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Luftgütedaten 2000
Nationaler und europäischer Städtevergleich

Einführung

Die Bekämpfung der Luftverschmutzung war in den letzten Jahren und ist auch noch heute eines der zentralen Themen, mit denen Umweltämter, Umweltbehörden bzw. sonstige für den Umweltschutz tätige Organisationen beschäftigt sind. In Form von regionalen oder nationalen Luftreinhalteplänen versucht man, die Luftverschmutzung in den Griff zu bekommen und Luftqualität sukzessive zu verbessern.

Um überhaupt den Erfolg von Sanierungsmaßnahmen nachweisen zu können, ist die Beobachtung der Schadstoffkonzentrationen mit Hilfe von Luftmessnetzen sinnvoll. Mittlerweile sind in den meisten Messgebieten Luftmessnetze seit 1 bis 2 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 aufgrund 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 2000
The Comparison of Cities and Regions in Europe

Introduction

The fight against air-pollution was one of the major topics to deal with of all organisations concerned with environmental affairs, such as national and local authorities. In the form of regional or national air-cleaning programmes it is tried to get air pollution under control as well as to increase the air quality step by step.

To prove the success of measurements of redevelopment at all, the observation of the concentrations of noxious compounds by means of monitoring station networks is useful. In most of the referred air-monitoring areas monitoring station networks have been installed already for 1 to 2 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 emittents 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 Amt für Natur- und Umweltschutz bereits seit mehreren Jahren durchgeführt, genaugenommen seit 1989. Anfänglich wurden nur österreichische Städte miteinander verglichen. In den folgenden Jahren wurde der Städtevergleich auf immer mehr europäische Städte und Regionen wegen des großen Interesses ausgedehnt. Im Jahr 2000 wurden weitere Städte bzw. Regionen aus Österreich und Deutschland, England, Frankreich, Belgien, Niederlande, Dänemark, Schweden, Italien, Schweiz, Spanien, Portigal, Polen, Griechenland, Bulgarien, Rumänien, Lettland, Ungarn und Kroation mit einbezogen. Leider wurden uns bis zum heutigen Tag keine Daten aus Bukarest und Budapest zur Verfügung gestellt.	Comparisons of the air quality have been carried out by our organization already for a couple 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 2000 comprised cities and regions of Austria, Germany, Cities from Great Britain, France, Belgium, The Nederlands, Denmark, Sweden, Italy, Switzerland, Spain, Portugal, Poland, Greec, Bulgaria, Romania, Latvia, Hungary and Croatia. Unfortunately up to the present day no data of Bucarest and Budapest were placed to our disposal.
Kritische Anmerkungen Als Kritikpunkt wird immer wieder angemerkt, daß ein Vergleich der Immissionsbelastung aus fachlichen Gründen nicht möglich ist, da 1. die Zahl der Messstellen sehr verschieden ist (die Anzahl der Messstellen pro Messgebiet ist in der Tabelle auf Seite 7 und den nachfolgenden Grafiken angeführt), 2. die Messstellendichte unterschiedlich ist, 3. die Situierung der Messstellen nicht immer vergleichbar ist (In manchen Städten hat man deswegen bei den Schadstoffkomponenten zwischen verkehrsbelasteten Messstationen und anderen Messstationen unterschieden). Den Autoren sind diese Tatsachen durchaus bewusst. Trotz der erhobenen Einwände gibt es einige Argumente für die Fortführung der Städtevergleiche:	**Critical remarks** Over and over again there is critically remarked that a comparison of the pollutant stress between monitoring areas is not possible. 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 on page 7 and the following tables), 2. the density of distribution of the monitoring stations is different, 3. the location of the monitoring station not always is comparable (for that reason in some cities the network services distinguished between traffic-stressed and non-traffic-influenced monitoring stations). 1. The authors of the comparative study is thoroughly conscious of these facts. But despite to the raised objections there are also some arguments of continuing the activities:

1. Die Luftschadstoffmessungen werden im allgemeinen in der gleichen Weise durchgeführt. Das bedeutet, daß die Luftüberwachung an bestimmten *Punkten* einer Stadt oder einer Region mit Hilfe automatisch registrierender Immissionsmessstationen durchgeführt werden. 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 oben bemerkt, unterscheiden einige Städte zwischen verkehrsbelasteten und nicht vom Verkehr beeinflussten Messstationen.

3. Schließlich wird eine stärker objektivierende Basis der Auswertungen besonders dann erreicht, wenn man längere Zeiträume betrachtet und daraus die Trends der Entwicklung der Schadstoffimmissionen abliest.
   Nachdem die Stadt Linz internationale und nationale Städtevergleiche schon seit einigen Jahren durchführt, wurden in diesen Bericht für die Jahresmittelwerte auch die mehrährige *Trendentwicklung* der Schadstoffbelastung seit 1993 für die einzelnen Immissionsgebiete mit aufgenommen. Die Daten von Städten bzw. Regionen, die erst seit kurzem im Städtevergleich integriert sind, wurden dabei auch so weit wie möglich nachgeführt.

1. The kind of measurement of air pollutants is carried out by the same way. This means that the results of air monitoring activities are obtained by sampling at special sampling *points* in a city or region by means of automatically registrating monitoring stations. The measured 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 that represent a wider portion of the monitored area, not only the pollution stress representative for a focal point. Exceptions are specially traffic stressed sampling points. The monitoring station network services were invited to seperate such monitoring points in order to reproduce the real situation of the monitored area. As already mentioned above, some cities distinguish between traffic-stressed and non-traffic-influenced monitoring stations.

1. And finally the evaluations are put to a more objectified basis, if one observes longer term developments and derives from these the trends of the pollutant immissions.
   Since the city of Linz has been carrying out comparisons of the air quality for years, in this report the *trend developments* for the annual mean value since 1993 for all immission regions have been included. The data of cities or regions that only have been participating the comparison since a couple of years, have been updatetd far as back as possible.

Immissionskenngrößen	**Immission reference values**
In der vorliegenden Studie wurden verschiedene Immissionskenngrößen miteinander verglichen: • 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)	The present study compares various Immission reference values, 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)
Von den einzelnen Messnetzbetreibern wurden die gewünschten Immissionsdaten in sehr unterschiedlicher Vollständigkeit zur Verfügung gestellt. Insbesondere betrifft dies die Percentil-Auswertungen und manchmal auch dieAuswertungen für max. HMW oder max. 3h-MW. Oftmals ist auch nicht das 98-Percentil verfügbar, sondern es werden andere Percentilgrößen (z. B. 95-Percentil) gebildet. Die meisten Messnetzbetreiber berechnen die Percentile aus den Halbstunden-Mittelwerten eines Jahres, manchmal werden jedoch auch die Tagesmittelwerte dafür herangezogen.	The individual monitoring network services supported us with immission data of very different completeness, especially referring to the evaluation of the percentiles or somtimes the evaluations of the max. 1/2-hours mean-value or the max. 3-hours mean-value. Often the 98-Percentile was not available but the value for the 95-Percentile was given. Most of the monitoring network services calculate the percentiles from the 1/2-hours mean values of a calender year, sometimes they were based on the daily mean values.
Aus diesem Grund wurde nur die Auswertung „max. 98-Percentil“ in grafischer Form durchgeführt. Im Kapitel „Luftgütekennzahlen“ der einzelnen Vergleichsregionen sind sämtliche dem Amt für Natur- und Umweltschutz übermittelten Percentilwerte aufgelistet. Die Art der Percentilbildung ist - soweit bekannt - in den Tabellen jeweils vermerkt.	This was the reason that only „max. 98-percentile“ was graphically evaluated. Within the chapter „Air quality reference numbers“ of each compared region all percentile-values the monitoring network sevices supported us with are mentioned. If known the kind of formation of percentiles is remarked in the tables.

Mehrjahresvergleich

Ein gutes Bild über die Entwicklung der Luftbelastung geben die Grafiken wieder. Dabei wurden von den am Luftgütevergleich teilnehmenden Städte die Entwickung der Immissionsbelastung von 1993 bis 2000 aufgetragen.

Wenn man die Daten analysiert, können folgende Aussagen getroffen werden:

1. Einige Städte und Regionen haben ein sehr 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 sichtbare Besserung der Immissionssituation eingetreten ist, während in Städten mit niedriger Immissionsbelastung im Vergleich dazu nahezu keine Änderung der Luftbelastung eingetreten ist.
4. Entwicklung der Langzeitbelastung (Jahresmittelwerte) gegenüber 1993:

   SO_2: Nahezu alle Regionen *geringer* belastet

   Staub: Nahezu alle Regionen *geringer* belastet

   NO: Nahezu alle Regionen *höher* belastet

   NO_2: tendenziell *gleichbleibend*

   CO: uneinheitlich, tendenziell *gleichbleibend*

   O_3: uneinheitlich

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 2000 are plotted.

The following statements can be given in analyzing the data:

1. Some cities and regions have - according to the area - a very 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 1992 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. Development of the air pollution stress in comparison with 1993:

   SO_2: Nearly all regions *less* stressed

   particulates: Nearly all regions *less* stressed

   NO: Nearly all regions *higher* stressed

   NO_2: trend *constant*

   CO: nonuniform, trend *constant*

   O_3: nonuniform

Übersicht über die Entwicklung der Schadstoffbelastungen 1993 - 2000

Overview over the development of the stress of air pollutants from 1993 through 2000

Beurteilungsbasis: Jahresmittelwerte über alle Stationen einer Region/ based on mean of all annual mean values of a region

Austrian cities

	SO_2			Particulates			NO			NO_2			CO			O_3		
	Stress in 1993	Tendency last 3 years	Stress in 2000	Stress in 1993	Tendency last 3 years	Stress in 2000	Stress in 1993	Tendency last 3 years	Stress in 2000	Stress in 1993	Tendency last 3 years	Stress in 2000	Stress in 1993	Tendency last 3 years	Stress in 2000	Stress in 1993	Tendency last 3 years	Stress in 2000
Linz		==			↘			↗			==			↘			↗	
Bludenz		↓			↘			==			↘		-		-		↗	
Dornbirn		↘			↘		-	↘			↗		-	↘		-	↑	-
Graz		↘			==		-	↗			==		-	==			↗	
Hallein		↓			↘		-		-		==			↓			==	
Innsbruck		↘			==			==			==			↘			==	
Klagenfurt		↘			↘			==			==			==			↗	
Leoben/Göß/Donawitz		↓			↘			==		-	==			==			↗	
Salzburg		↘			==		-		-		==			↓			↘	
St. Pölten		↗		-	==			==			↘		-	↓		-	↗	
Vienna		↓			↘			==			↘			==			==	
Villach		↓			↘			==			↘			↘			==	

European Cities

	SO_2			Particulates			NO			NO_2			CO			O_3		
	Stress in 1993	Tendency last 3 years	Stress in 2000	Stress in 1993	Tendency last 3 years	Stress in 2000	Stress in 1993	Tendency last 3 years	Stress in 2000	Stress in 1993	Tendency last 3 years	Stress in 2000	Stress in 1993	Tendency last 3 years	Stress in 2000	Stress in 1993	Tendency last 3 years	Stress in 2000
Barcelona		↓			==			↘			==			↘		-	↗	
Basel		↘			↘			↘			↘						==	
Belfast		↓			↘			↘			↘			↘			==	
Berlin		↓			↓			↘			↘			↘			==	
Birmingham		↓			↘			↓	-		↘			↘			==	
Bristol		↘			==			==	-		==			↘			==	
Brussells		↓			↘			↓			==			==			↗	
Budapest																		
Chemnitz		↓↓			↘			==			↘			↓			==	
Copenhagen		↘			==			↘			==							
Debrecen		↓			↓			↘			↘				-		↗	
Dresden		↓↓			↘			==			==			↓			↘	
Edinburgh		==			==			==			==			==			==	
Frankfurt		↓			↘			==			↘			↘			==	
Goteborg		↘			==			↘			==			↓			==	
Hamburg		↓			↘			↓			↓			↓			==	
Karlsruhe		↘			==			==			==			↘			↗	
Leeds		↓			↘			↘			↓			↘			↗	
Leipzig		↓↓			↘			↗			==			↓			==	
Liverpool		↓↓			↘			↗			↘			==			↗	
London		↓			==			↘			==			==			==	
Luxemburg		↘			==			==			==			↘			↗	

	SO_2			Particulates			NO			NO_2			CO			O_3		
	Stress in 1993	Ten-dency last 3 years	Stress in 2000	Stress in 1993	Ten-dency last 3 years	Stress in 2000	Stress in 1993	Ten-dency last 3 years	Stress in 2000	Stress in 1993	Ten-dency last 3 years	Stress in 2000	Stress in 1993	Ten-dency last 3 years	Stress in 2000	Stress in 1993	Ten-dency last 3 years	Stress in 2000
Lyon-Agglomeration		↓			==			↗			↗			↘			==	
Madrid		==			==						==			↓			==	
Mannheim		==			==			==			==			↘			==	
Milan		↘			↗			↘			↘			↓			==	
Munich		↘			↓			↘			==			↓			↘	
Rhine-Area south		↓			↘			↘			↘			↓			==	
Rhine Area Centre		↘			↘			↘			↘			↓			==	
Rotterdam		==			↘			↘			↘						==	
Ruhr-Area West		↘			==			==			↘			↘			==	
Ruhr-Area Centre		↘			==			↘			↘			↓			==	
Ruhr-Area East		↓			==			==			↘			↓			==	
Stockholm		↘						↘			↘			↘			==	
Warszawa		↓			↘						==			==			==	
Wiesbaden		↓			↘			==			==			↘			==	
Zagreb		==			==						==						↗	
Zurich - town centre		↓			==			↘			↘			↘			↘	

Legend:

- slightly stressed
- Medium stressed
- Highly stressed
- No data
- ↘ slight stress decrease
- ↓ strong stress decrease
- ↓↓ very strong stress decrease
- == keeping constant
- ↗ slight stress increase
- ↑ strong stress increas

Anzahl der Messstellen **Number of monitoring stations**

Country	Monitored Area	SO_2	partic-ulates	NO	NO_2	CO	O_3
Austria	Bludenz-Town-Hall	1	1	1	1	-	1
	Dornbirn-Stadtstraße	1	1	1	1	1	-
	Graz	6	6	6	6	4	4
	Hallein	3	1	-	1	1	1
	Innsbruck	2	2	2	2	2	2
	Klagenfurt	2	2	2	2	2	2
	Leoben/Göß/Donawitz	3	3	3	3	2	1
	Linz	10	10	10	10	10	4
	Salzburg	3	3	-	3	2	2
	St. Pölten	1	1	1	1	1	1
	Vienna	17	17	17	17	5	5
	Villach	1	1	1	1	1	1
Belgium	Brussels	8	5	8	8	5	5
Bulgaria	Sofia	9	7	4	9	4	4
Croatia	Zagreb	9	4	1	6	-	4
Denmark	Copenhagen	1	1	2	2	2	1
France	Lyon-Agglomeration	11	6	11	11	5	5
Germany	Berlin	19	12	21	21	18	10
	Chemnitz	2	2	2	2	2	2
	Dresden	2	2	2	2	2	2
	Frankfurt	5	5	5	5	4	5
	Hamburg	11	5	11	11	3	6
	Karlsruhe	3	3	3	3	3	3
	Leipzig	3	3	3	3	3	3
	Mannheim	3	3	3	3	3	3
	Munich	8	7	8	8	8	3
	Rhine Area Centre (Region Düsseldorf)	4	4	4	4	3	2
	Rhine Area South (Region Cologne, Bonn)	8	8	8	8	5	7
	Ruhr Area East (Region Dortmund)	9	9	9	9	7	4
	Ruhr Area Centre (Region Essen, Bochum)	8	8	8	8	5	5
	Ruhr Area West (Region Duisburg, Oberhausen)	8	8	8	8	6	5
	Wiesbaden	1	1	1	1	1	1
Greece	Athens	8	-	8	8	9	8
	Thessaloniki	3	2	-	3	3	3

Anzahl der Messstellen — Number of monitoring stations

Country	Monitored Area	SO_2	partic-ulates	NO	NO_2	CO	O_3
Hungary	Budapest	8	8	8	8	8	2
	Debrecen	10	2	1	10	-	1
Italy	Milan	5	1	9	9	5	3
Latvia	Riga	4	1	-	4	-	4
Luxemburg	Luxemburg	2	1	2	2	1	2
Netherlands	Rotterdam	8	5	3	3	-	3
Poland	Warszawa	17	4	-	16	2	2
Portugal	Lisbon	5	3	-	8	8	2
Romania	Bukarest	5	5	-	5	-	-
Spain	Barcelona	2	5	5	5	5	5
	Madrid	25	24	25	25	25	25
Switzerland	Basel-Outskirts	1	1	1	1	0	1
	Zurich-Centre	1	1	1	1	1	1
Sweden	Göteborg	3	1	2	3	1	3
	Stockholm	1	2	5	6	4	1
U.K.	Belfast	2	2	1	1	1	1
	Birmingham	2	2	2	2	2	2
	Bristol	1	1	2	2	2	1
	Edinburgh	1	1	1	1	1	1
	Leeds	1	1	1	1	1	1
	Liverpool	1	1	1	1	1	1
	London	11	11	22	22	16	14

Quellen für die Immissionsdaten **Sources for the immission-data**

Austria, *Bludenz, Dornbirn*	Umweltinstitut des Landes Vorarlberg Montfortstraße 4 A-6901 Bregenz Austria *e-mail:* ui@vlr.gv.at *homepage: -*
Austria, *Graz, Leoben, Donawitz*	Amt der Steiermärkischen Landesregierung Fachabt. Ia (Ref. f. Luftgüteüberwachung) Landhausgasse 7 A-8010 Graz *e-mail:* post@fa1a.stmk.gv.at *homepage:* http://www.stmk.gv.at/luis
Austria, Innsbruck	Amt der Tiroler Landesregierung Landesforstdirektion Abt. Waldschutz-Luftgüte Bürgerstrasse 36 A-6020 Innsbruck Austria *e-mail:* an.weber@tirol.gv.at *homepage: -*
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Austria, *Klagenfurt, Villach*	Amt der Kärntner Landesregierung Abt. 15 (Umweltschutz und Technik) Flatschacher Straße 70 A-9020 Klagenfurt *e-mail:* Luftimmission_abt15@ktn.gv.at *homepage: -*
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Luftgütevergleich

2000

Jahresmittelwert (Gebietsmittel)

Comparison of The Air Quality

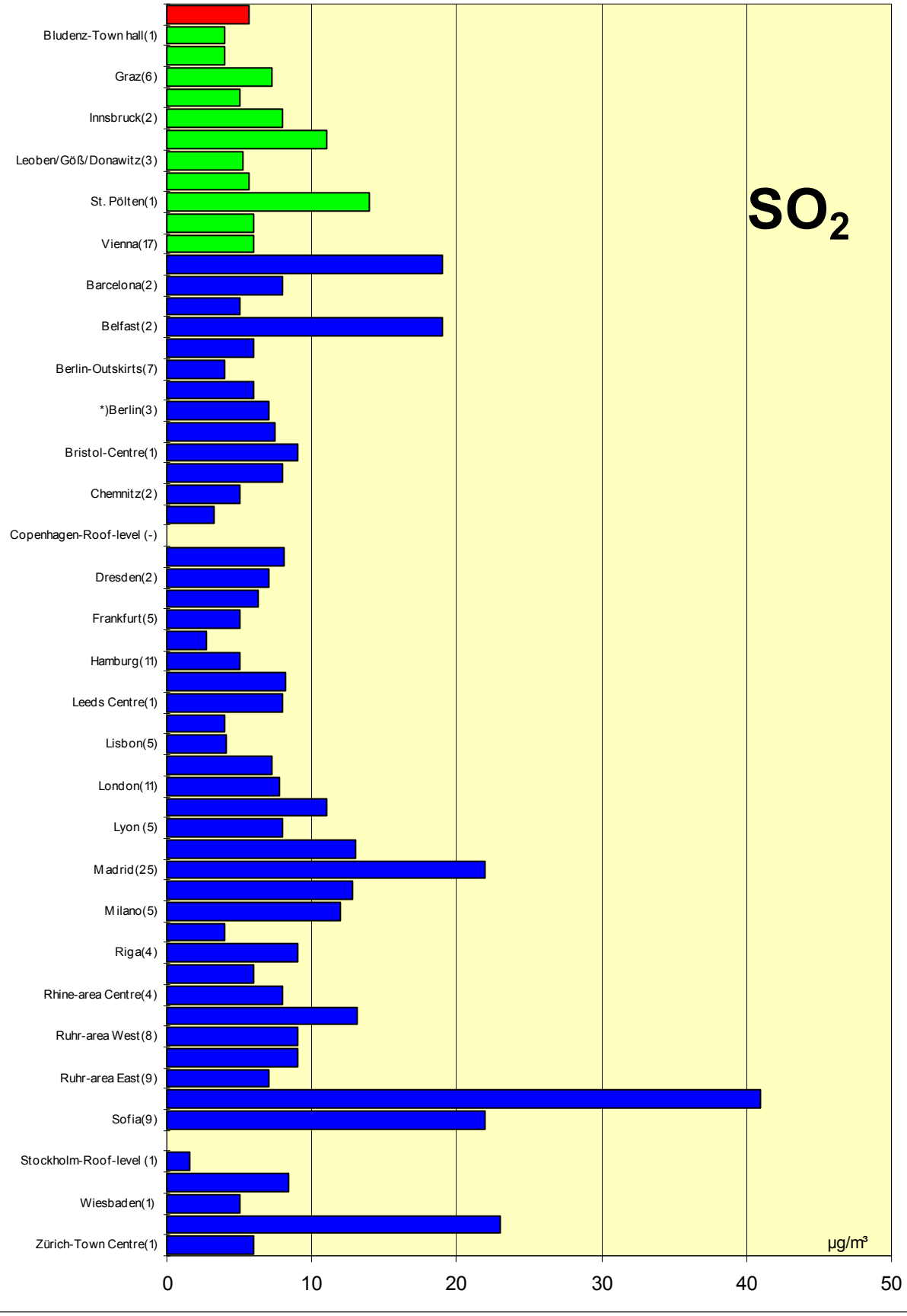
2000

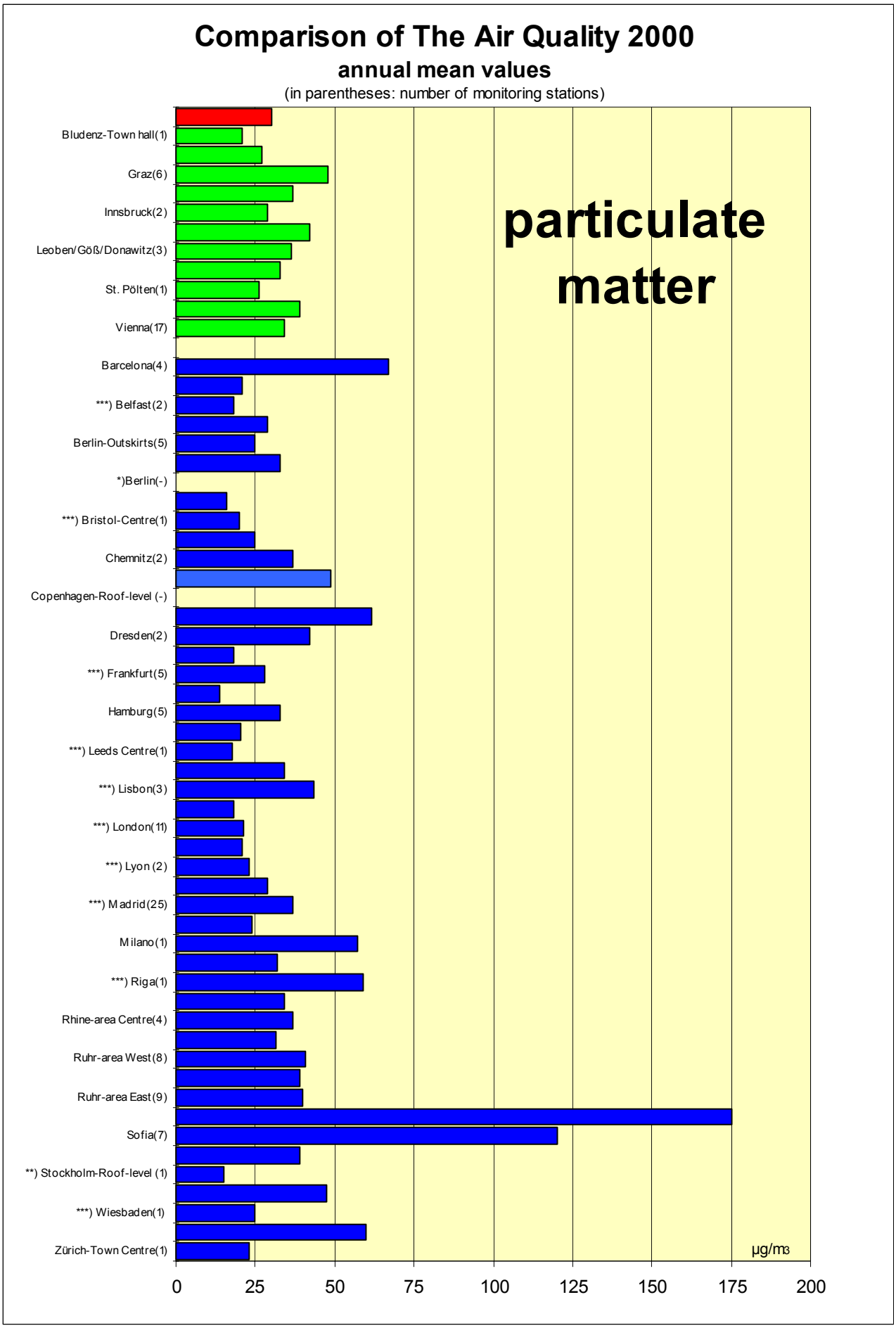
Annual Mean Values

Comparison of The Air Quality 2000

annual mean values

(in parentheses: number of monitoring stations)

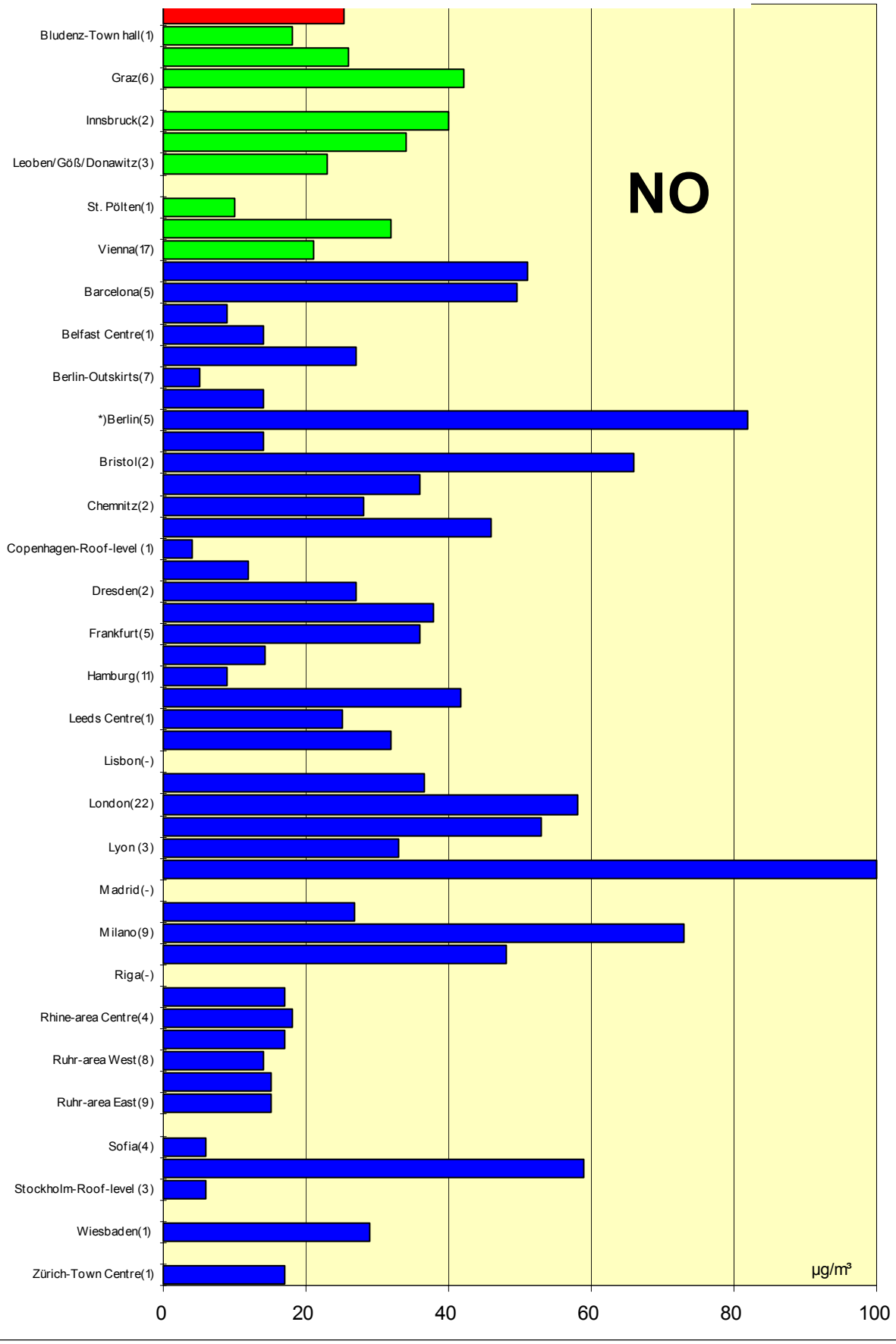



Comparison of The Air Quality 2000
annual mean values
(in parentheses: number of monitoring stations)
particulate matter
Bludenz-Town hall(1)
Graz(6)
Innsbruck(2)
Leoben/Göß/Donawitz(3)
St. Pölten(1)
Vienna(17)
Barcelona(4)
***) Belfast(2)
Berlin-Outskirts(5)
*)Berlin(-)
***) Bristol-Centre(1)
Chemnitz(2)
Copenhagen-Roof-level (-)
Dresden(2)
***) Frankfurt(5)
Hamburg(5)
***) Leeds Centre(1)
***) Lisbon(3)
***) London(11)
***) Lyon (2)
***) Madrid(25)
Milano(1)
***) Riga(1)
Rhine-area Centre(4)
Ruhr-area West(8)
Ruhr-area East(9)
Sofia(7)
**) Stockholm-Roof-level (1)
***) Wiesbaden(1)
Zürich-Town Centre(1)
µg/m3
0
25
50
75
100
125
150
175
200

Comparison of The Air Quality 2000

annual mean values

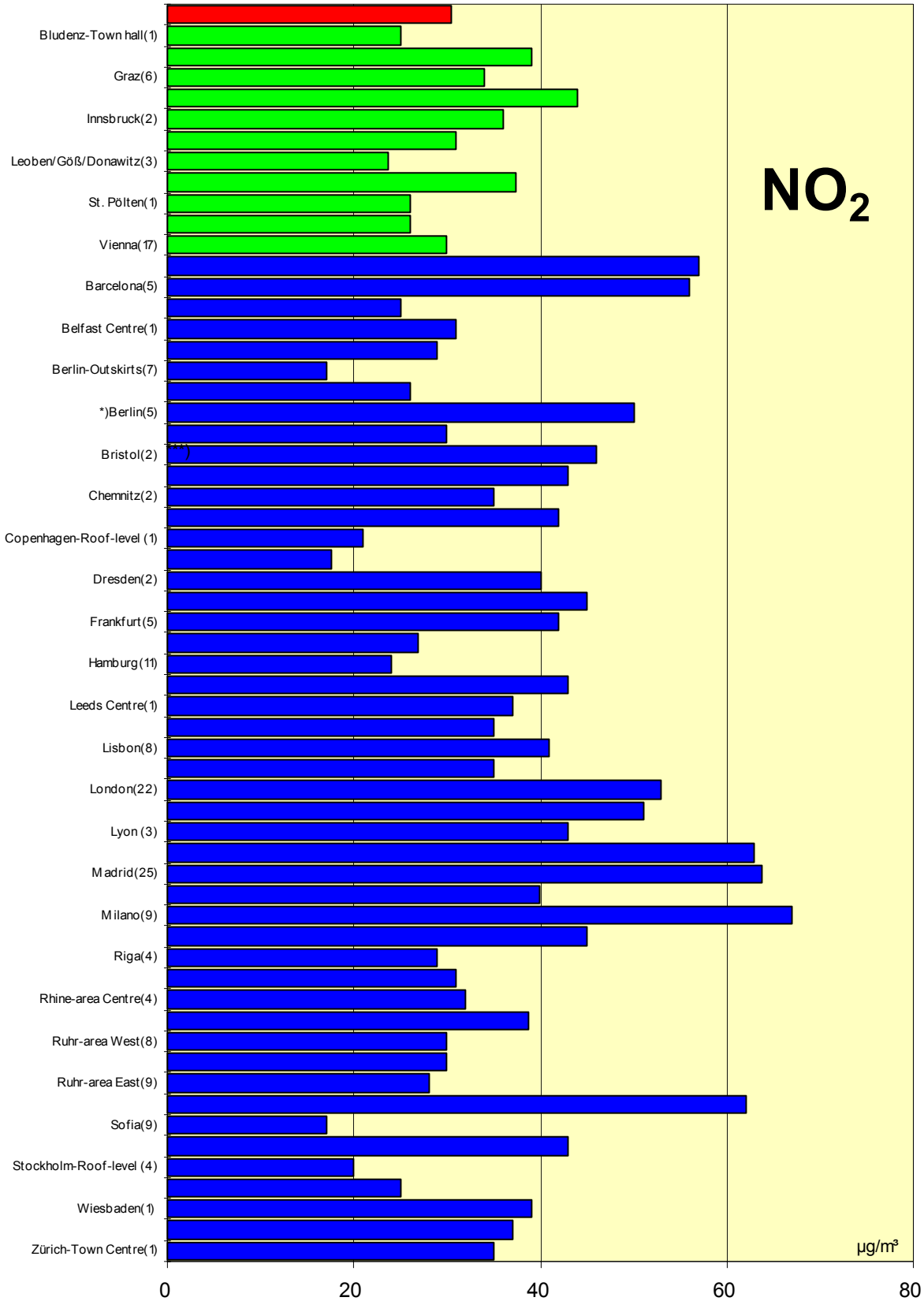
(in parentheses: number of monitoring stations)



Comparison of The Air Quality 2000

annual mean values

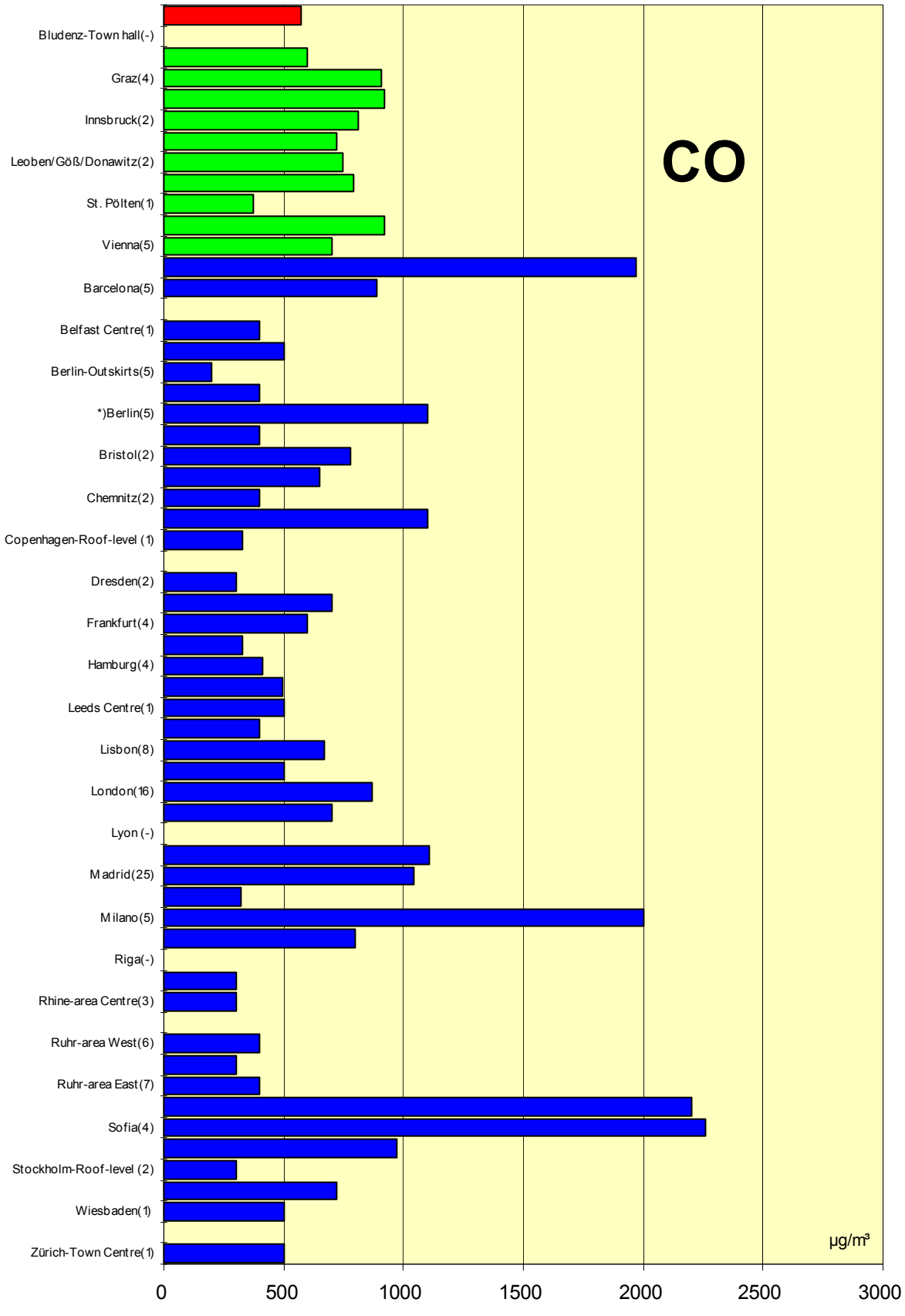
(in parentheses: number of monitoring stations)



Comparison of The Air Quality 2000

annual mean values

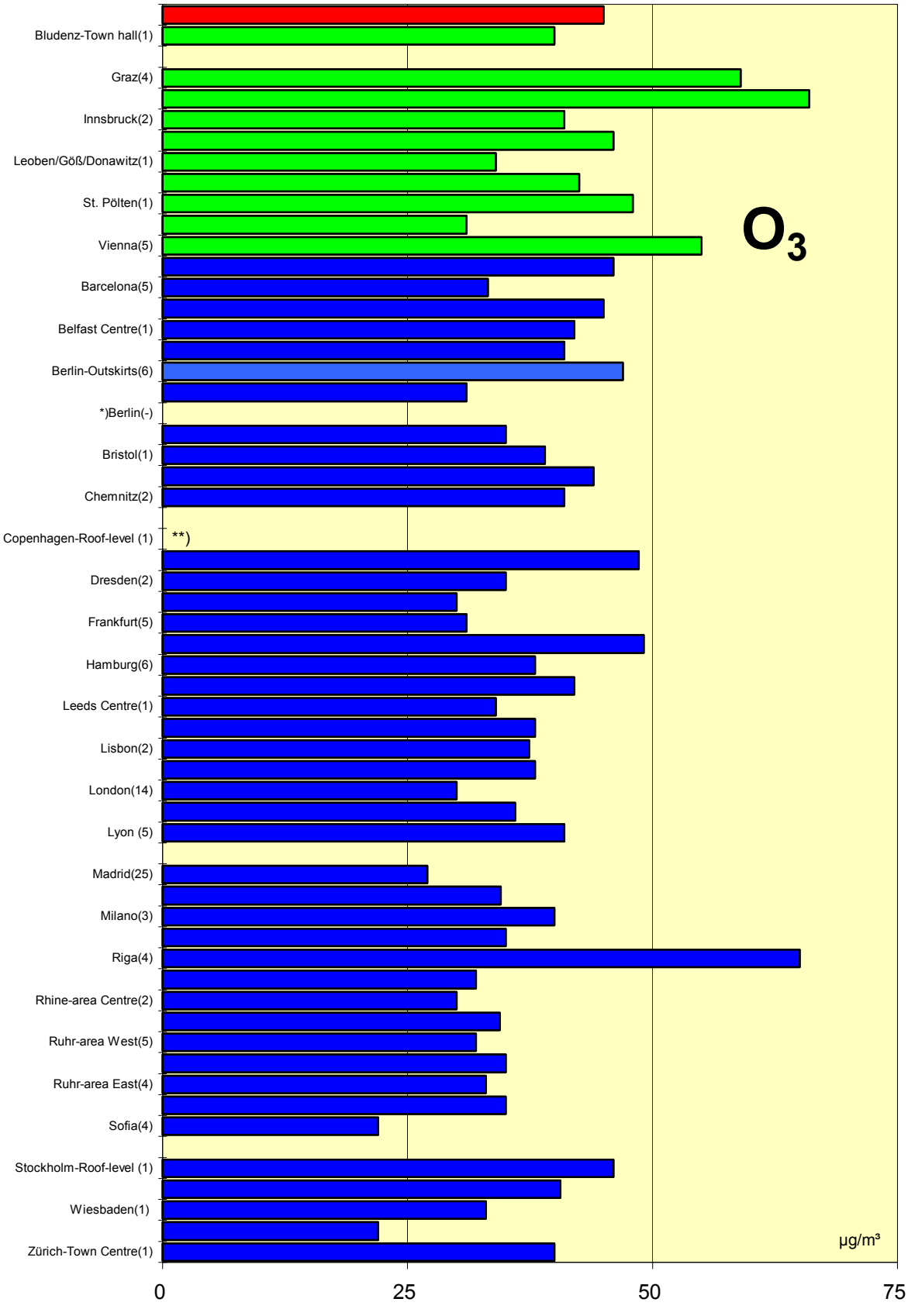
(in parentheses: number of monitoring stations)



Comparison of The Air Quality 2000

annual mean values

(in parentheses: number of monitoring stations)



Luftgütevergleich

2000

max. Monatsmittelwert

Comparison of The Air Quality

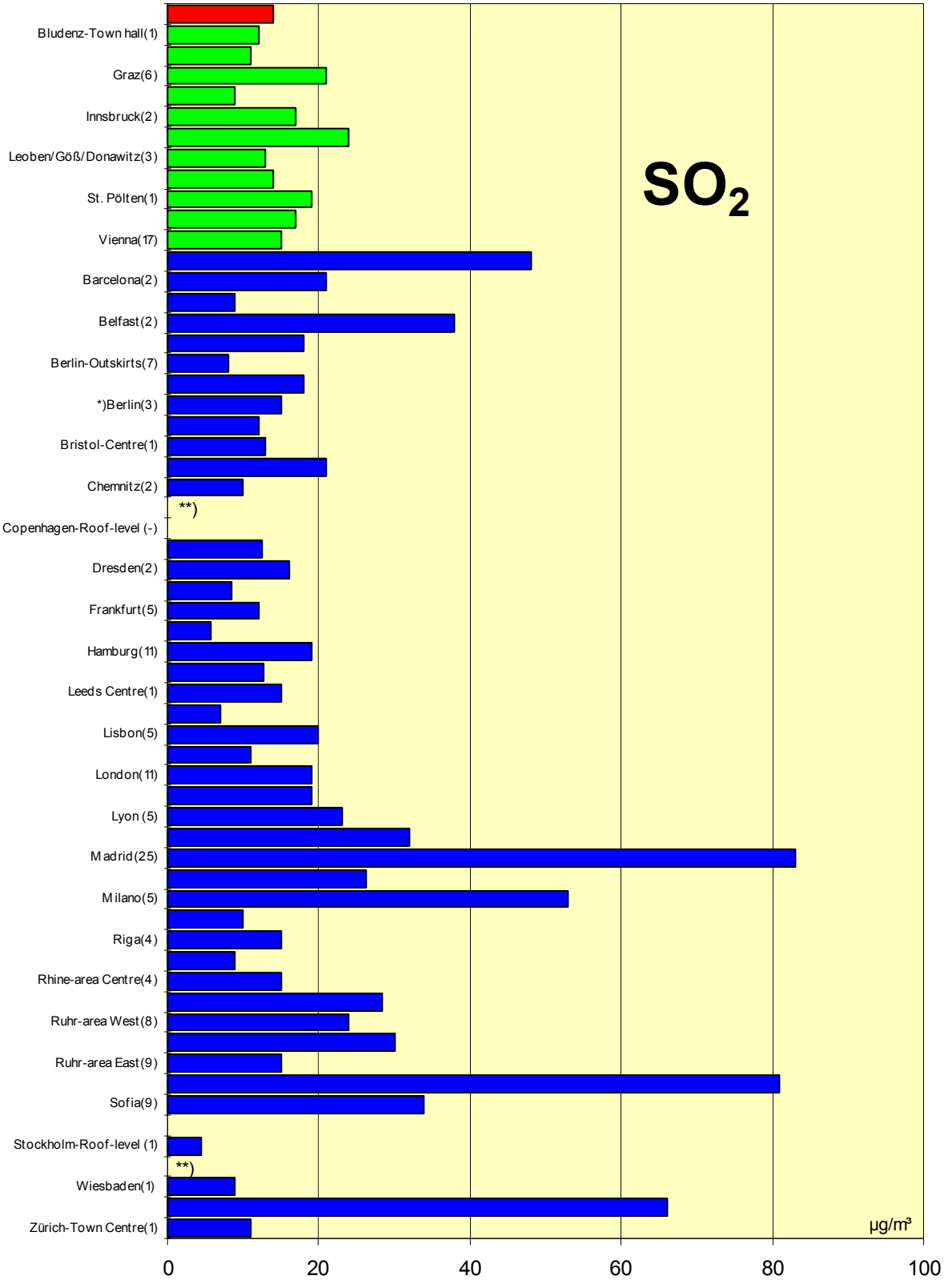
2000

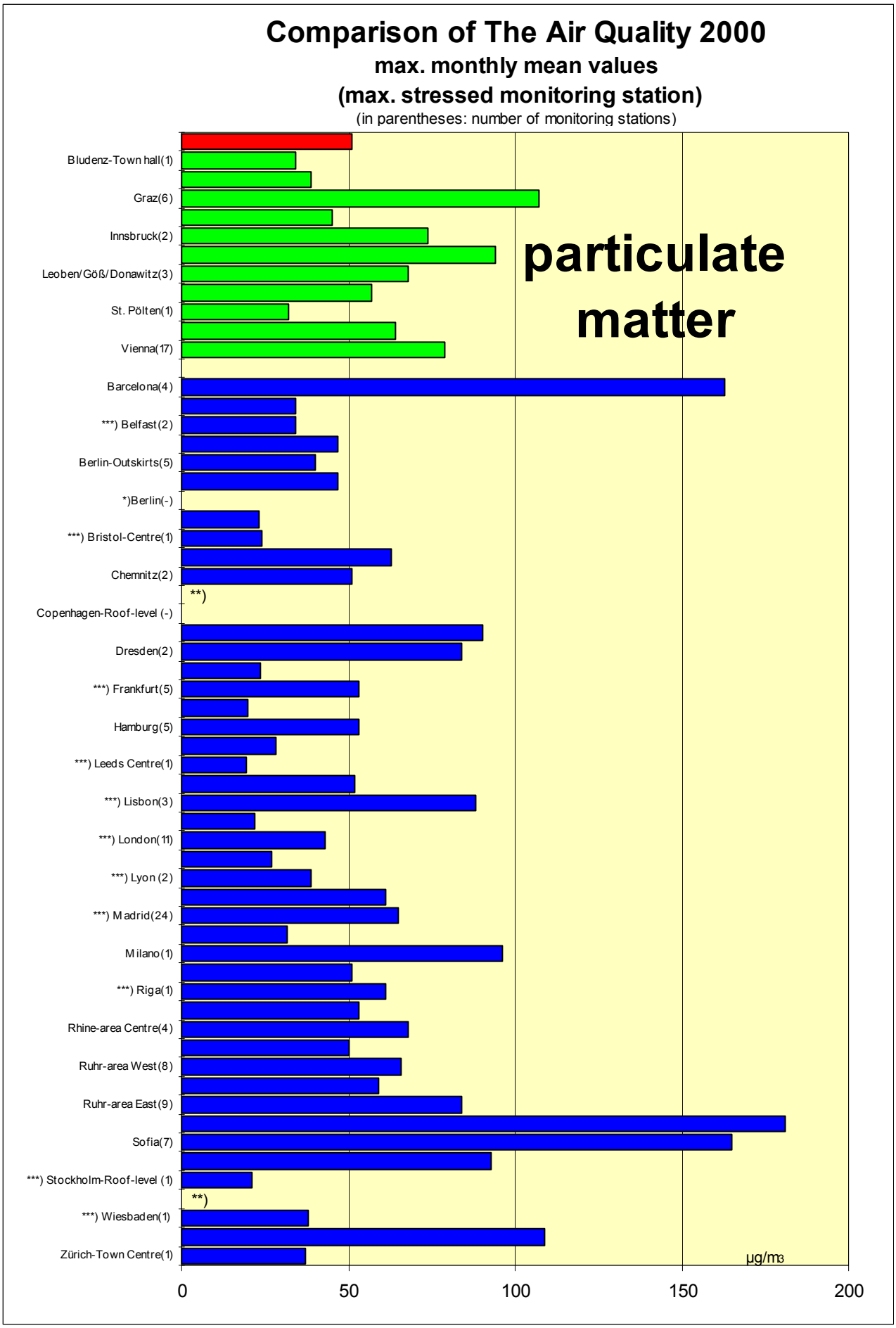
Max. Monthly Mean Values

Comparison of The Air Quality 2000

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

(in parentheses: number of monitoring stations)

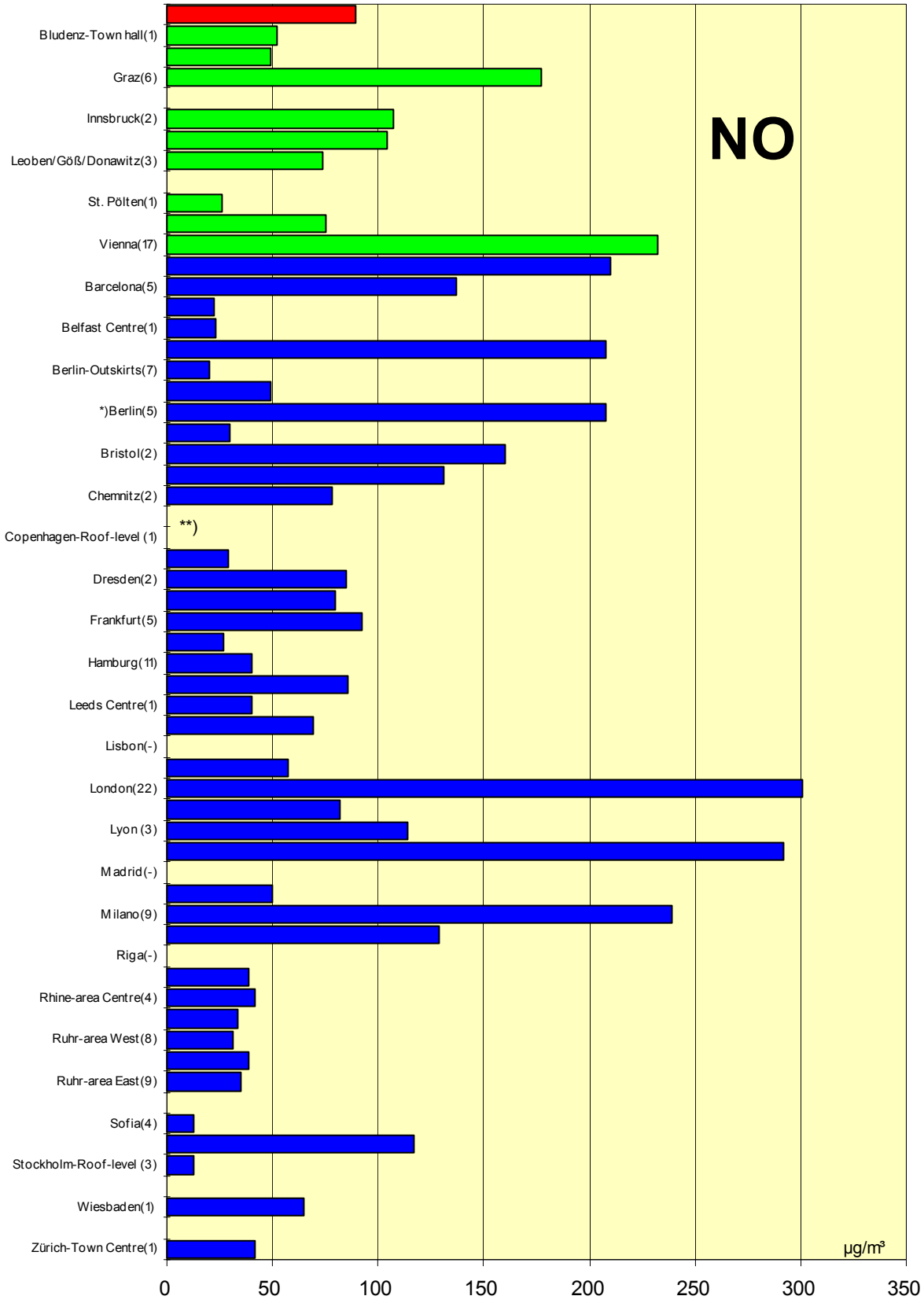



Comparison of The Air Quality 2000
max. monthly mean values
(max. stressed monitoring station)
(in parentheses: number of monitoring stations)
particulate matter
Bludenz-Town hall(1)
Graz(6)
Innsbruck(2)
Leoben/Göß/Donawitz(3)
St. Pölten(1)
Vienna(17)
Barcelona(4)
***) Belfast(2)
Berlin-Outskirts(5)
*)Berlin(-)
***) Bristol-Centre(1)
Chemnitz(2)
**)
Copenhagen-Roof-level (-)
Dresden(2)
***) Frankfurt(5)
Hamburg(5)
***) Leeds Centre(1)
***) Lisbon(3)
***) London(11)
***) Lyon (2)
***) Madrid(24)
Milano(1)
***) Riga(1)
Rhine-area Centre(4)
Ruhr-area West(8)
Ruhr-area East(9)
Sofia(7)
***) Stockholm-Roof-level (1)
**)
***) Wiesbaden(1)
Zürich-Town Centre(1)
µg/m3
0
50
100
150
200

Comparison of The Air Quality 2000

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

(in parentheses: number of monitoring stations)

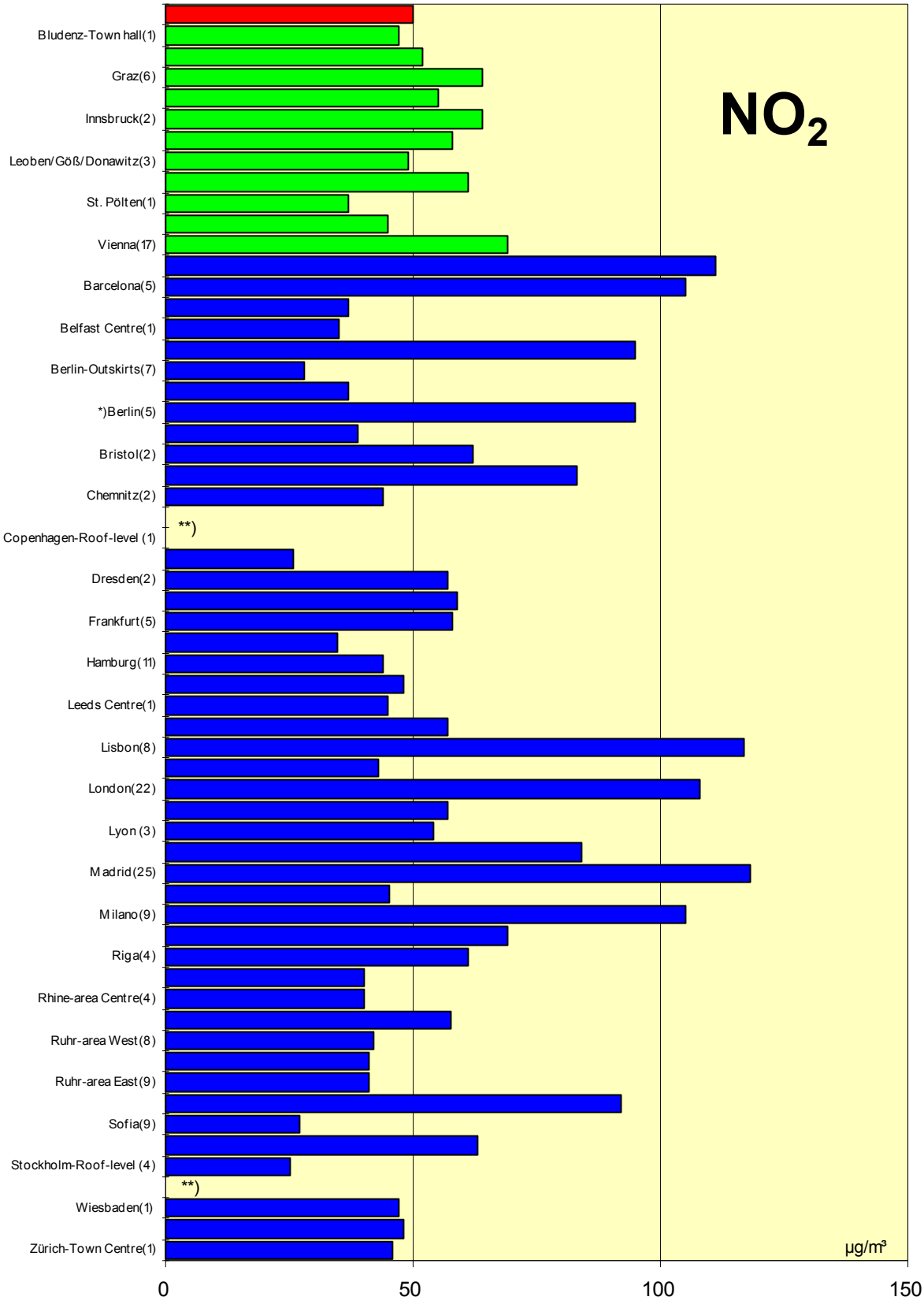


Comparison of The Air Quality 2000

max. monthly mean values

(max. stressed monitoring station)

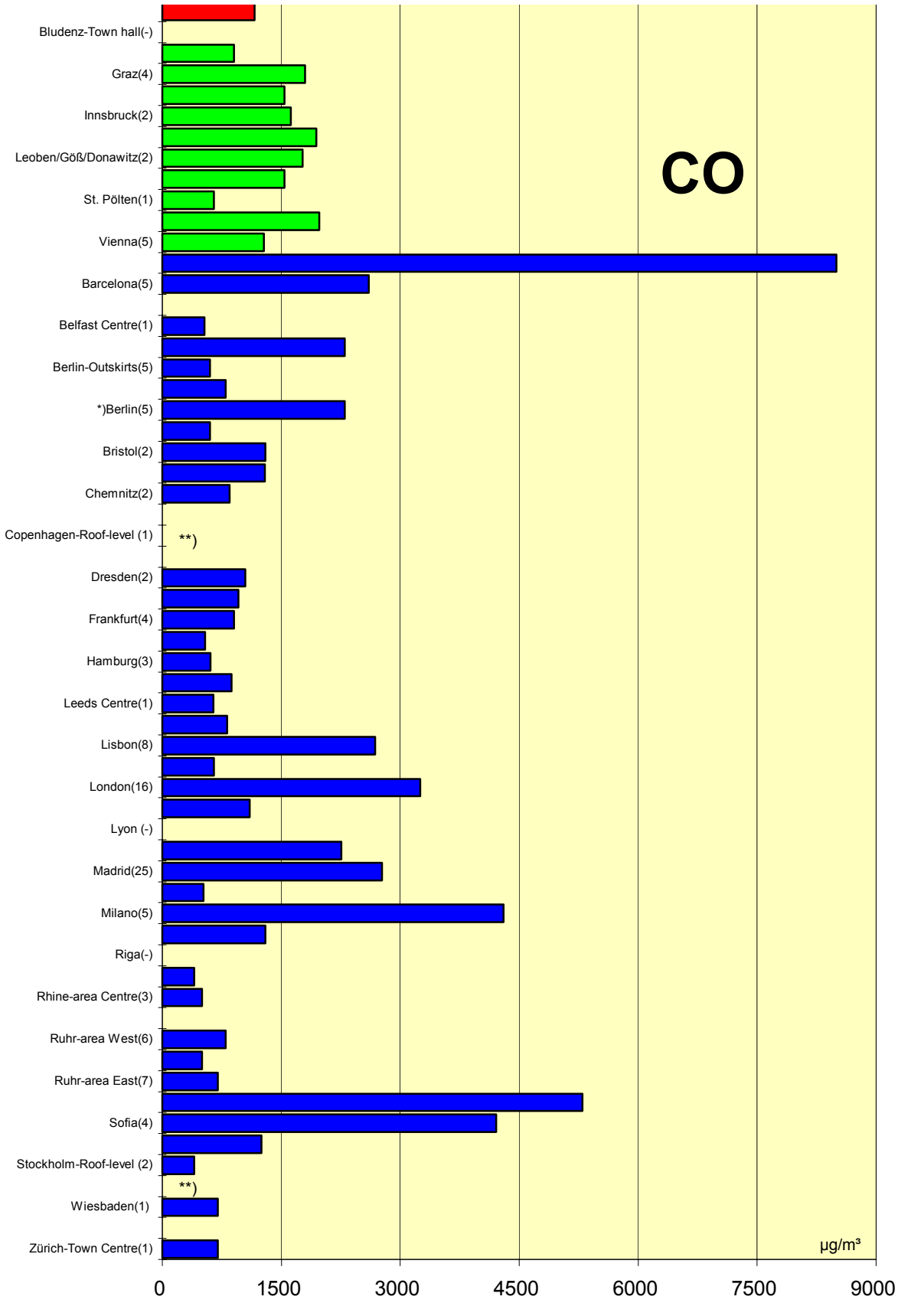
(in parentheses: number of monitoring stations)



Comparison of The Air Quality 2000

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

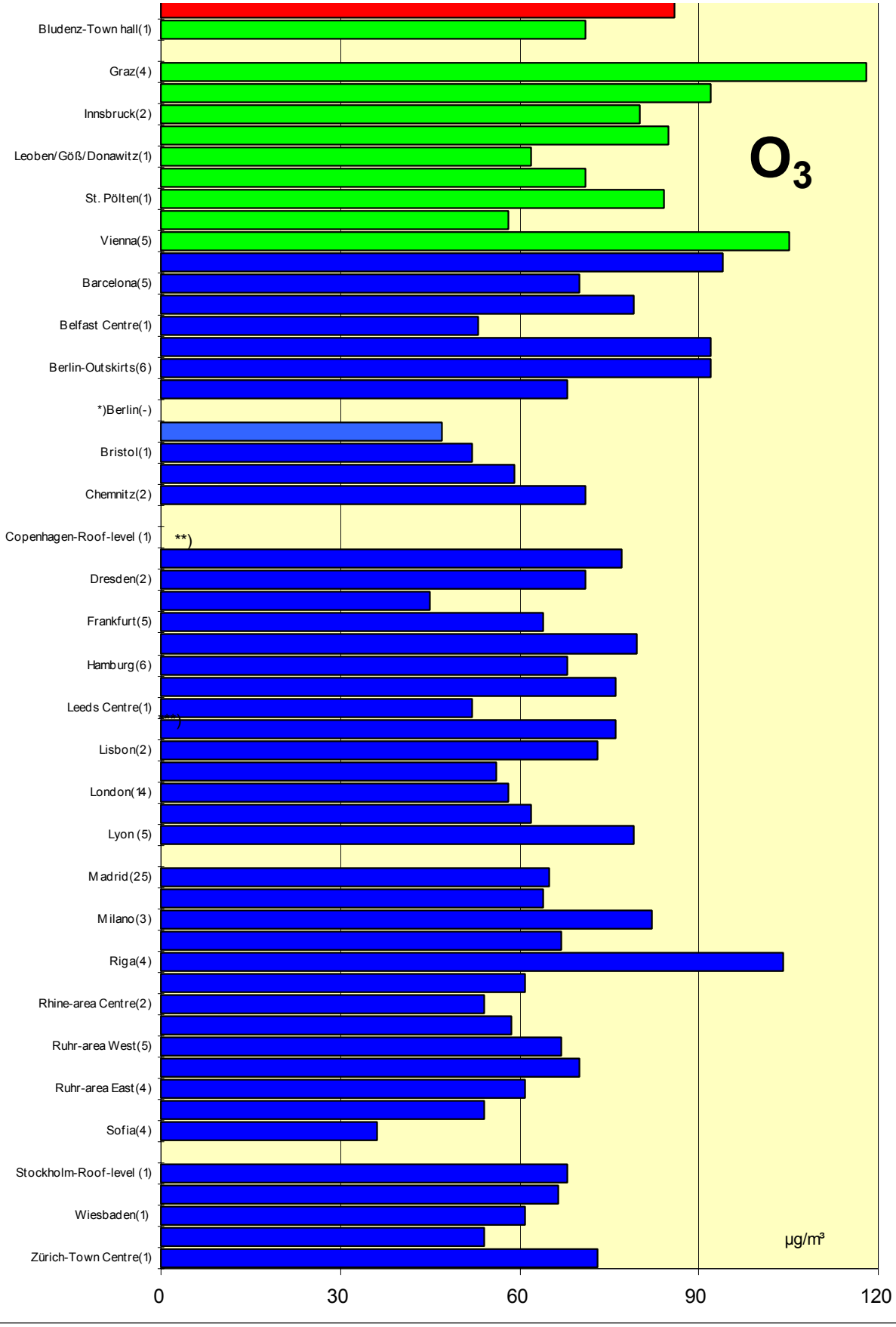
(in parentheses: number of monitoring stations)



Comparison of The Air Quality 2000

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

(in parentheses: number of monitoring stations)



Luftgütevergleich

2000

max. Tagesmittelwert

Comparison of The Air Quality

2000

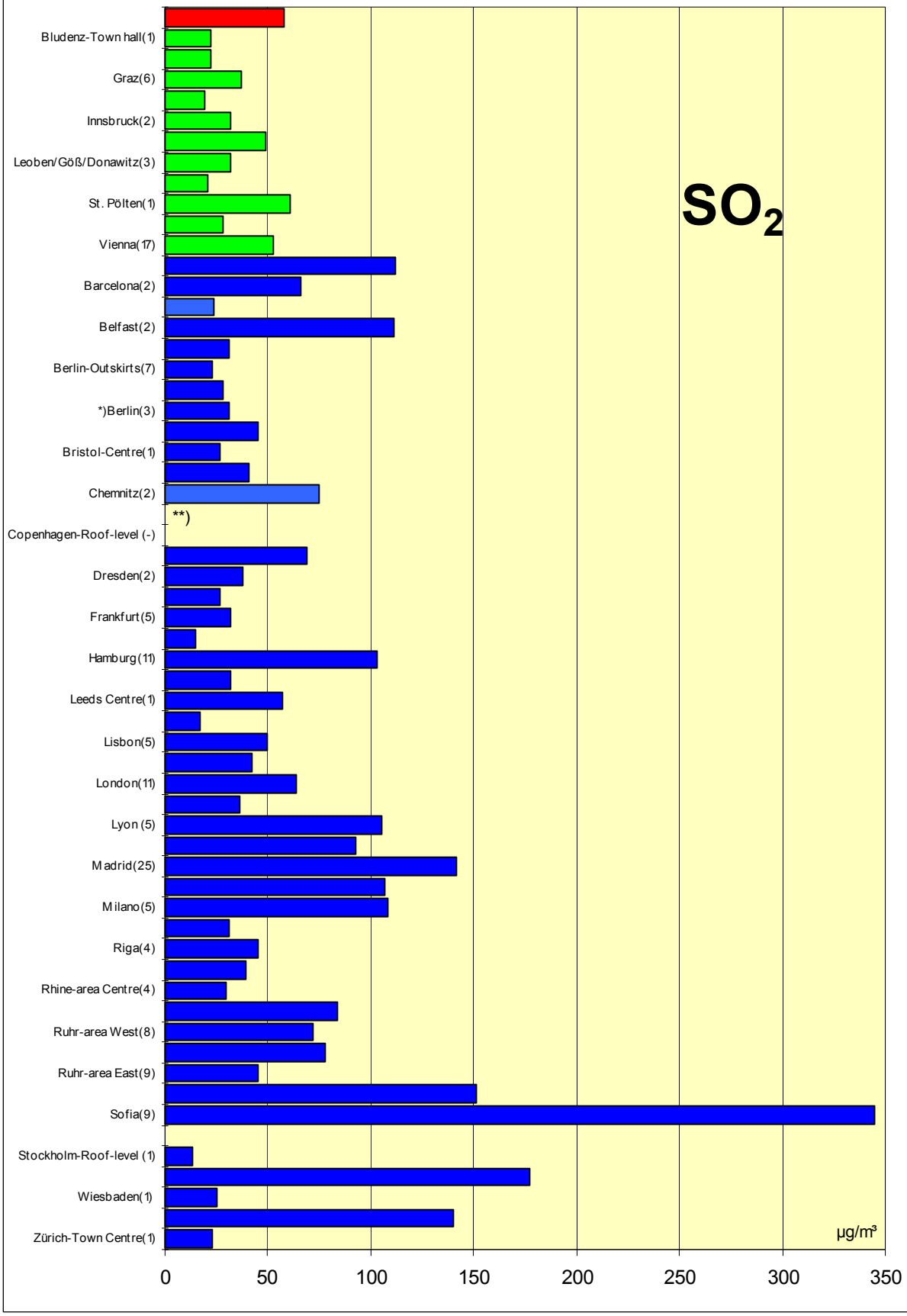
Max. Daily Mean Values

Comparison of The Air Quality in 2000

max. daily mean values

(max. stressed monitoring station)

(in parentheses: number of monitoring stations)

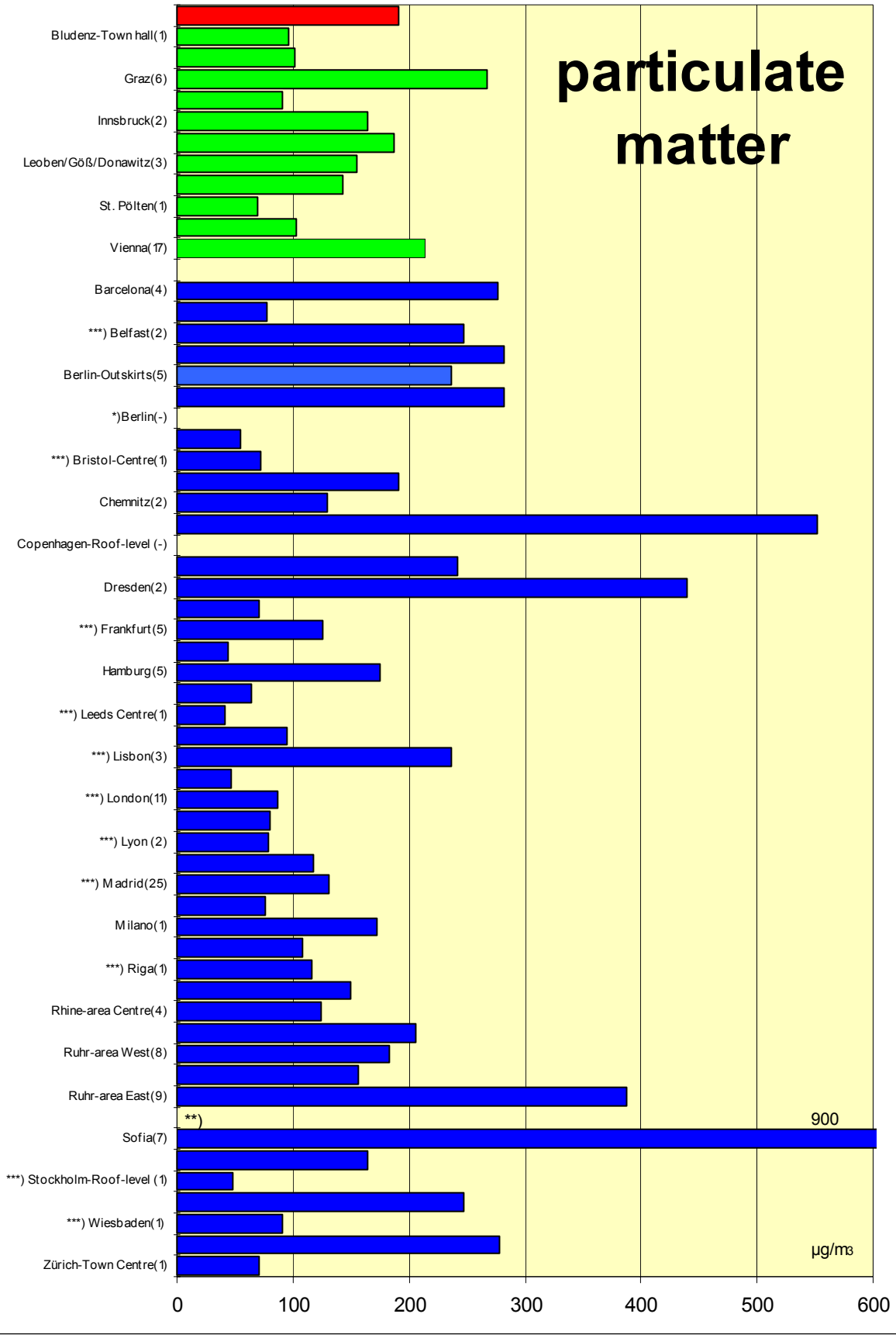


Comparison of The Air Quality in 2000

max. daily mean values

(max. stressed monitoring station)

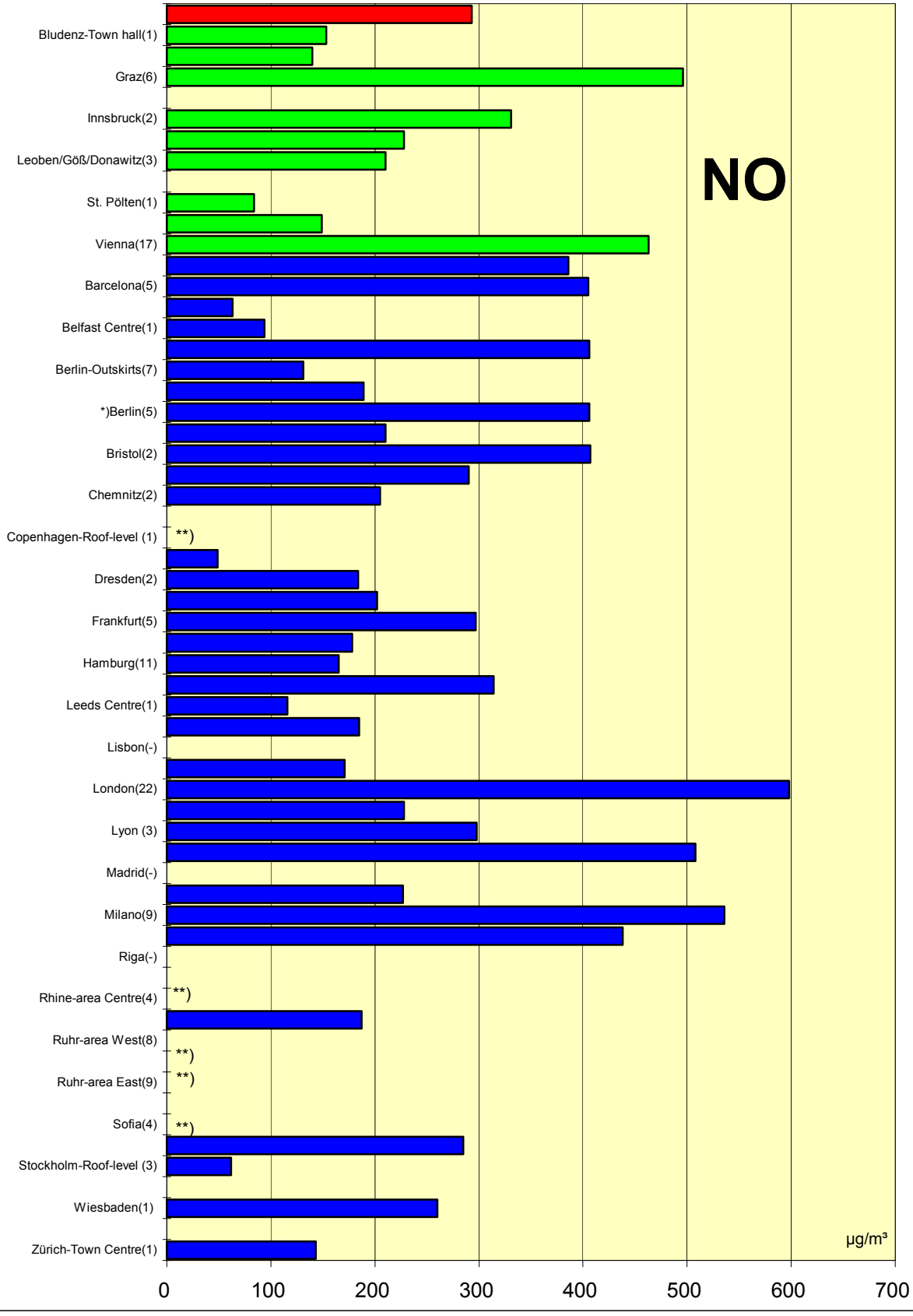
(in parentheses: number of monitoring stations)



Comparison of The Air Quality in 2000

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

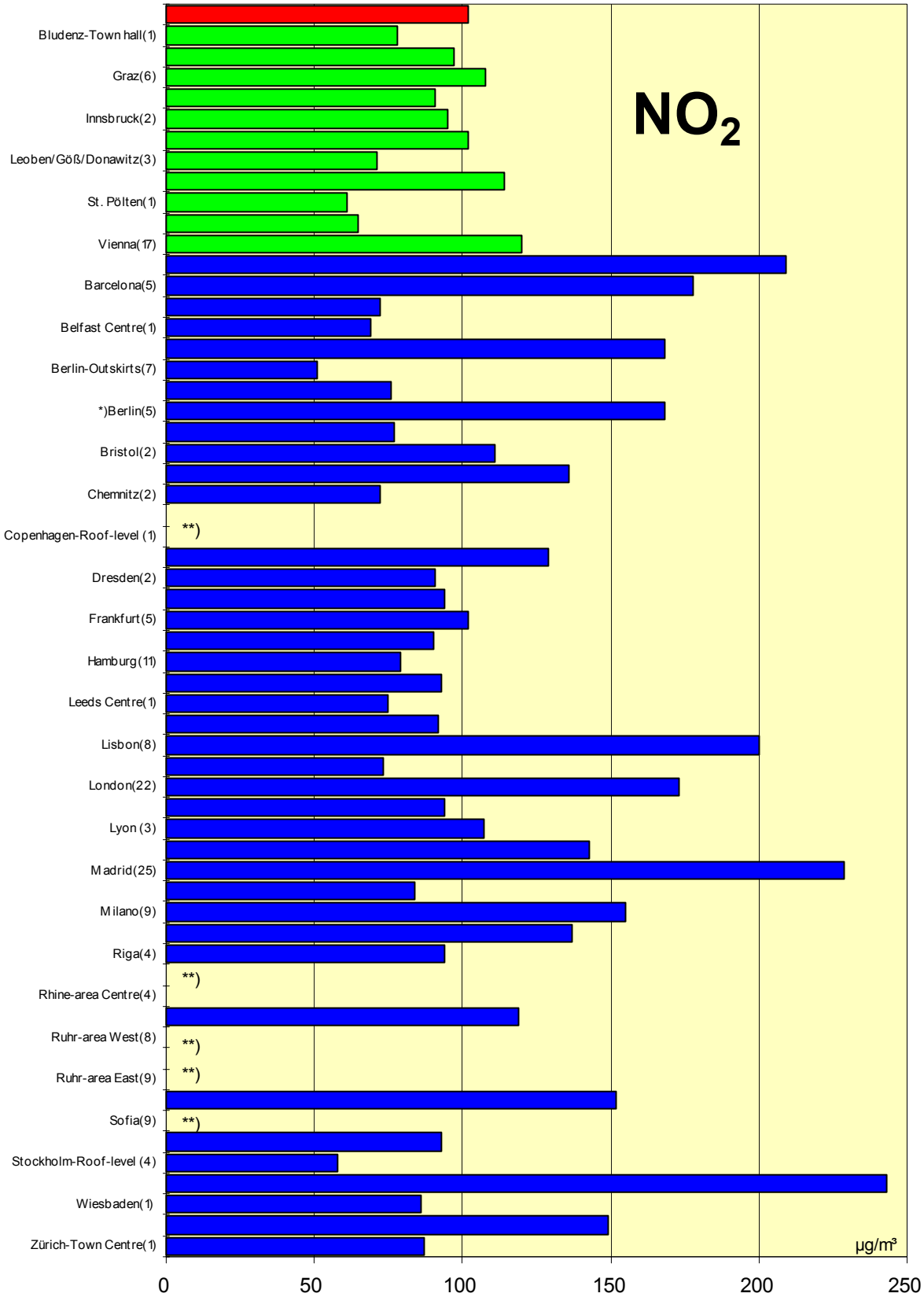
(in parentheses: number of monitoring stations)



Comparison of The Air Quality in 2000

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

(in parentheses: number of monitoring stations)

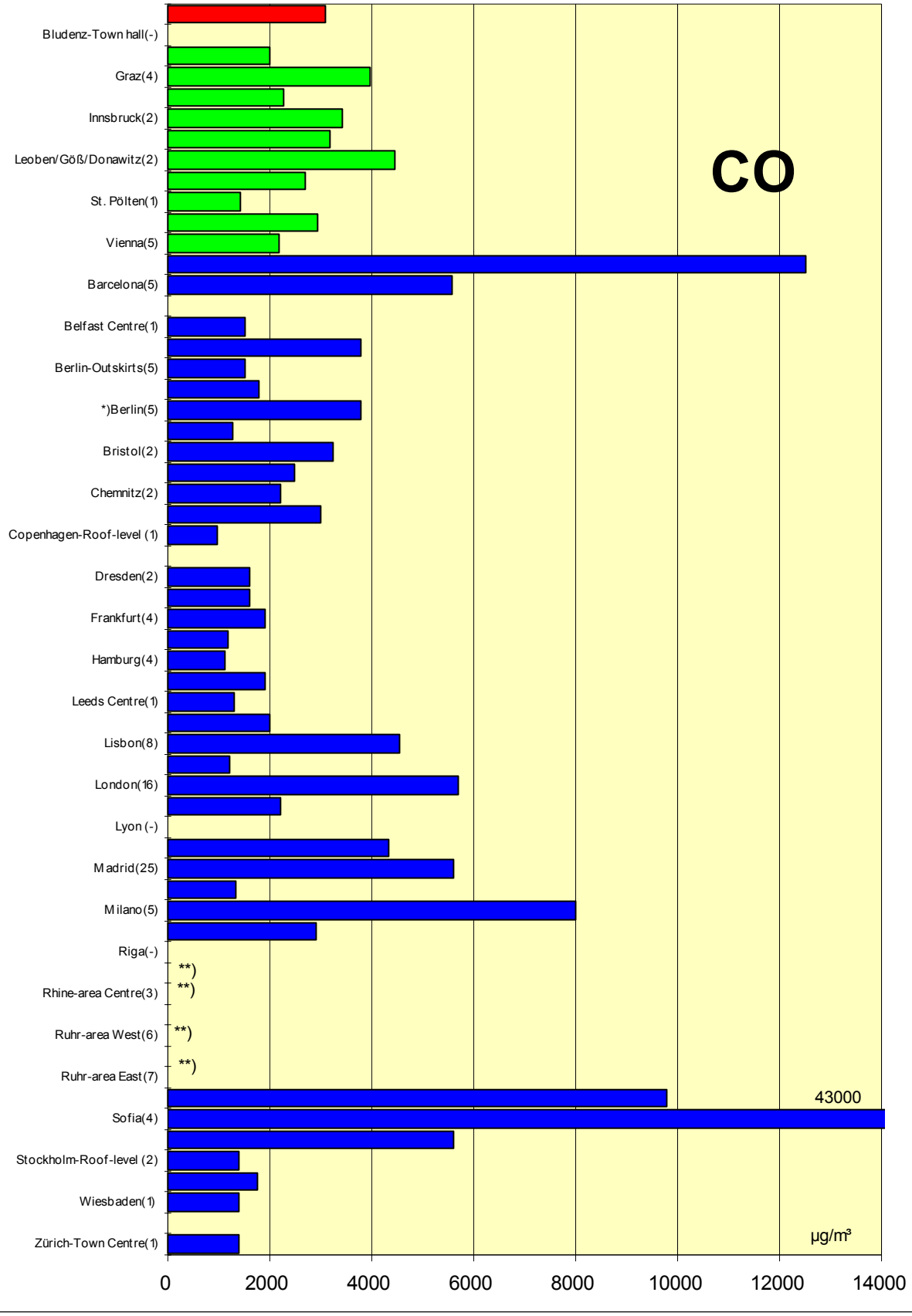


Comparison of The Air Quality in 2000

max. daily mean values

(max. stressed monitoring station)

(in parentheses: number of monitoring stations)

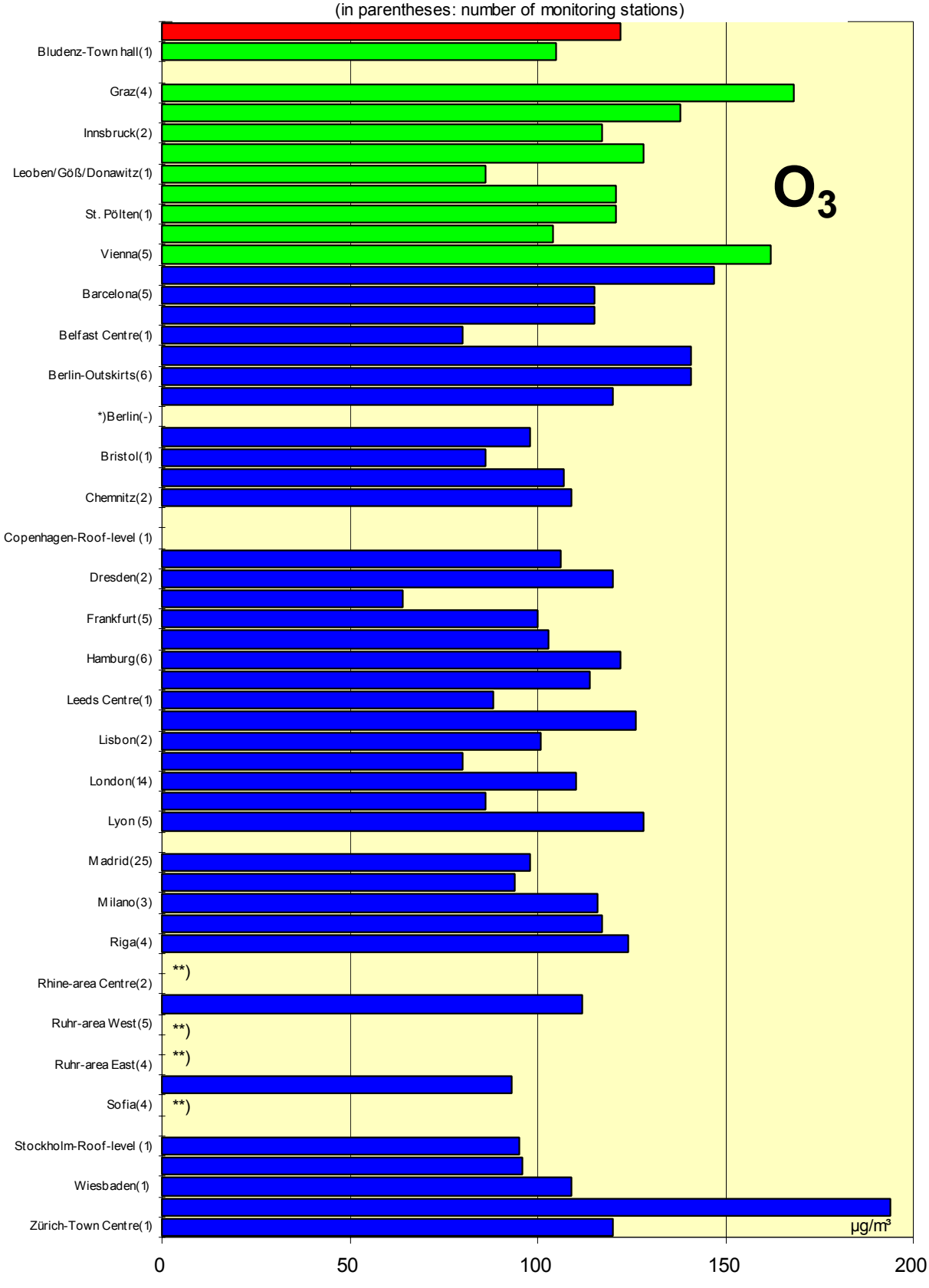


Comparison of The Air Quality in 2000

max. daily mean values

(max. stressed monitoring station)

(in parentheses: number of monitoring stations)



Luftgütevergleich

2000

max. 3h-Mittelwerte

Comparison of The Air Quality

2000

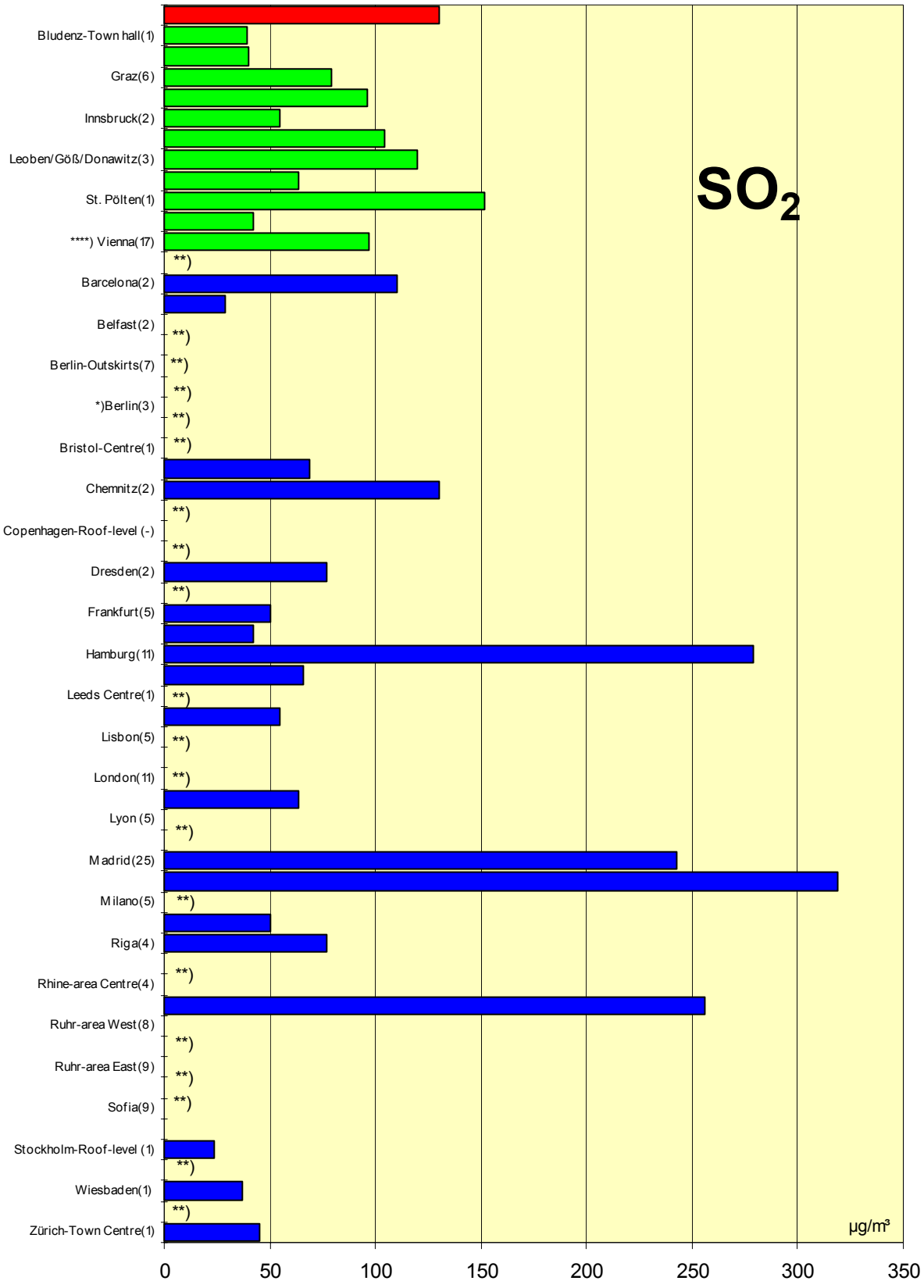
Max. 3h- Mean Values

Comparison of The Air Quality in 2000

max. 3h mean values

(max. stressed monitoring station)

(in parentheses: number of monitoring stations)

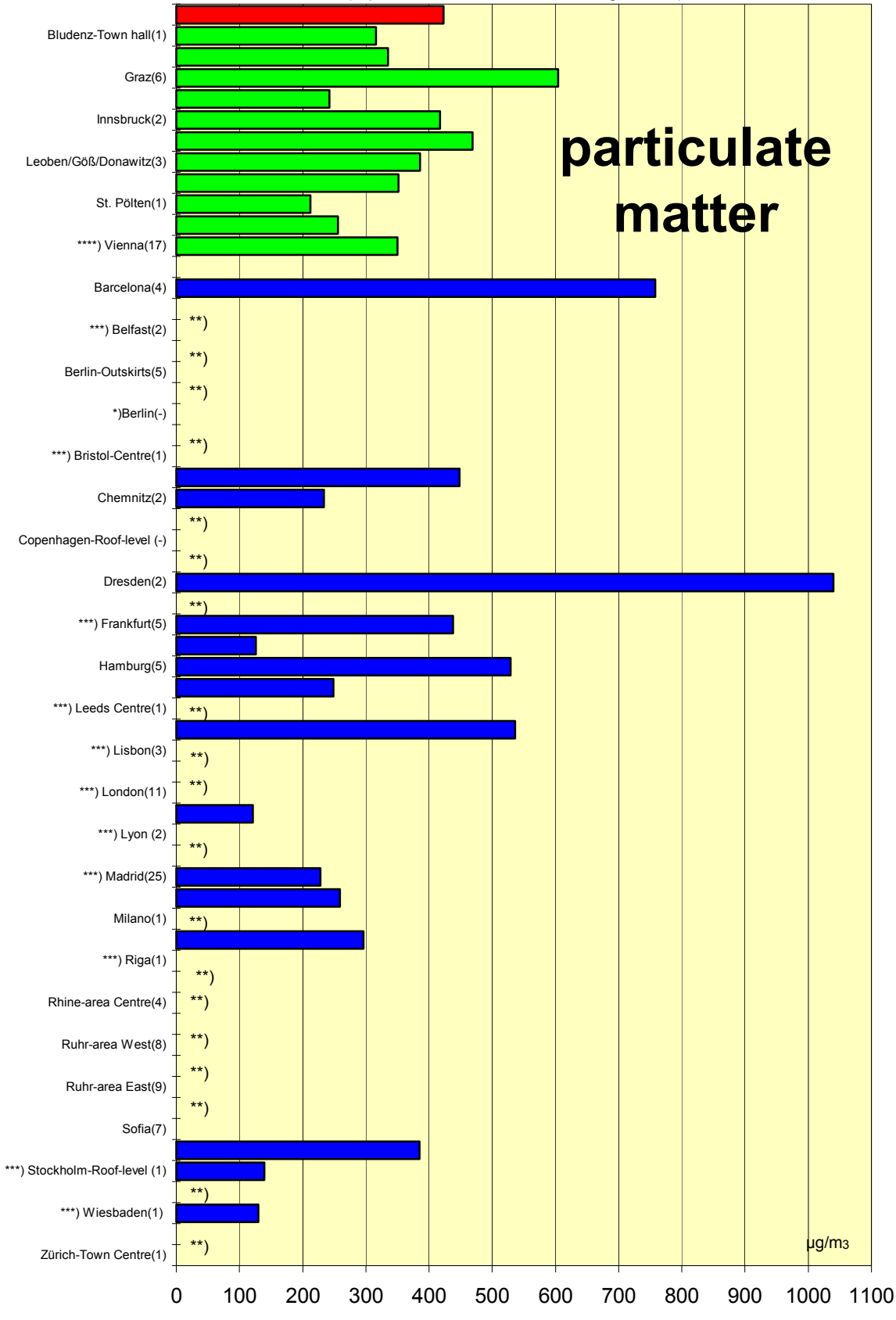


Comparison of The Air Quality in 2000

max. 3h mean values

(max. stressed monitoring station)

(in parentheses: number of monitoring stations)

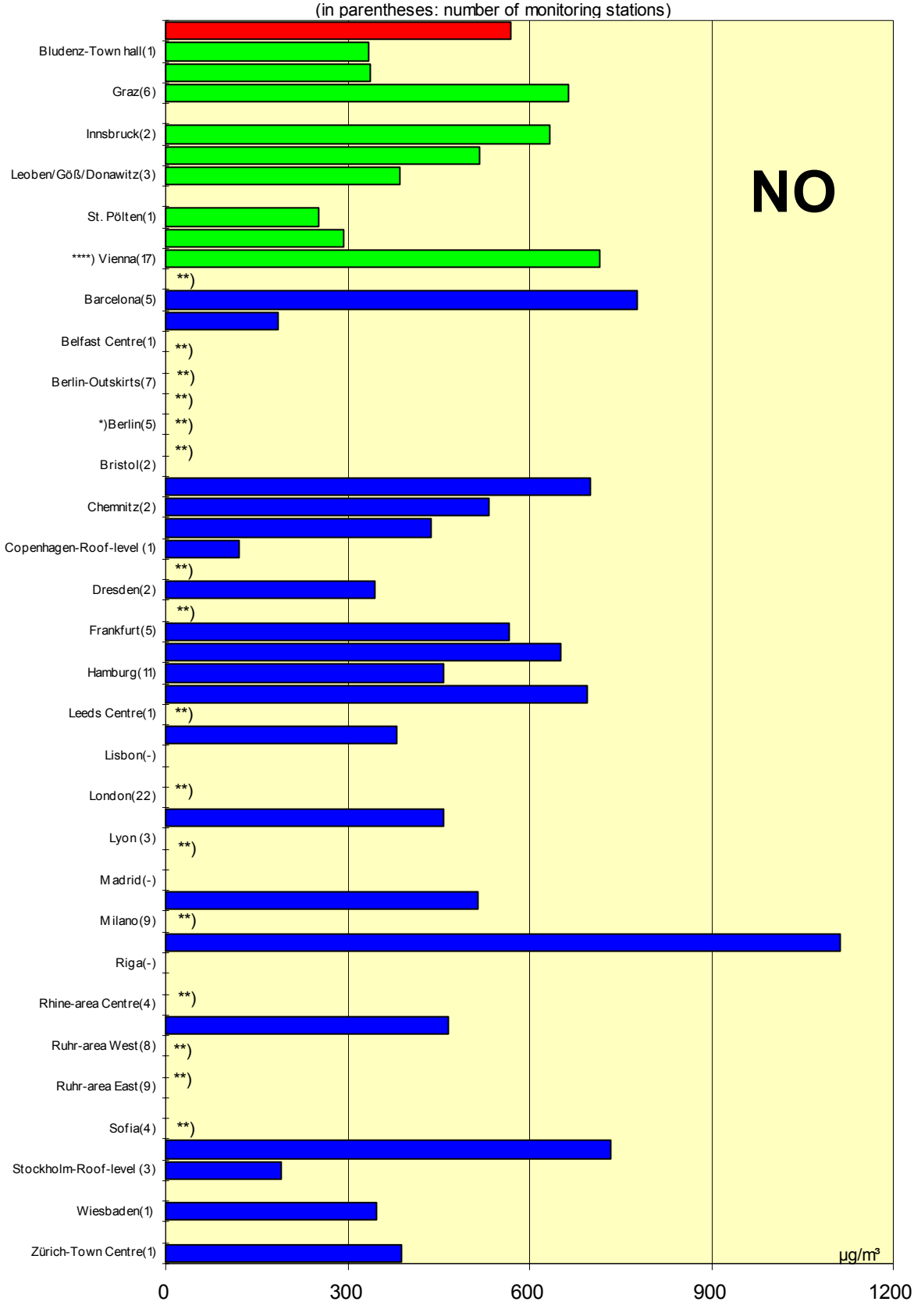


Comparison of The Air Quality in 2000

max. 3h mean values

(max. stressed monitoring station)

(in parentheses: number of monitoring stations)

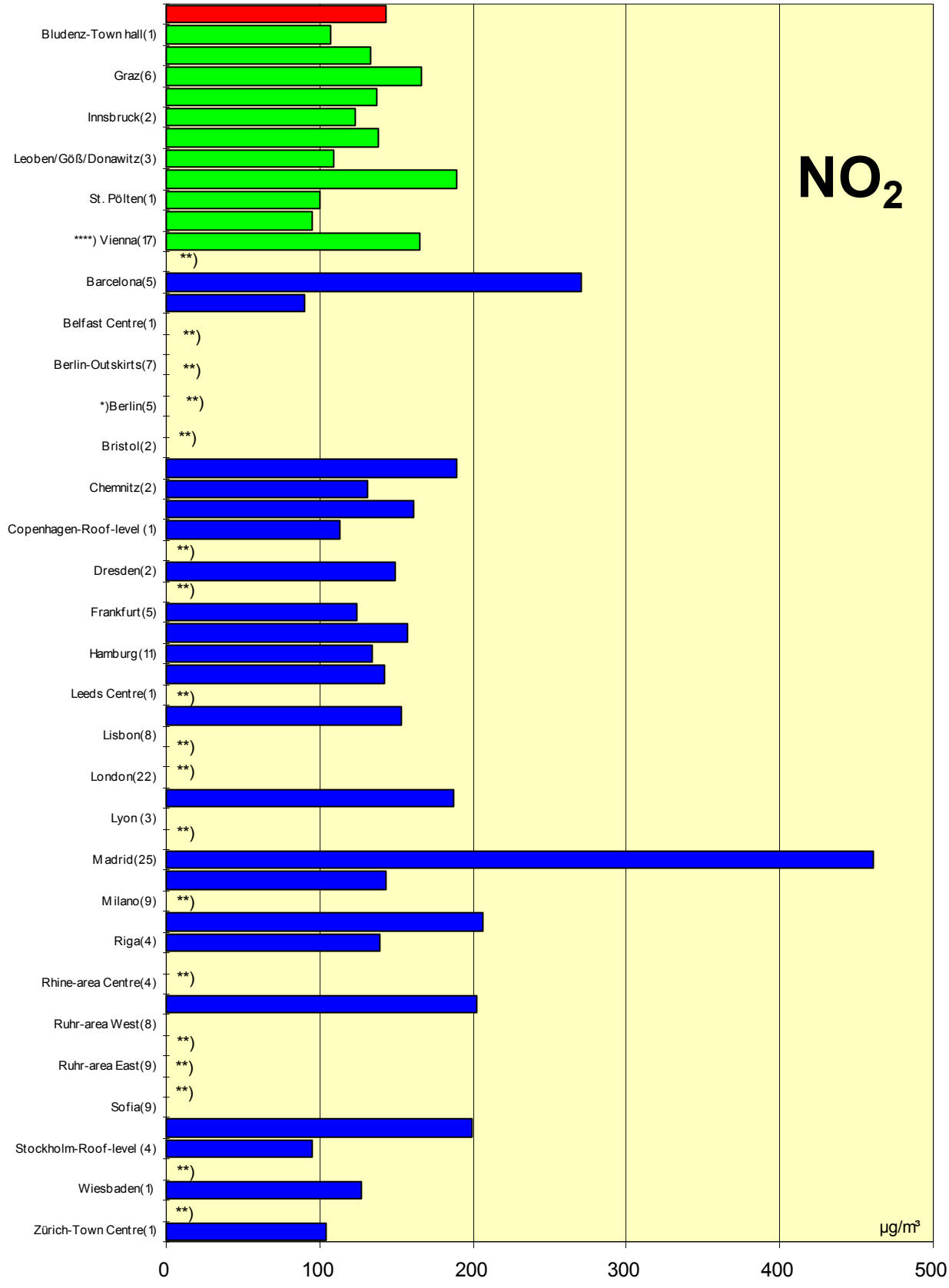


Comparison of The Air Quality in 2000

max. 3h mean values

(max. stressed monitoring station)

(in parentheses: number of monitoring stations)

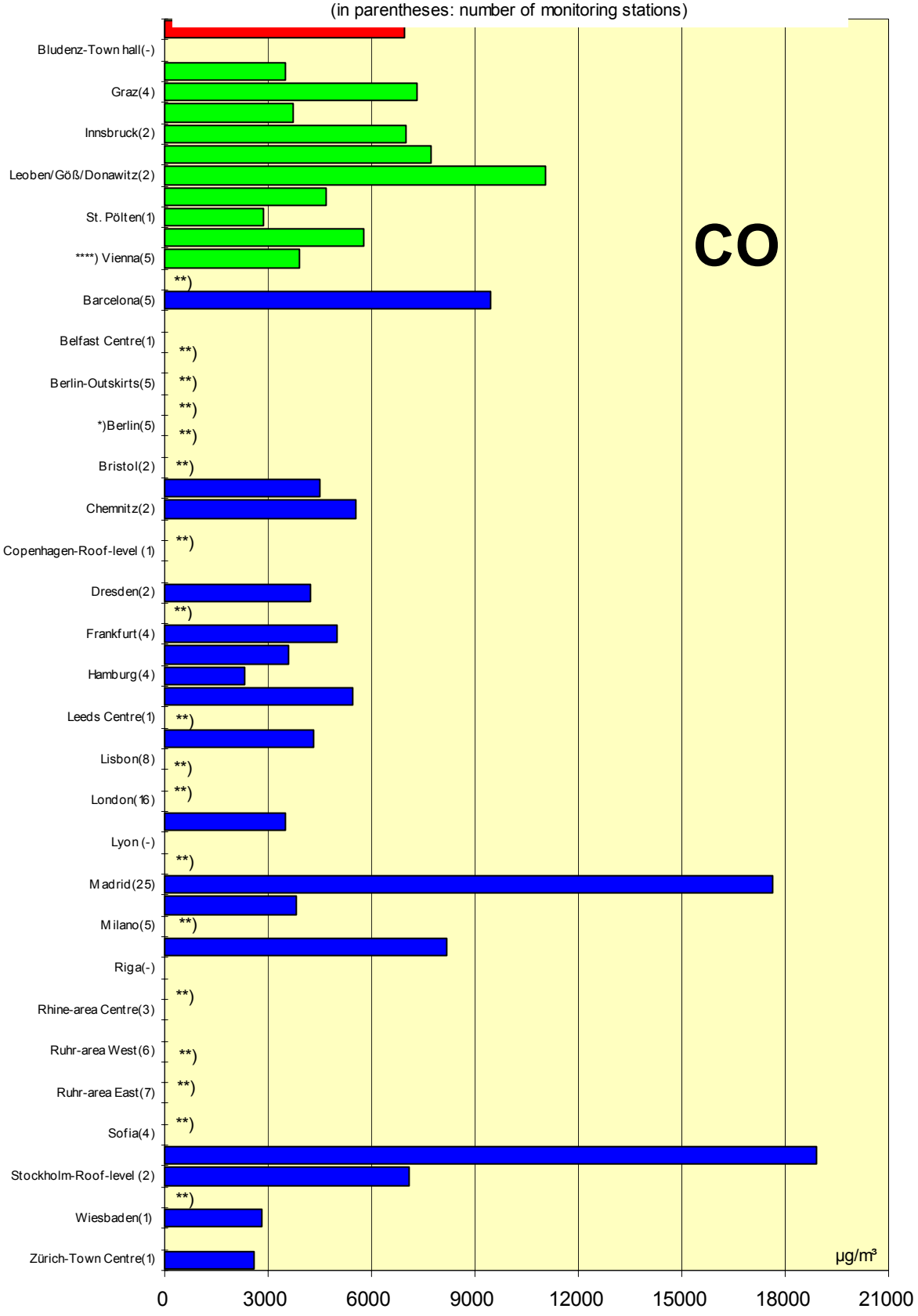


Comparison of The Air Quality in 2000

max. 3h mean values

(max. stressed monitoring station)

(in parentheses: number of monitoring stations)

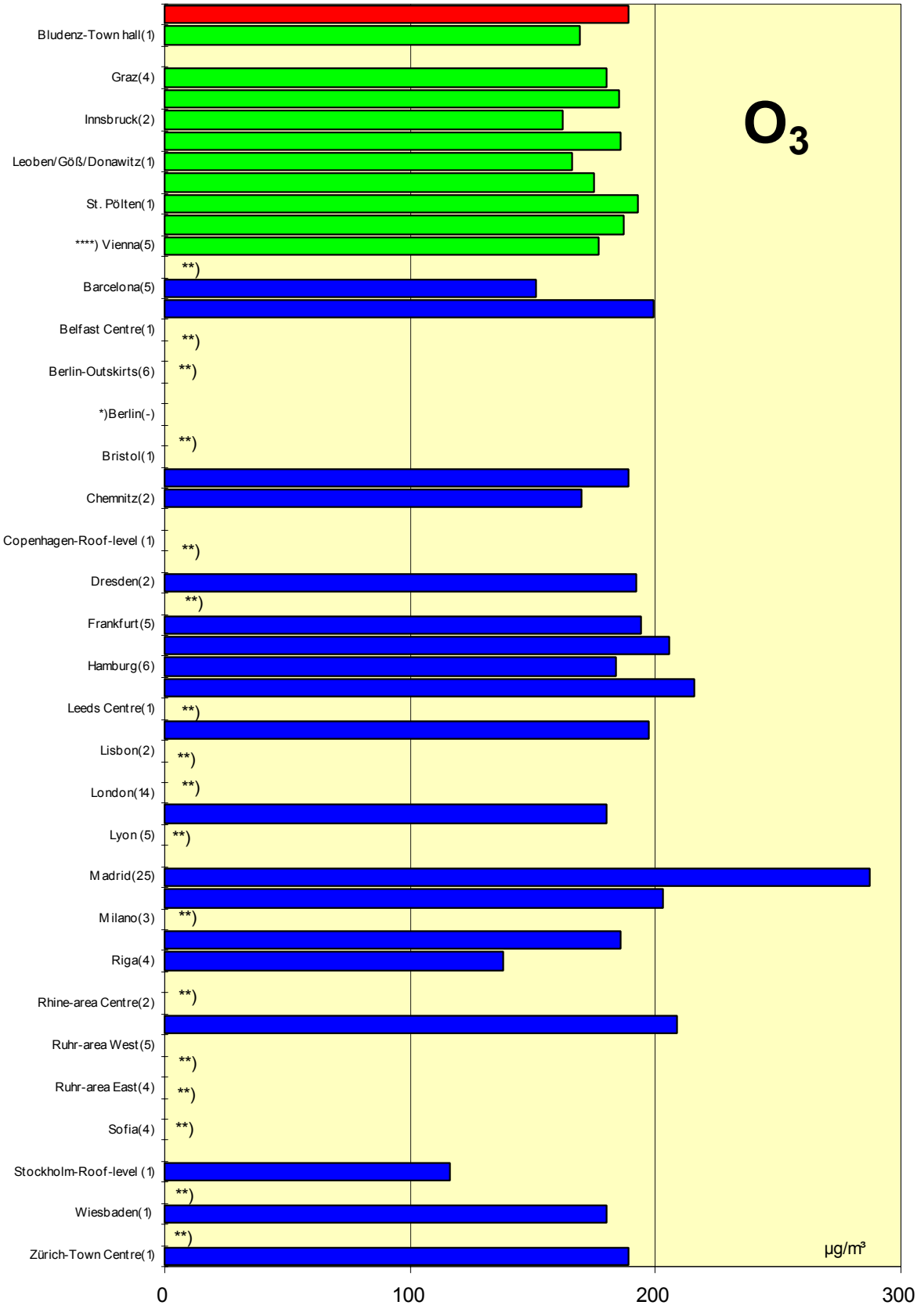


Comparison of The Air Quality in 2000

max. 3h mean values

(max. stressed monitoring station)

(in parentheses: number of monitoring stations)



Luftgütevergleich

2000

max. 1h-Mittelwerte

Comparison of The Air Quality

2000

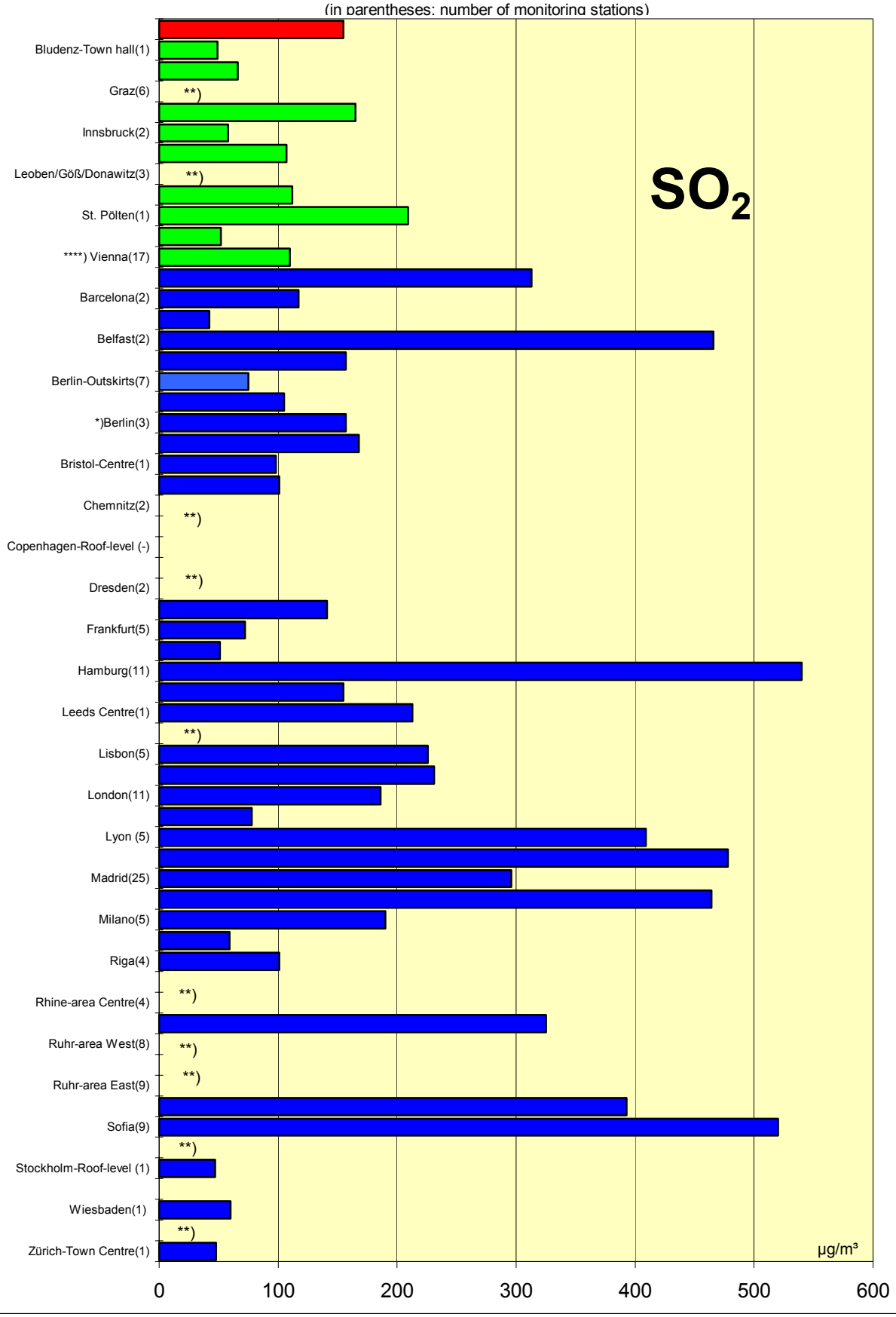
Max. 1h-Mean Values

Comparison of The Air Quality in 2000

max. 1h mean values

(max. stressed monitoring station)

(in parentheses: number of monitoring stations)

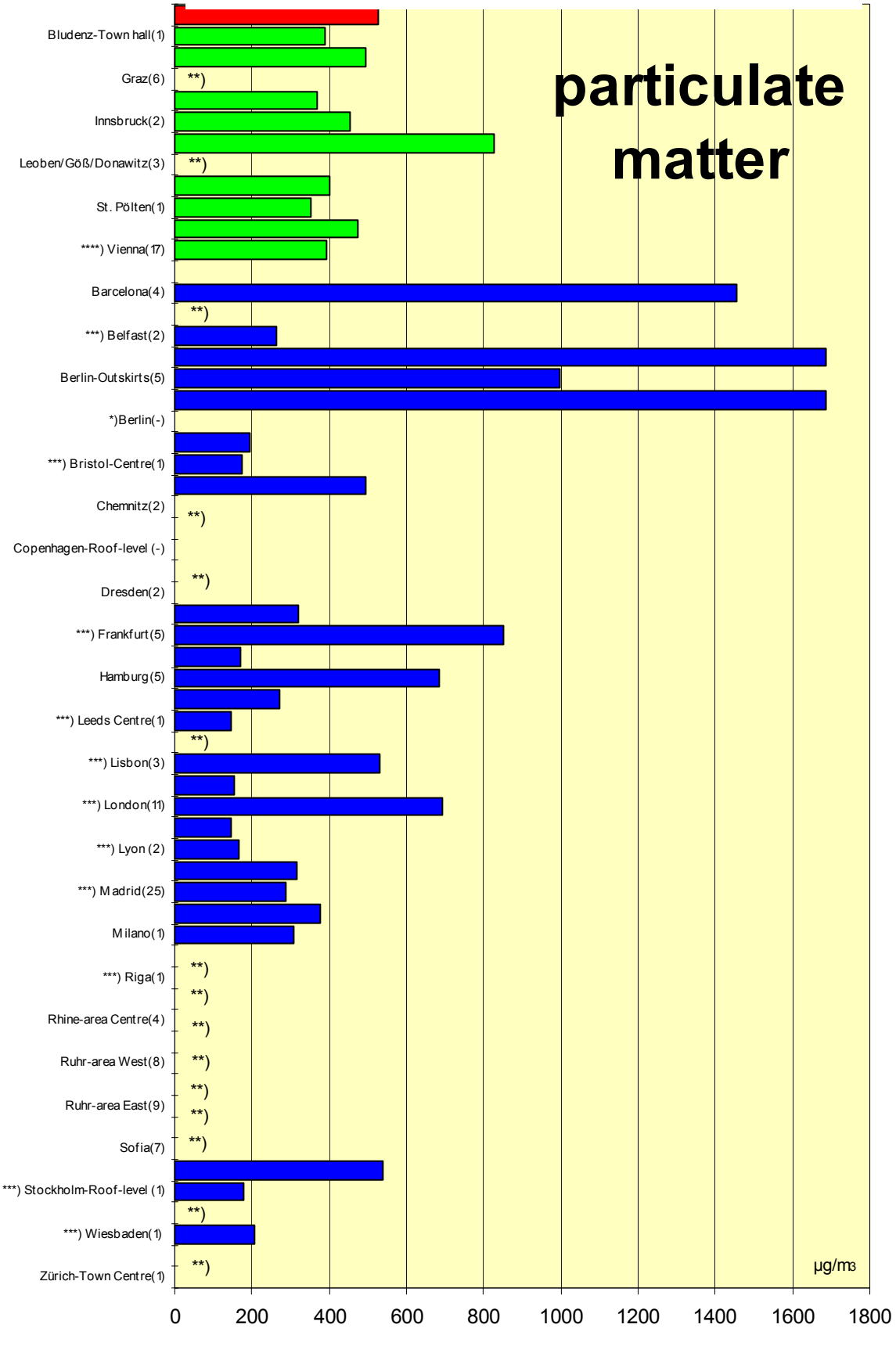


Comparison of The Air Quality in 2000

max. 1h mean values

(max. stressed monitoring station)

(in parentheses: number of monitoring stations)

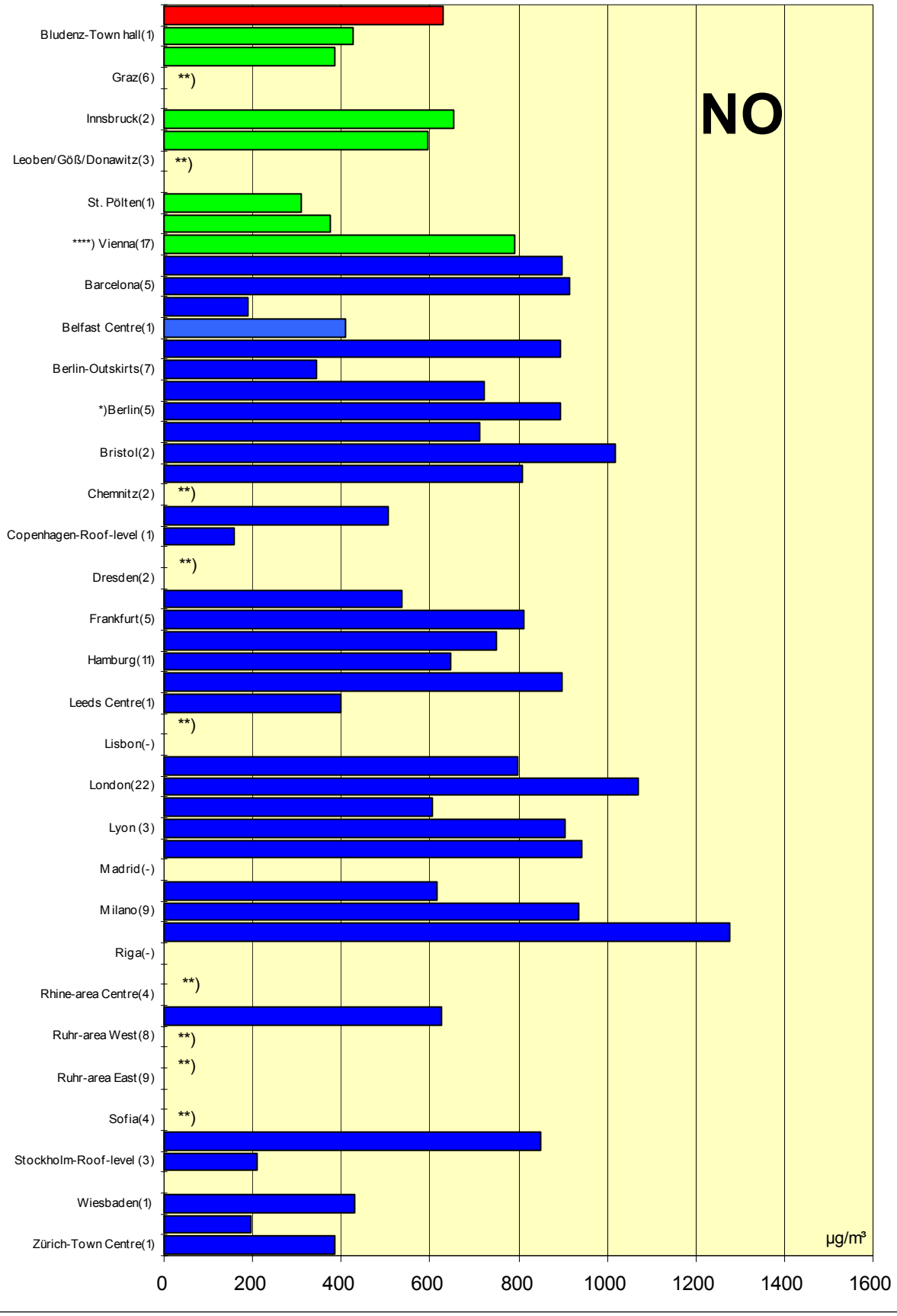


Comparison of The Air Quality in 2000

max. 1h mean values

(max. stressed monitoring station)

(in parentheses: number of monitoring stations)

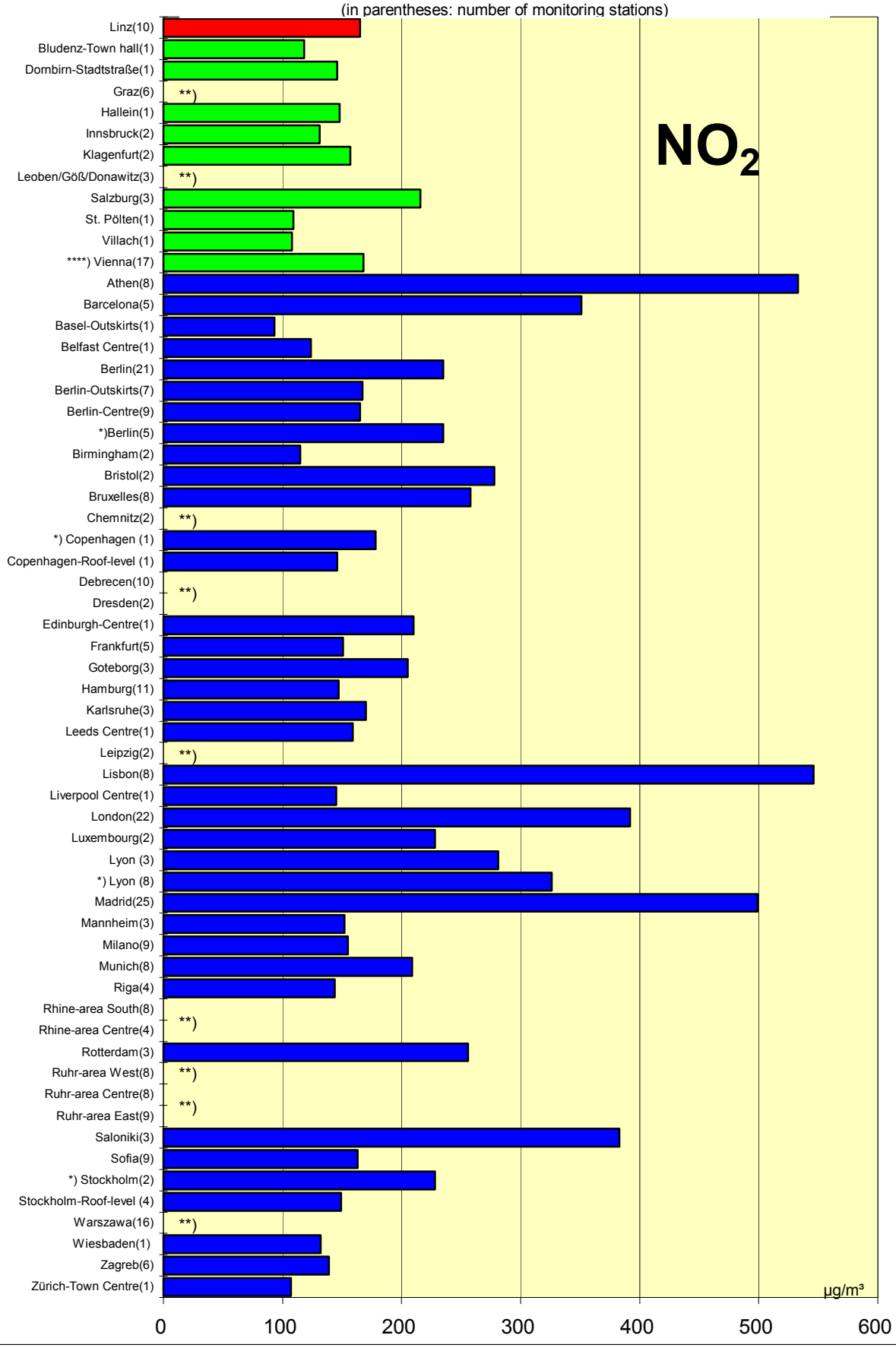


Comparison of The Air Quality in 2000

max. 1h mean values

(max. stressed monitoring station)

(in parentheses: number of monitoring stations)

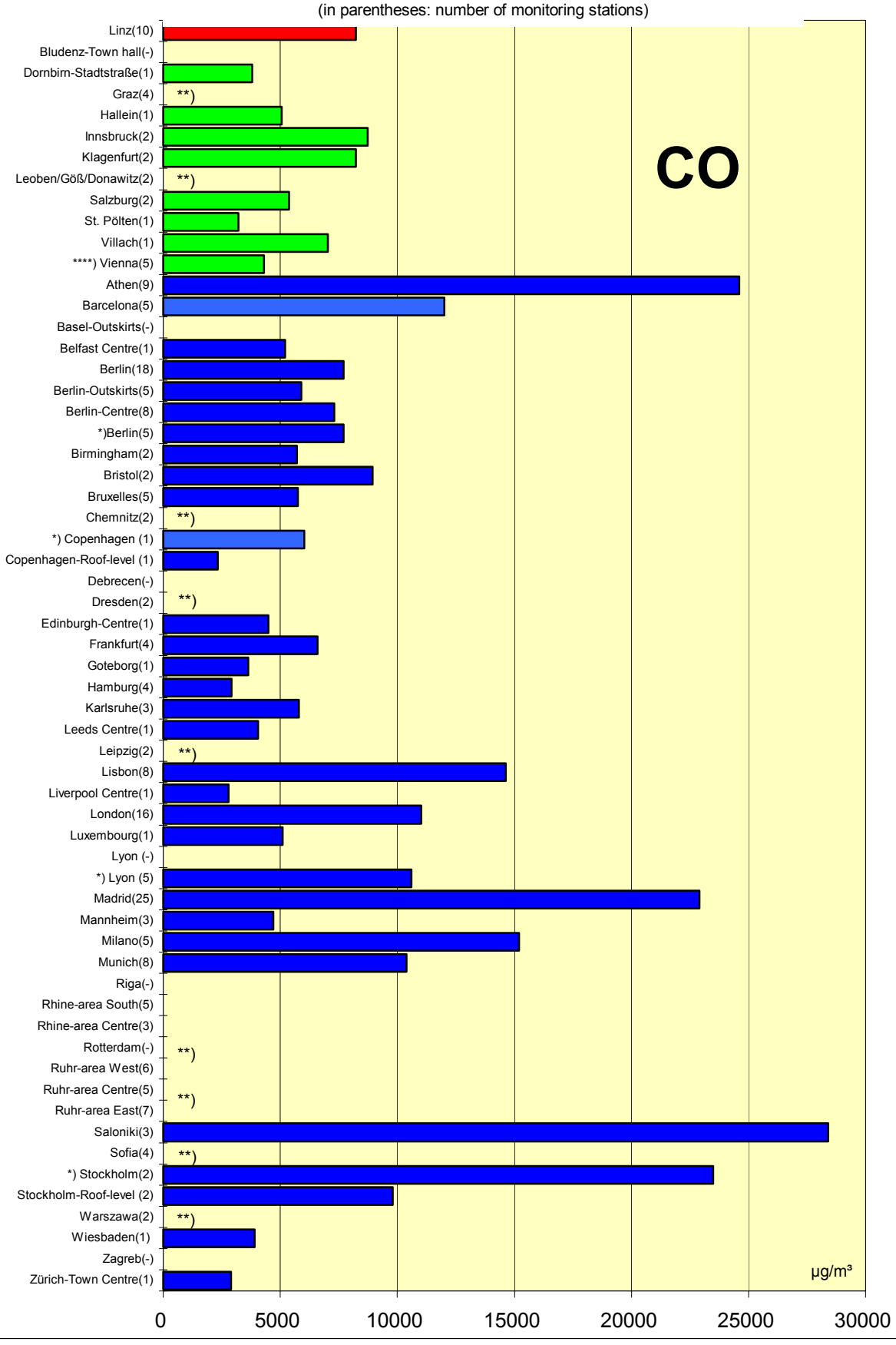


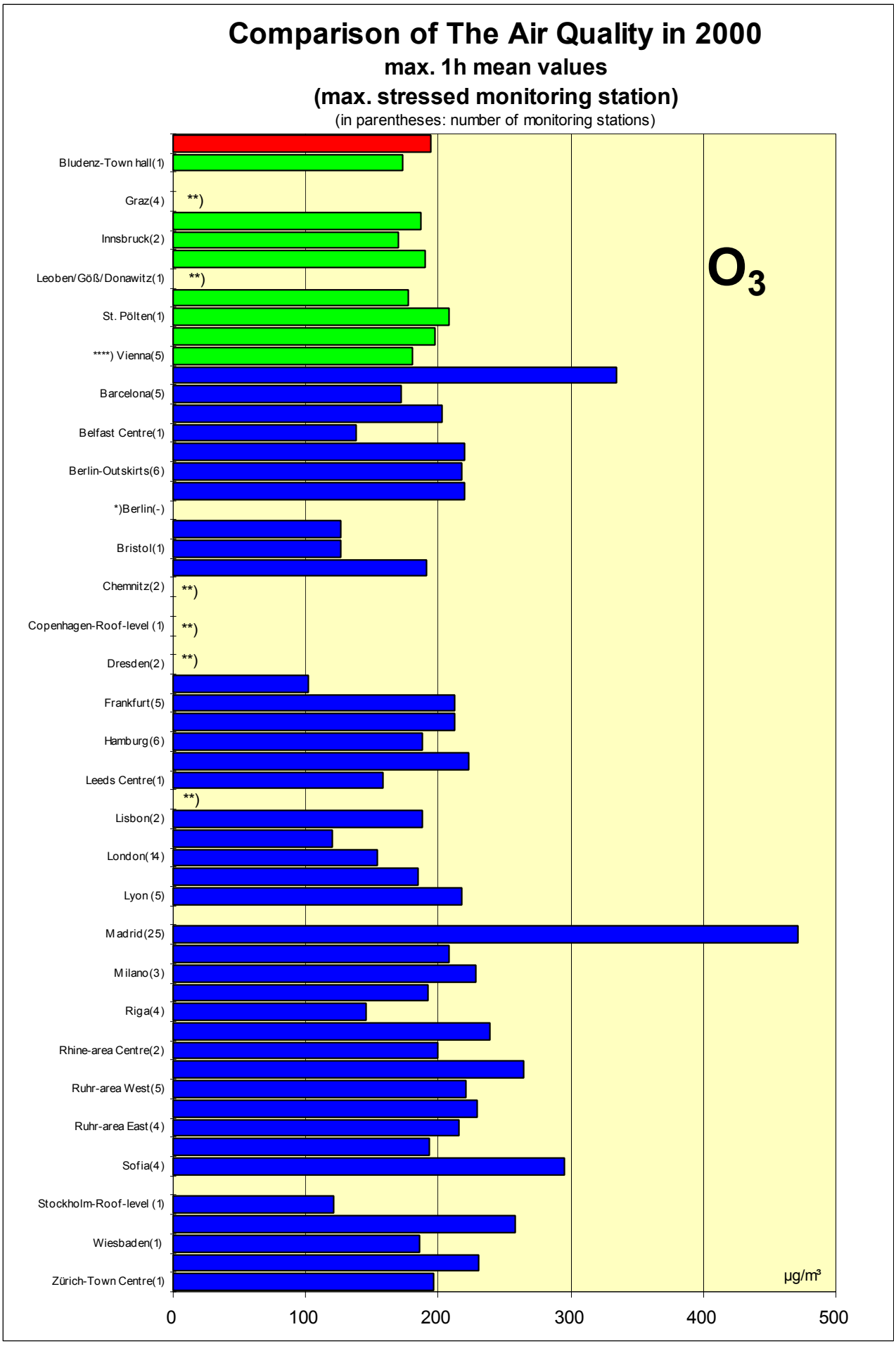
Comparison of The Air Quality in 2000

max. 1h mean values

(max. stressed monitoring station)

(in parentheses: number of monitoring stations)




Comparison of The Air Quality in 2000
max. 1h mean values
(max. stressed monitoring station)
(in parentheses: number of monitoring stations)
O3
Bludenz-Town hall(1)
Graz(4)
**)
Innsbruck(2)
Leoben/Göß/Donawitz(1)
**)
St. Pölten(1)
****) Vienna(5)
Barcelona(5)
Belfast Centre(1)
Berlin-Outskirts(6)
*)Berlin(-)
Bristol(1)
Chemnitz(2)
**)
Copenhagen-Roof-level (1)
**)
Dresden(2)
**)
Frankfurt(5)
Hamburg(6)
Leeds Centre(1)
**)
Lisbon(2)
London(14)
Lyon (5)
Madrid(25)
Milano(3)
Riga(4)
Rhine-area Centre(2)
Ruhr-area West(5)
Ruhr-area East(4)
Sofia(4)
Stockholm-Roof-level (1)
Wiesbaden(1)
Zürich-Town Centre(1)
µg/m³
0
100
200
300
400
500

Luftgütevergleich

2000

max. Halbstunden-Mittelwerte

Comparison of The Air Quality

2000

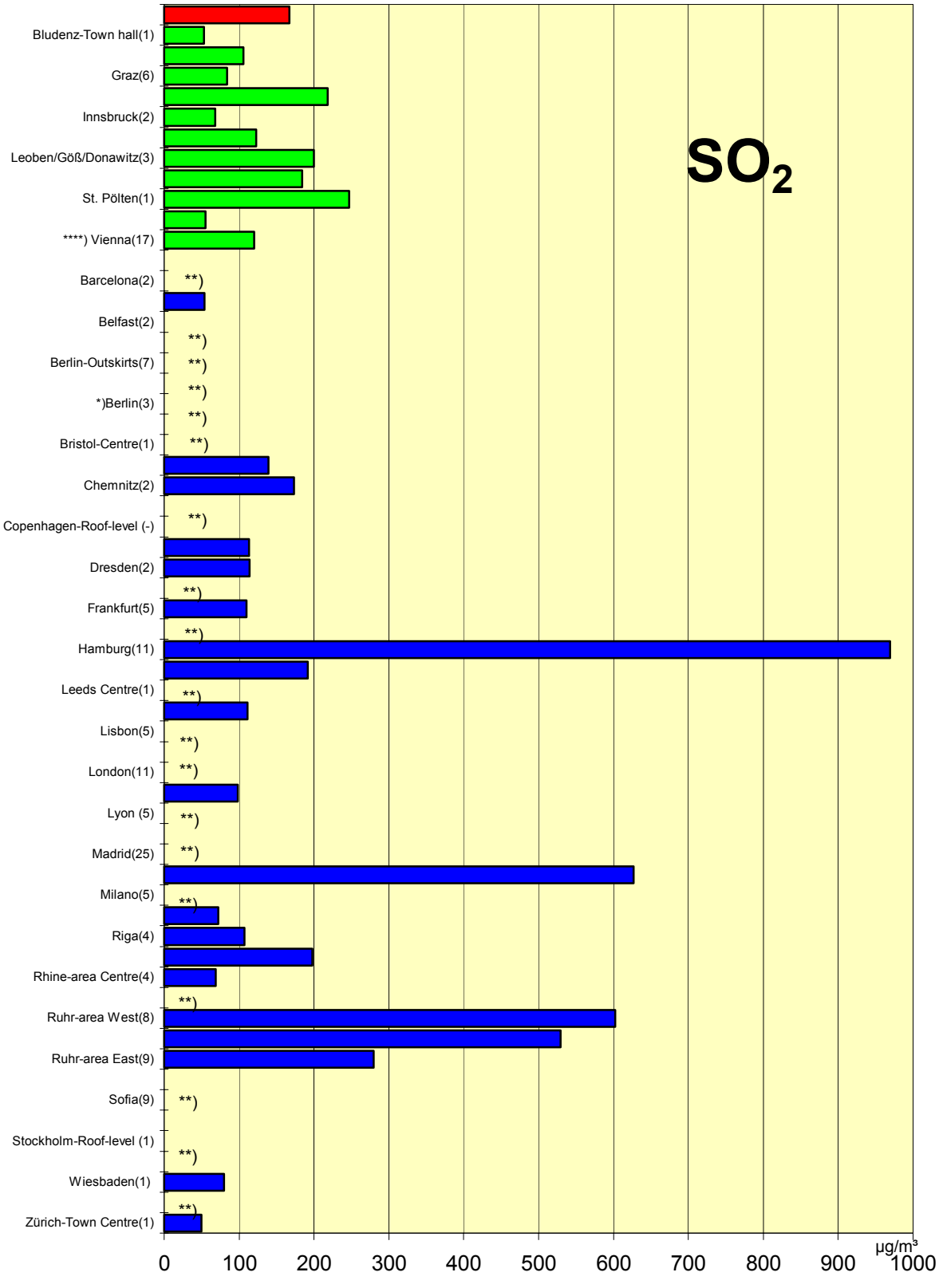
Max. 1/2h-Mean Values

Comparison of The Air Quality in 2000

max. 1/2-h mean values

(max. stressed monitoring station)

(in parentheses: number of monitoring stations)

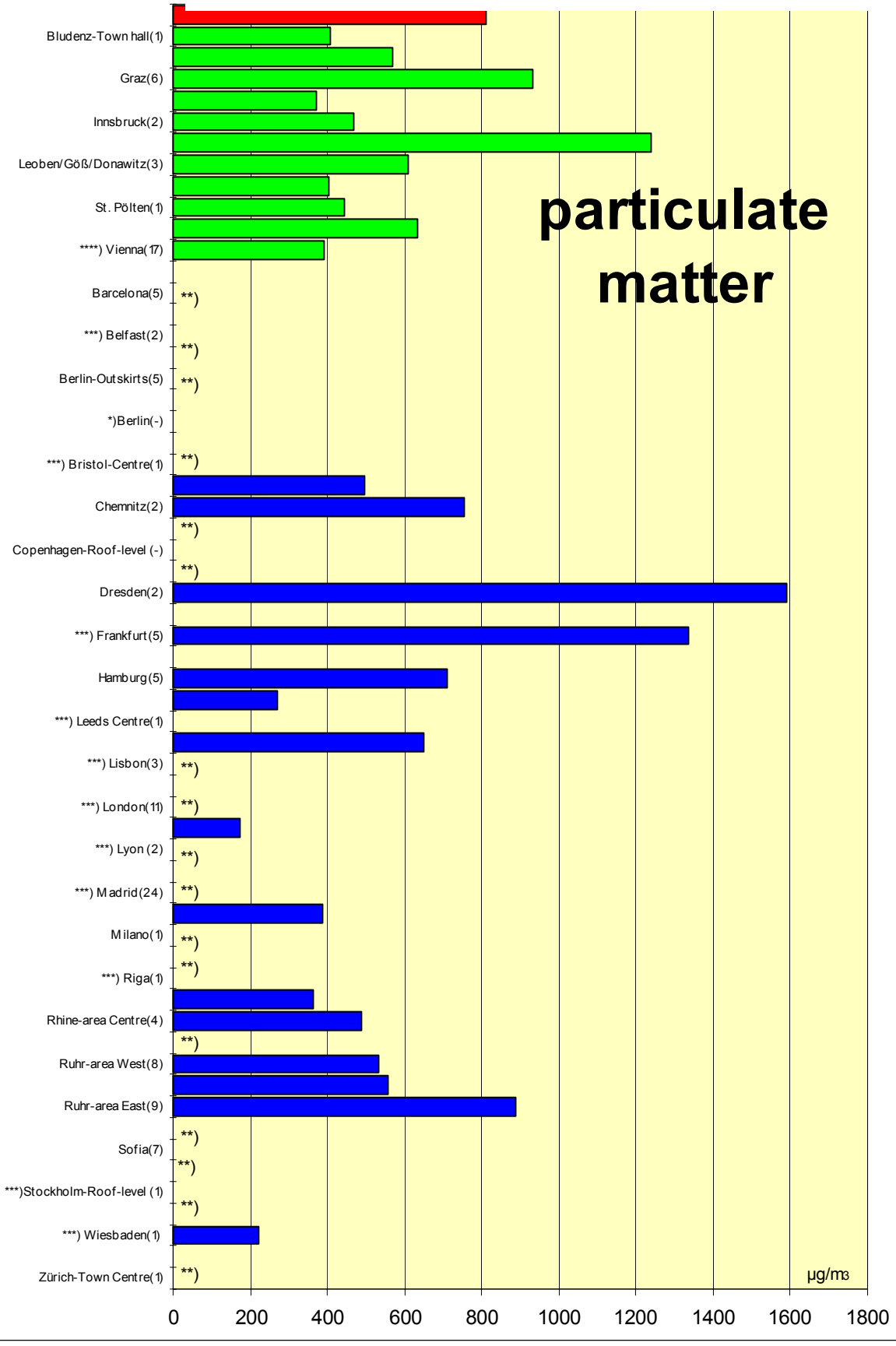


Comparison of The Air Quality in 2000

max. 1/2-h mean values

(max. stressed monitoring station)

(in parentheses: number of monitoring stations)

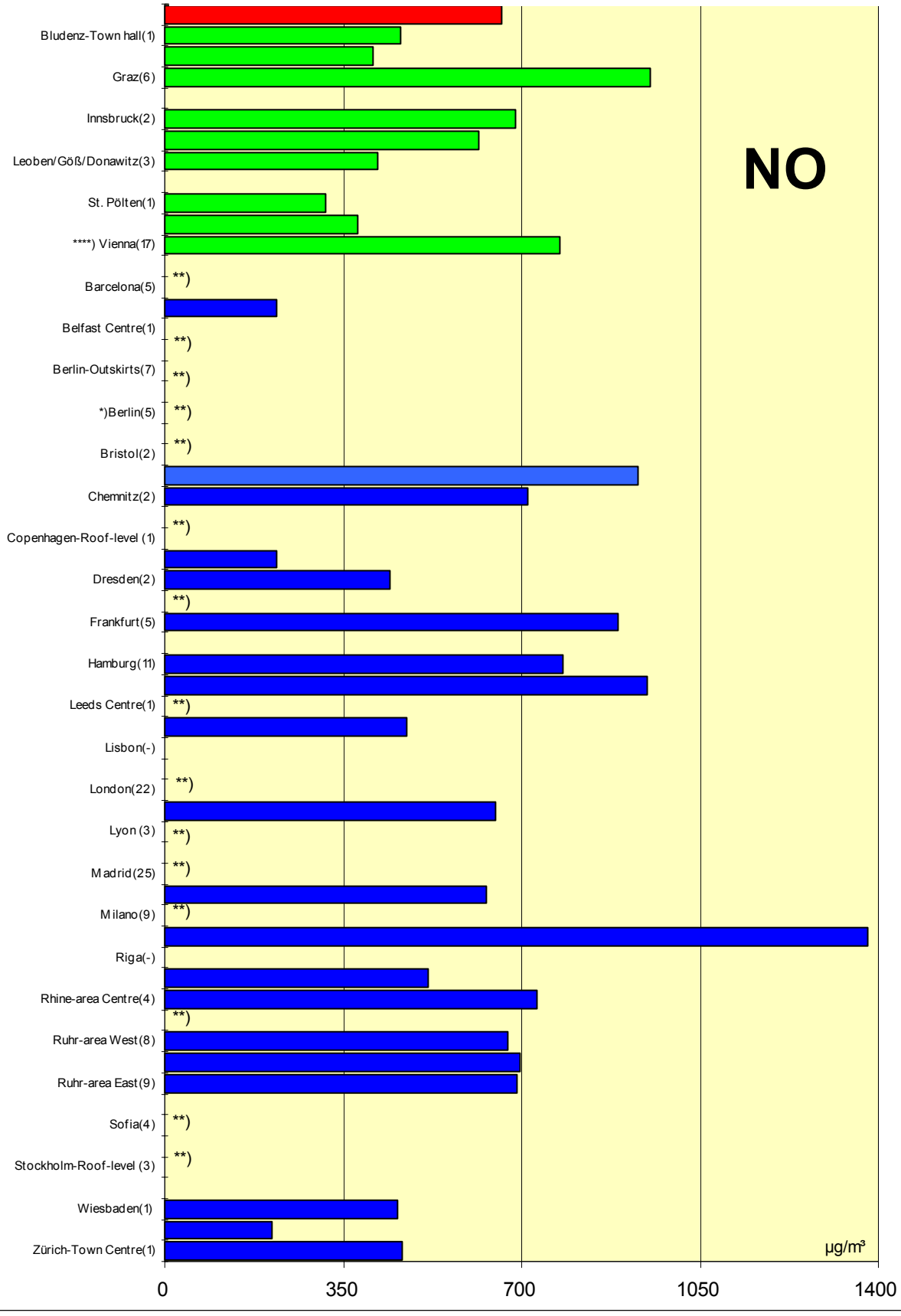


Comparison of The Air Quality in 2000

max. 1/2-h mean values

(max. stressed monitoring station)

(in parentheses: number of monitoring stations)

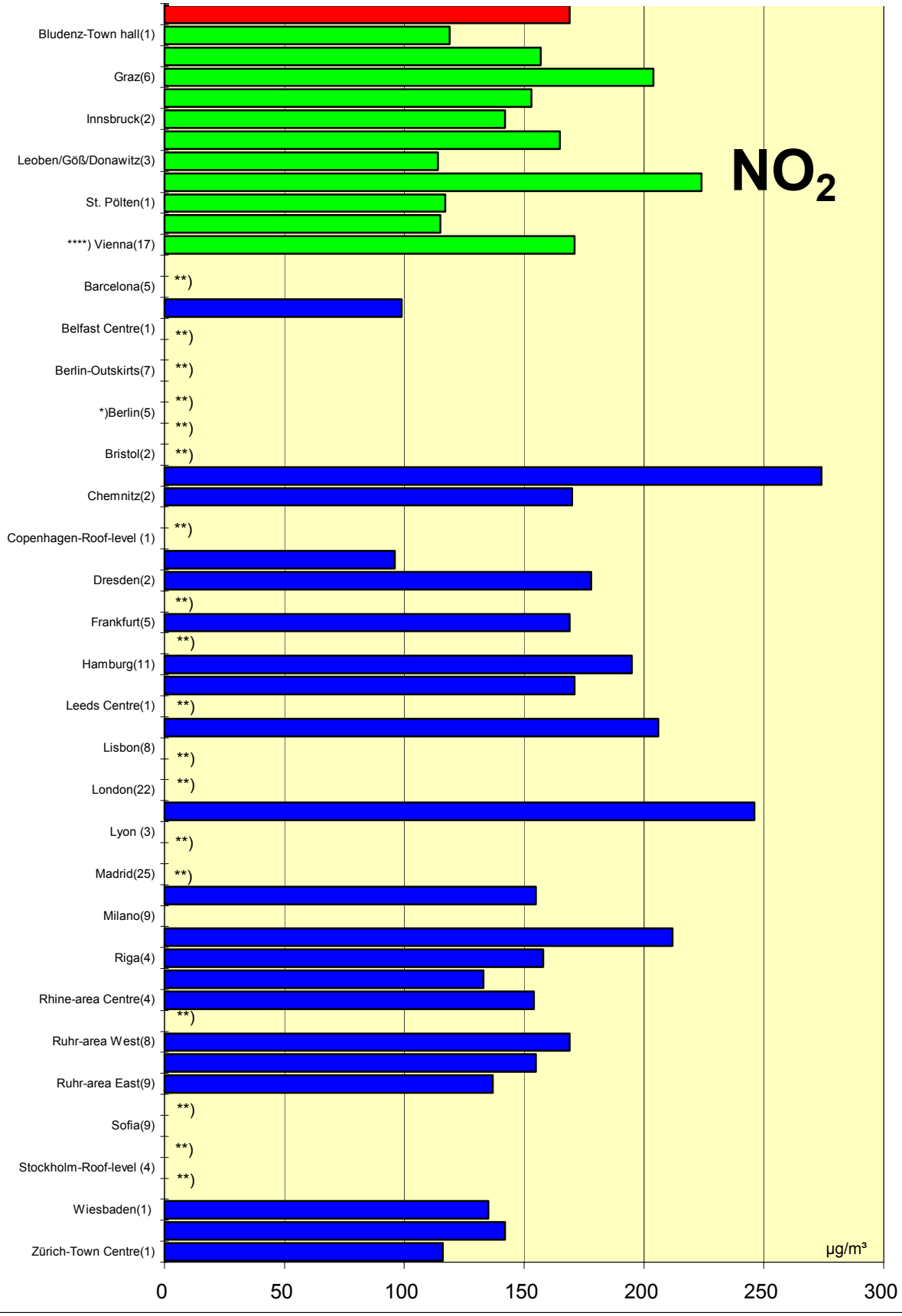


Comparison of The Air Quality in 2000

max. 1/2-h mean values

(max. stressed monitoring station)

(in parentheses: number of monitoring stations)

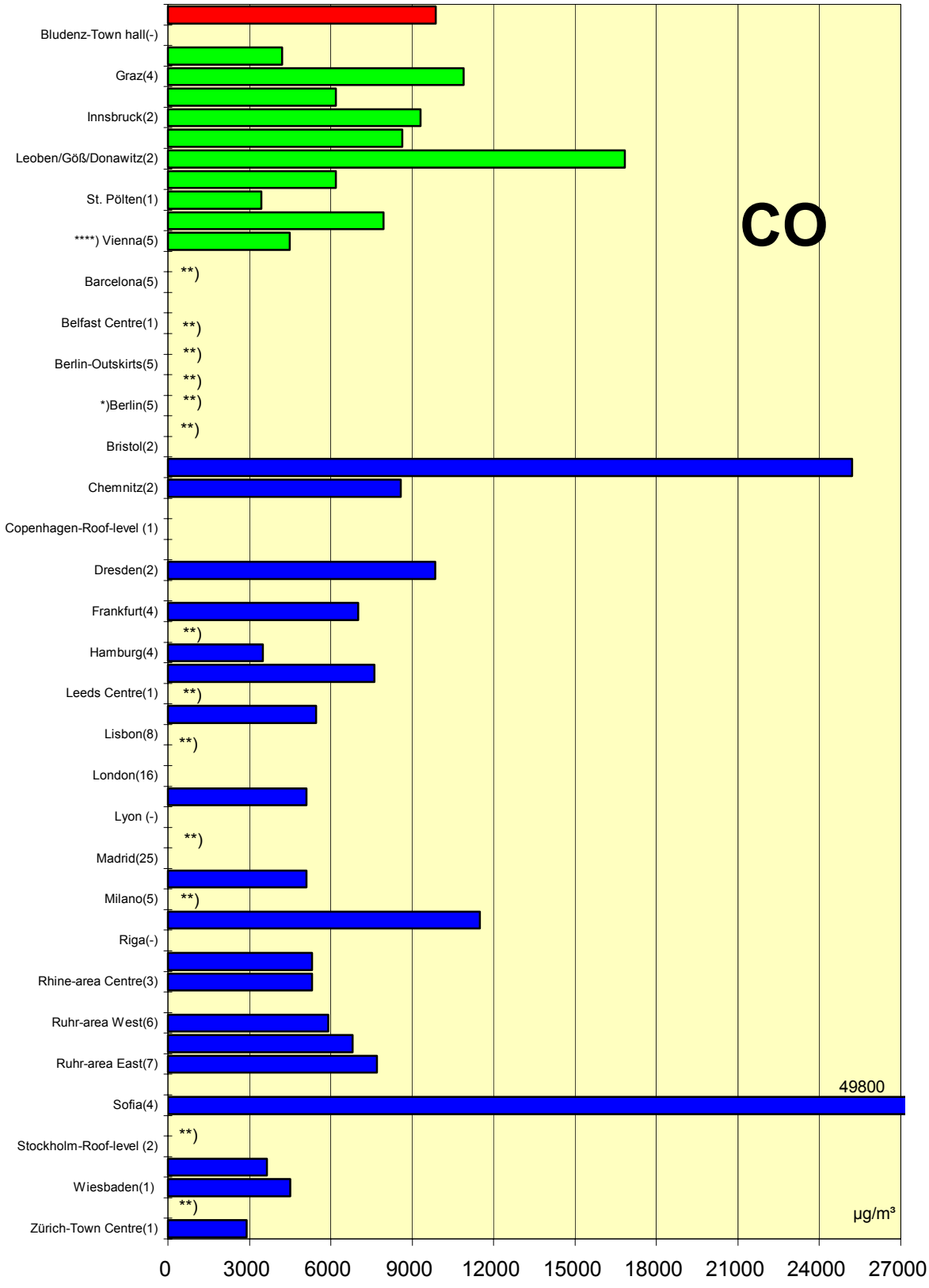


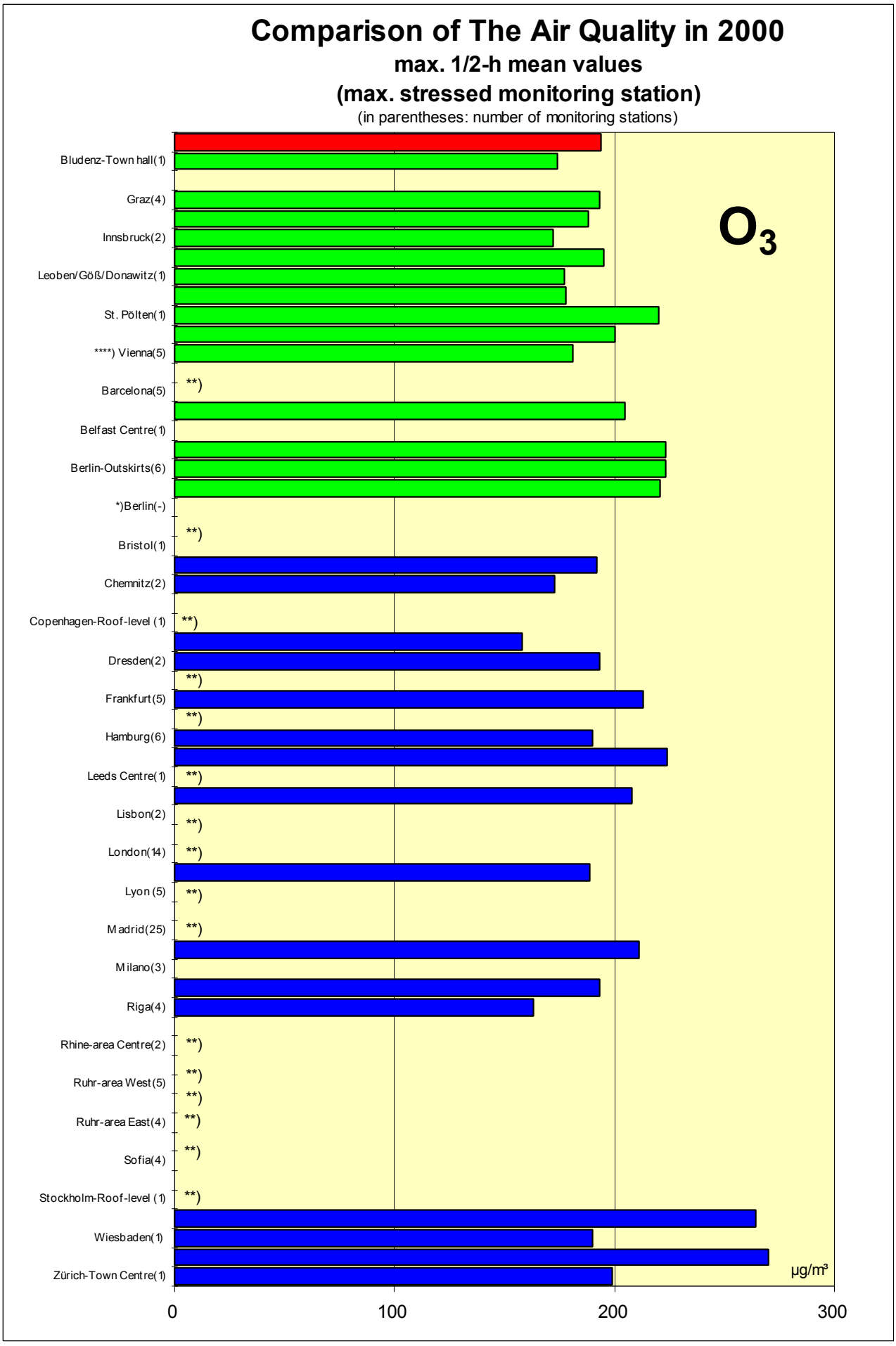
Comparison of The Air Quality in 2000

max. 1/2-h mean values

(max. stressed monitoring station)

(in parentheses: number of monitoring stations)




Comparison of The Air Quality in 2000
max. 1/2-h mean values
(max. stressed monitoring station)
(in parentheses: number of monitoring stations)
O3
Bludenz-Town hall(1)
Graz(4)
Innsbruck(2)
Leoben/Göß/Donawitz(1)
St. Pölten(1)
****) Vienna(5)
Barcelona(5)
Belfast Centre(1)
Berlin-Outskirts(6)
*)Berlin(-)
Bristol(1)
Chemnitz(2)
Copenhagen-Roof-level (1)
Dresden(2)
Frankfurt(5)
Hamburg(6)
Leeds Centre(1)
Lisbon(2)
London(14)
Lyon (5)
Madrid(25)
Milano(3)
Riga(4)
Rhine-area Centre(2)
Ruhr-area West(5)
Ruhr-area East(4)
Sofia(4)
Stockholm-Roof-level (1)
Wiesbaden(1)
Zürich-Town Centre(1)
**)
µg/m³
0
100
200
300

Luftgütevergleich

2000

max. 98-Percentil/Jahr

Comparison of The Air Quality

2000

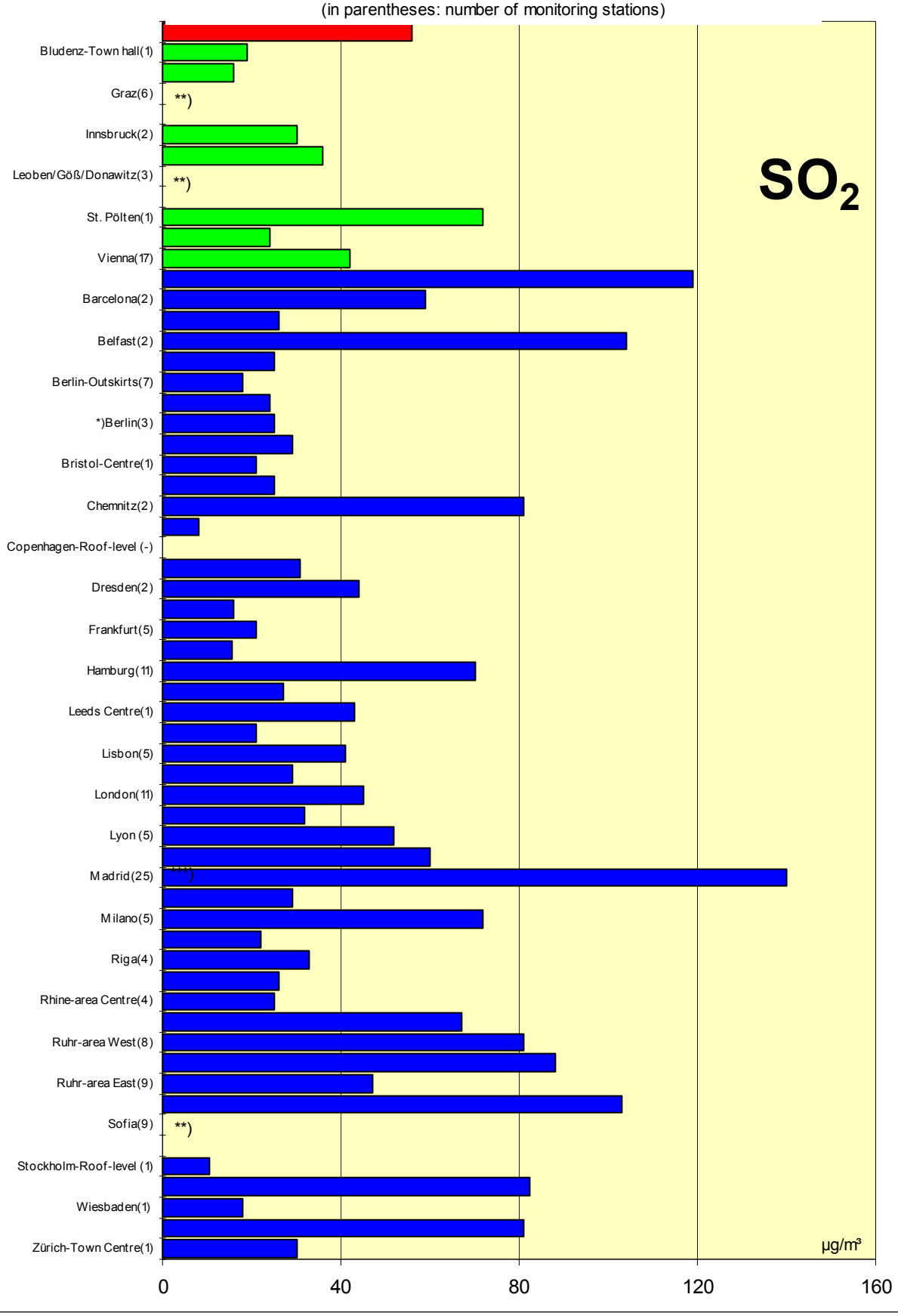
Max. 98-Percentile per Year

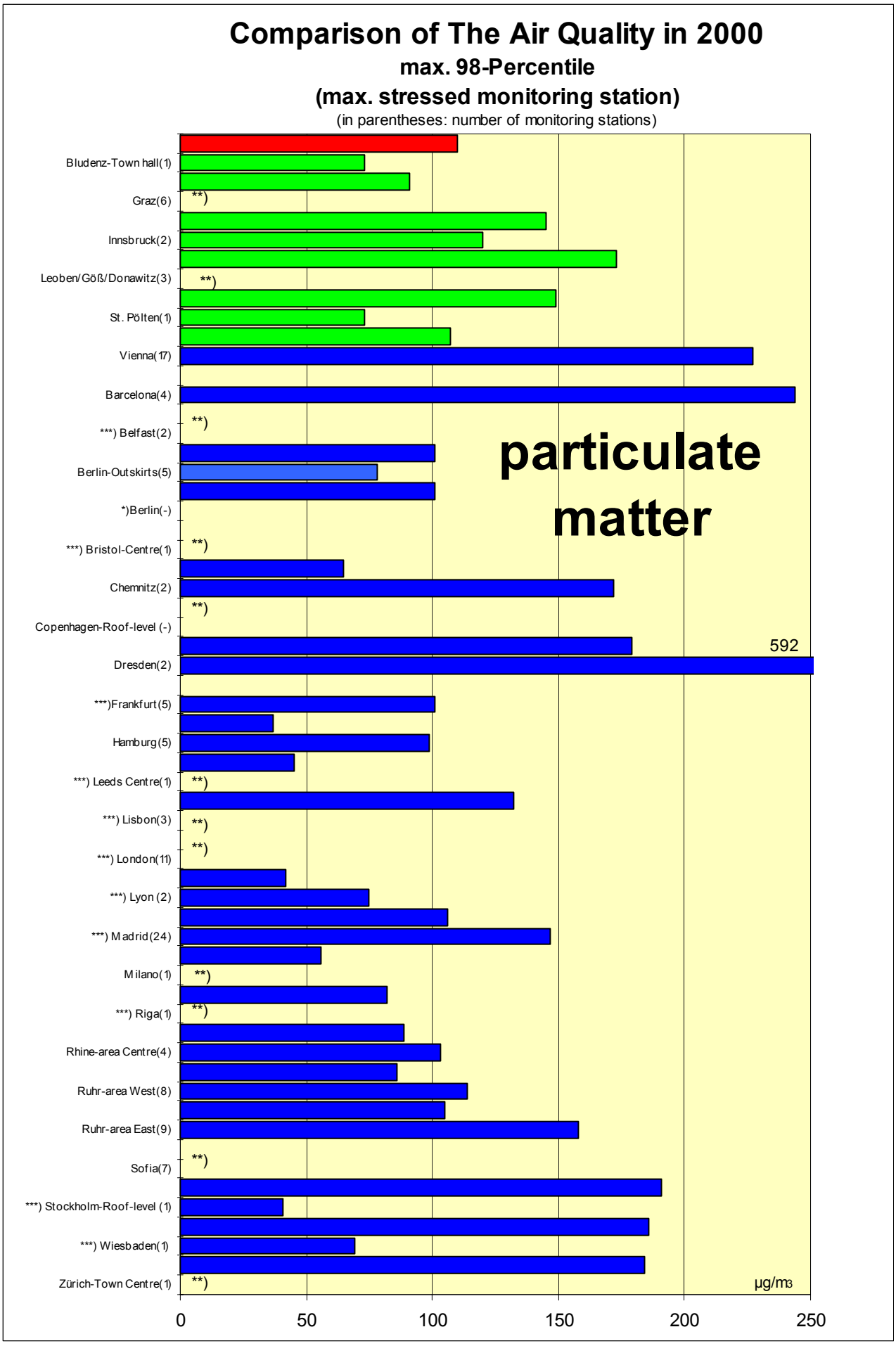
Comparison of The Air Quality in 2000

max. 98-Percentile

(max. stressed monitoring station)

(in parentheses: number of monitoring stations)



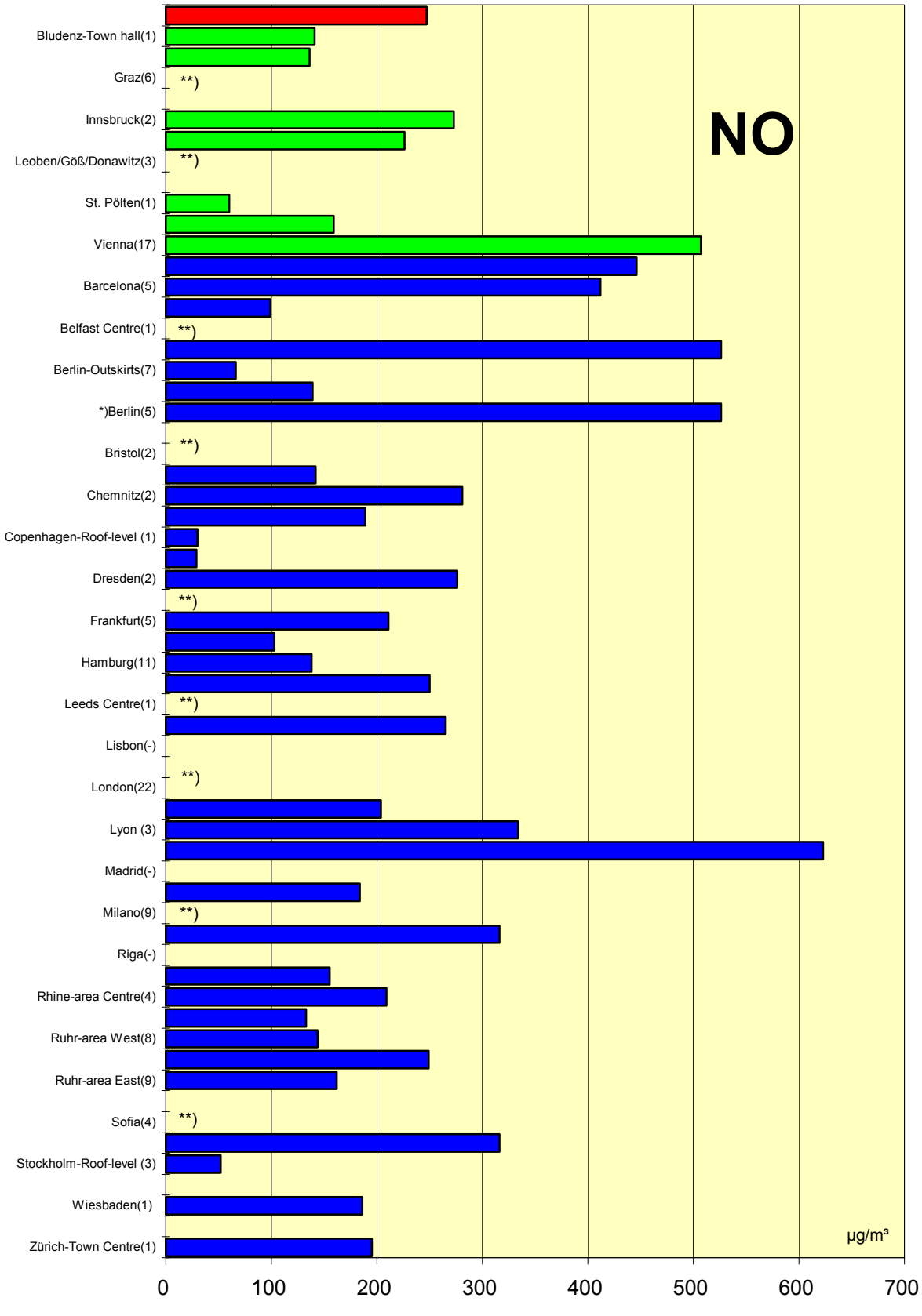

Comparison of The Air Quality in 2000
max. 98-Percentile
(max. stressed monitoring station)
(in parentheses: number of monitoring stations)
particulate matter
Bludenz-Town hall(1)
Graz(6)
Innsbruck(2)
Leoben/Göß/Donawitz(3)
St. Pölten(1)
Vienna(17)
Barcelona(4)
***) Belfast(2)
Berlin-Outskirts(5)
*)Berlin(-)
***) Bristol-Centre(1)
Chemnitz(2)
Copenhagen-Roof-level (-)
Dresden(2)
592
***)Frankfurt(5)
Hamburg(5)
***) Leeds Centre(1)
***) Lisbon(3)
***) London(11)
***) Lyon (2)
***) Madrid(24)
Milano(1)
***) Riga(1)
Rhine-area Centre(4)
Ruhr-area West(8)
Ruhr-area East(9)
Sofia(7)
***) Stockholm-Roof-level (1)
***) Wiesbaden(1)
Zürich-Town Centre(1)
**)
µg/m3
0
50
100
150
200
250

Comparison of The Air Quality in 2000

max. 98-Percentile

(max. stressed monitoring station)

(in parentheses: number of monitoring stations)

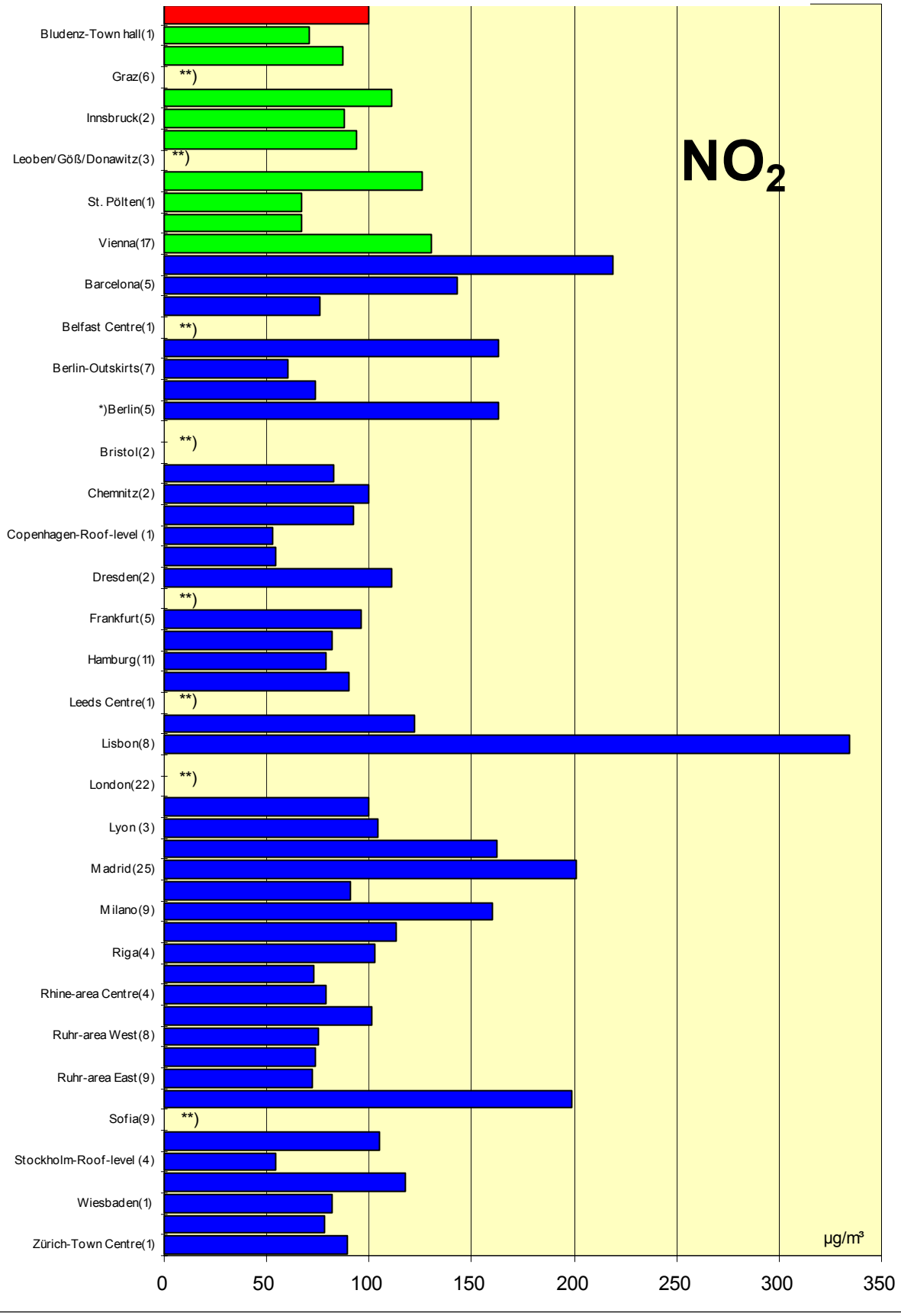


Comparison of The Air Quality in 2000

max. 98-Percentile

(max. stressed monitoring station)

(in parentheses: number of monitoring stations)

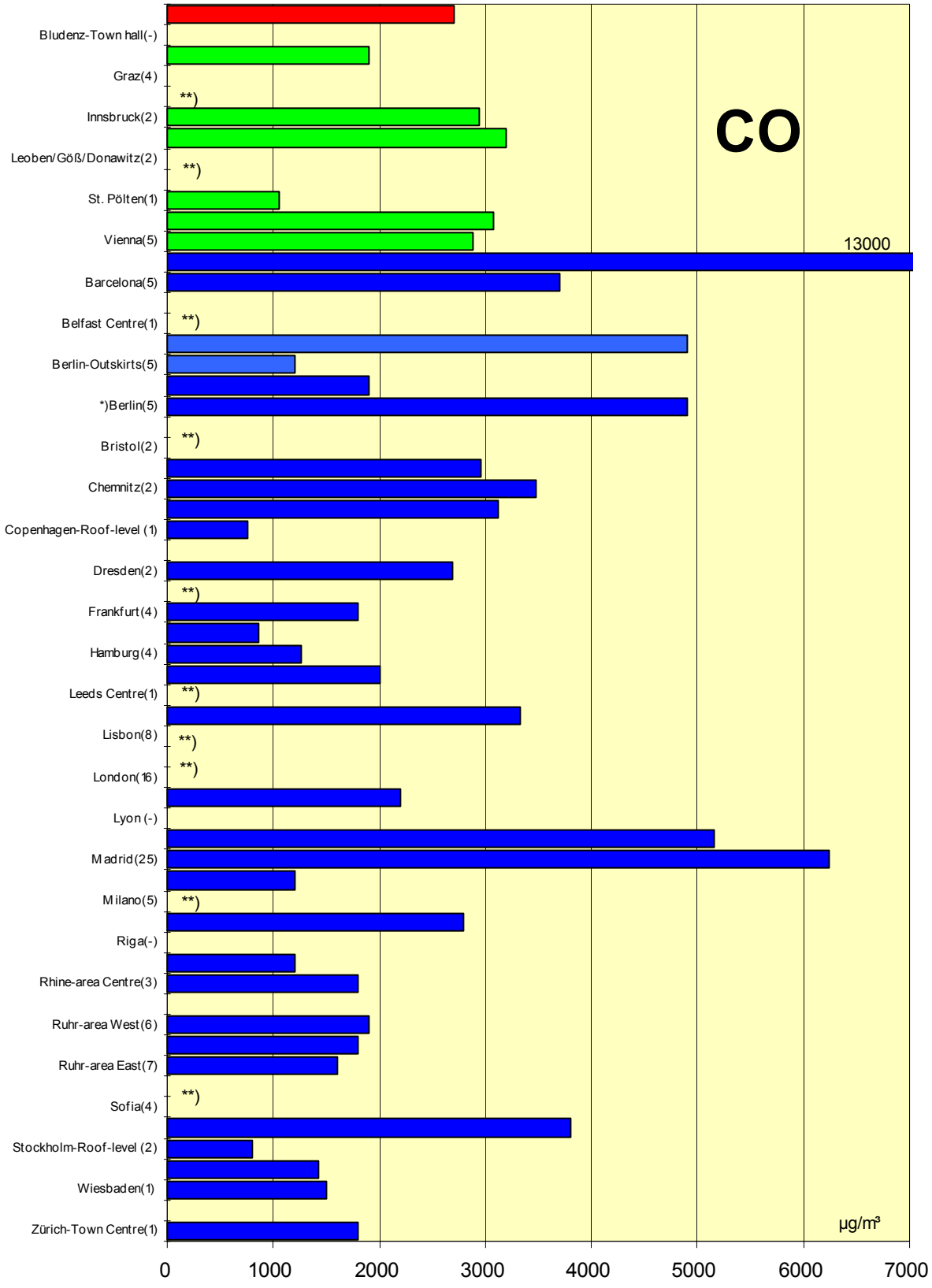


Comparison of The Air Quality in 2000

max. 98-Percentile

(max. stressed monitoring station)

(in parentheses: number of monitoring stations)

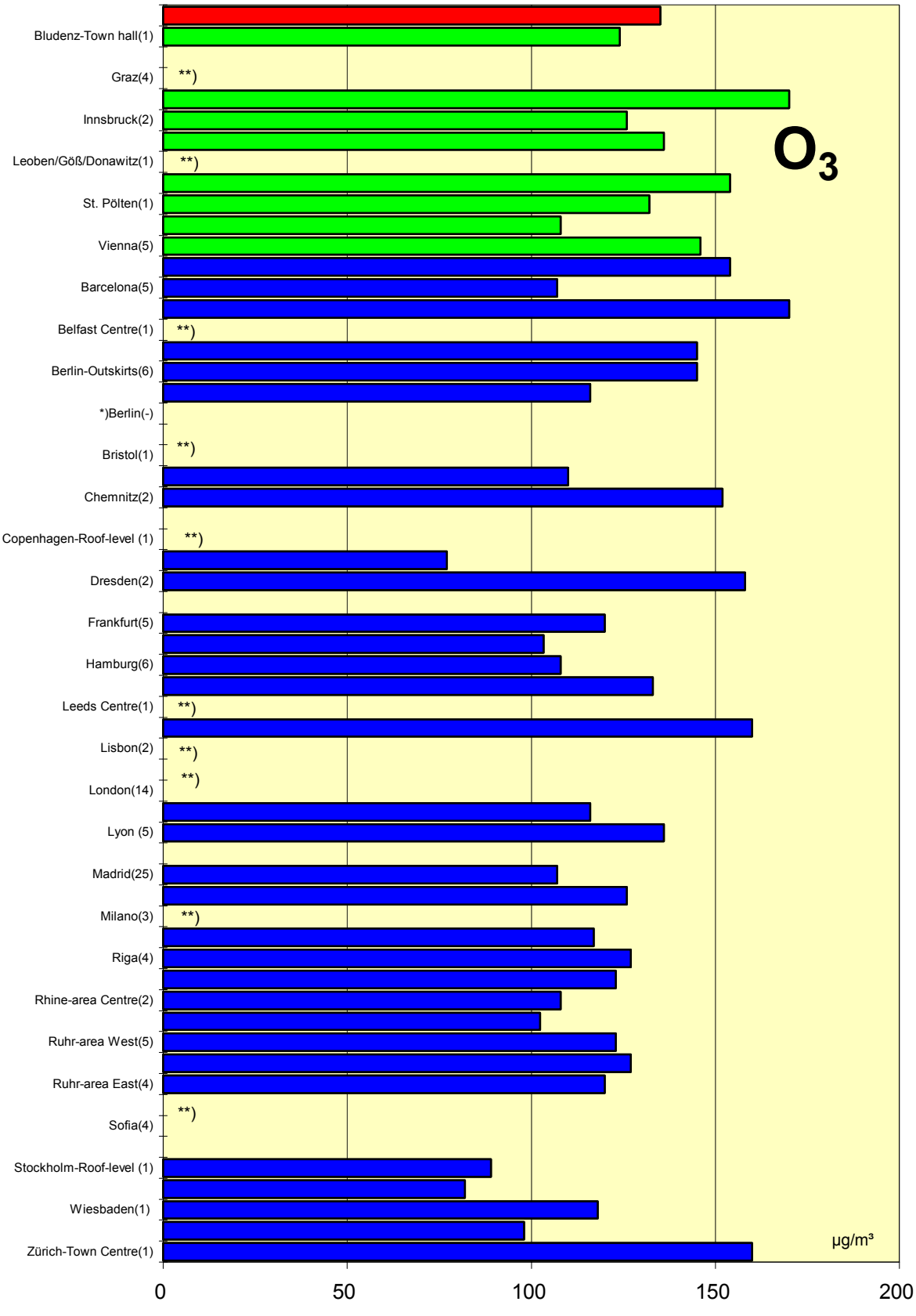


Comparison of The Air Quality in 2000

max. 98-Percentile

(max. stressed monitoring station)

(in parentheses: number of monitoring stations)



Jahresvergleich

1993 - 2000

Jahresmittelwerte

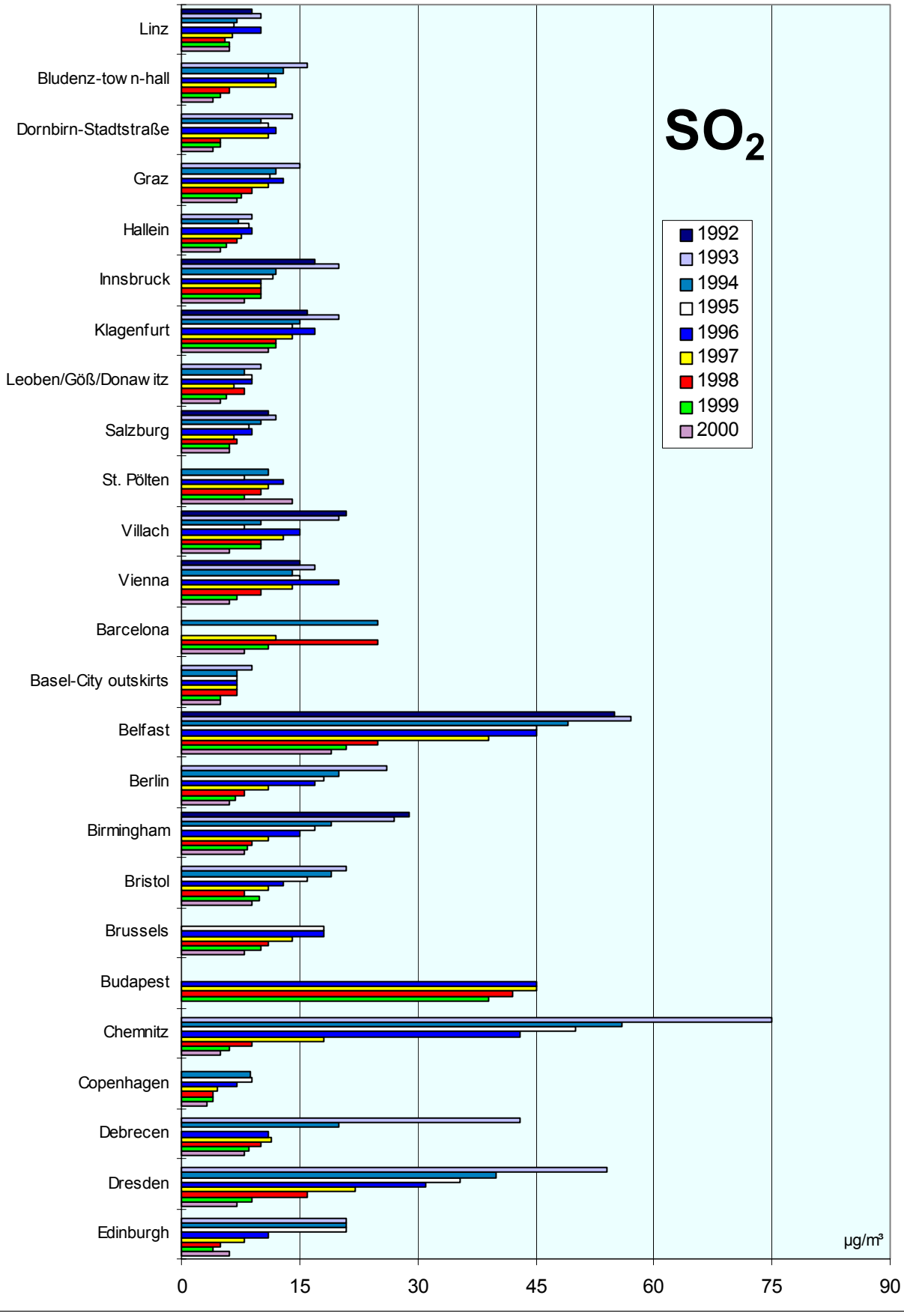
Comparison of The Air Quality Over The Years

1993 - 2000

Annual Mean Values

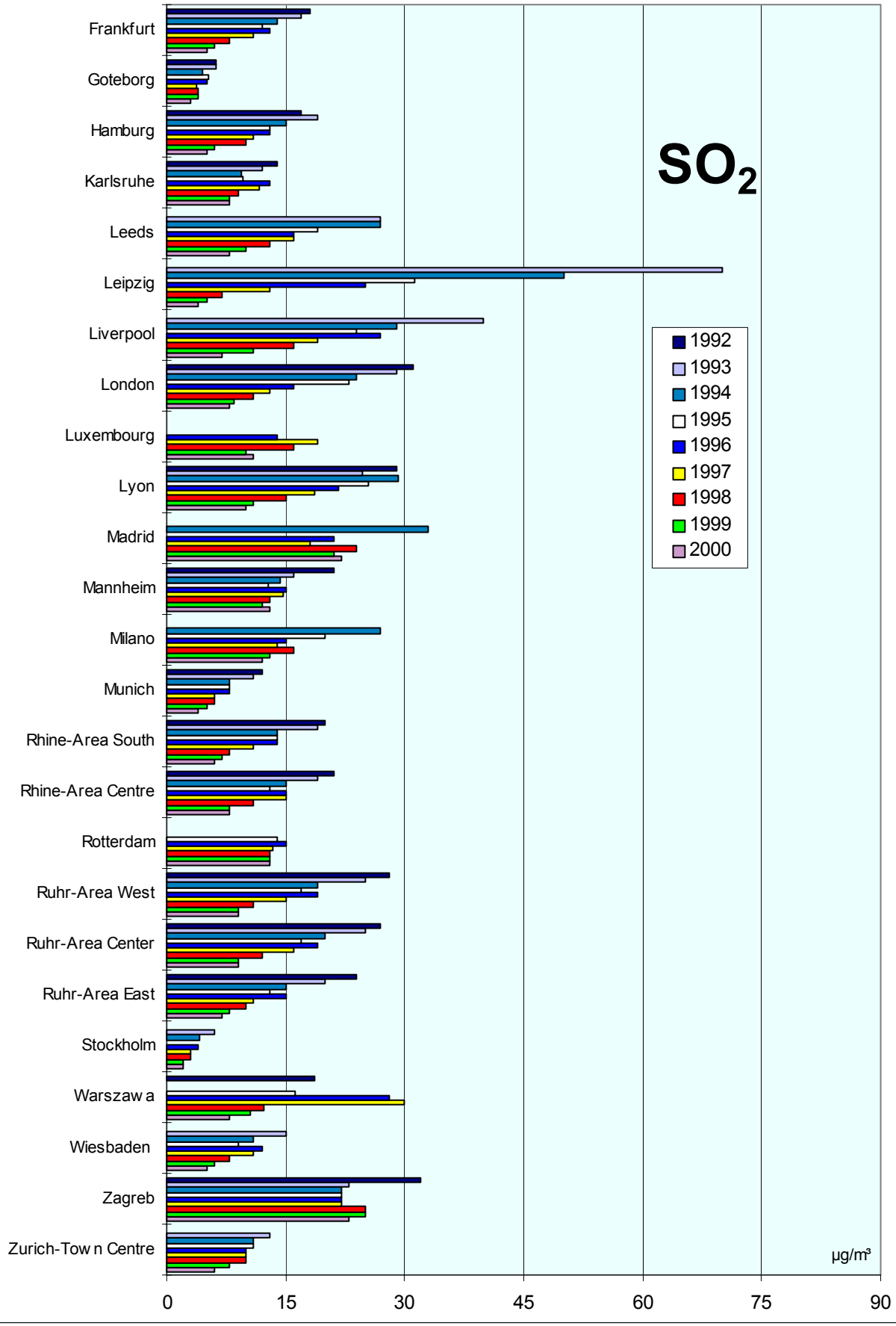
Comparison of The Air Quality 1992 - 2000

Annual mean values (mean of all monitoring stations)



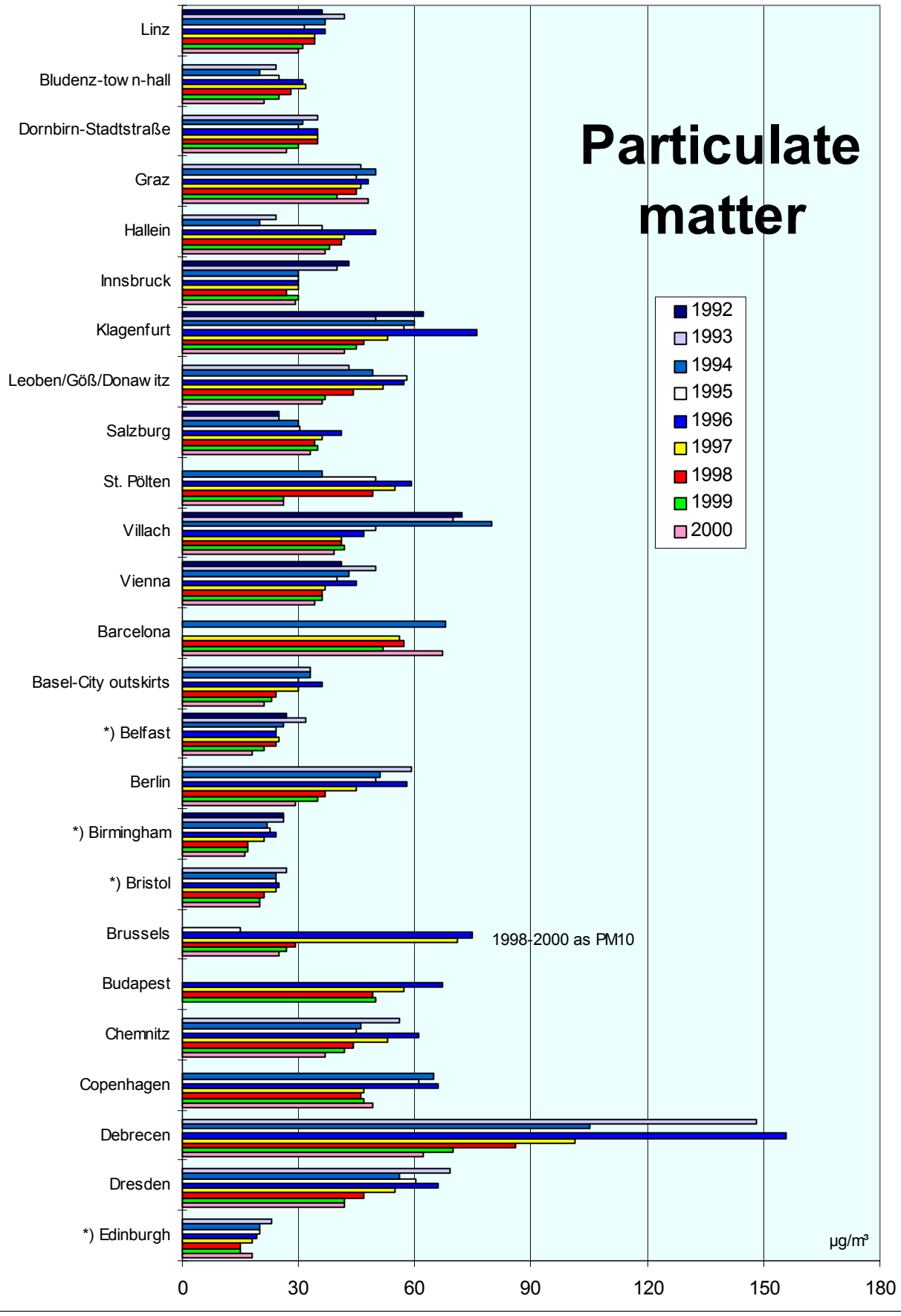
Comparison of The Air Quality 1992 - 2000

Annual mean values (mean of all monitoring stations)



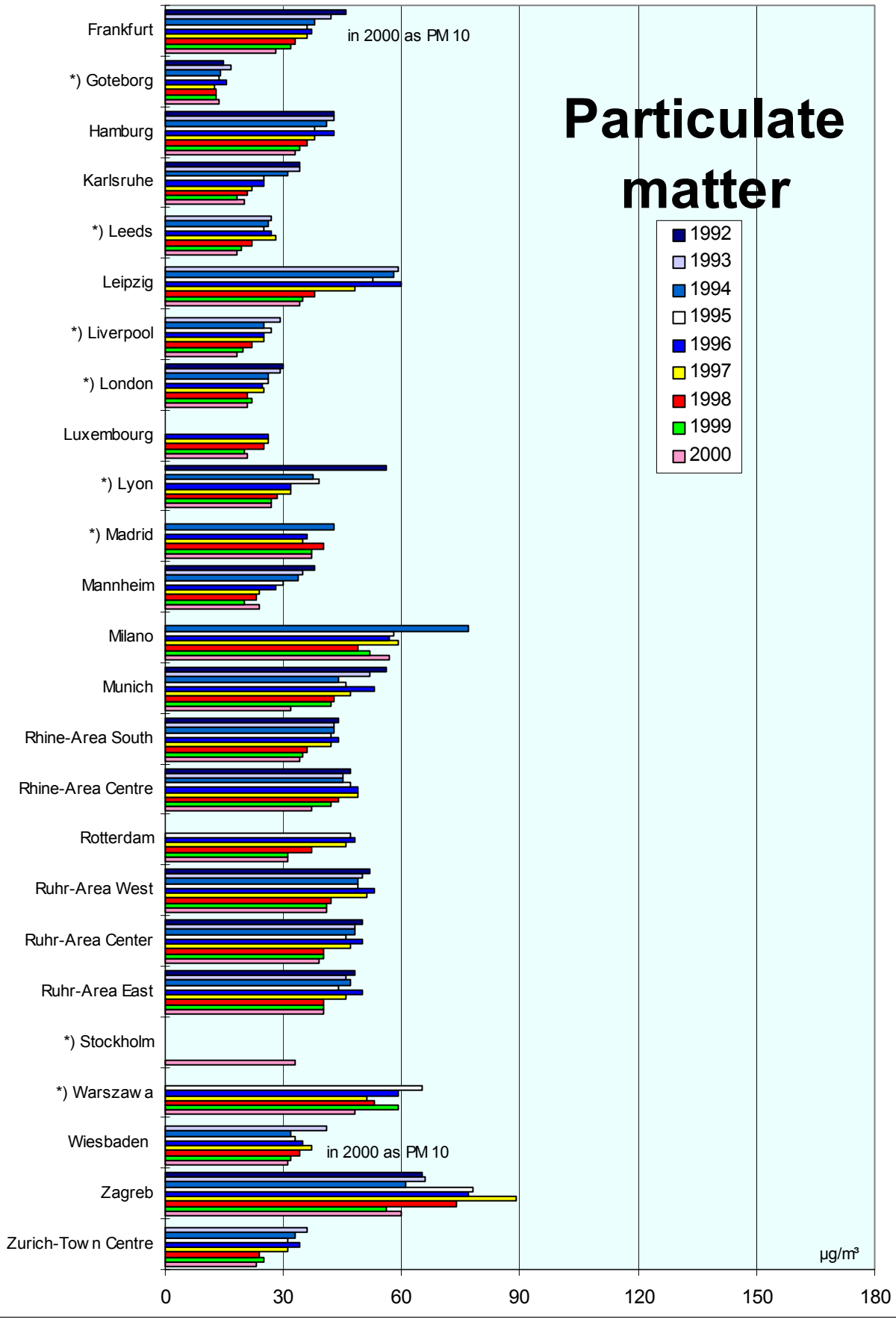
Comparison of The Air Quality 1992 - 2000

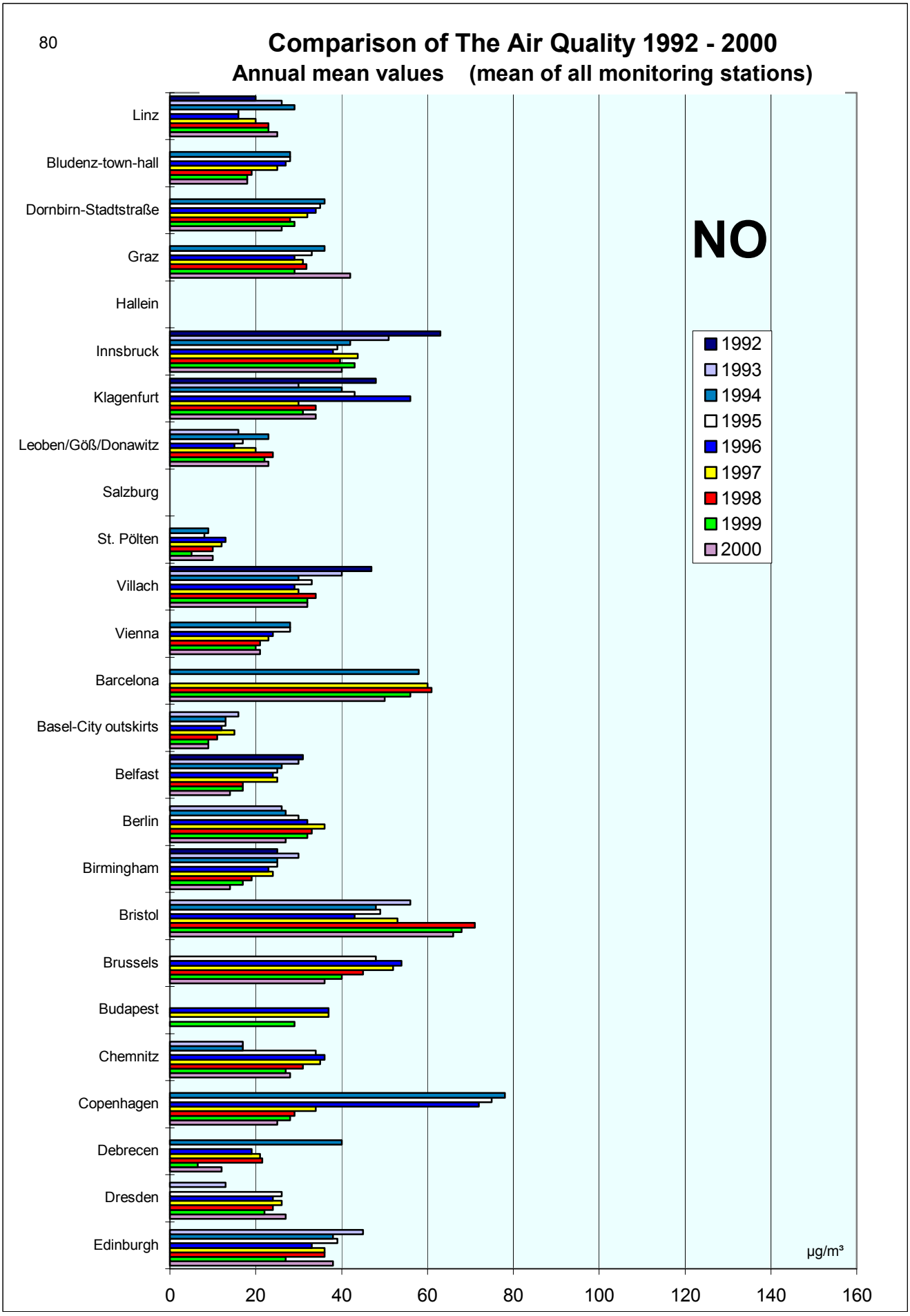
Annual mean values (mean of all monitoring stations)



Comparison of The Air Quality 1992 - 2000

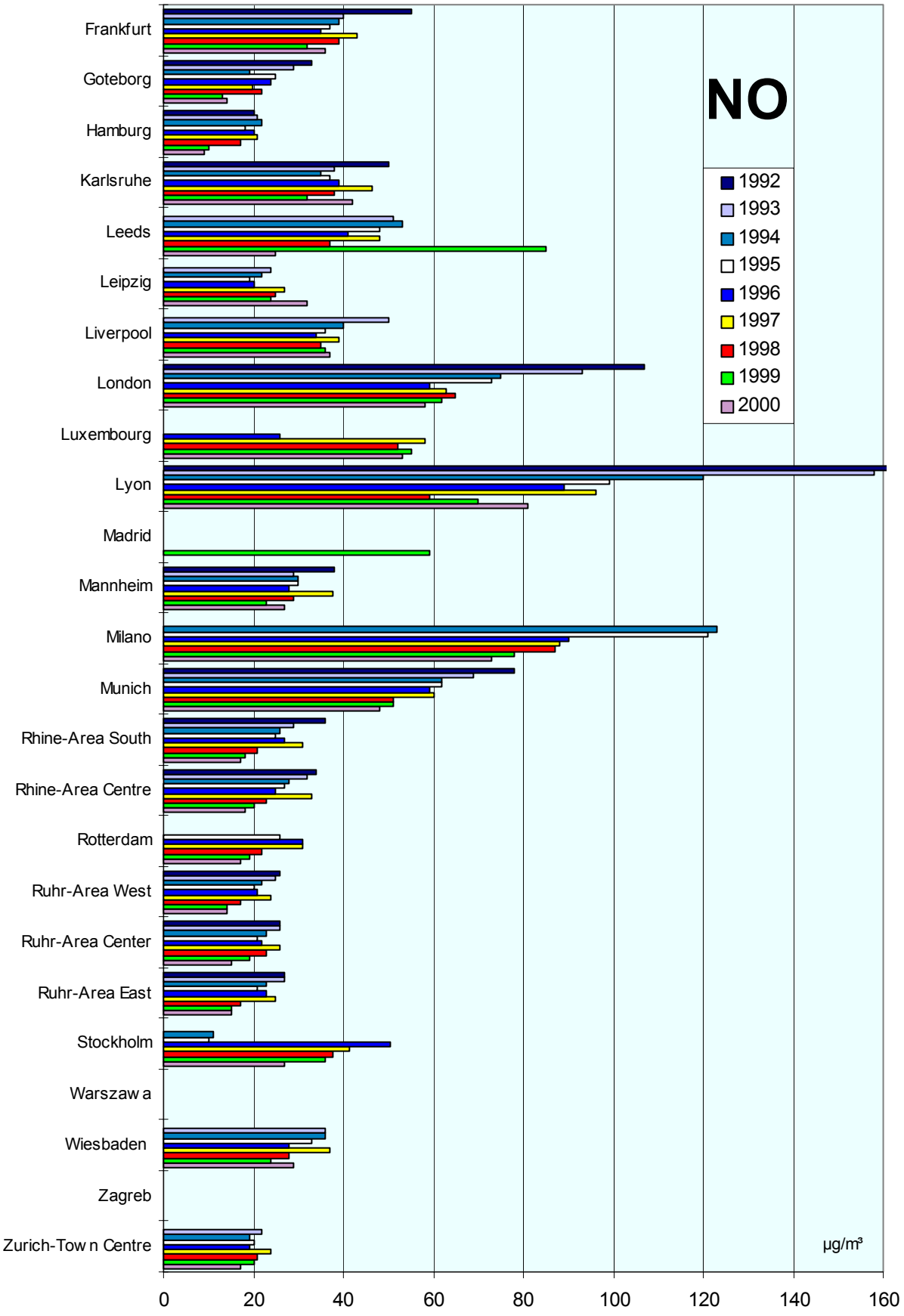
Annual mean values (mean of all monitoring stations)




Comparison of The Air Quality 1992 - 2000
Annual mean values (mean of all monitoring stations)
NO
Linz
Bludenz-town-hall
Dornbirn-Stadtstraße
Graz
Hallein
Innsbruck
Klagenfurt
Leoben/Göß/Donawitz
Salzburg
St. Pölten
Villach
Vienna
Barcelona
Basel-City outskirts
Belfast
Berlin
Birmingham
Bristol
Brussels
Budapest
Chemnitz
Copenhagen
Debrecen
Dresden
Edinburgh
1992
1993
1994
1995
1996
1997
1998
1999
2000
µg/m³
0
20
40
60
80
100
120
140
160

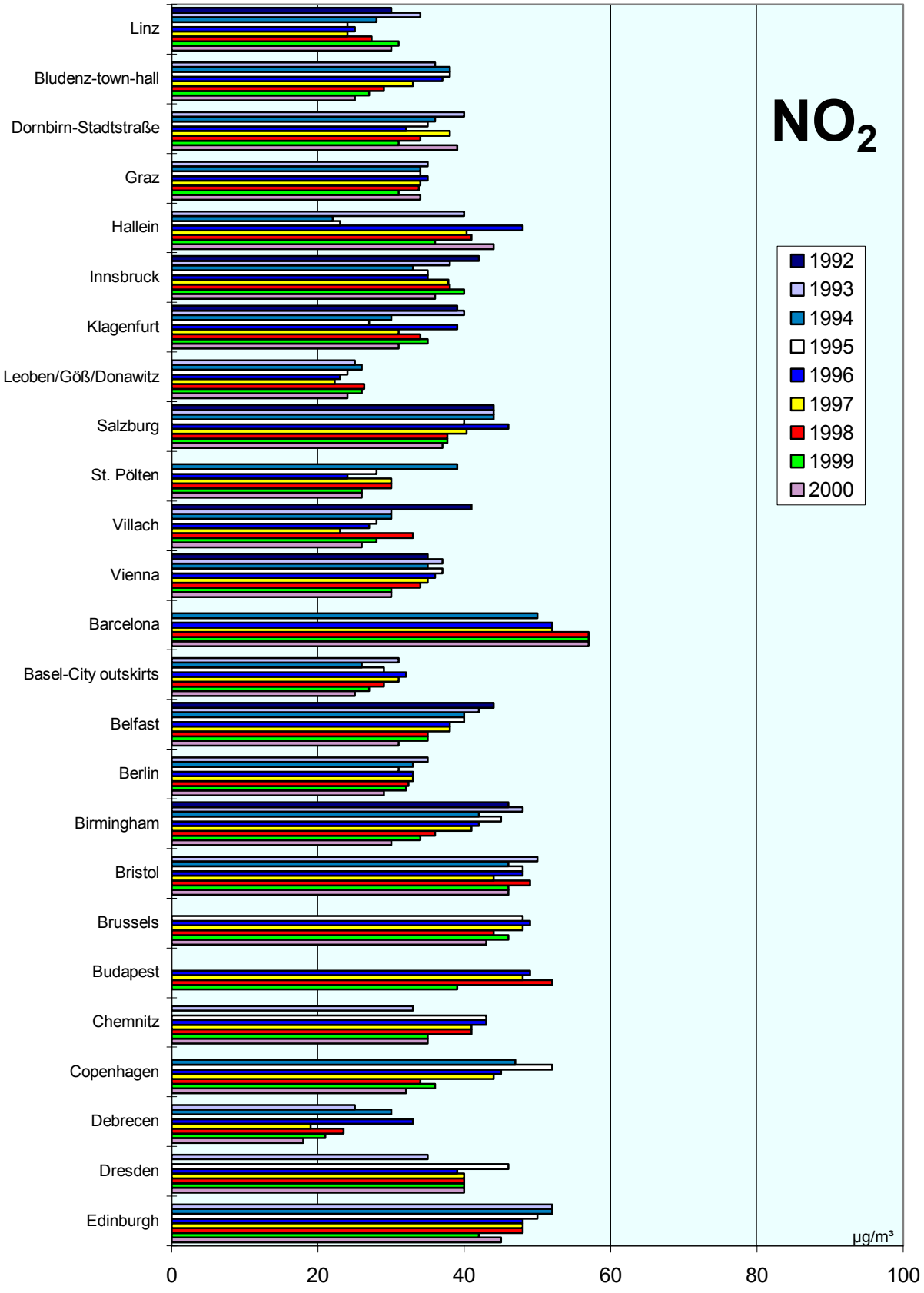
Comparison of The Air Quality 1992 - 2000

Annual mean values (mean of all monitoring stations)



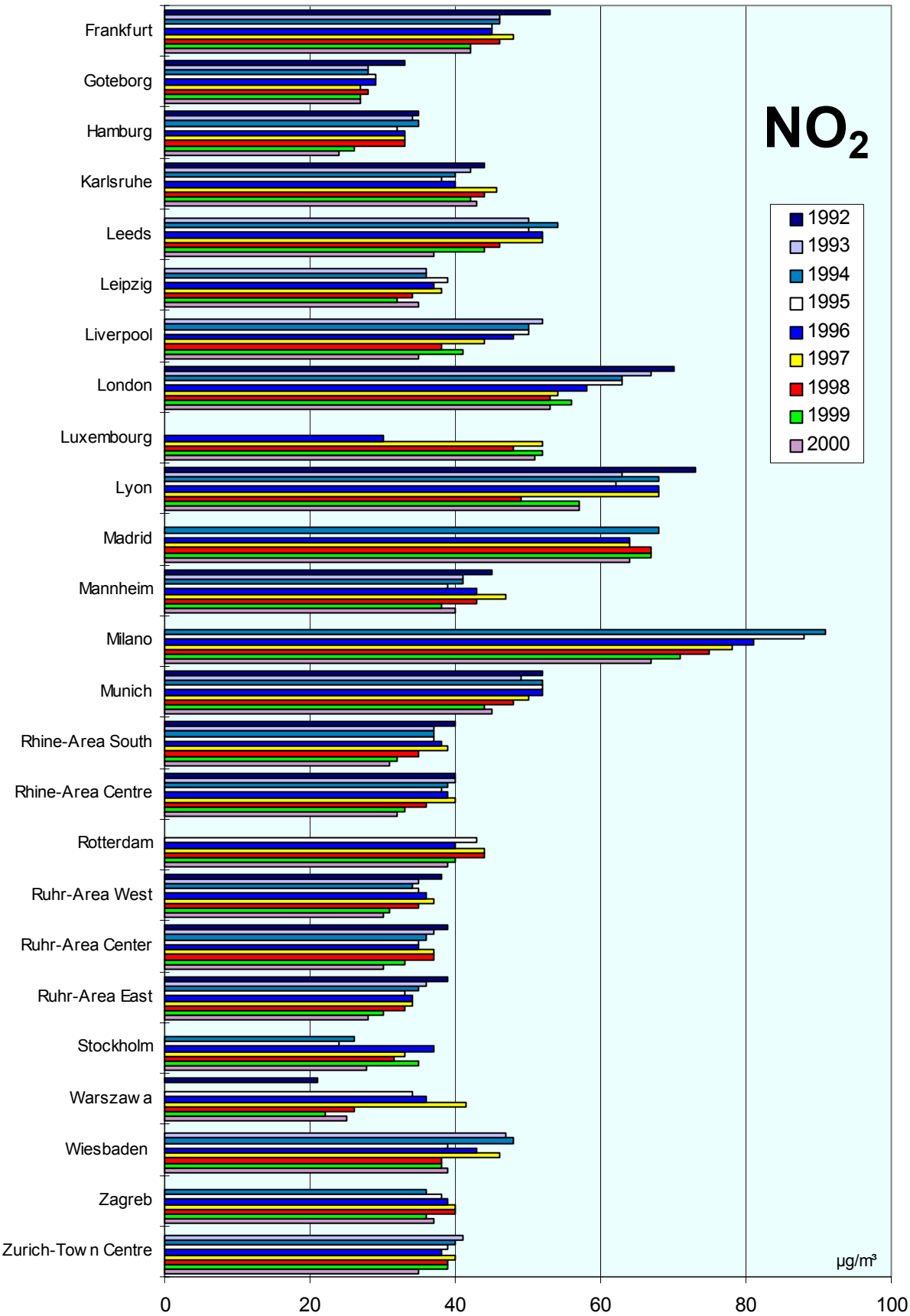
Comparison of The Air Quality 1992 - 2000

Annual mean values (mean of all monitoring stations)



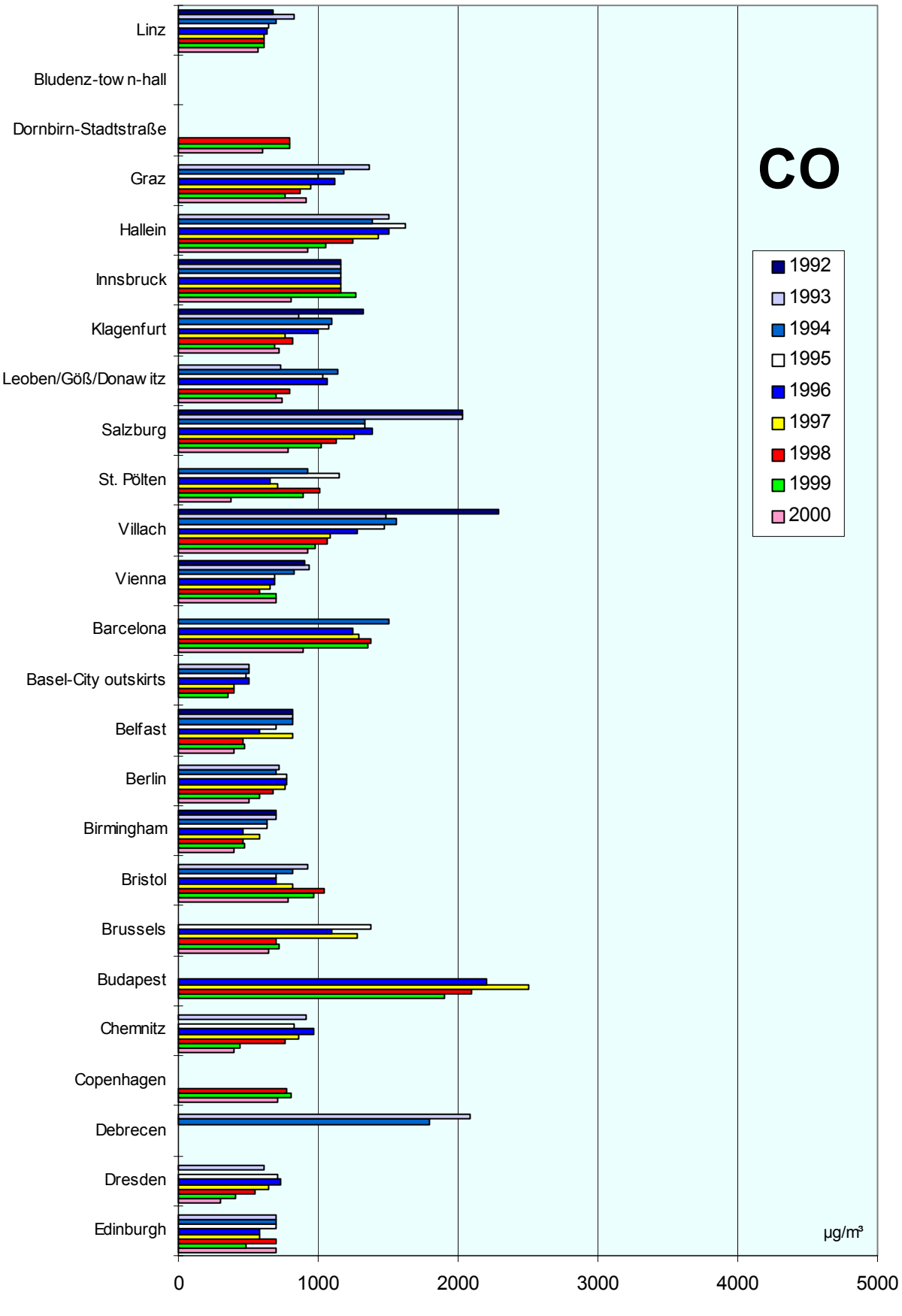
Comparison of The Air Quality 1992 - 2000

Annual mean values (mean of all monitoring stations)



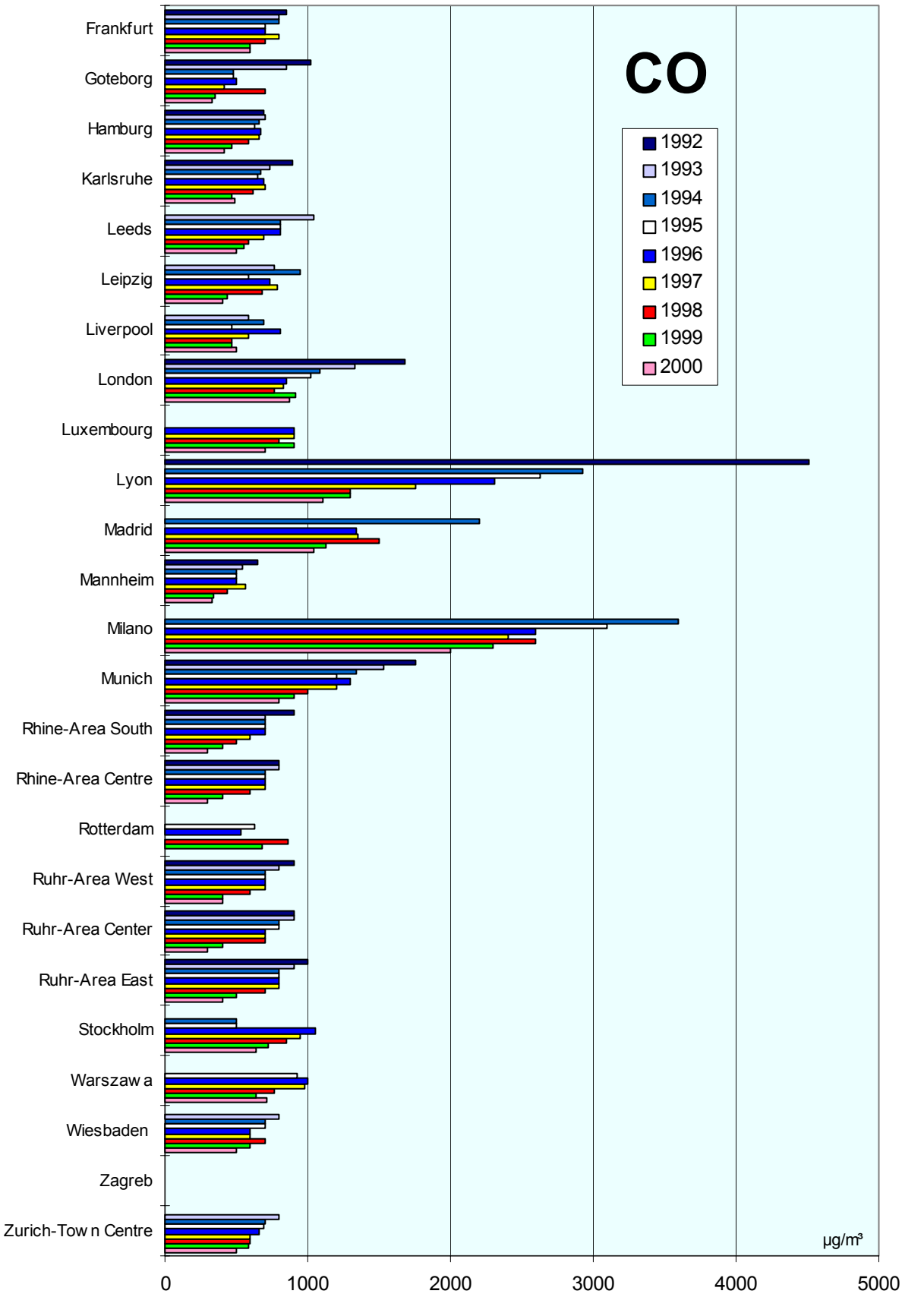
Comparison of The Air Quality 1992 - 2000

Annual mean values (mean of all monitoring)



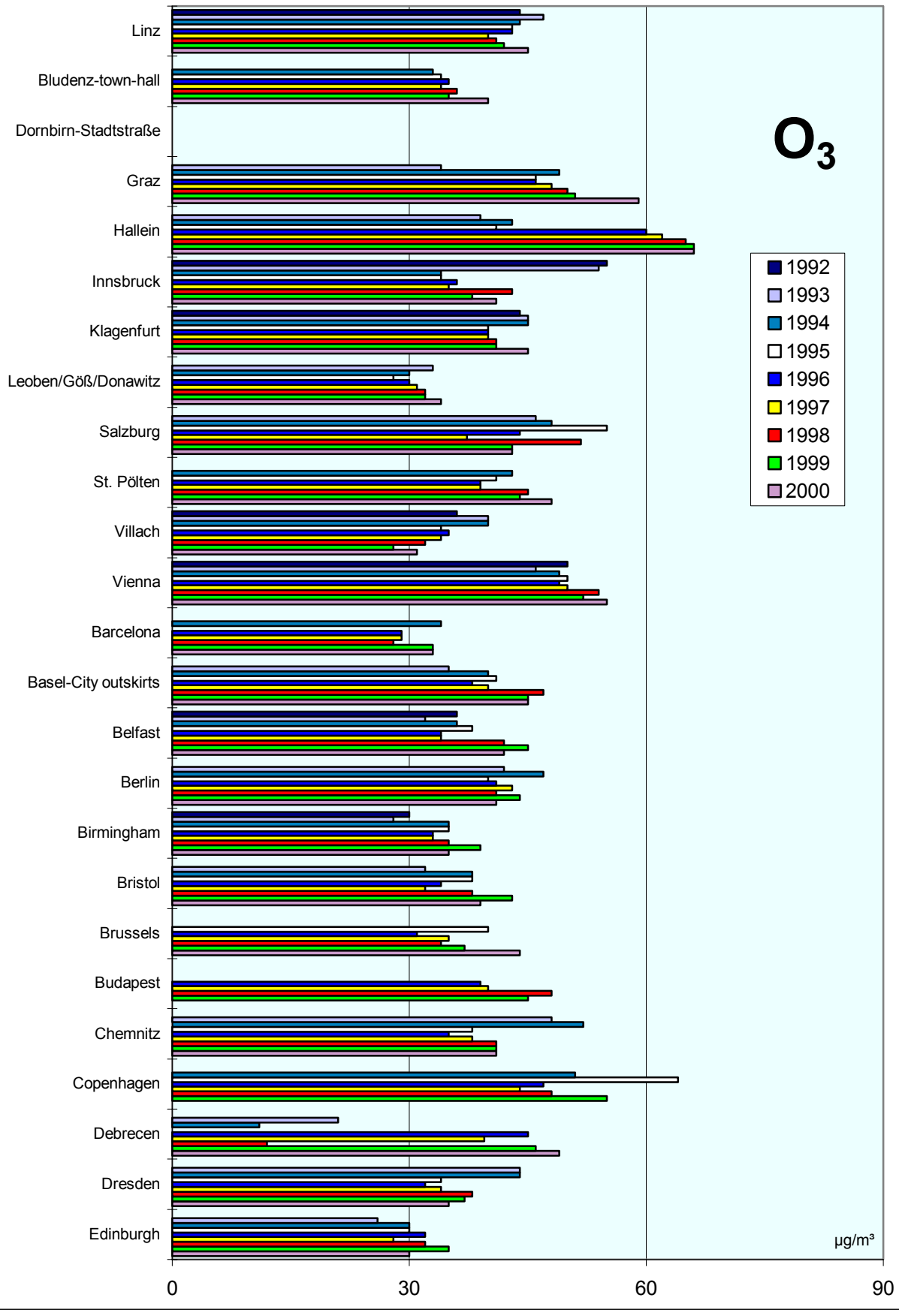
Comparison of The Air Quality 1992 - 2000

Annual mean values (mean of all monitoring stations)



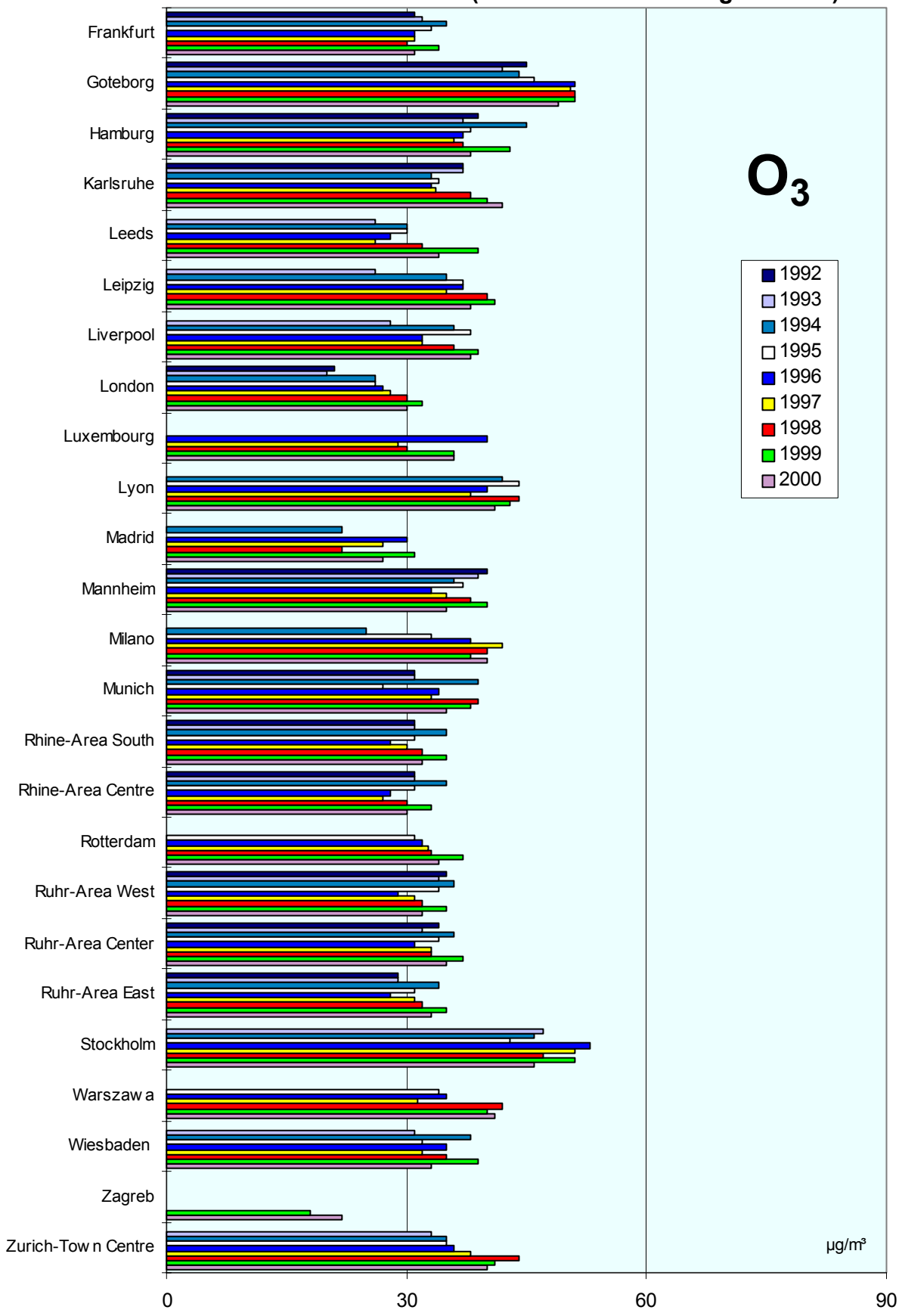
Comparison of The Air Quality 1992 - 2000

Annual mean values (mean of all monitoring stations)



Comparison of The Air Quality 1992 - 2000

Annual mean values (mean of all monitoring stations)



Jahresvergleich

1993 - 2000

max. Tagesmittelwerte

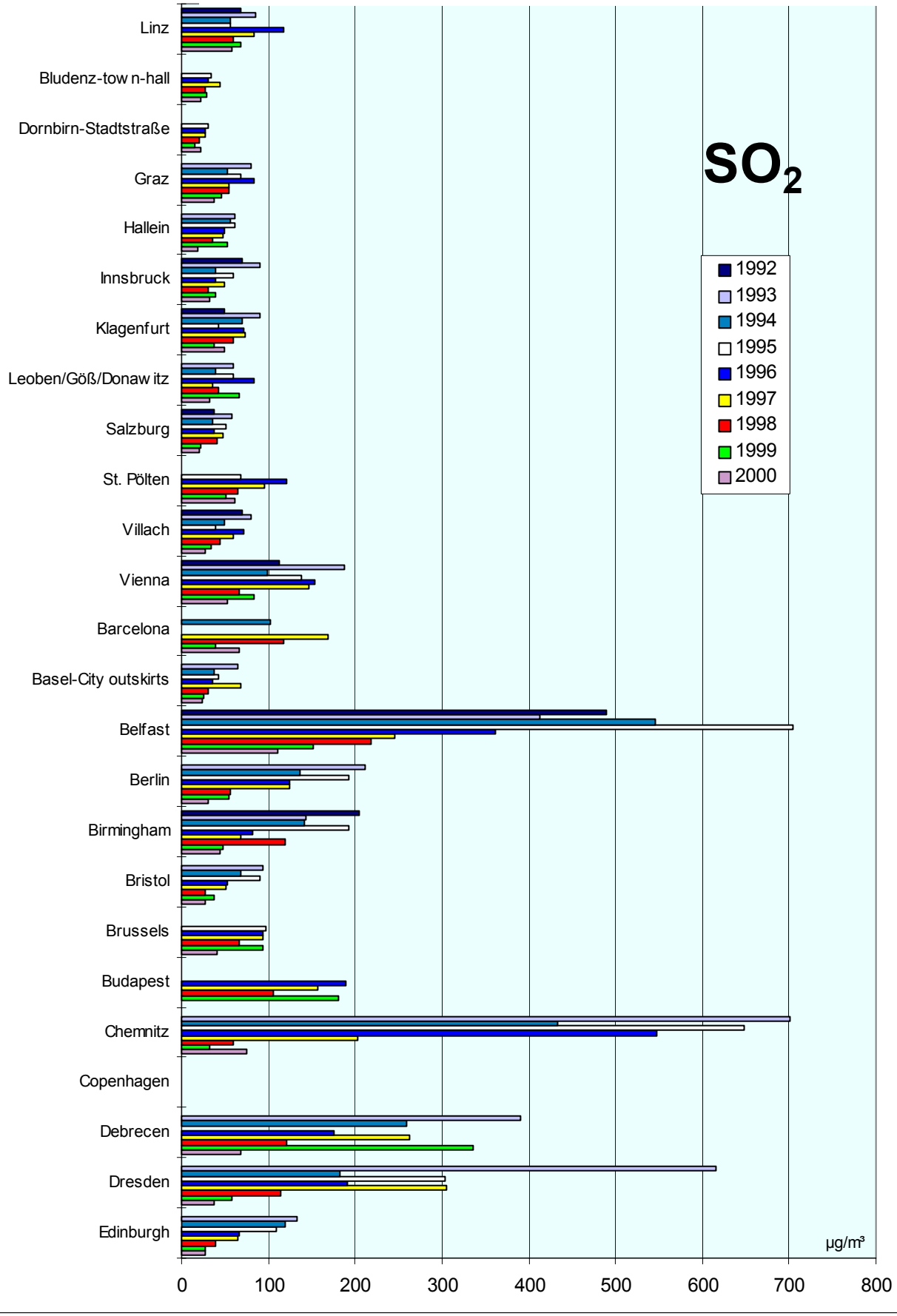
Comparison of The Air Quality Over The Years

1993 - 2000

Max. Daily Mean Values

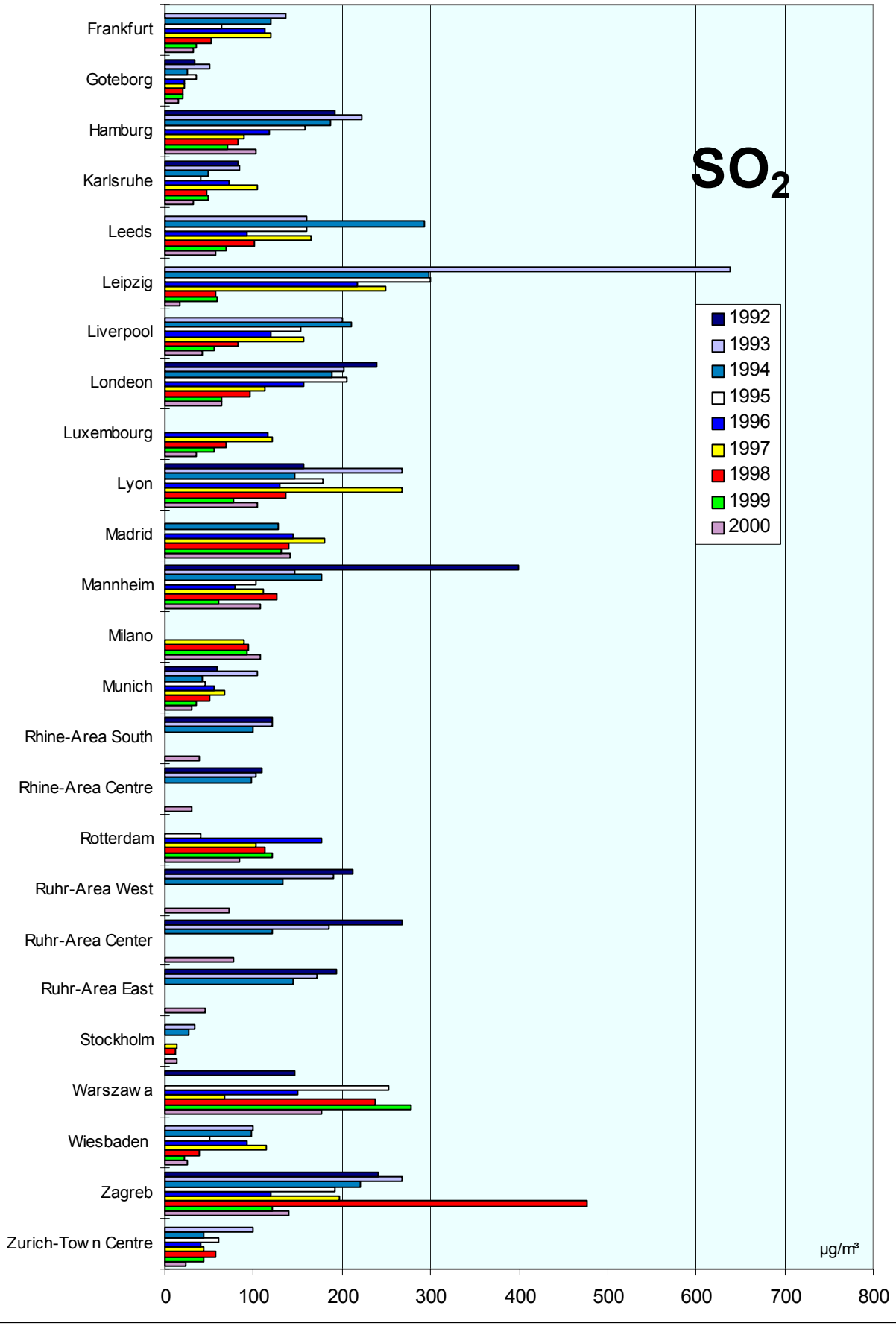
Comparison of The Air Quality 1992 - 2000

Max. daily mean values (peak stressed monitoring) station)



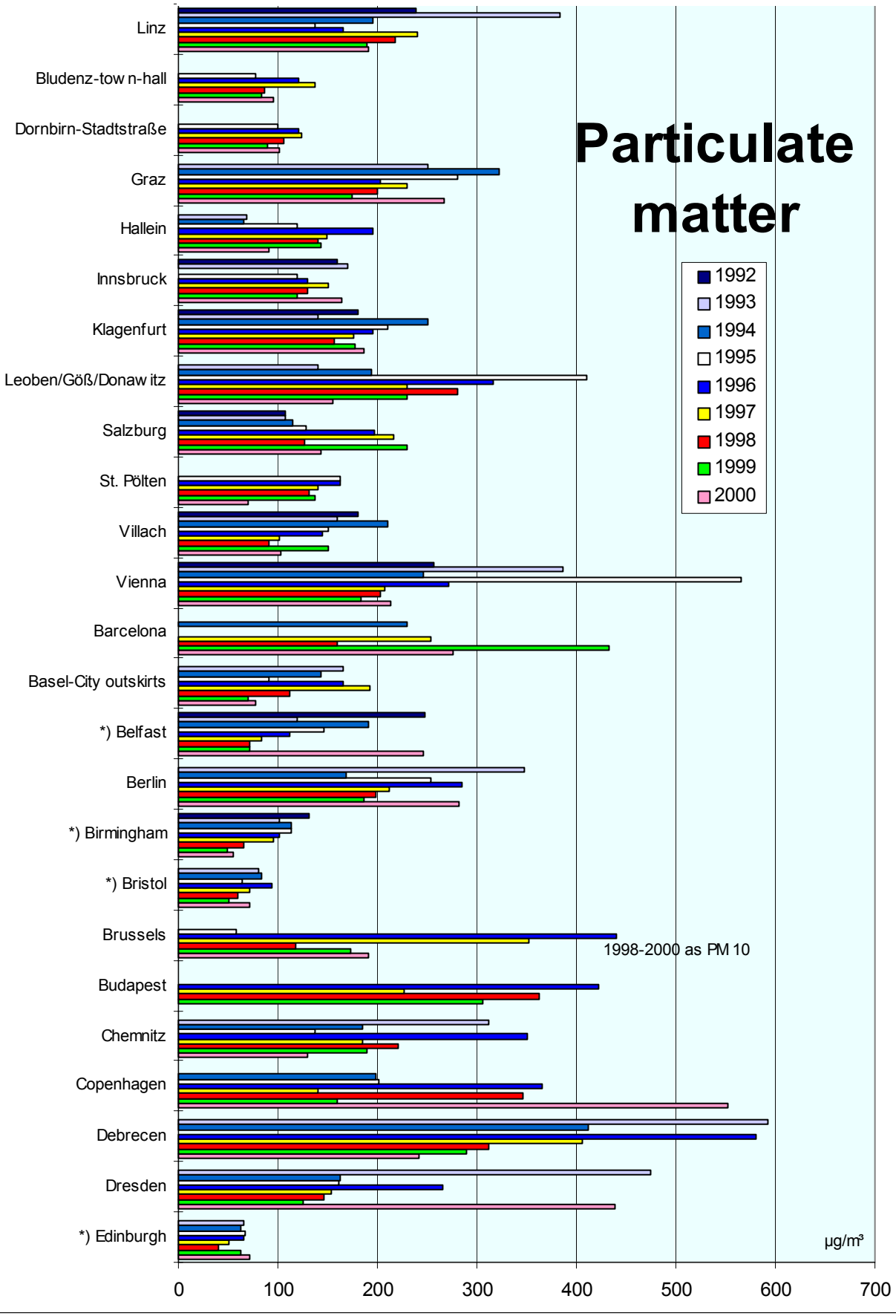
Comparison of The Air Quality 1992 - 2000

Max. daily mean values (peak stressed monitoring station)



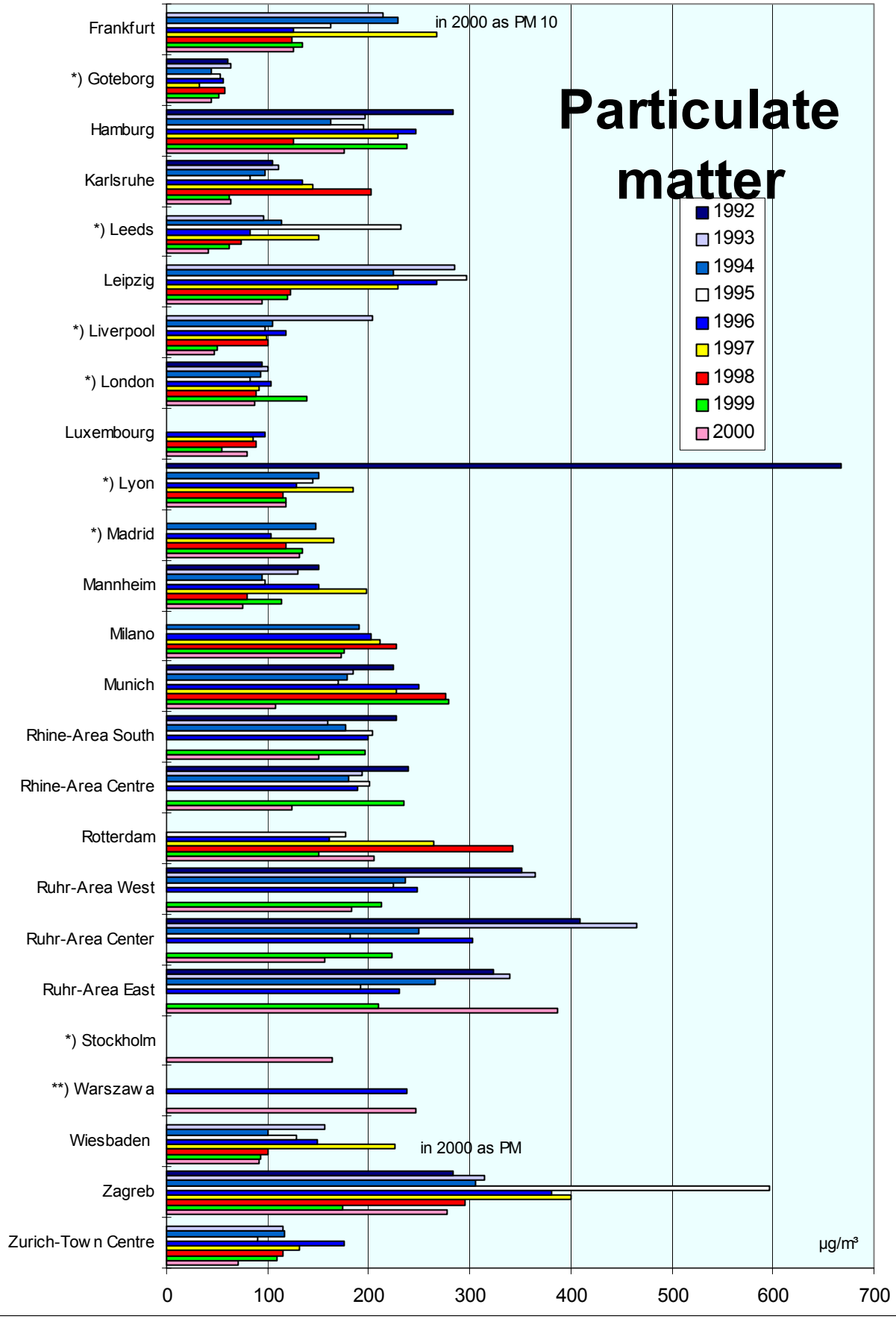
Comparison of The Air Quality 1992 - 2000

Max. daily mean values (peak stressed monitoring station)



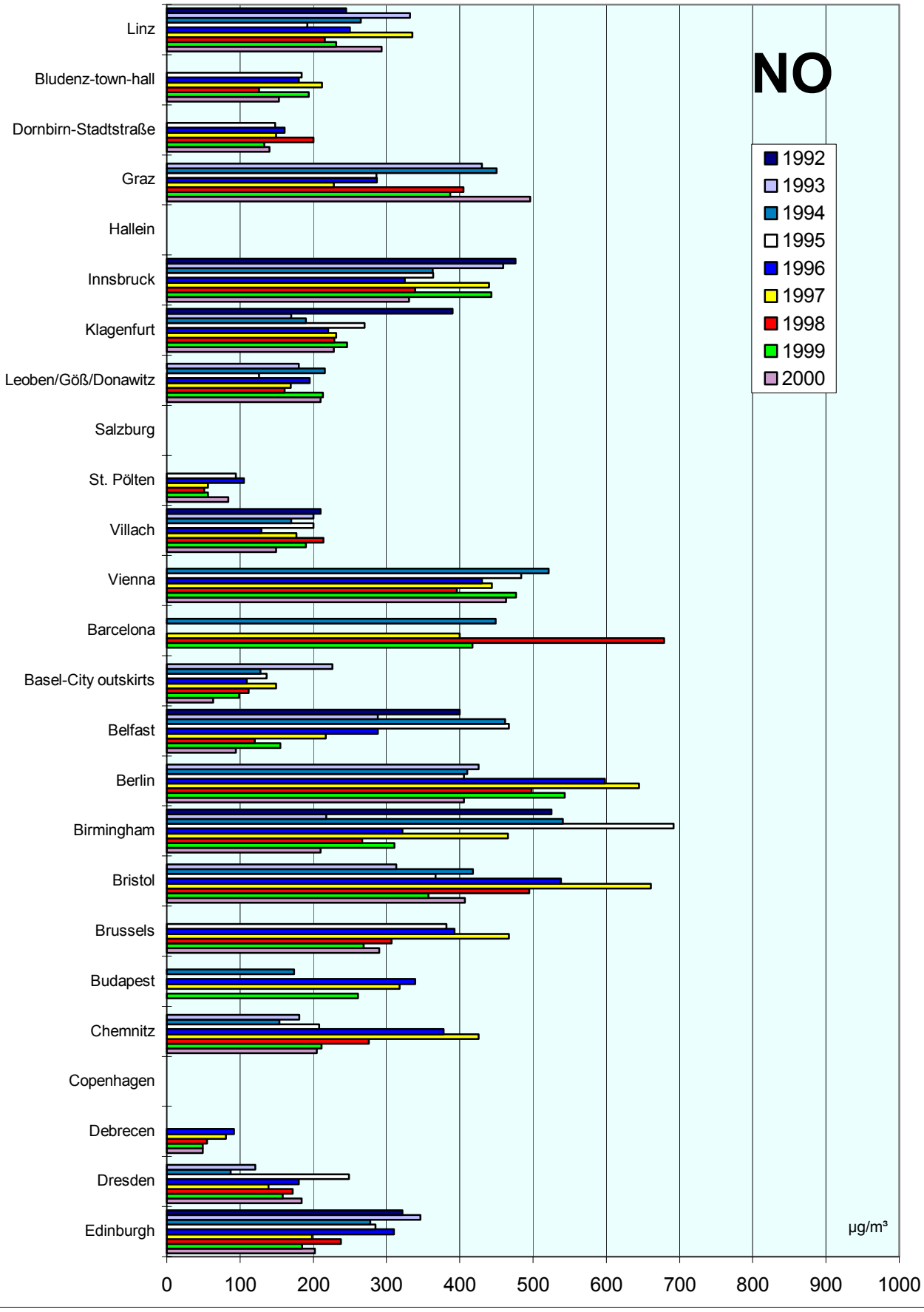
Comparison of The Air Quality 1992 - 2000

Max. daily mean values (peak stressed monitoring station)



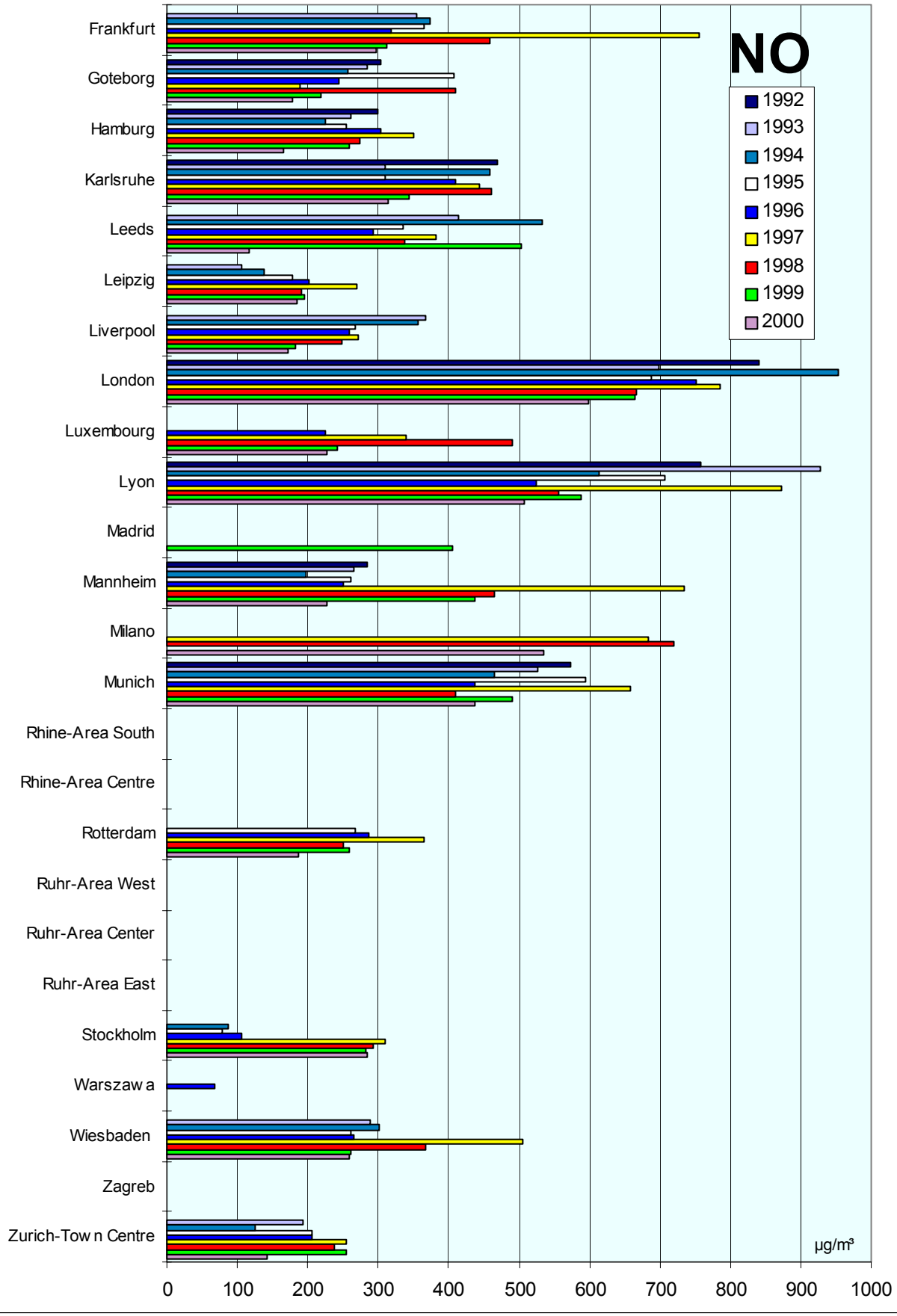
Comparison of The Air Quality 1992 - 2000

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



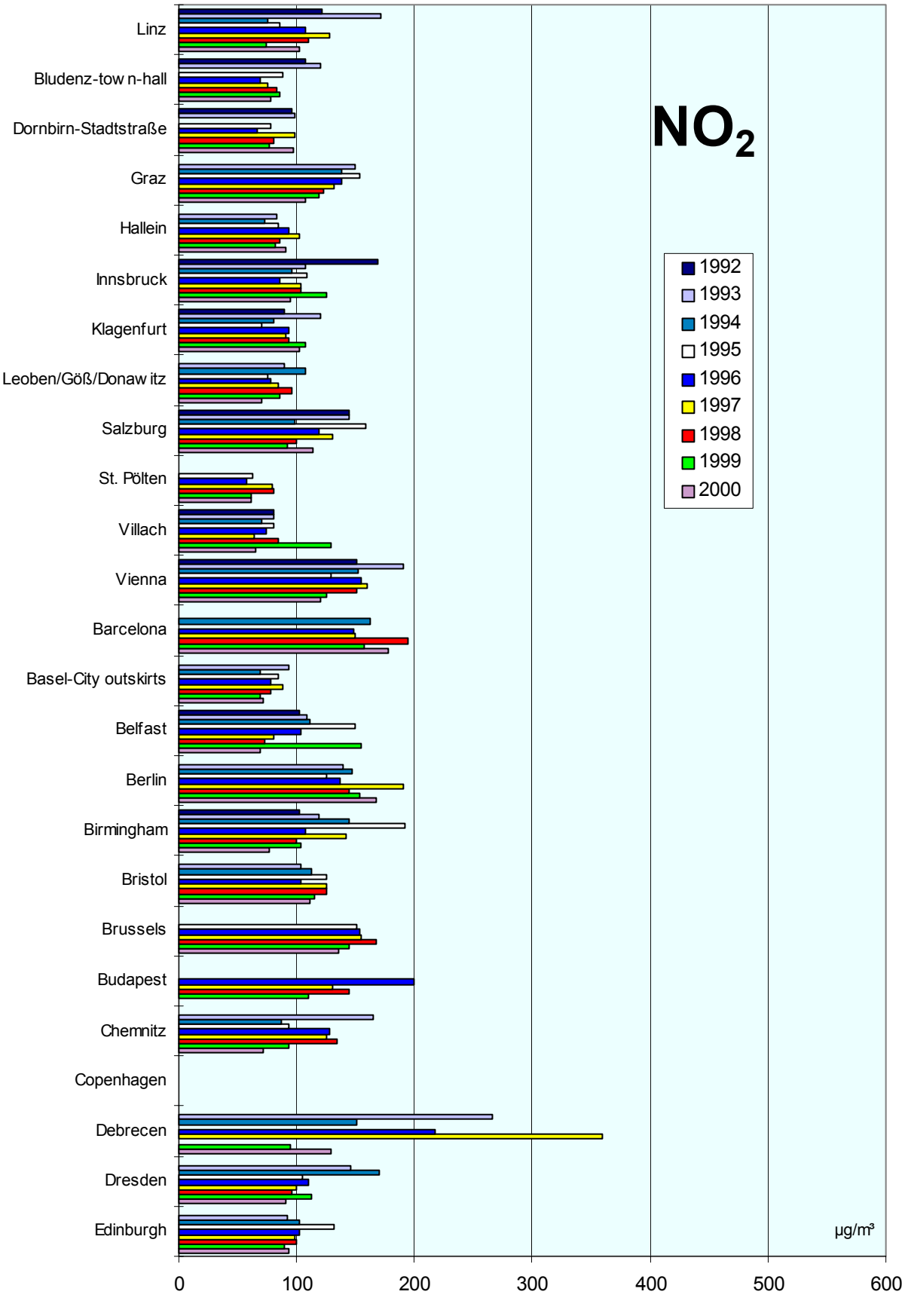
Comparison of The Air Quality 1992 - 2000

Max. daily mean values (peak stressed monitoring station)



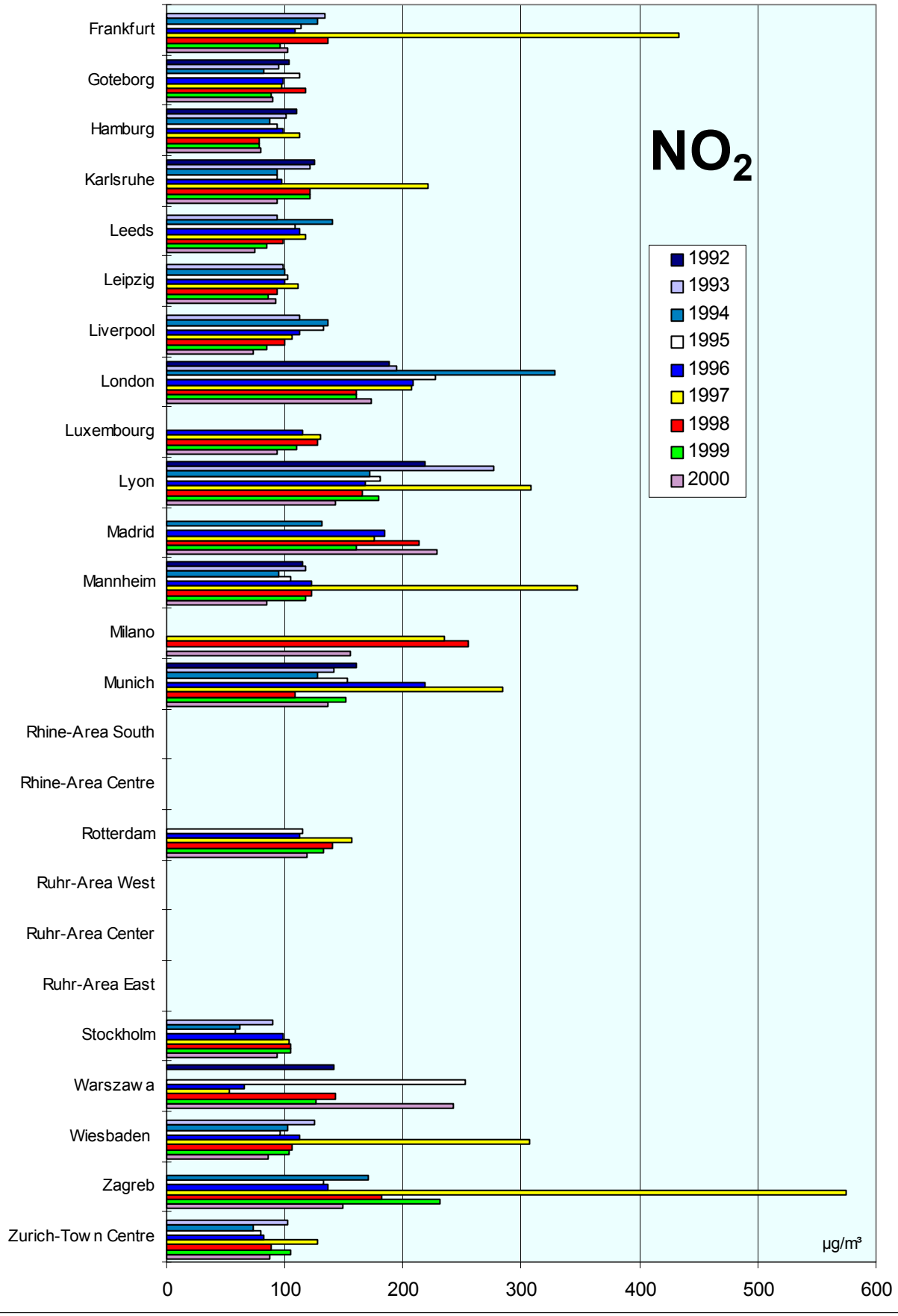
Comparison of The Air Quality 1992 - 2000

Max. daily mean values (peak stressed monitoring)



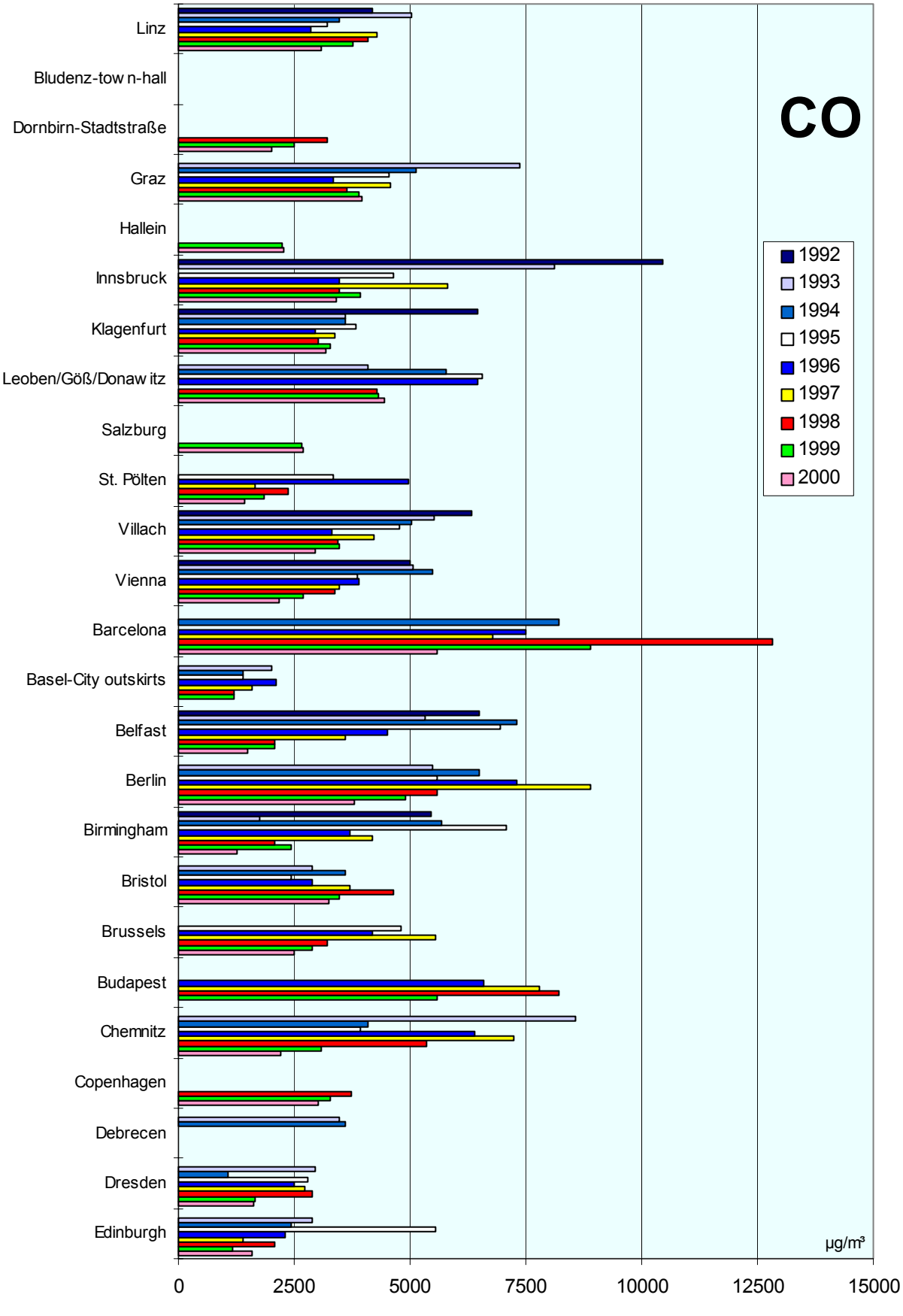
Comparison of The Air Quality 1992 - 2000

Max. daily mean values (peak stressed monitoring station)



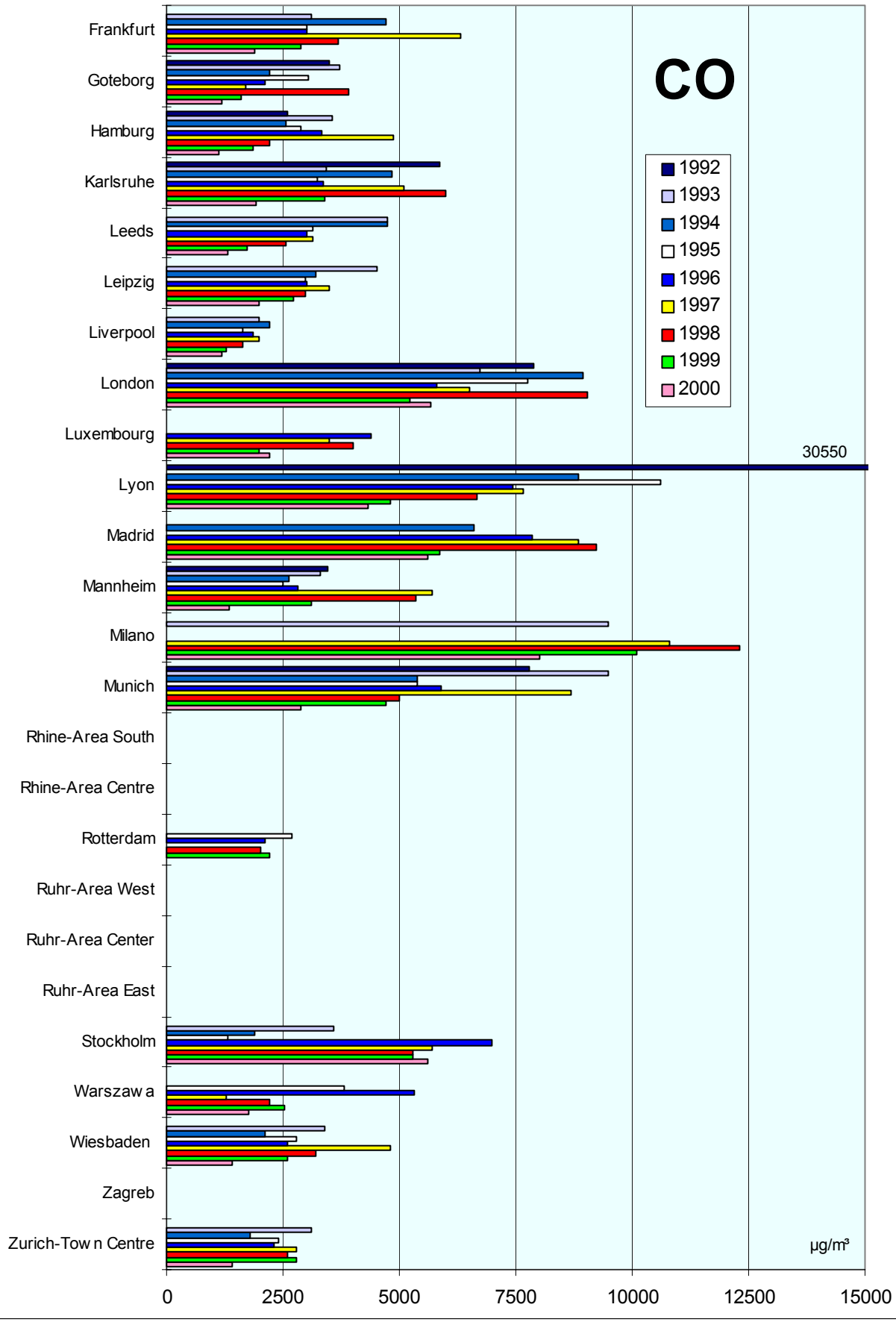
Comparison of The Air Quality 1992 - 2000

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



Comparison of The Air Quality 1992 - 2000

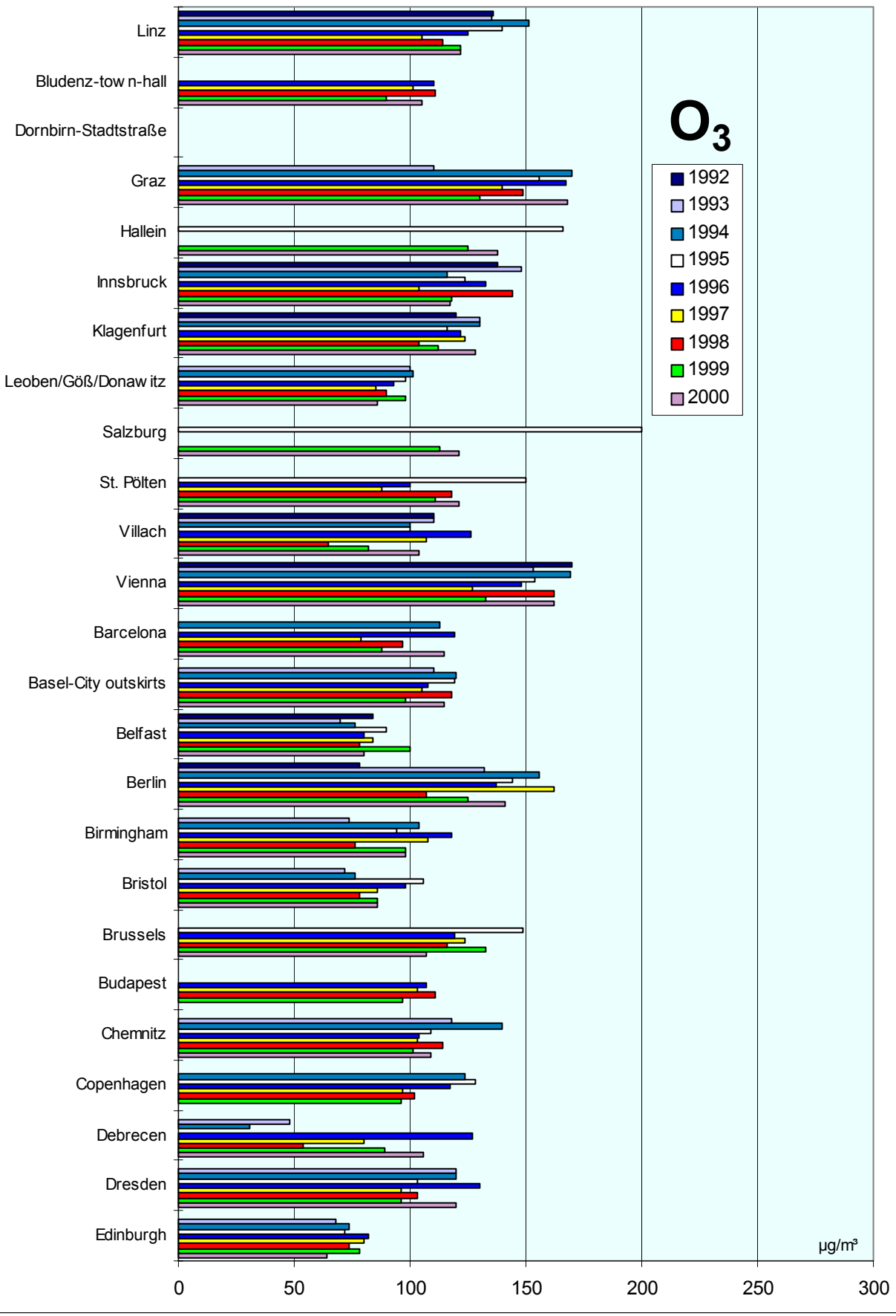
Max. daily mean values (peak-stressed monitoring station)



100

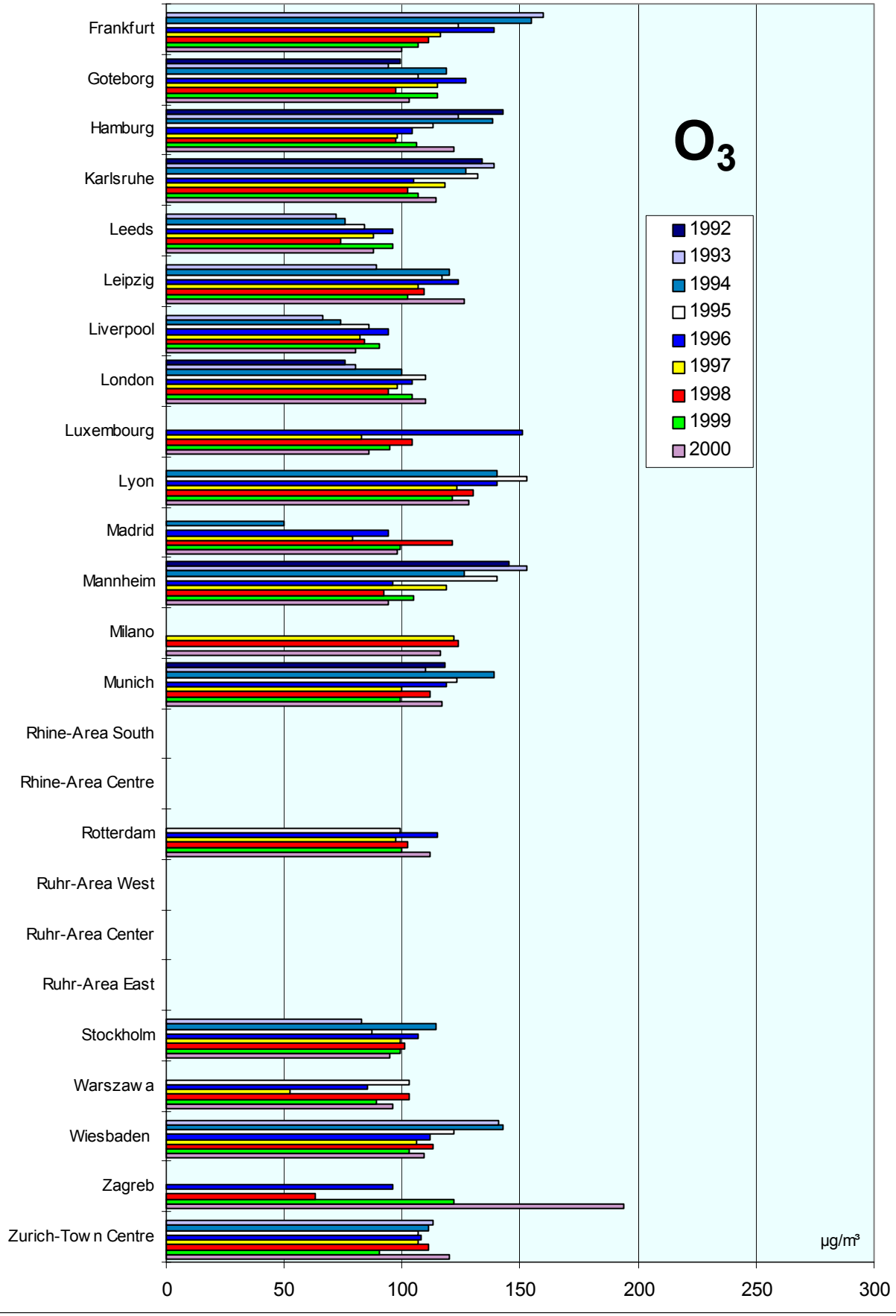
Comparison of The Air Quality 1992 - 2000

Max. daily mean values (peak stressed monitoring



Comparison of The Air Quality 1992 - 2000

Max. daily mean values (peak stressed monitoring station)



Jahresvergleich

1993 - 2000

max. 98-Percentile

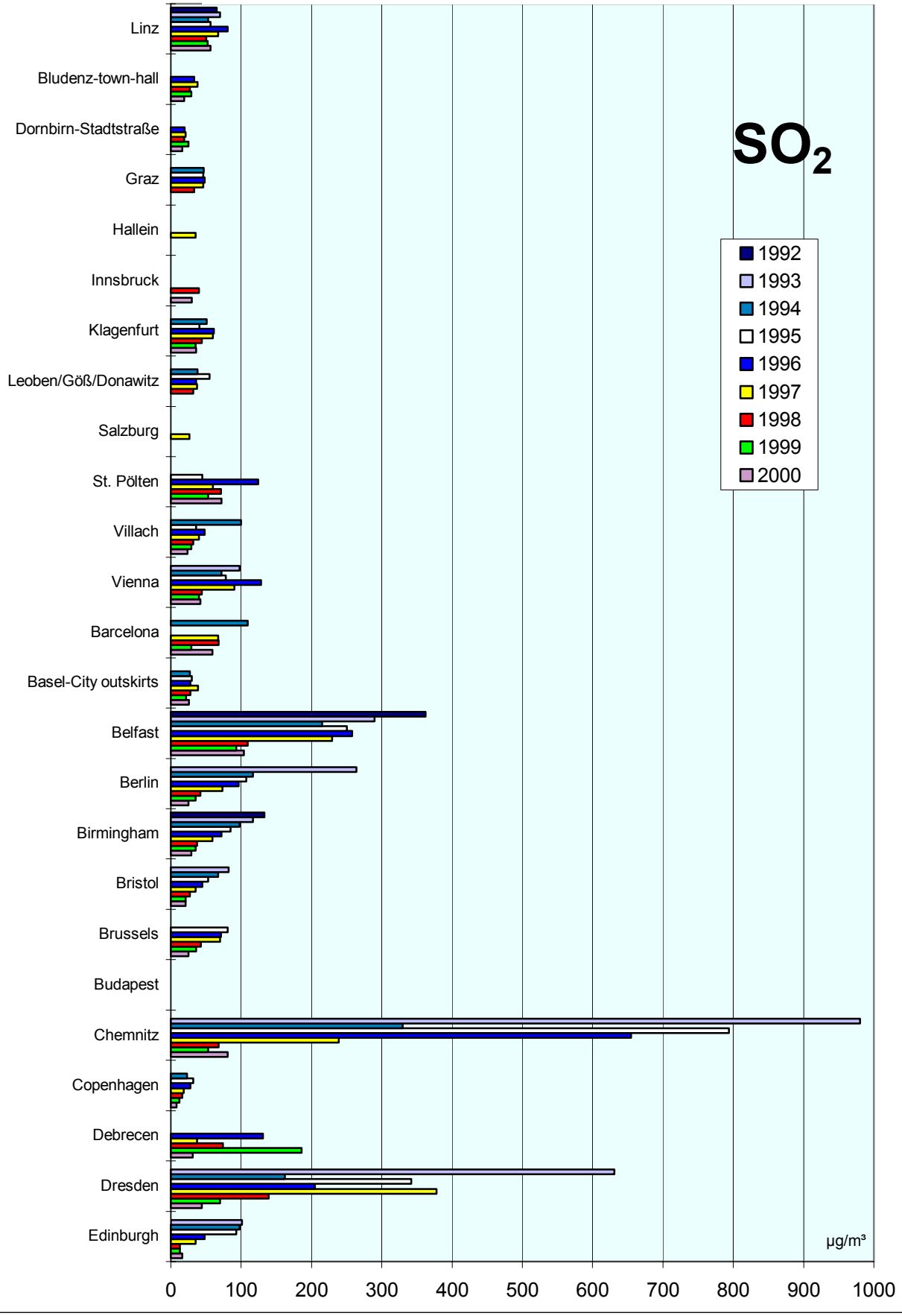
Comparison of The Air Quality Over The Years

1993 - 2000

Max. 98-Percentiles

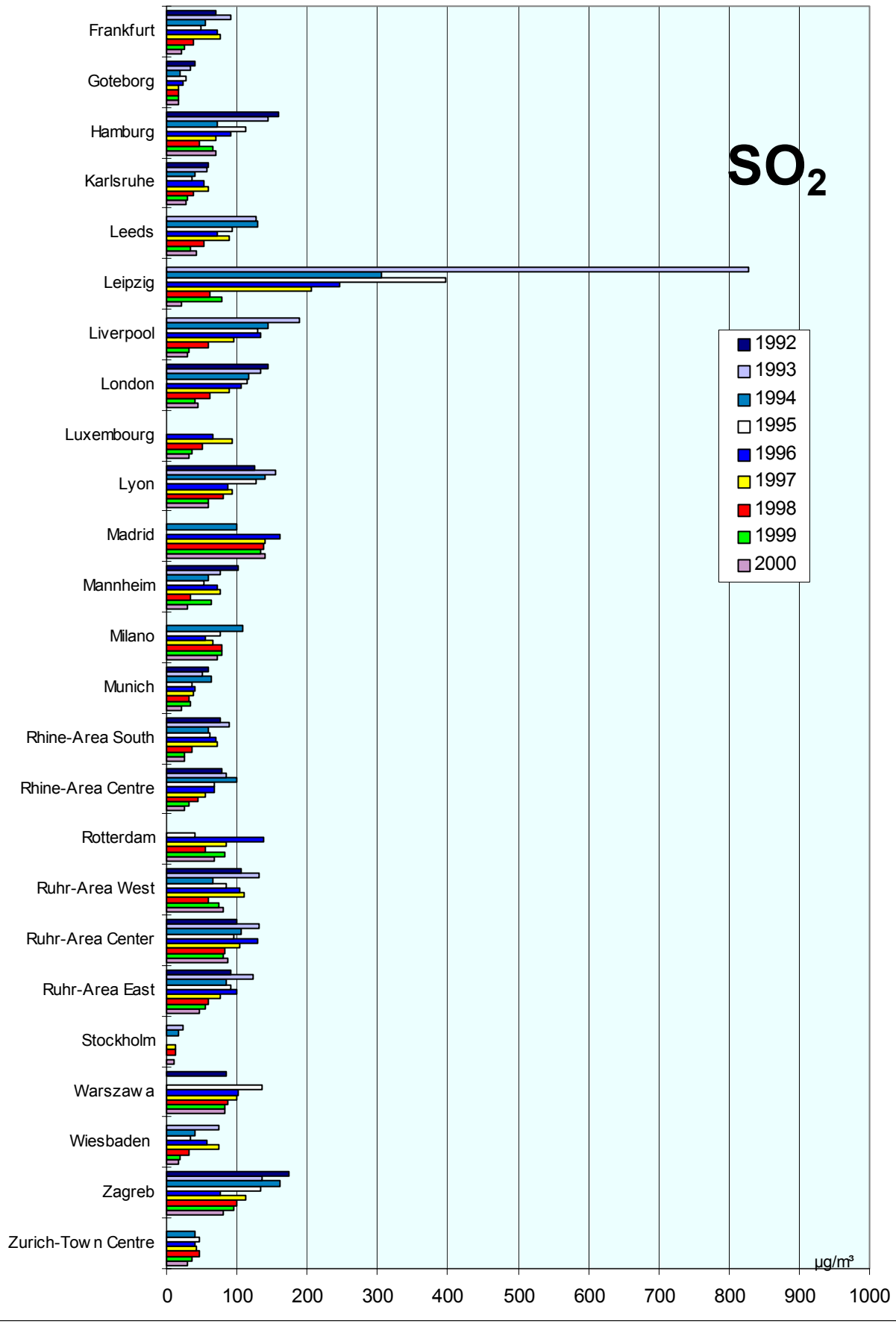
Comparison of The Air Quality 1992 - 2000

Max. 98-Percentile (peak stressed monitoring station)



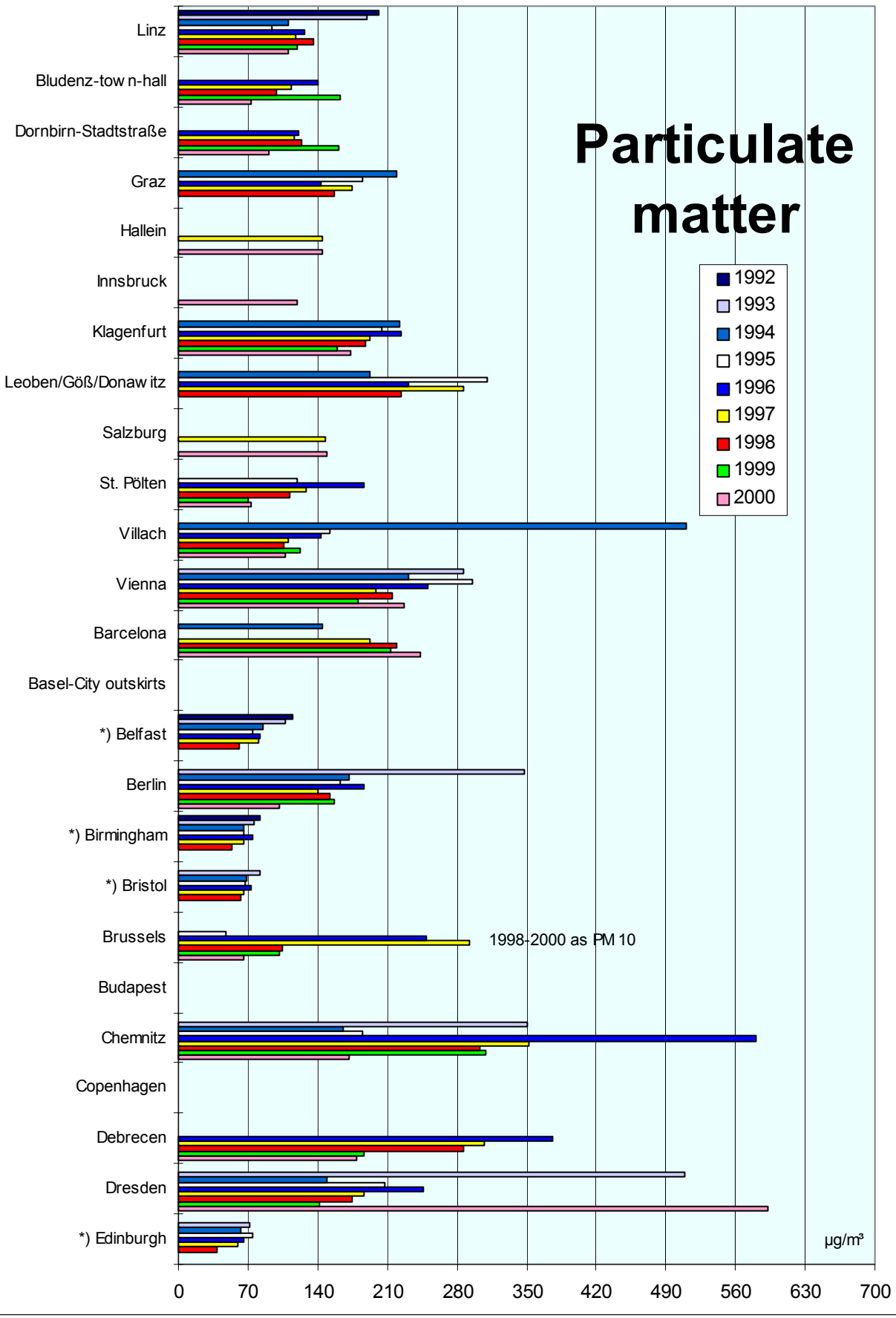
Comparison of The Air Quality 1992 - 2000

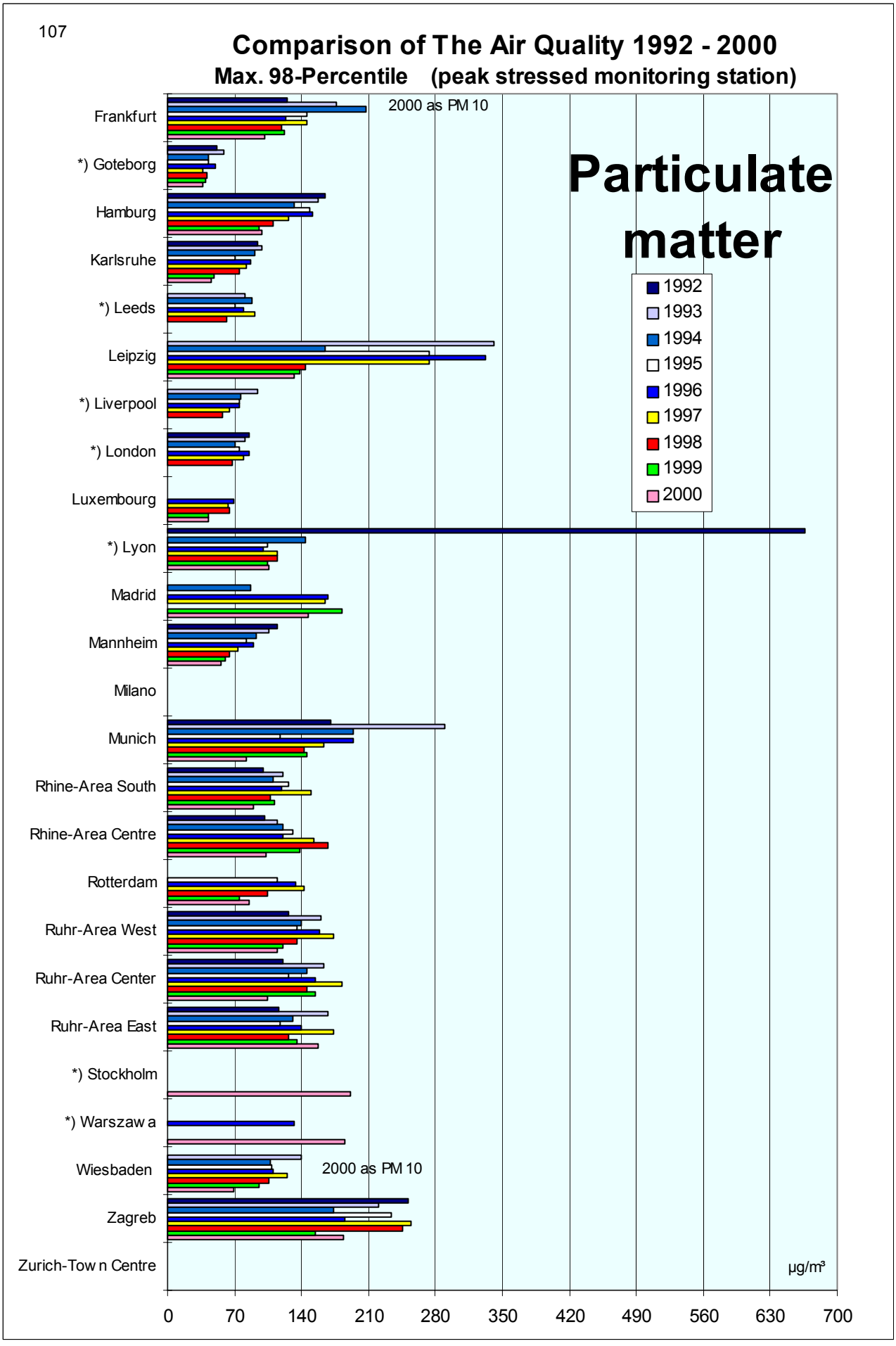
Max. 98-Percentile (peak stressed monitoring station)



Comparison of The Air Quality 1992 - 2000

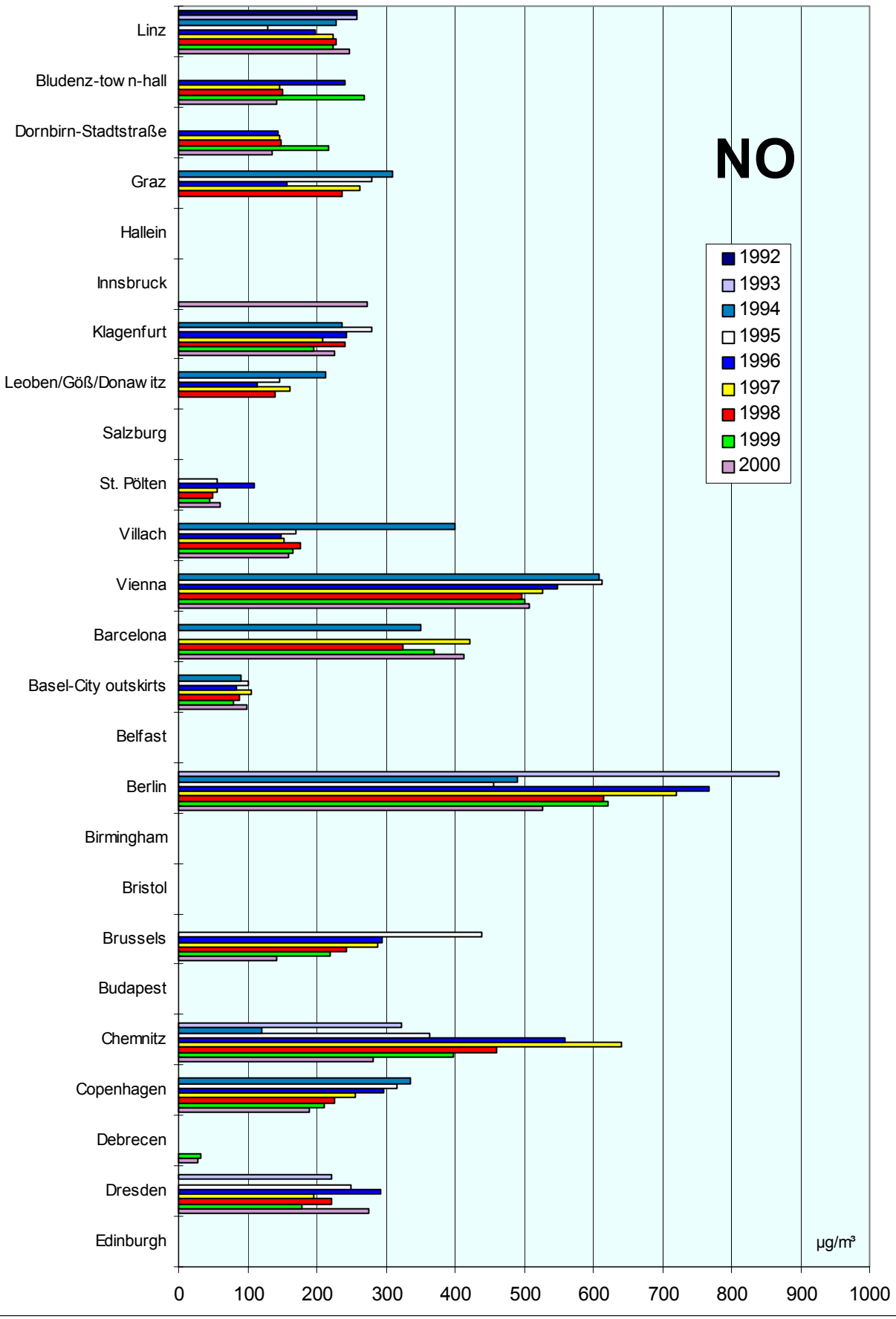
Max. 98-Percentile (peak stressed monitoring station)




Comparison of The Air Quality 1992 - 2000
Max. 98-Percentile (peak stressed monitoring station)
Particulate matter
2000 as PM 10
2000 as PM 10
1992
1993
1994
1995
1996
1997
1998
1999
2000
Frankfurt
*) Goteborg
Hamburg
Karlsruhe
*) Leeds
Leipzig
*) Liverpool
*) London
Luxembourg
*) Lyon
Madrid
Mannheim
Milano
Munich
Rhine-Area South
Rhine-Area Centre
Rotterdam
Ruhr-Area West
Ruhr-Area Center
Ruhr-Area East
*) Stockholm
*) Warszaw a
Wiesbaden
Zagreb
Zurich-Tow n Centre
µg/m³
0
70
140
210
280
350
420
490
560
630
700

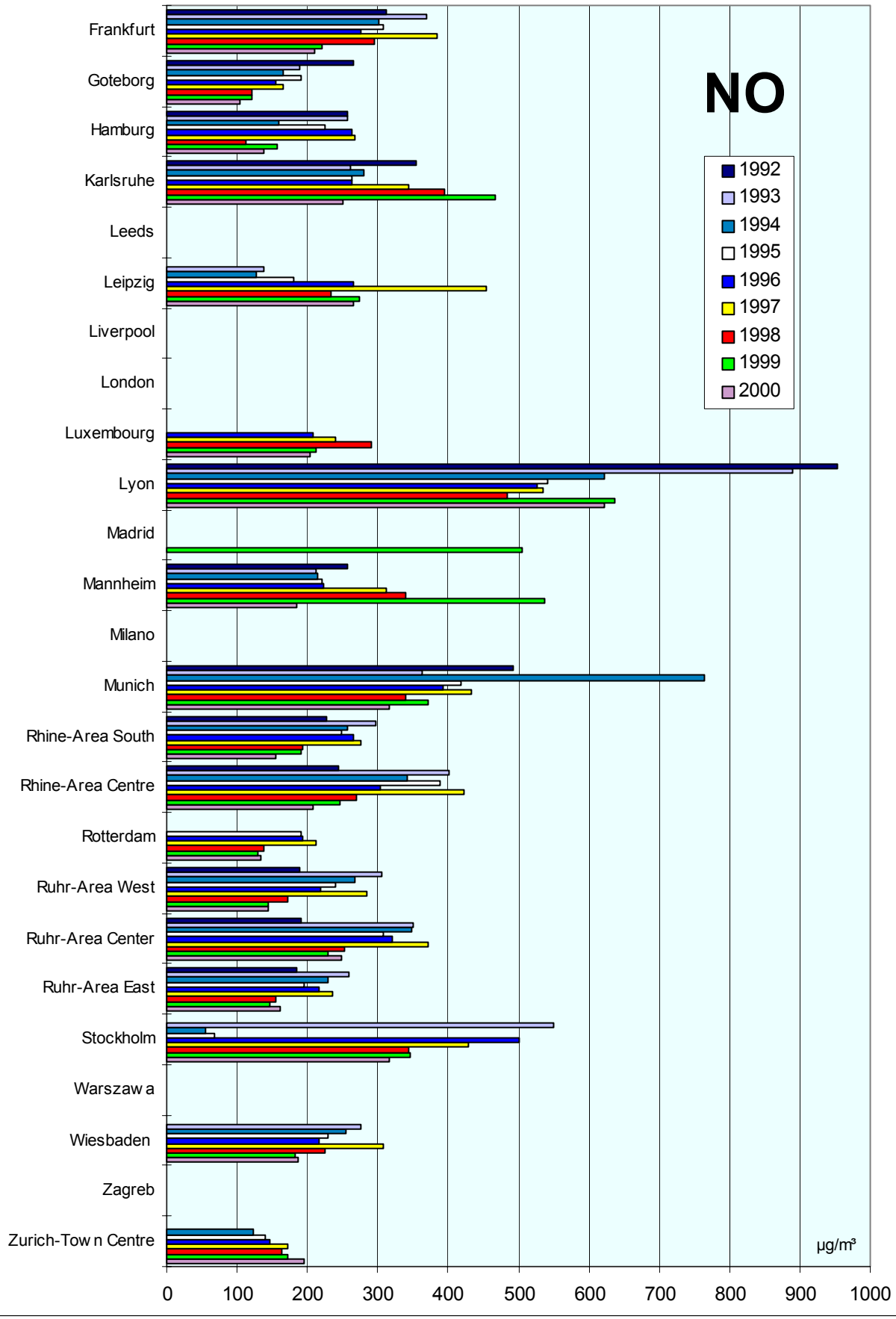
Comparison of The Air Quality 1992 - 2000

Max. 98-Percentile (peak-stressed monitoring station)



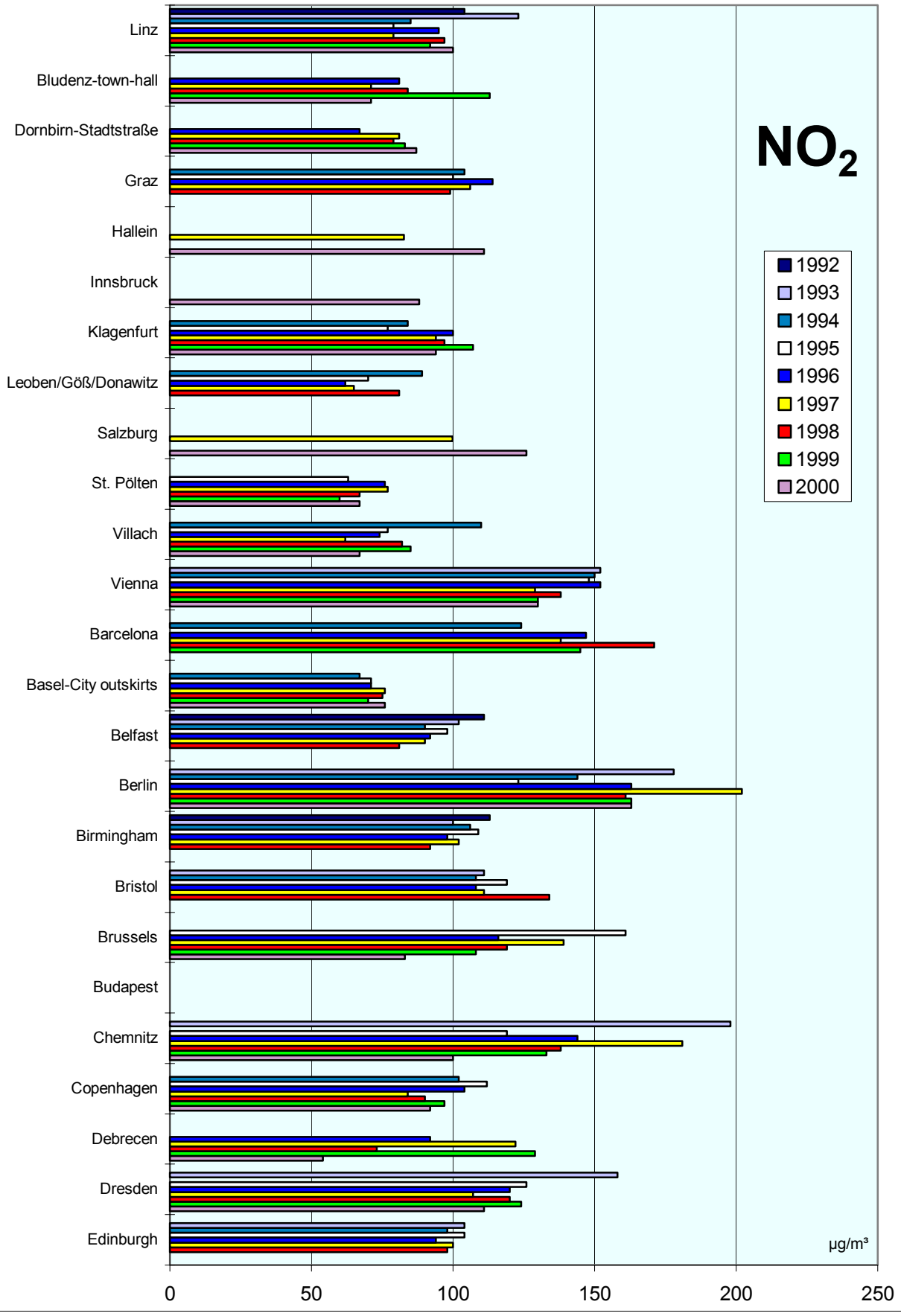
Comparison of The Air Quality 1992 - 2000

Max. 98-Percentile (peak stressed monitoring station)



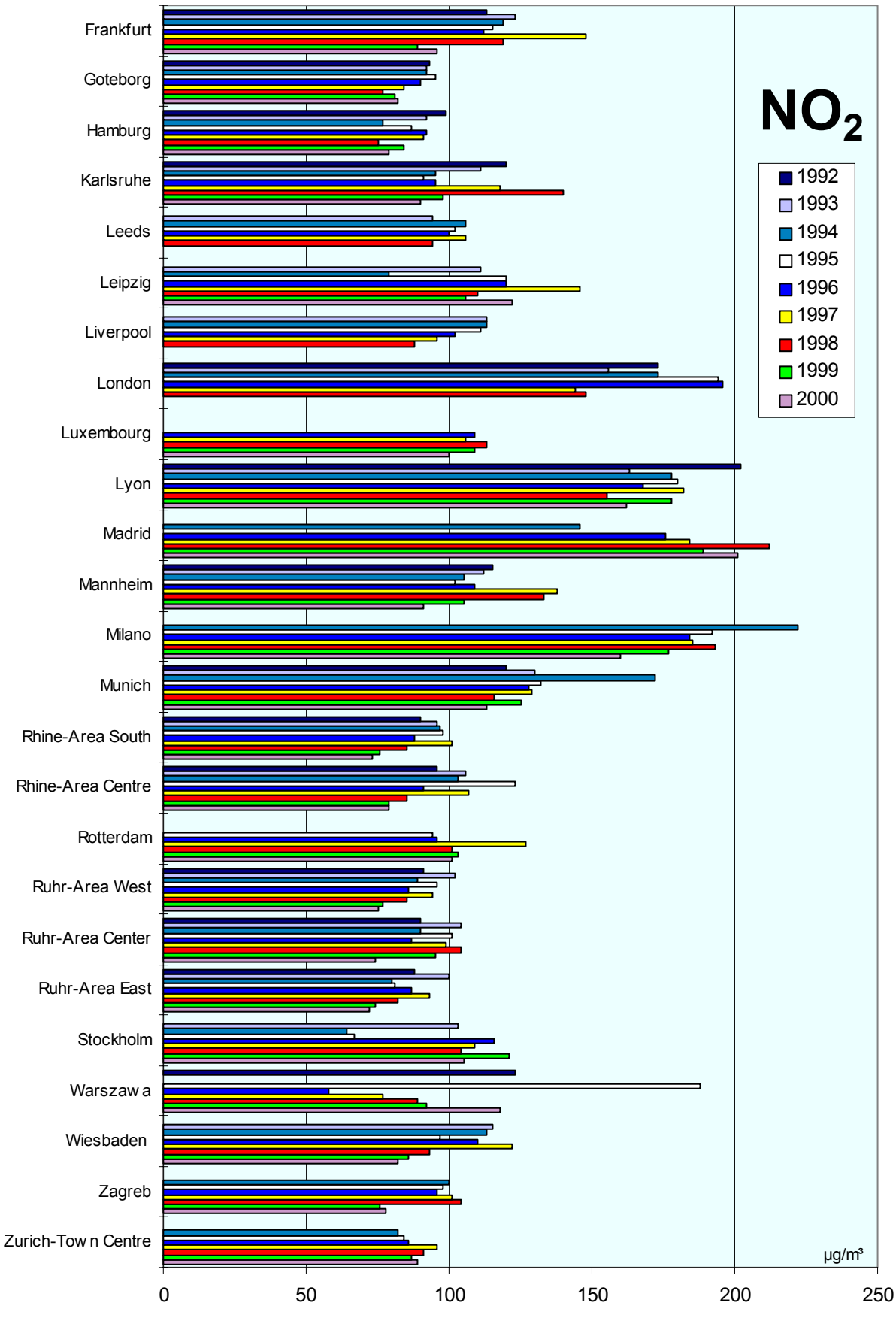
Comparison of The Air Quality 1992 - 2000

Max. 98-Percentile (peak stressed monitoring station)



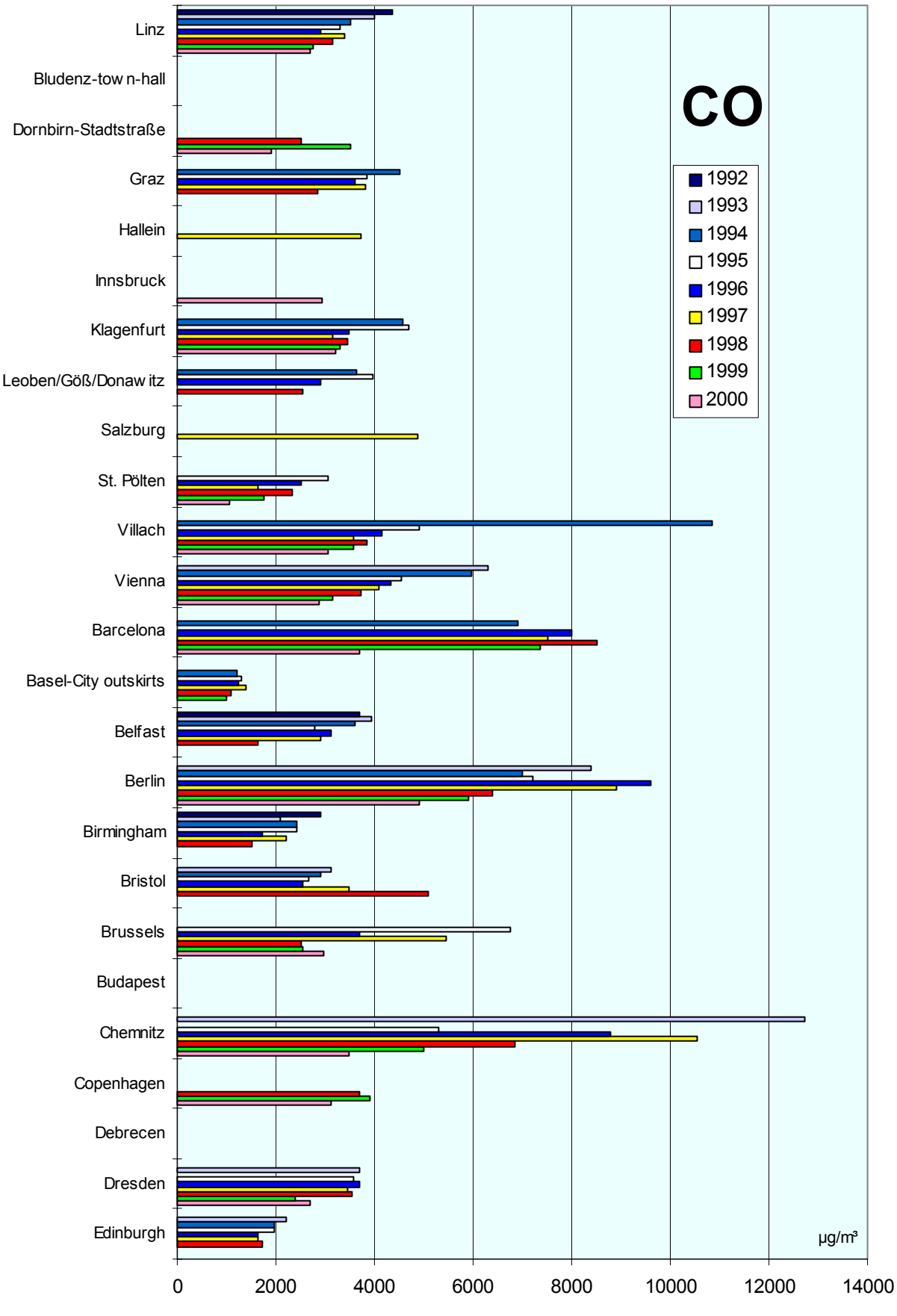
Comparison of The Air Quality 1992 - 2000

Max. 98-Percentile (peak stressed monitoring station)



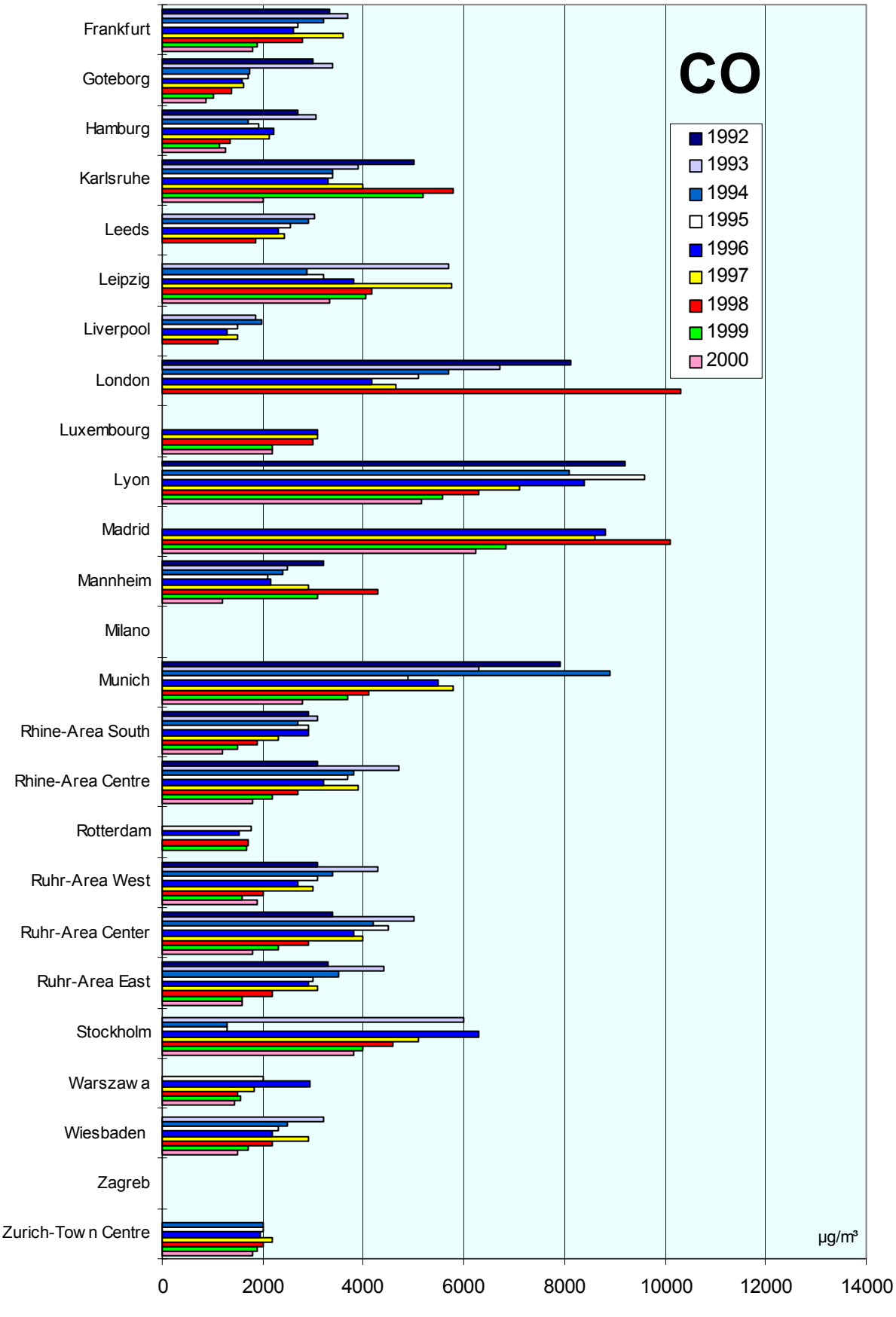
Comparison of The Air Quality 1992 - 2000

Max. 98-Percentile (peak-stressed monitoring)



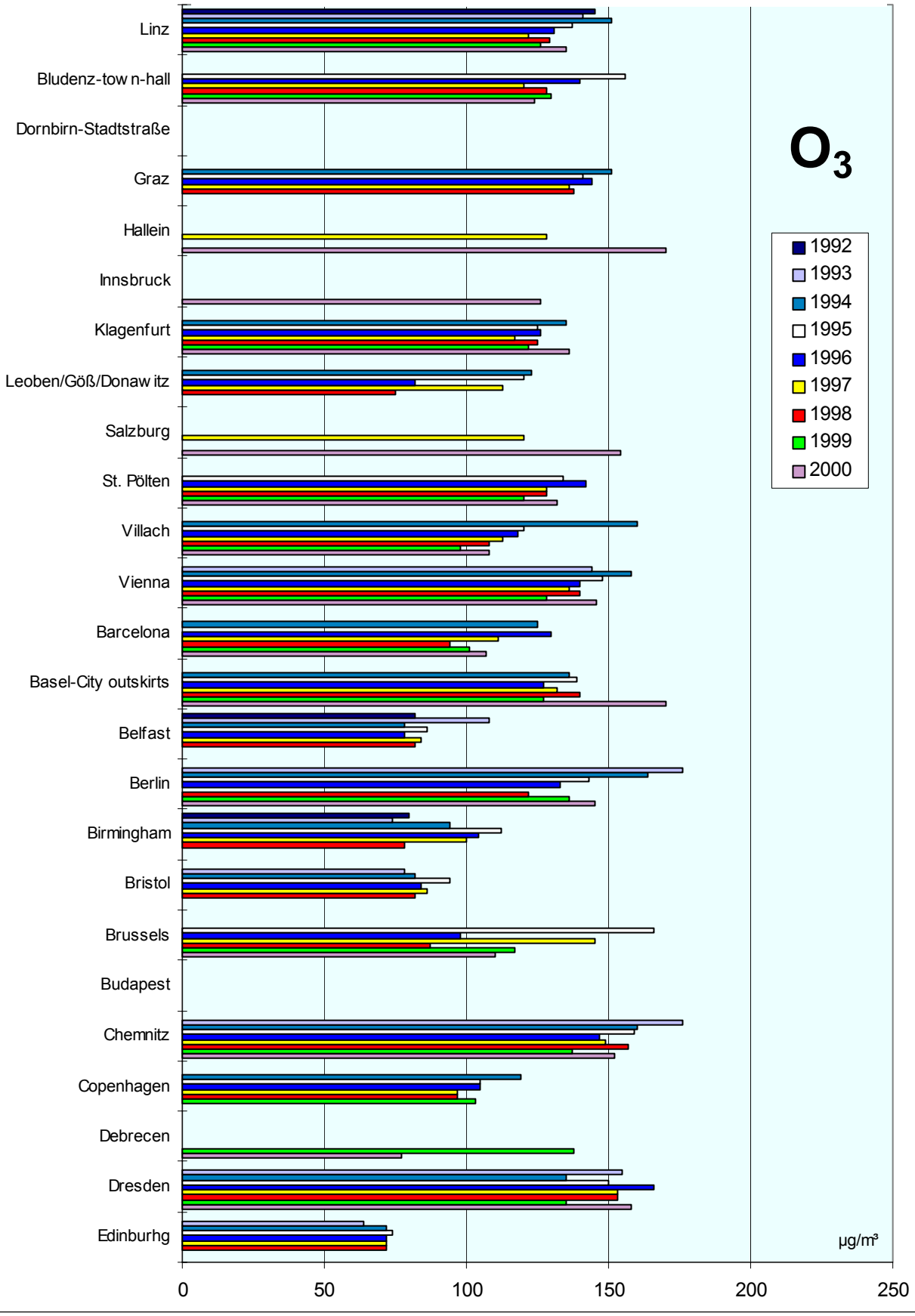
Comparison of The Air Quality 1992 - 2000

Max. 98-Percentile (peak-stressed monitoring station)



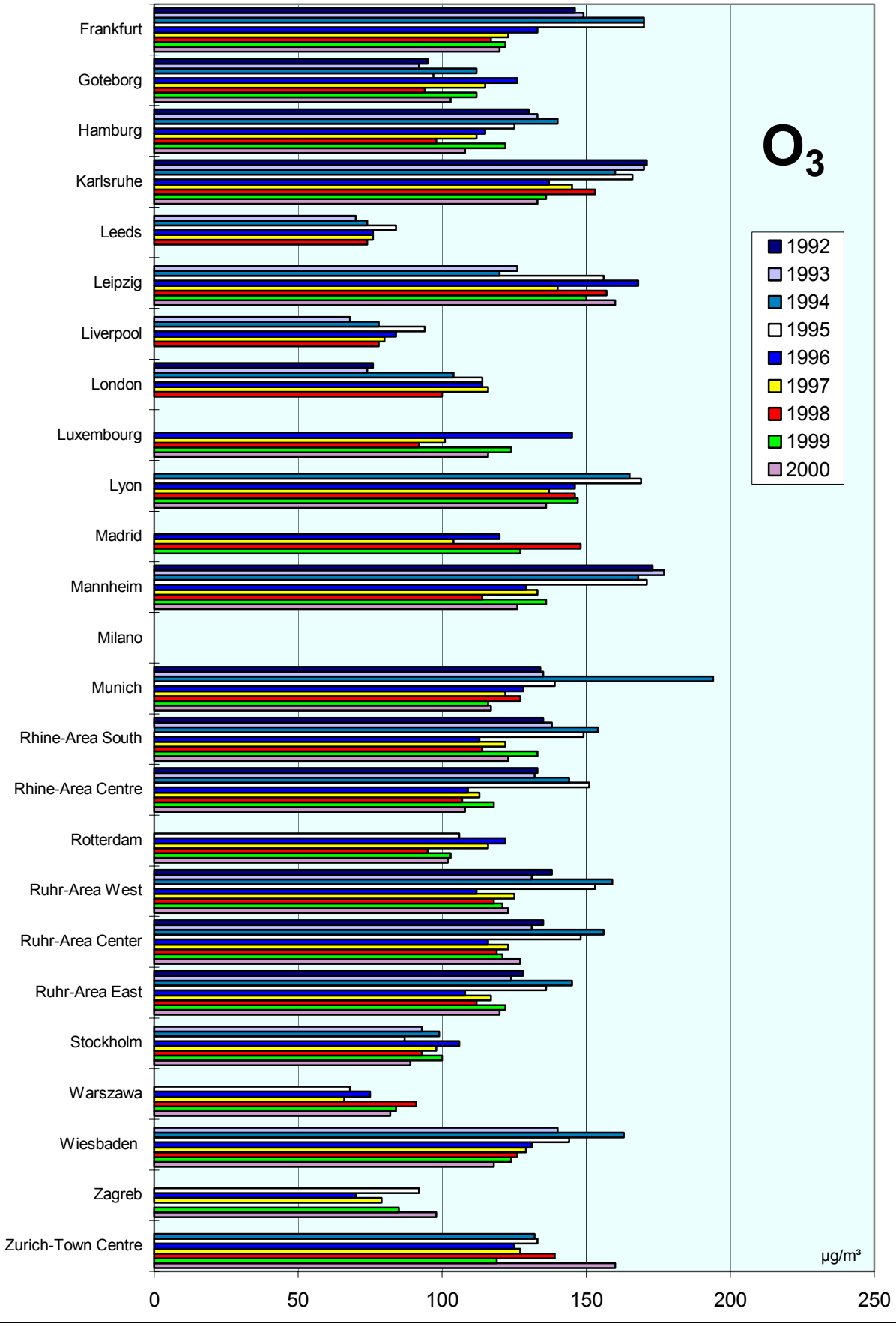
Comparison of The Air Quality 1992 - 2000

Max. 98-Percentile (peak stressed monitoring station)



Comparison of The Air Quality 1992 - 2000

Max. 98-Percentile (peak stresses monitoring station)



Jahresvergleich

1993 - 2000

Summe der Jahresmittelwerte SO2, Staub, NO2

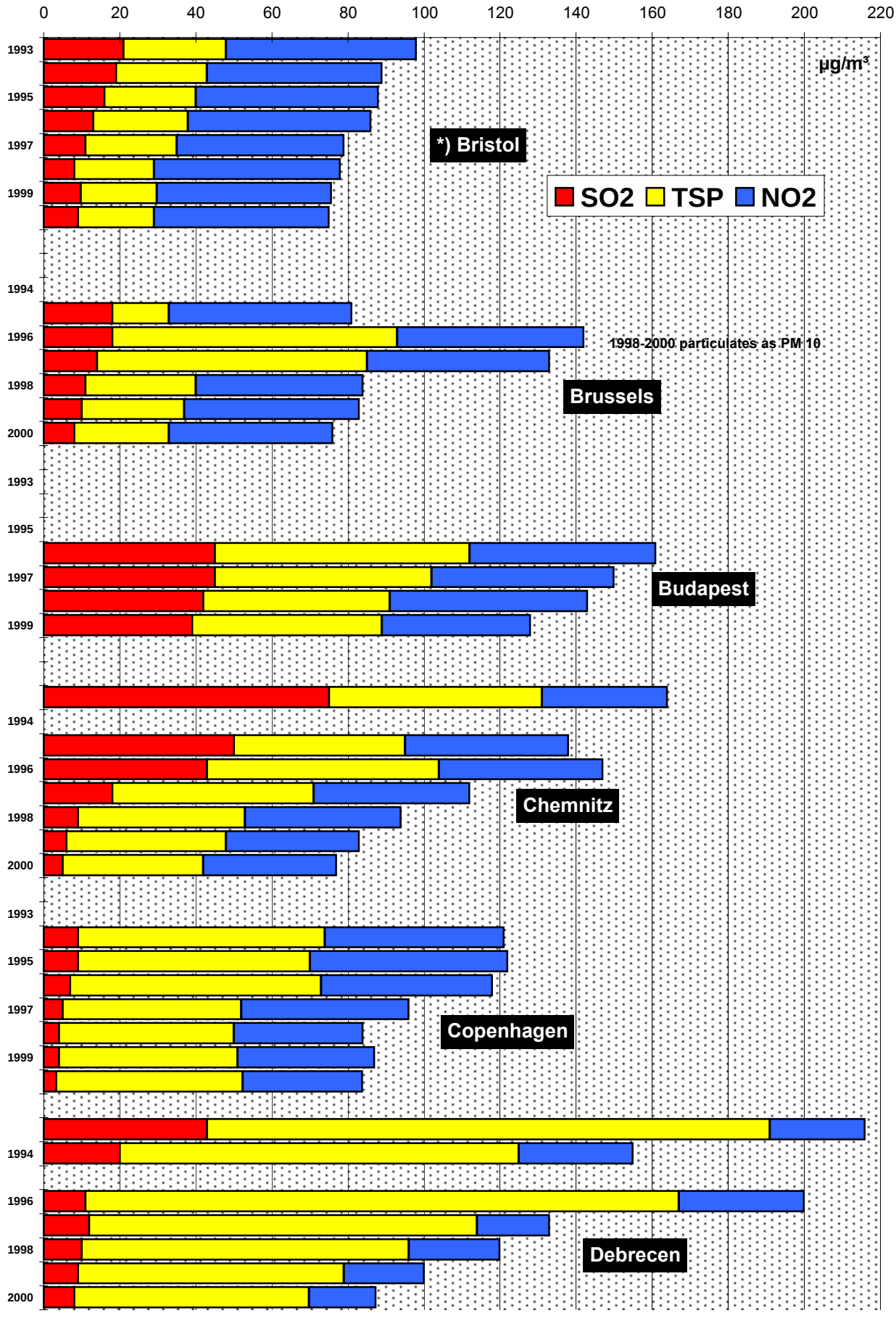
Comparison of The Air Quality Over The Years

1993 - 2000

Sum of Annual Mean Values for SO2, TSP ans NO2

Comparison Of The Air Quality 1993-2000

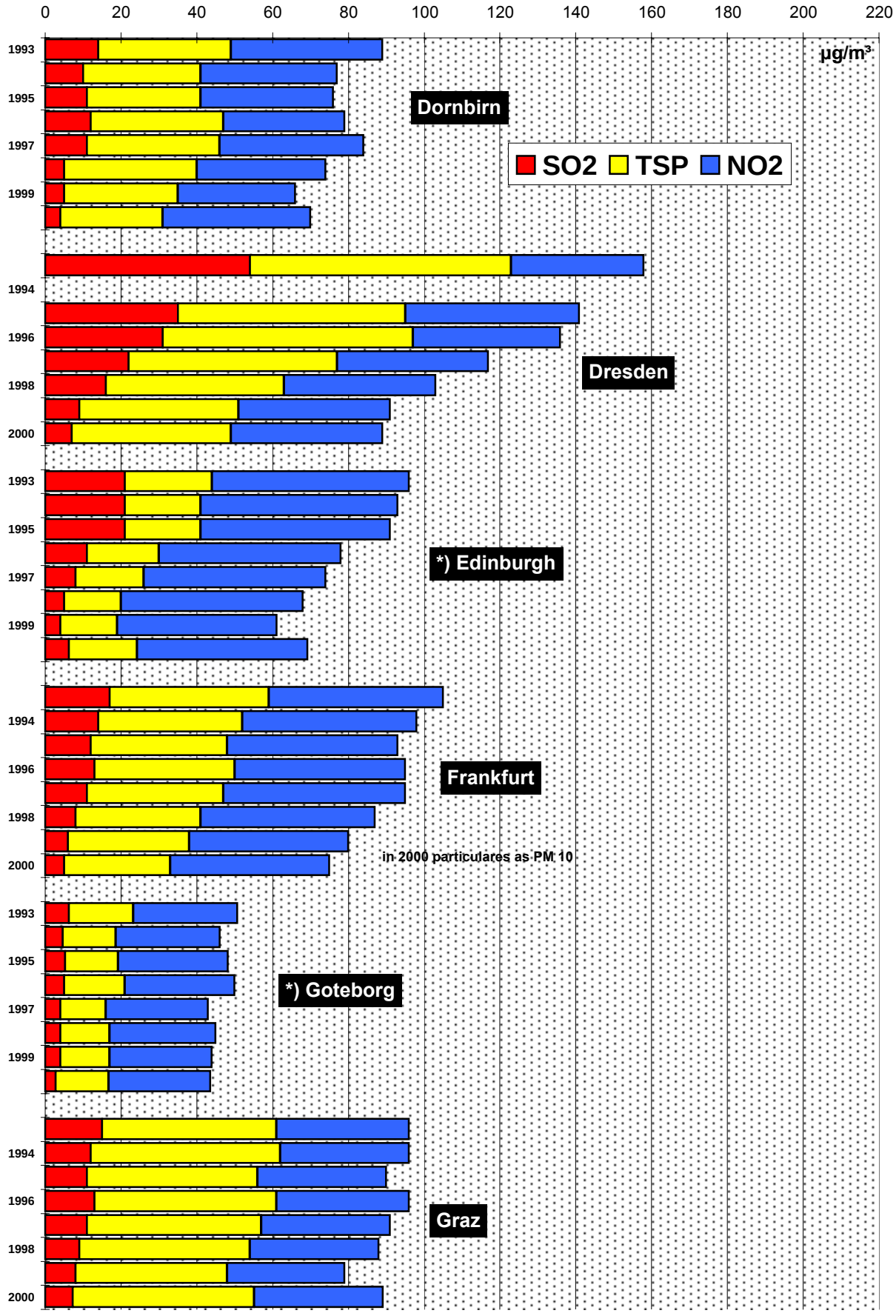
Development of the annual mean values, Σ SO2, TSP, NO2
(mean of all monitoring stations)



particulates calculated as PM 10

Comparison Of The Air Quality 1993-2000

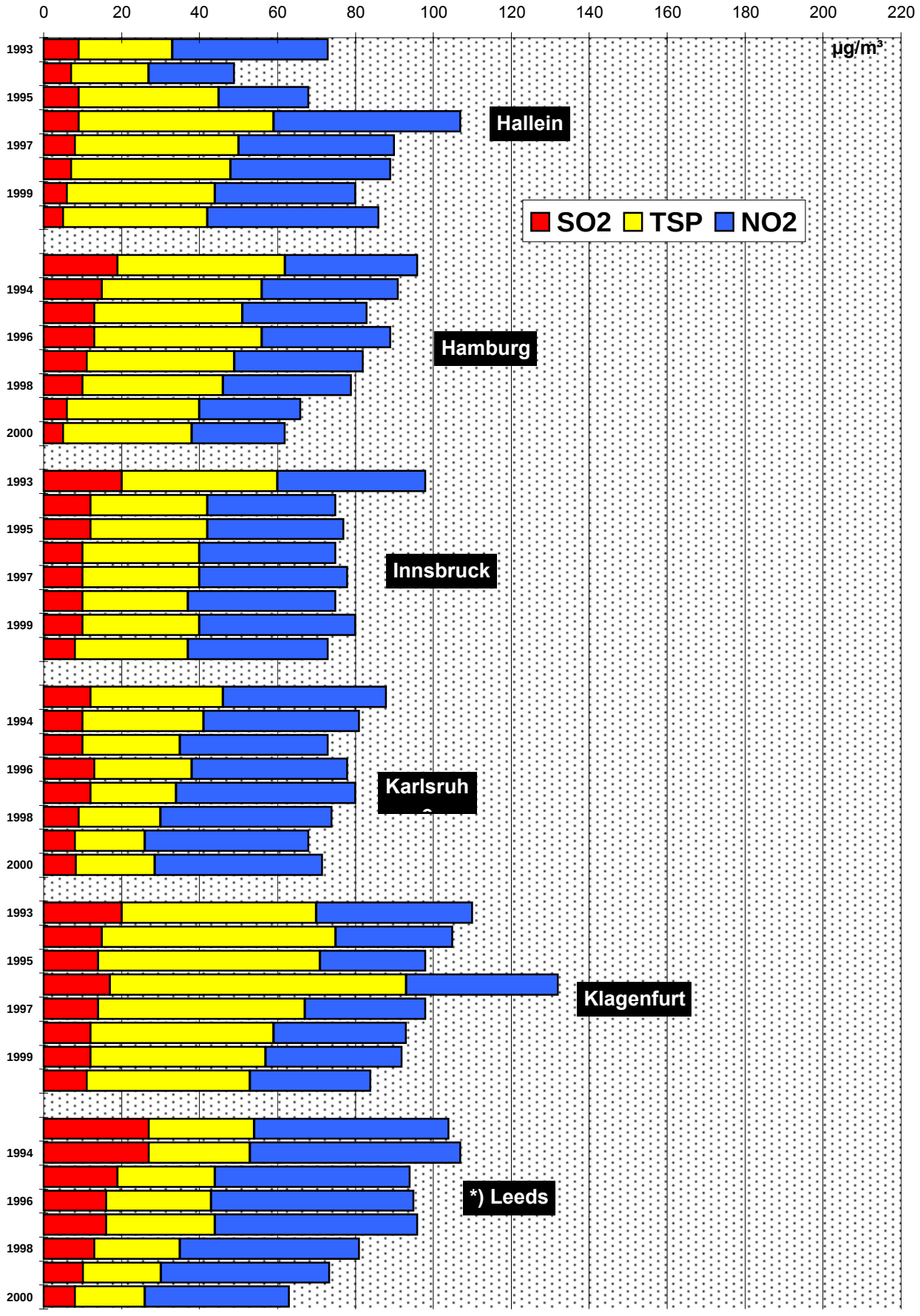
Development of the annual mean values, Σ SO2, TSP, NO2 (mean of all monitoring stations)



Comparison Of The Air Quality 1993-2000

Development of the annual mean values, Σ SO2, TSP, NO2

(mean of all monitoring stations)

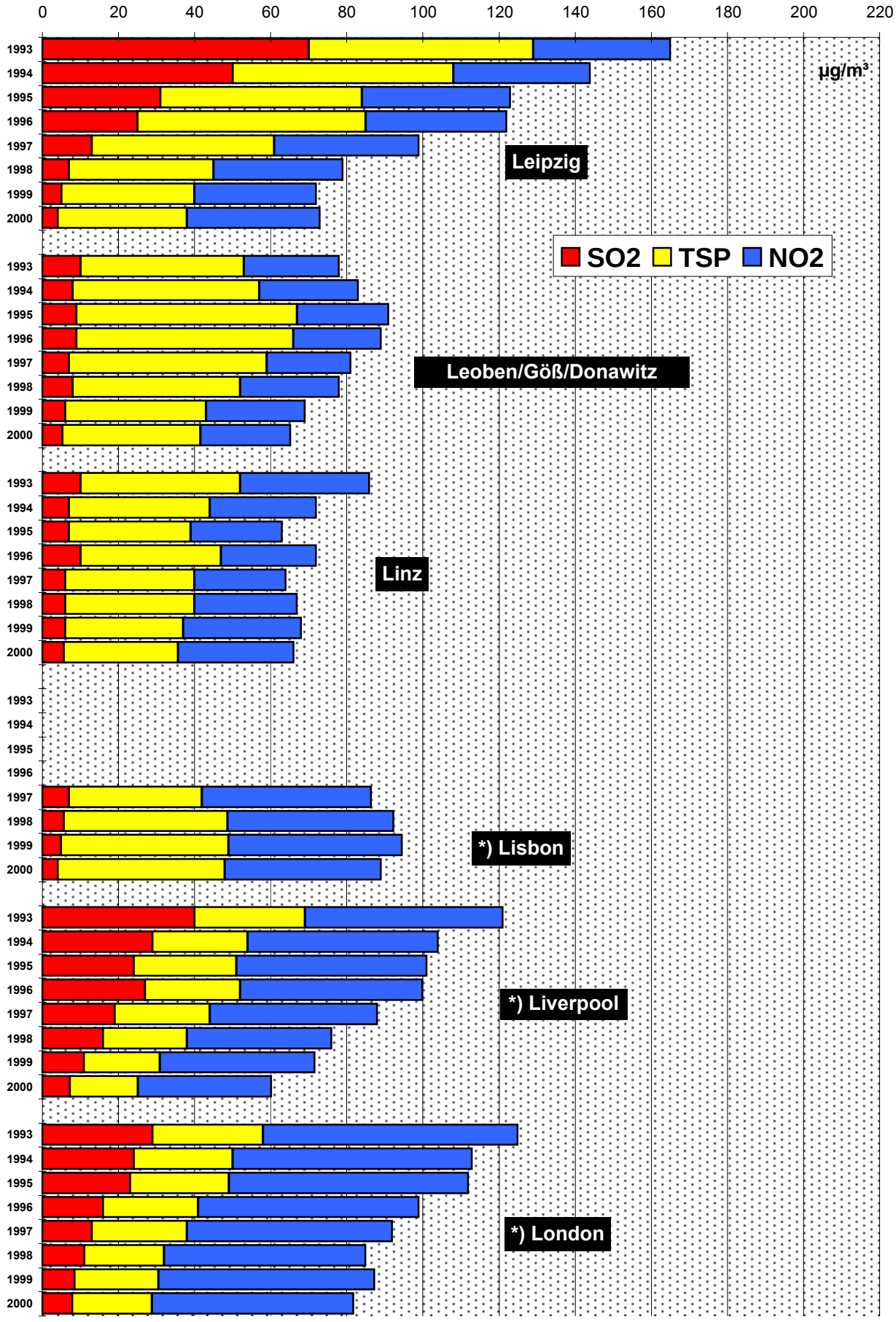


*) particulates calculated as PM 10

Comparison Of The Air Quality 1993-2000

Development of the annual mean values, Σ SO2, TSP, NO2

(mean of all monitoring stations)

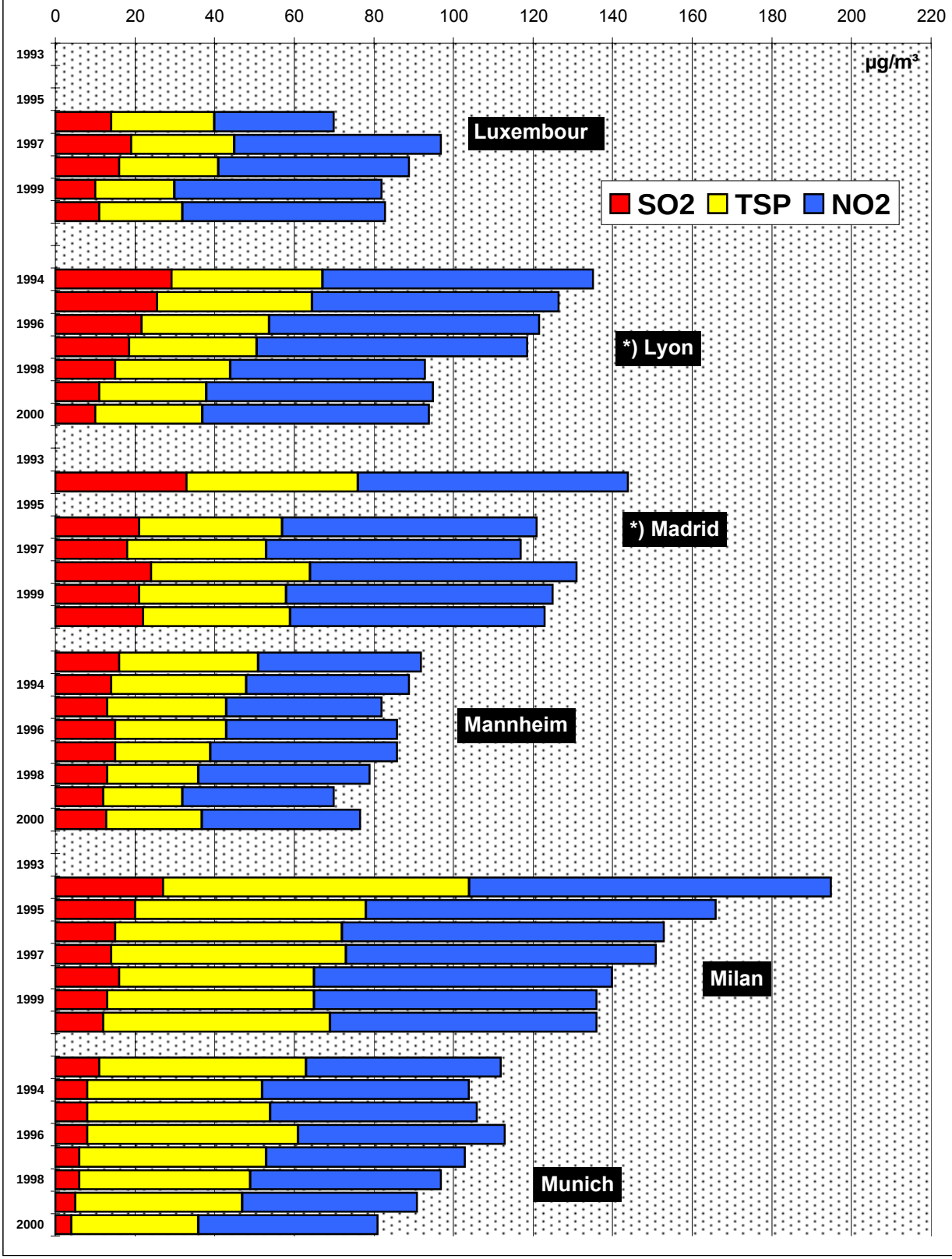


*) particulates calculated as PM 10

Comparison Of The Air Quality 1993-2000

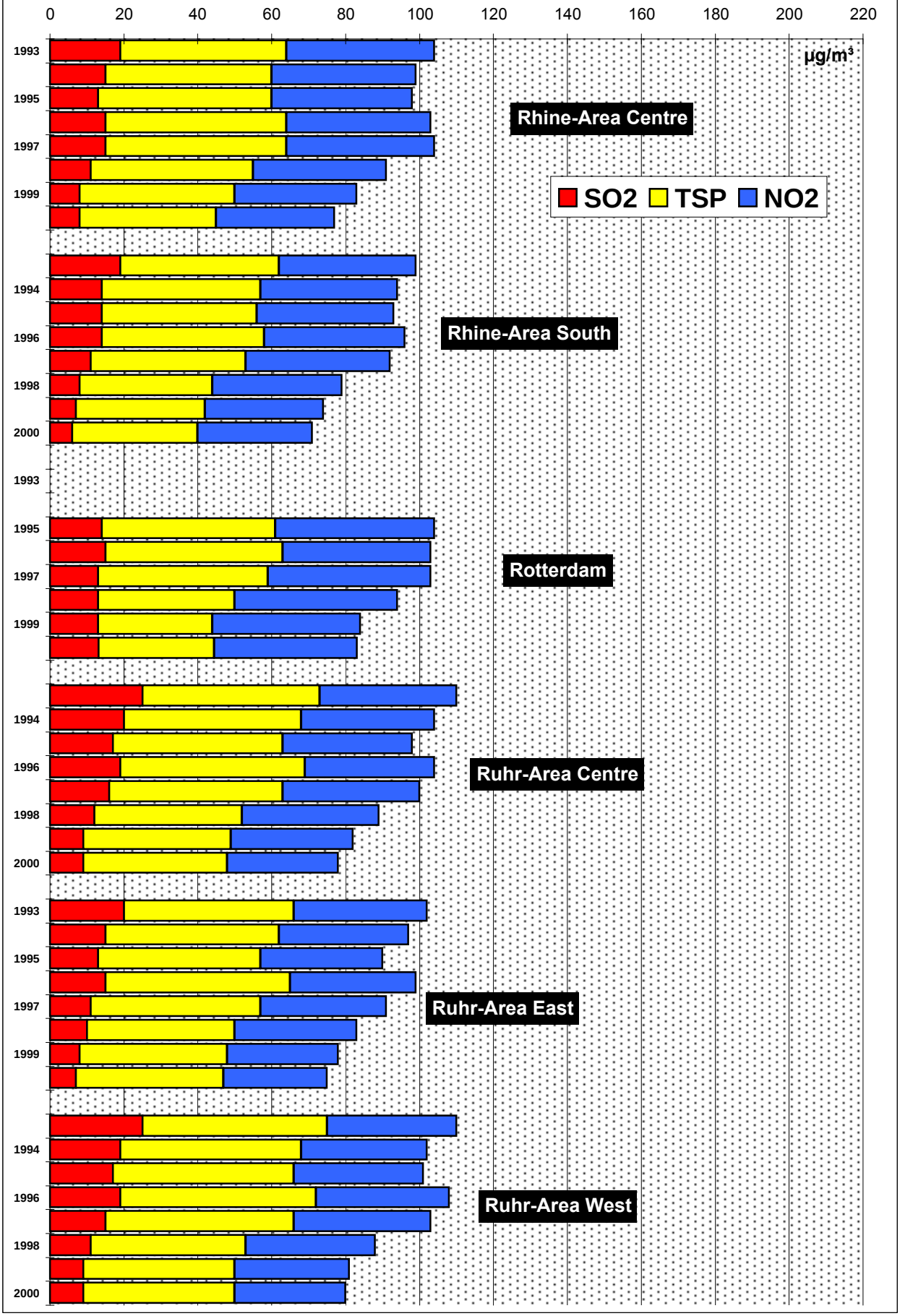
Development of the annual mean values, Σ SO2, TSP, NO2

(mean of all monitoring stations)



Comparison Of The Air Quality 1993-2000

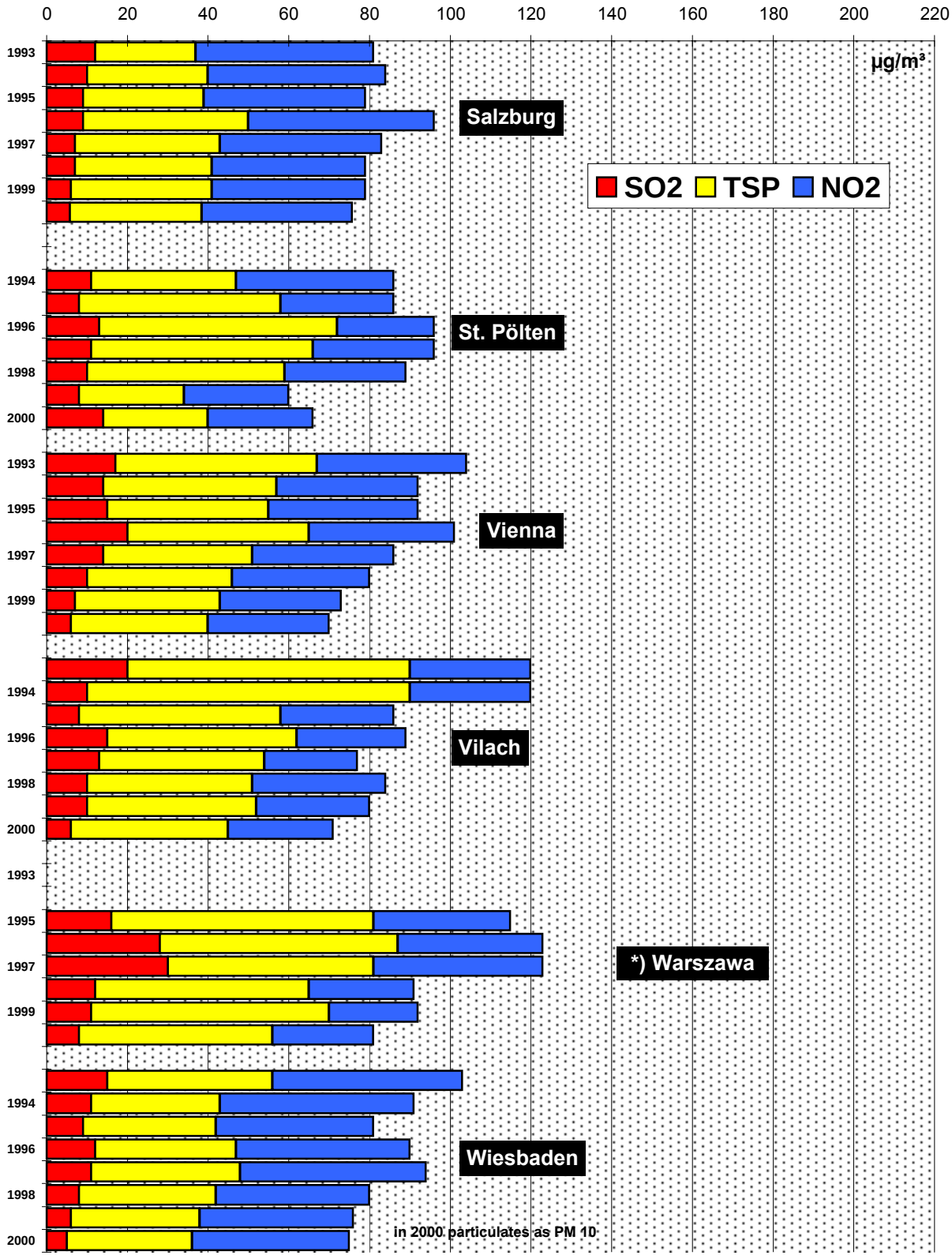
Development of the annual mean values, Σ SO2, TSP, NO2 (mean of all monitoring stations)



Comparison Of The Air Quality 1993-2000

Development of the annual mean values, Σ SO2, TSP, NO2

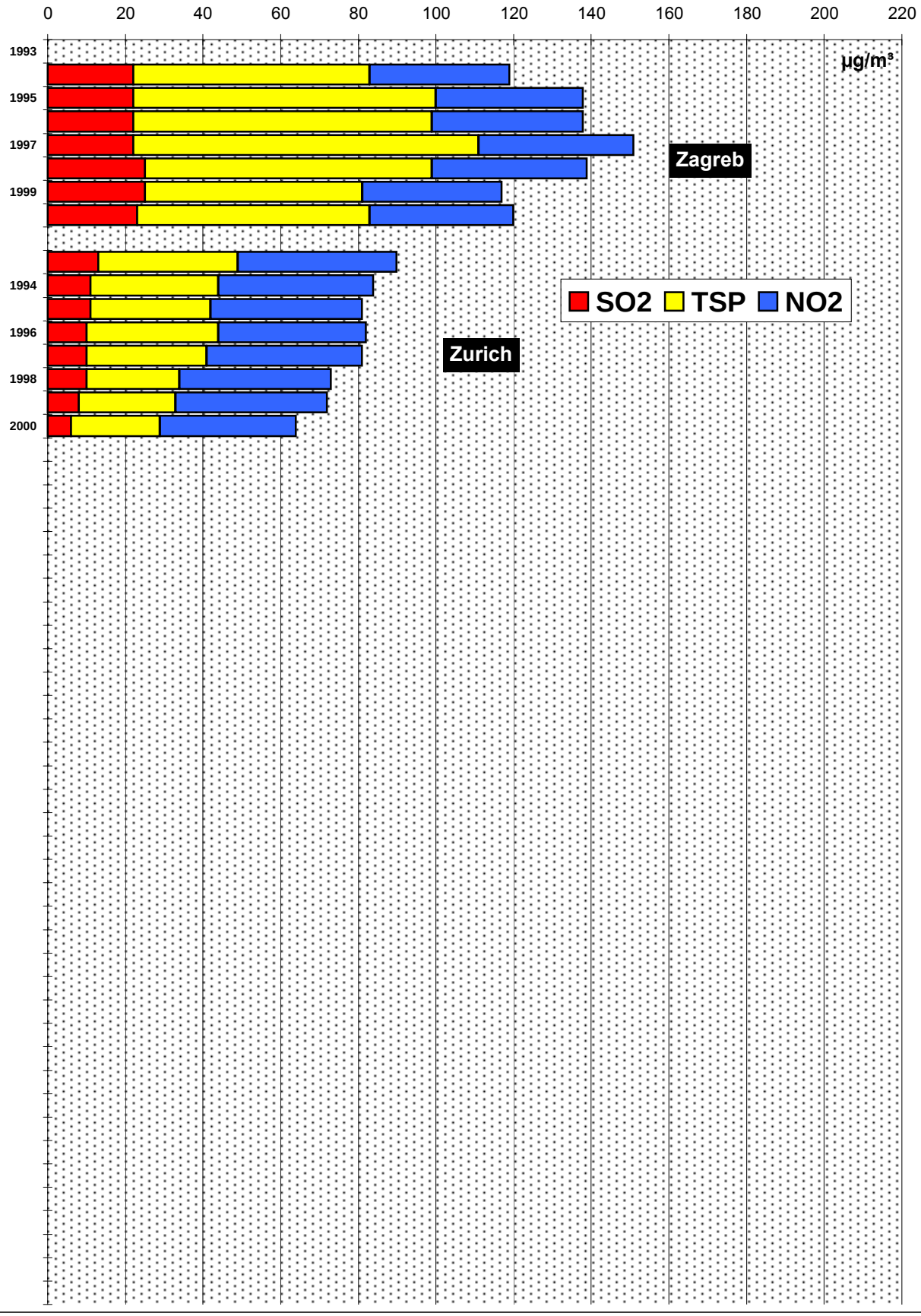
(mean of all monitoring stations)



Comparison Of The Air Quality 1993-2000

Development of the annual mean values, Σ SO2, TSP, NO2

(mean of all monitoring stations)



Luftgütekennzahlen

der einzelnen

Vergleichsregionen

Immission Reference Values

Of All Compared Regions

Reference Numbers for Air Quality

2000

Immission-area: Athens

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	8	19	48	112	-	313	-	119
Black smoke	5	48	179	329	-	-	-	255
NO	8	51	210	386	-	898	-	446
NO2	8	57	111	209	-	533	-	219
CO	9	1970	8500	12500	-	24600	-	13000
O3	8	46	94	147	-	334	.-	154

Immission-area: Barcelona

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. **) 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max.***) 98-Percentile per year (2) (µg/m³)
SO2 *)	2	8,4	21	66	110	117	-	59
TSP *)	4	66,9	163	277	758	1455	-	244
NO	5	49,5	138	406	778	915	-	412
NO2	5	56,4	105	178	271	351	-	143
CO	5	890	2600	5590	9450	12000	-	3700
O3	5	33,2	70	115	151	172	-	107

COMMENTS:

*) Only automatic stations are taken into account (there exist manual stations but they have not been considered in the calculations)

**) Static average (not moving average)

***) Maximum 98 percentile of 1-hour values. Only stations having more than 75 % of valid values are considered

1 arithmetic mean of all monitoring stations of an immission-area

2 highest monitored value of an immission-area

MAGISTRAT LINZ
Amt für Natur- und Umweltschutz

Reference Numbers for Air Quality
2000

Immission-area: Basel - outskirts

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	1	5	9	24	29	42	54	26
TSP	1	21	34	77	-	-	-	-
NO	1	9	22	63	185	188	220	99
NO2	1	25	37	72	90	93	99	76
CO	-	-	-	-	-	-	-	-
O3	1	45	79	115	199	203	205	170

Immission-area: Belfast

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	2	19	38	111	-	466	-	104
PM 10	2	18	34	247	-	263	-	-
NO	1	14	23	94	-	411	-	-
NO2	1	31	35	69	-	124	-	-
CO	1	400	530	1500	-	5200	-	-
O3	1	42	53	80	-	138	-	-

1 arithmetic mean of all monitoring stations of an immission-area

2 highest monitored value of an immission-area

MAGISTRAT LINZ
Amt für Natur- und Umweltschutz

Reference Numbers for Air Quality

2000

Immission-area: **Berlin**

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 8-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	19/7/9/3	6/4/6/7	18/8/18/15/	31/23/28/31	-	157/75/105/157	-	25/18/24/25
	a/b/c/d	a/b/c/d	a/b/c/d	a/b/c/d	-	a/b/c/d	-	a/b/c/d
Staub[1)]	12.05.2007	29/25/33	47/40/47	282/236/282	-	1687/997/1687	-	101/78/101
	a/b/c	a/b/c	a/b/c	a/b/c	-	a/b/c	-	a/b/c
PM10[2)]	06.03.2003	31/35/27	49/49/41	281/281/261	-	2775/27751714	-	78/78/65
	a/d/e	a/d/e	a/d/e	a/d/e	-	a/d/e	-	a/d/e
NO	21/7/9/5	27/5/14/82	208/20/49/208	406/1317189/406	-	894/344/724/894	-	526/66/139/526
NO2	21/7/9/5	29/17/26/50	95/28/37/95	168/51/76/168	-	235/167/165/235	-	163/60/74/163
	a/b/c/d	a/b/c/d	a/b/c/d	a/b/c/d	-	a/b/c/d	-	a/b/c/d
CO[3)]	18/5/8/5	0,5/0,2/0,4/1,1	2,3/0,6/0,8/2,3	3,8/1,5/1,8/3,8	5,4/2,7/1,9/4,9	7,7/5,9/7,3/7,7	-	4,9/1,2/1,9/4,9
	a/b/c/d	a/b/c/d	a/b/c/d	a/b/c/d	a/b/c/d	a/b/c/d	-	a/b/c/d
O3	10.06.2004	41/47/31	92/92/68	141/141/120	195/195/ 193	220/218/220	223/223/221	145/145/116
	a/b/c	a/b/c	a/b/c	a/b/c	a/b/c	a/b/c	a/b/c	a/b/c

1) Gesamtstaub 2) PM 10-Staub 3) CO in mg/m³

a) alle Messstationen b) Berlin-Outskirts c) Berlin-Centre d) Straßenmessstation e) Hintergrrundstationen

1 arithmetic mean of all monitoring stations of an immission-area

2 highest monitored value of an immission-area

MAGISTRAT LINZ

Amt für Natur- und Umweltschutz

Reference Numbers for Air Quality
2000

Immission-area: **Birmingham**

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	2	7,5	12	45	-	168	-	29
PM10	2	16,5	23	55	-	195	-	-
NO	2	14	30	210	-	711	-	-
NO2	2	30	39	77	-	115	-	-
CO	2	400	600	1280	-	5700	-	-
O3	2	35	47	98	-	126	-	-

1 arithmetic mean of all monitoring stations of an immission-area

2 highest monitored value of an immission-area

MAGISTRAT LINZ
Amt für Natur- und Umweltschutz

Reference Numbers for Air Quality
2000

Immission-area: Bludenz-Town hall

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	1	4	12	22	39	49	53	19
TSP	1	21	34	96	316	388	408	73
NO	1	18	52	153	336	428	463	141
NO2	1	25	47	78	107	118	119	71
CO	-	-	-	-	-	-	-	-
O3	1	40	71	105	169	173	174	124

Immission-area: Bristol

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	1	9	13	27	-	98	-	21
PM 10	1	20	24	72	-	173	-	-
NO	2	66	160	407	-	1020	-	-
NO2	2	46	62	111	-	278	-	-
CO	2	780	1300	3250	-	8950	-	-
O3	1	39	52	86	-	126	-	-

1 arithmetic mean of all monitoring stations of an immission-area

2 highest monitored value of an immission-area

MAGISTRAT LINZ
Amt für Natur- und Umweltschutz

Reference Numbers for Air Quality
2000

Immission-area: Brussels

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	8	8	21	41	69	101	139	25
PM 10	5	25	63	191	448	496	496	65
NO	8	36	131	290	701	808	927	142
NO2	8	43	83	136	189	258	274	83
CO	5	650	1290	2490	4500	5750	25200	2960
O3	5	44	59	107	189	191	192	110

Immission-area: Chemnitz

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	2	5	10	75	130	-	173	81
TSP	2	37	51	130	234	-	755	172
NO	2	28	78	205	533	-	713	281
NO2	2	35	44	72	131	-	170	100
CO	2	400	846	2200	5532	-	8579	3484
O3	2	41	71	109	170	-	173	152

1 arithmetic mean of all monitoring stations of an immission-area

2 highest monitored value of an immission-area

MAGISTRAT LINZ
Amt für Natur- und Umweltschutz

Reference Numbers for Air Quality
2000

Immission-area: **Copenhagen (monitoring station at roof-level)**

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	-	-	-	-	-	-	-	-
TSP	-	-	-	-	-	-	-	-
NO	4	-	-	-	121	159	-	30
NO2	21	-	-	-	113	146	-	53
CO	328	-	-	956	-	2339	-	754
O3	-	-	-	-	-	-	-	-

Immission-area: **Copenhagen (monitoring station at street-level)**

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	1	3,3	-	-	-	-	-	8
TSP	1	49	-	552	-	-	-	94 (95-Per.)
NO	1	46	-	-	439	506	-	189
NO2	1	42	-	-	161	178	-	92
CO	1	1099	-	3006	-	6017	-	3120
O3	-	-	-	-	-	-	-	-

1 arithmetic mean of all monitoring stations of an immission-area

2 highest monitored value of an immission-area

MAGISTRAT LINZ
Amt für Natur- und Umweltschutz

Reference Numbers for Air Quality
2000

Immission-area: Debrecen

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	10	8,1	12,5	69	-	-	113	31
TSP	2	61,7	90	242	-	-	-	179
NO	1	12	29	49	-	-	219	29
NO2	10	17,6	25,7	129	-	-	96	54
CO	-	-	-	-	-	-	-	-
O3	1	48,6	77	106	-	-	158	77

Immission-area: Dornbirn

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	1	4	11	22	40	66	106	16
TSP	1	27	39	101	335	494	568	91
NO	1	26	49	140	337	384	409	136
NO2	1	39	52	97	133	146	157	87
CO	1	600	900	2000	3500	3800	4200	1900
O3	-	-	-	-	-	-	-	-

1 arithmetic mean of all monitoring stations of an immission-area

2 highest monitored value of an immission-area

MAGISTRAT LINZ
Amt für Natur- und Umweltschutz

Reference Numbers for Air Quality
2000

Immission-area: Dresden

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	2	7	16	38	77	-	114	44
TSP	2	42	84	439	1040	-	1589	592
NO	2	27	85	184	345	-	442	276
NO2	2	40	57	91	149	-	178	111
CO	2	300	1046	1617	4213	-	9850	2694
O3	2	35	71	120	192	-	193	158

Immission-area: Edinburgh-Centre

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	1	6,3	8,4	27	-	141	-	16
PM 10	1	18	24	71	-	320	-	-
NO	1	37,9	80	202	-	536	-	-
NO2	1	45	59	94	-	210	-	-
CO	1	700	960	1600	-	4500	-	-
O3	1	30	45	64	-	102	-	-

1 arithmetic mean of all monitoring stations of an immission-area

2 highest monitored value of an immission-area

MAGISTRAT LINZ
Amt für Natur- und Umweltschutz

Reference Numbers for Air Quality
2000

Immission-area: Frankfurt

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	5	5	12	32	50	72	110	21
PM 10	5	28	53	126	438	850	1337	101
NO	5	36	92	297	566	811	890	211
NO2	5	42	58	102	124	151	169	96
CO	4	600	900	1900	5000	6600	7000	1800
O3	5	31	64	100	194	212	213	120

Immission-area: Göteborg

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	3	2,7	5,8	14,7	42,5	51,3	-	15,7
PM 10	1	13,7	20,0	43,7	125,7	172,4	-	37,0
NO	2	14,2	26,8	177,9	652,0	750,0	-	103,0
NO2	3	26,9	34,8	89,9	156,9	205,4	-	81,6
CO	1	330	540	1180	3580	3640	-	860
O3	3	49,1	79,7	103,1	205,7	212,0	-	103,4

1 arithmetic mean of all monitoring stations of an immission-area

2 highest monitored value of an immission-area

MAGISTRAT LINZ
Amt für Natur- und Umweltschutz

Reference Numbers for Air Quality
2000

Immission-area: Graz

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 97,5-Percentile per year (2) (µg/m³)
SO2	6	7	21	37	79	-	84	52
TSP	6	48	107	267	604	-	933	-
NO	6	42	177	496	664	-	952	-
NO2	6	34	64	108	166	-	204	-
CO	4	910	1800	3960	7310	-	10890	-
O3	4	59	118	168	180	-	193	-

Immission-area: Hallein

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	3	5	9	19	96	165	218	22 (97,5-Per.)
TSP	1	37	45	91	242	367	370	145
NO	-	-	-	-	-	-	-	-
NO2	1	44	55	91	137	148	153	111
CO	1	920	1540	2280	3740	5060	6190	3350 (97,5-Per.)
O3	1	66	92	138	185	187	188	170

1 arithmetic mean of all monitoring stations of an immission-area

2 highest monitored value of an immission-area

MAGISTRAT LINZ
Amt für Natur- und Umweltschutz

Reference Numbers for Air Quality
2000

Immission-area: Hamburg

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	11	5	19	103	279	540	969	70 / 28
TSP	5	33	53	175	529	687	709	99 / 93
NO	11	9	40	165	458	646	781	138 / 76
NO2	11	24	44	79	134	147	195	79 / 63
CO	3	411	604	1134	2307	2915	3503	1256 / 1068
O3	6	38	68	122	184	188	190	108 / 103
PM 10 *)	(2-7)	-	31	64	123	219	246	-

*) Die Ergebnisse sind nicht repräsentativ für das gesamte Stadtgebiet und das Kalenderjahr 2000.

Immission-area: Innsbruck

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (1/2) (µg/m³)
SO2	2	8	17	32	55	58	68	28 / 30
TSP	2	29	74	164	417	455	470	105 / 120
NO	2	40	107	331	634	655	687	247 / 273
NO2	2	36	64	95	123	131	142	87 / 88
CO	2	809	1618	3419	6984	8730	9312	2441 / 2941
O3	2	41	80	117	162	170	172	121 / 126

1 arithmetic mean of all monitoring stations of an immission-area

2 highest monitored value of an immission-area

MAGISTRAT LINZ
Amt für Natur- und Umweltschutz

Reference Numbers for Air Quality
2000

Immission-area: Karlsruhe

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	3	8,2	12,8	32	66	155	192	27
TSP	3	20,4	28,3	64	249	272	272	45
NO	3	41,8	86,0	314	695	899	947	250
NO2	3	42,9	48,4	93	142	170	171	90
CO	3	493	870	1909	5467	5800	7600	2000
O3	3	42,0	76,1	114	216	223	224	133

Immission-area: Klagenfurt

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	2	11	24	49	104	107	123	36
TSP	2	42	94	187	469	825	1240	173
NO	2	34	104	228	518	595	617	226
NO2	2	31	58	102	138	157	165	94
CO	2	720	1938	3193	7712	8230	8640	3201
O3	2	46	85	128	186	190	195	136

1 arithmetic mean of all monitoring stations of an immission-area

2 highest monitored value of an immission-area

MAGISTRAT LINZ
Amt für Natur- und Umweltschutz

Reference Numbers for Air Quality
2000

Immission-area: Leeds Centre

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	1	8	15	57	-	213	-	43
PM 10	1	17,8	19	42	-	147	-	-
NO	1	25,0	41	116	-	400	-	-
NO2	1	37	45	75	-	159	-	-
CO	1	500	640	1300	-	4060	-	-
O3	1	34	52	88		158		

Immission-area: Leipzig

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	2	4	7	17	55	-	111	21
TSP	2	34	52	95	536	-	651	132
NO	2	32	69	185	381	-	476	265
NO2	2	35	57	92	153	-	206	122
CO	2	400	819	1988	4313	-	5461	3328
O3	2	38	76	126	197	-	208	160

1 arithmetic mean of all monitoring stations of an immission-area

2 highest monitored value of an immission-area

MAGISTRAT LINZ
Amt für Natur- und Umweltschutz

Reference Numbers for Air Quality
2000

Immission-area: Leoben/Göß/Donawitz

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h- **) mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 97,5-Percentile per year (2) (µg/m³)
SO2	3	5,3	13	32	120	-	200	44
TSP	3	36,3	68	155	386	-	611	-
NO	3	23	74	210	387	-	417	-
NO2	3	23,6	49	71	109	-	114	-
CO	2	745	1770	4455	11034	-	16830	-
O3	1	34	62	86	166	-	177	-

Immission-area: Linz

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	10	5,7	14	58	130	155	167	56
TSP	10	30	51	191	423	529	810	110
NO	10	25,3	89	293	570	630	660	247
NO2	10	30,4	50	102	143	165	169	100
CO	10	570	1160	3090	6940	8220	9860	2700
O3	4	45	86	122	189	194	194	135

1 arithmetic mean of all monitoring stations of an immission-area

2 highest monitored value of an immission-area

MAGISTRAT LINZ
Amt für Natur- und Umweltschutz

Reference Numbers for Air Quality
2000

Immission-area: Lisbon

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	5	4,1	20	50	-	226	-	41
PM 10	3	43,5	88	236	-	530	-	125 (95-Per.)
NO	-	-	-	-	-	-	-	-
NO2	8	41	117	200	-	546	-	334
CO	8	667	2682	4539	-	14633	-	-
O3	2	37,4	73	101	-	188	-	-

Immission-area: Liverpool Centre

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	1	7,2	11	42	-	231	-	29
PM 10	1	18,3	22	47	-	156	-	-
NO	1	36,5	57	171	-	797	-	-
NO2	1	35	43	73	-	145	-	-
CO	1	500	650	1200	-	2800	-	-
O3	1	38	56	80	-	120	-	-

1 arithmetic mean of all monitoring stations of an immission-area

2 highest monitored value of an immission-area

MAGISTRAT LINZ
Amt für Natur- und Umweltschutz

Reference Numbers for Air Quality
2000

Immission-area: London

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	11	7,8	19	64	-	186	-	45
PM 10	11	21	43	87	-	693	-	-
NO	22	58	301	598	-	1071	-	-
NO2	22	53	108	173	-	392	-	-
CO	16	870	3250	5684	-	11020	-	-
O3	14	30	58	110	-	154	-	-

Immission-area: Luxembourg

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	2	11	19	36	64	78	98	32
TSP	1	21	27	80	121	144	173	42
NO	2	53	82	228	458	604	649	204
NO2	2	51	57	94	187	228	246	100
CO	1	700	1100	2200	3500	5100	5100	2200
O3	2	36	62	86	180	185	189	116

1 arithmetic mean of all monitoring stations of an immission-area

2 highest monitored value of an immission-area

MAGISTRAT LINZ
Amt für Natur- und Umweltschutz

Reference Numbers for Air Quality
2000

Immission-area: Lyon Urban site

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	5	8	23	105	-	409	-	52
PM 10	2	23	39	79	-	168	-	75
NO	3	33	114	298	-	905	-	334
NO2	3	43	54	107	-	281	-	104
CO	-	-	-	-	-	-	-	-
O3	5	41	79	128	-	218	-	136

Immission-area: Lyon Traffic site

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	6	13	32	93	-	478	-	60
PM 10	4	29	61	118	-	317	-	106
NO	8	100	292	508	-	942	-	623
NO2	8	63	84	143	-	326	-	162
CO	5	1108	2254	4334	-	10600	-	5150
O3	-	-	-	-	-	-	-	-

1 arithmetic mean of all monitoring stations of an immission-area

2 highest monitored value of an immission-area

MAGISTRAT LINZ
Amt für Natur- und Umweltschutz

Reference Numbers for Air Quality
2000

Immission-area: Madrid

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. *) daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max.**) 98-Percentile per year (2) (µg/m³)
SO2	25	22	84	142	243	296	-	140
PM 10	25	37	66	132	229	287	-	147
NO	-	-	-	-	-	-	-	-
NO2	25	64	118	229	462	499	-	201
CO	25	1040	2770	5600	17650	22910	-	6240
O3	25	27	65	98	287	471	-	107

*) Static average (not moving average)

**) max. 98 percentile of 1-h-values. Only stations having more than 75% of valid values are considered

Immission-area: Mannheim

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	3	12,8	26	107	319	464	627	29
TSP	3	24,0	32	76	259	376	388	56
NO	3	26,8	50	227	516	617	632	184
NO2	3	39,9	45	84	143	152	155	91
CO	3	325	519	1335	3817	4700	5100	1200
O3	3	34,5	64	94	203	208	211	126

Kommenare:Hohe SO2-Konzentration in Mannheim Nord durch Wäscherausfall in einer Paperfabrik

1 arithmetic mean of all monitoring stations of an immission-area

2 highest monitored value of an immission-area

MAGISTRAT LINZ
Amt für Natur- und Umweltschutz

Reference Numbers for Air Quality
2000

Immission-area: Milano

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	5	12	53	108	-	190	-	72
TSP	1	57	96	173	-	308	-	117 (95 Per.)
NO	9	73	239	536	-	935	-	-
NO2	9	67	105	155	-	155	-	160
CO	5	2000	4300	8000	-	15200	-	-
O3	3	40	82	116	-	228	-	-
PM 10	2	46	84	172	-	398	-	119
Benze	2	5,6	10,5	-	-	-	-	-

Comments:

For TSP and PM10, the minimum average is 2-hourly.
For SO2 and PM10, 98th percentile of the average 24 hour concentration levels recorded throughout the entire year.

For PTS, 95th percentile of the average 24 hour concentration levels recorded throughout the entire year.

For NO2, 98th percentile of the average 1 hour concentration levels recorded throughout the entire year.

Immission-area: Munich

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	8	4	10	31	50	59	72	22
TSP	7	32	51	108	296	-	-	82
NO	8	48	129	438	1113	1276	1380	316
NO2	8	45	69	137	206	209	212	113
CO	8	800	1300	2900	8200	10400	11500	2800
O3	3	35	67	117	186	192	193	117

1 arithmetic mean of all monitoring stations of an immission-area

2 highest monitored value of an immission-area

MAGISTRAT LINZ
Amt für Natur- und Umweltschutz

Reference Numbers for Air Quality
2000

Immission-area: Rhine-area Centre

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	4	8	15	30	-	-	69	25
TSP	4	37	68	124	-	-	487	103
NO	4	18	42	-	-	-	731	209
NO2	4	32	40	-	-	-	154	79
CO	3	300	500	-	-	-	5300	1800
O3	2	30	54	-	-	200	-	108

Immission-area: Rhine-area South

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	8	6	9	39	-	-	198	26
TSP	8	34	53	150	-	-	364	89
NO	8	17	39	-	-	-	518	155
NO2	8	31	40	-	-	-	133	73
CO	5	300	400	-	-	-	5300	1200
O3	7	32	61	-	-	239	-	123

1 arithmetic mean of all monitoring stations of an immission-area

2 highest monitored value of an immission-area

MAGISTRAT LINZ

Amt für Natur- und Umweltschutz

Reference Numbers for Air Quality
2000

Immission-area: Riga

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	4	9	15	45	77	101	107	33
PM 10	1	59	61	116	-	-	-	-
NO	-	-	-	-	-	-	-	-
NO2	4	29	61	94	139	144	158	103
CO	-	-	-	-	-	-	-	-
O3	4	65	104	124	138	145	163	127

Immission-area: Rotterdam

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	8	13,1	28	84	256	325	-	67
TSP	5	31,3	50	206	-	-	-	86
NO	3	17,1	33	187	466	625	-	133
NO2	3	38,7	58	119	203	256	-	101
CO	-	-	-	-	-	-	-	-
O3	3	34,4	59	112	208	264	-	102

1 arithmetic mean of all monitoring stations of an immission-area

2 highest monitored value of an immission-area

MAGISTRAT LINZ
Amt für Natur- und Umweltschutz

Reference Numbers for Air Quality
2000

Immission-area: Ruhr-area Centre

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	8	9	30	78	-	-	529	88
TSP	8	39	59	157	-	-	557	105
NO	8	15	39	-	-	-	696	249
NO2	8	30	41	-	-	-	155	74
CO	5	300	500	-	-	-	6800	1800
O3	5	35	70	-	-	229	-	127

Immission-area: Ruhr-area East

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	9	7	15	45	-	-	280	47
TSP	9	40	84	387	-	-	888	158
NO	9	15	35	-	-	-	690	162
NO2	9	28	41	-	-	-	137	72
CO	7	400	700	-	-	-	7700	1600
O3	4	33	61	-	-	215	-	120

1 arithmetic mean of all monitoring stations of an immission-area

2 highest monitored value of an immission-area

MAGISTRAT LINZ

Amt für Natur- und Umweltschutz

Ruhr-area West

# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
8	9	24	72	-	-	602	81
8	41	66	183	-	-	534	114
8	14	31	-	-	-	674	144
8	30	42	-	-	-	169	75
6	400	800	-	-	-	5900	1900
5	32	67	-	-	221	-	123

Saloniki

# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
3	41	81	151	-	393	-	103
2	175	181	-	-	-	-	-
-	-	-	-	-	-	-	-
3	62	92	152	-	383	-	199
3	2200	5300	9800	-	28400	-	-
3	35	54	93	-	193	-	-

MAGISTRAT LINZ

Amt für Natur- und Umweltschutz

Reference Numbers for Air Quality
2000

Immission-area: Salzburg

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	3	5,7	14	21	64	112	184	33 (97,5 Per.)
TSP	3	32,7	57	143	352	402	402	149
NO	-	-	-	-	-	-	-	-
NO2	3	37,3	61	114	189	216	224	126
CO	2	790	1540	2710	4680	5370	6190	3580 (97,5 Per.)
O3	2	42,5	71	121	175	177	178	154

Immission-area: Sofia

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	9	22	34	345	-	520	-	-
TSP	7	120	165	900	-	-	-	-
NO	4	6	13	-	-	-	-	-
NO2	9	16,7	28	-	-		-	-
CO	4	2262	4213	43000	-	-	49890	-
O3	4	22,3	36	-	-	295	-	-

1 arithmetic mean of all monitoring stations of an immission-area

2 highest monitored value of an immission-area

MAGISTRAT LINZ

Amt für Natur- und Umweltschutz

Reference Numbers for Air Quality
2000

Immission-area: Stockholm (monitoring stations at roof-level)

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	1	1,6	4,4	13	24	47	-	10,4
PM 10	1	15	21	48	139	177	-	41
NO	3	6	13	62	190	211	-	52
NO2	4	20	25	58	95	149	-	54
CO	2	300	400	1400	7100	9800	-	800
O3	1	46	68	95	116	121	-	89
PM 2,5	1	9	14	36	115	147	-	26

Immission-area: Stockholm (monitoring stations at street-level)

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	-	-	-	-	-	-	-	-
PM 10	1	39	93	164	385	538	-	191
NO	2	59	117	285	735	850	-	316
NO2	2	43	63	93	199	228	-	105
CO	2	970	1250	5600	18900	23500	-	3800
O3	-	-	-	-	-	-	-	-
PM 2,5	1	14	19	37	139	179	-	36

1 arithmetic mean of all monitoring stations of an immission-area

2 highest monitored value of an immission-area

MAGISTRAT LINZ

Amt für Natur- und Umweltschutz

Reference Numbers for Air Quality
2000

Immission-area: St. Pölten

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	1	14	19	61	152	209	247	72
TSP	1	26	32	70	212	353	443	73
NO	1	10	26	84	252	309	316	60
NO2	1	26	37	61	100	109	117	67
CO	1	374	649	1416	2846	3219	3434	1059
O3	1	48	84	121	193	208	220	132

Immission-area: Vienna

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max.99,9-Percentil 3-h-mean (2) (µg/m³)	Max.99,9-Percentil 1 h-mean (2) (µg/m³)	Max.99,9-Percentil 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	17	6	15	53	97	110	120	42
TSP	17	34	79	214	350	393	393	227
NO	17	21	232	463	717	791	774	507
NO2	17	30	69	120	165	168	171	130
CO	5	700	1280	2170	3890	4300	4490	2890
O3	5	55	105	162	177	180	181	146

Der eine höhere 1h-Percentilwert **(791**) als der entsprechende Halbstunden-Percentilwert **(774)** ist korrekt.

Dies ergibt sich vor allem aus der etwas geringeren Anzahl gültiger Einstundenmittelwerte.

1 arithmetic mean of all monitoring stations of an immission-area

2 highest monitored value of an immission-area

MAGISTRAT LINZ
Amt für Natur- und Umweltschutz

Reference Numbers for Air Quality
2000

Immission-area: Villach

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	1	6	17	28	42	52	55	24
TSP	1	39	64	103	256	475	634	107
NO	1	32	75	149	294	375	378	159
NO2	1	26	45	65	95	108	115	67
CO	1	923	1975	2952	5761	7031	7934	3075
O3	1	31	58	104	187	197	200	108

Immission-area: Warszawa

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	17	8,4	-	177	-	-	-	82
PM 10	4	47,5	-	247	-	-	-	186
NO	-	-	-	-	-	-	-	-
NO2	16	25,1	-	243	-	-	-	118
CO	2	718	-	1750	-	-	3650	1431
O3	2	40,6	66	96	-	258	264	82

1 arithmetic mean of all monitoring stations of an immission-area

2 highest monitored value of an immission-area

MAGISTRAT LINZ
Amt für Natur- und Umweltschutz

Reference Numbers for Air Quality
2000

Immission-area: Rhein-Main (Wiesbaden)

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	1	5	9	25	37	60	80	18
PM 10	1	25	38	91	130	205	221	69
NO	1	29	65	260	348	430	457	186
NO2	1	39	47	86	127	132	135	82
CO	1	500	700	1400	2800	3900	4500	1500
O3	1	33	61	109	180	186	190	118

Immission-area: Zagreb

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	9	23	66	140	-	-	-	81
TSP	4	60	109	278	-	-	-	184
NO	1	-	-	-	-	195	210	-
NO2	6	37	48	139	-	142	149	78
CO	-	-	-	-	-	-	-	-
O3	4	22	54	194	-	230	270	98

1 arithmetic mean of all monitoring stations of an immission-area

2 highest monitored value of an immission-area

MAGISTRAT LINZ

Amt für Natur- und Umweltschutz

Reference Numbers for Air Quality
2000

Immission-area: Zurich (Centre)

	# of monitoring stations	annual mean (1) (µg/m³)	Max. monthly mean (2) (µg/m³)	Max. daily mean (2) (µg/m³)	Max. 3-h-mean (2) (µg/m³)	Max. 1 h-mean (2) (µg/m³)	Max. 1/2 h-mean (2) (µg/m³)	Max. 98-Percentile per year (2) (µg/m³)
SO2	1	6	11	23	45	48	50	30
TSP	1	23	37	71	-	-	-	-
NO	1	17	42	143	387	389	467	195
NO2	1	35	46	87	104	107	116	89
CO	1	500	700	1400	2600	2900	2900	1800
O3	1	40	73	120	189	196	199	160

1 arithmetic mean of all monitoring stations of an immission-area

2 highest monitored value of an immission-area

MAGISTRAT LINZ
Amt für Natur- und Umweltschutz