

Bold printed monitoruing stations: additionally gravimetrical method used

- $PM_{2,5}$ – equivalence functions for continuous monitoring methods in 2012::

$PM_{2,5}$-monitoring station	Valid from/to	Type of monitor	Calibration funktion
Tfromorstraße	to 28.3.	Eberline FH62 I/R	$y_{equivalent} = y_{roh} / 0{,}824$
Tfromorstraße	from 28.3.	Grimm EDM-180	$y_{equivalent} = 0{,}866 * y_{roh} + 0{,}661$
AKH	to 29.3.	Eberline FH62 I/R	$y_{equivalent} = y_{roh} / 0{,}824$
AKH	from 29.3.	Grimm EDM-180	$y_{equivalent} = 0{,}866 * y_{roh} + 0{,}661$
Rinnböckstraße	from 26.1.	Grimm EDM-180	$y_{equivalent} = 0{,}866 * y_{roh} + 0{,}661$
Kendlerstraße	from 29.3.	Grimm EDM-180	$y_{equivalent} = 0{,}866 * y_{roh} + 0{,}661$
Lobau	from 28.3.	Grimm EDM-180	$y_{equivalent} = 0{,}866 * y_{roh} + 0{,}661$
Stadlau	from 1.1.	Grimm EDM-180	$y_{equivalent} = 0{,}866 * y_{roh} + 0{,}661$

Bold printed monitoruing stations: additionally gravimetrical method used

- 99.9-Percentile values (HMW, MW1 and MW3) of PM_{10} and $PM_{2,5}$ are from continuous measure (including station factor). This is also for station with continuous and gravimetrical measurements, because the gravimetric method delivers only daily mean values.
- All other particulates values (annual mean, max. MMW and max. daily mean) are derived preferably from gravimetric monitoring.

[1] arithmetic mean value of all monitoring stations of the affected area
[2] max. value of all monitoring stations of the affected area

Comparison of The Air Quality in 2012

Villach

immission area: 135 km^2 population: 59 646

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	0	-	-	-	-	-	-	-
PM_{10}	1	19	32	73	-	-	-	-
$PM_{2,5}$	0	-	-	-	-	-	-	-
NO	1	23	59	141	217	354	413	132
NO_2	1	30	50	74	126	157	197	81
CO	0	-	-	-	-	-	-	-
O_3	0	-	-	-	-	-	-	-

PM_{10}	Monitoring method(s) used:	Kontinuierlich (Sharp 5030)
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	N/A
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if applicable):	2
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	0

Warsaw

immission area: 517 km^2 population: 1 715 517

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per day [µg/m³]
SO_2	5	7,5	20,1	38,3	134,6	146,5	-	26,7
PM_{10}	3	42,5	79,6	223,1	415,4	433,6	-	127
$PM_{2,5}$	2	40,2	59,4	204,3	279,5	293,9	-	115,7
NO	-	-	-	-	-	-	-	-
NO_2	5	31,0	49,4	96,3	192,9	226,9	-	78,4
CO	3	591	998	2386	5244	5517	-	1444
O_3	4	42,3	66,7	95,4	142,6	154,1	-	84,7

[1]

PM_{10}	Monitoring method(s) used:	automatic TEOM + FDMS and beta attenuation, manual gravimetric method
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	automatic methods factor 1,0
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if applicable):	90
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	1

Comments: In this report the values from PM_{10} and $PM_{2,5}$ from the traffic stations are not included because the monitor has broken down.

[1] arithmetic mean value of all monitoring stations of the affected area
[2] max. value of all monitoring stations of the affected area

Comparison of The Air Quality in 2012

Wiesbaden (urban stations)

immission area: 204 km^2 population: 279 578

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	1	1,6	3,2	10,5	12,2	16,3	27,3	6,9
PM_{10}	1	19,1	28,3	114,1**	499,4**	638,2**	787,2**	53,7
$PM_{2,5}$	1*	13,8	24,8	83,6**	-	-	-	-
NO	1	16,8	32,8	203,3	276,1	326,4	398,0	127,5
NO_2	1	33,0	40,5	69,8	107,9	131,3	143,9	80,9
CO	0	-	-	-	-	-	-	-
O_3	1	38,0	65,3	137,5	224,0	225,2	226,3	117,4

[1]

PM_{10}	Monitoring method(s) used:	nephelometer with ß-absorption
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	-
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2005 (measured values **including** equivalent factor, if appliccable):	6
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2005:	0

Comments: * = method: gravimetrically
** = value from Jan. 1 2012 (New Year's Eve fire works)

Wiesbaden (traffic station)

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	0	-	-	-	-	-	-	-
PM_{10}	2	22,0	33,4	346,7**	2341,1**	3332,9**	3947,7**	56,6
$PM_{2,5}$	1	15,7	23,2	171,8**	1107,3**	1968,2**	2347,0**	45,5
NO	2	59,2	97,3	203,3	389,8	512,2	580,3	242,9
NO_2	2	58,6	68,4	103,7	187,1	223,8	240,5	131,8
CO	1	550	740	1200	2570	4040	4810	1510
O_3	0	-	-	-	-	-	-	-

[1]

PM_{10}	Monitoring method(s) used:	nephelometer with ß-absorption
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	-
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2005 (measured values **including** equivalent factor, if appliccable):	8
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2005:	2

Comments: ** = value from Jan. 1 2012 (New Year's Eve fire works)

[1] arithmetic mean value of all monitoring stations of the affected area
[2] max. value of all monitoring stations of the affected area

Comparison of The Air Quality in 2012

Zagreb

immission area: 641 km^2 population: 790 017

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	6	2,0	10,1	25,3		106		14,8
PM_{10}	6	32	71	202				138
$PM_{2,5}$	3	24	63	182				99
NO								
NO_2	5	41	61	171		176		92
CO	1	500	1000	2100		3700		1300
O_3	5	39	90	186		259		135

PM_{10}	Monitoring method(s) used:	gravimetrically
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if applicable):	87
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	0

Zurich

immission area: 1 086 km^2 population: 1 185 214

	Number of monitoring stations	Annual mean value [1] [µg/m³]	max. monthly mean value [2] [µg/m³]	max. daily mean value [2] [µg/m³]	max. 3h mean value [2] [µg/m³]	max. 1h mean value [2] [µg/m³]	max. ½ h mean value [2] [µg/m³]	Max. 98-Percentile per year [µg/m³]
SO_2	1	2.15	6.34	12.66	19.10	26.30	33.42	15.68
PM_{10}	1	17.42	35.45	84.80	160.07	208.68	230.88	84.80
$PM_{2,5}$	1	13.56	26.12	51.80	-	-	-	-
NO	1	9.92	22.70	108.51	189.98	200.09	217.83	114.69
NO_2	1	30.96	46.03	83.02	109.91	118.61	123.08	97.79
CO	1	318.12	443.28	872.67	1204.11	1570.65	1893.32	928.62
O_3	1	46.41	75.82	111.37	157.93	158.94	161.36	144.18

PM_{10}:	Monitoring method(s) used:	β-meter-measurement, calibrated with gravimetrical measurements every 4 days
	Equivalent factor for monitoring method(s) according to EU-directive 2008/50/EG:	1
	Number of limit violations of the daily mean standard of 50 µg/m³ at the highest stressed station in 2012 (measured values **including** equivalent factor, if applicable):	7
NO_2	Number of limit violations of the 1h mean standard of 200 µg/m³ at the highest stressed station in 2012:	0

[1] arithmetic mean value of all monitoring stations of the affected area
[2] max. value of all monitoring stations of the affected area