

AIR QUALITY & AIR QUALITY INDICES A WORLD APART?

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CITEAIR workshop
31 March 2006, Brussels



European Topic Centre
on Air and Climate Change

Topics for today

- Comparison of operational Air Quality indicator
- short introduction to AirBase

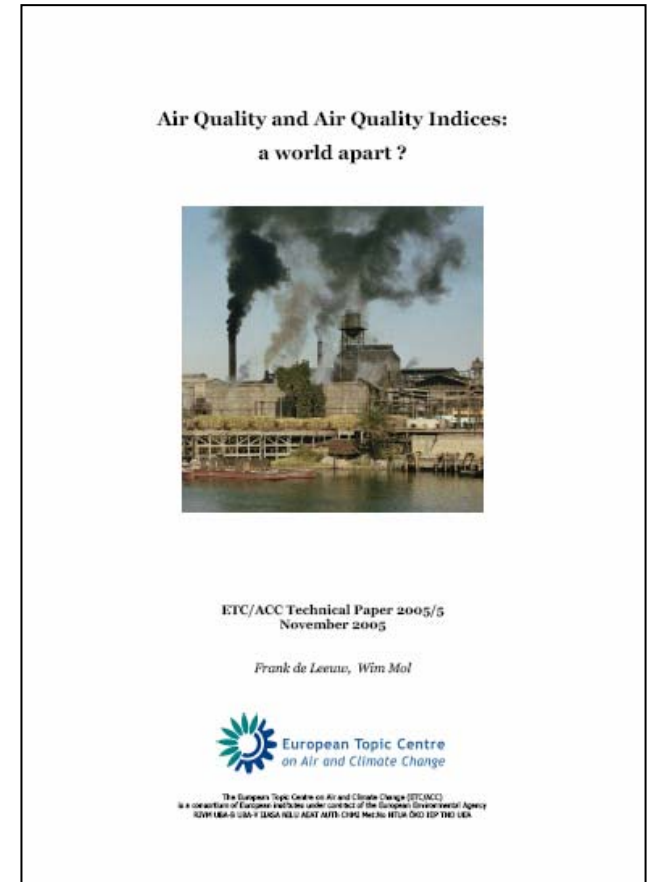


Air Quality Indicators

based on a report available from
the ETC/ACC web site

<http://air-climate.eionet.eu.int>

look for: *reports*
and next: *technical papers*



What is an Air Quality Index??

Index (according to the Concise Oxford Dictionary):

- forefinger
- list of books forbidden to Roman Catholics, or to be read by them only in expurgated editions
- quantity indicating relative level of prices or wages at a particular date compared with that at a date taken as standard



What is an Air Quality Index??

A numerical relation expressing the relative levels of air quality in a region derived from air quality measurements at specific locations in that region, frequently used to inform the public on air quality.

It is as old as “automatic” measurements:

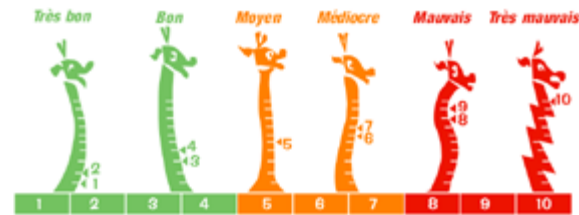
- Paris, daily bulletin on ozone levels at 12 stations (Sainte-Claire Deville Ch. Comptes Rendus 69, 99-101, 1869);
- Ontario (Shenfield L., J. Air Pollution Control Assoc. 20, 612, 1970)



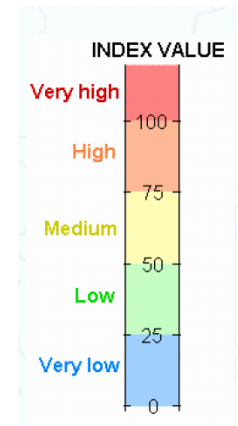
Comparing different approaches

index	1	2	3	4	5	6	7	8	9	10
rating	excellent	very good	good	fairly good	Mode rate	poor	very poor	bad	very bad	horrible

Banding	Index
Low	1
	2
	3
Moderate	4
	5
	6
High	7
	8
	9
Very High	10



Index
1. sehr gut
2. gut
3. befriedigend
4. ausreichend
5. schlecht
6. sehr schlecht



The common principles:

- composed from 4-5 sub-indices
- based on short-term health-related targets and/or information and alert levels
- the worst wins (TSP)
- (near) on-line information; hourly/daily update
- applicable in forecast mode



Drawbacks

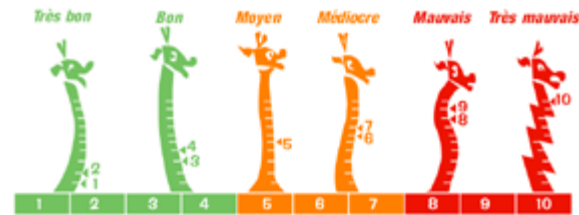
- No relation between AQI-value and pollutant mix
- Health effects of pollutants not comparable
- Long-term health effects not considered
- Assessment of long-term changes in air quality



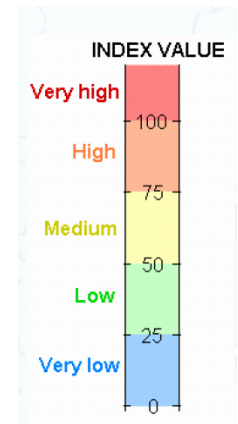
Classes, colours, names

index	1	2	3	4	5	6	7	8	9	10
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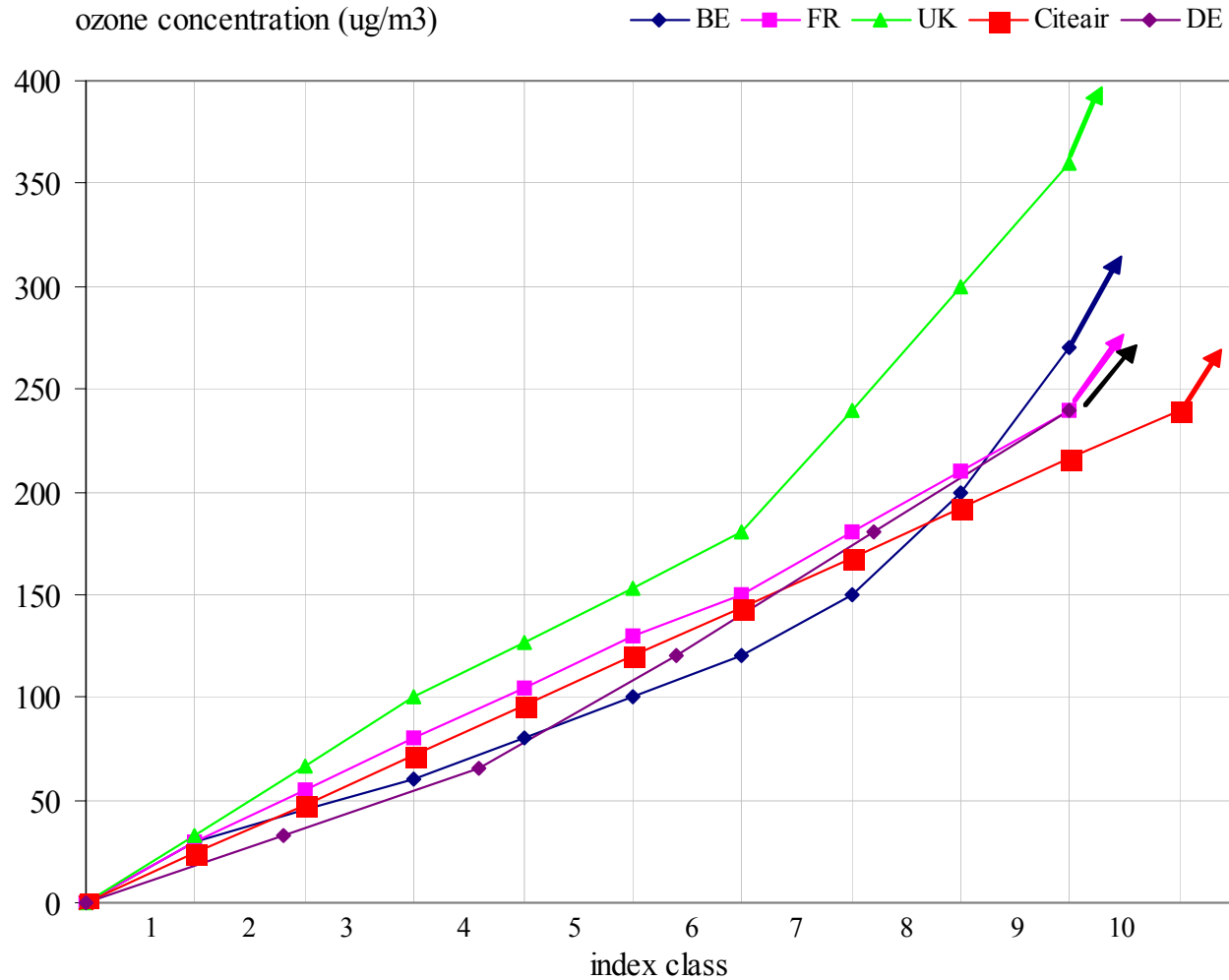


Overview of AQIs

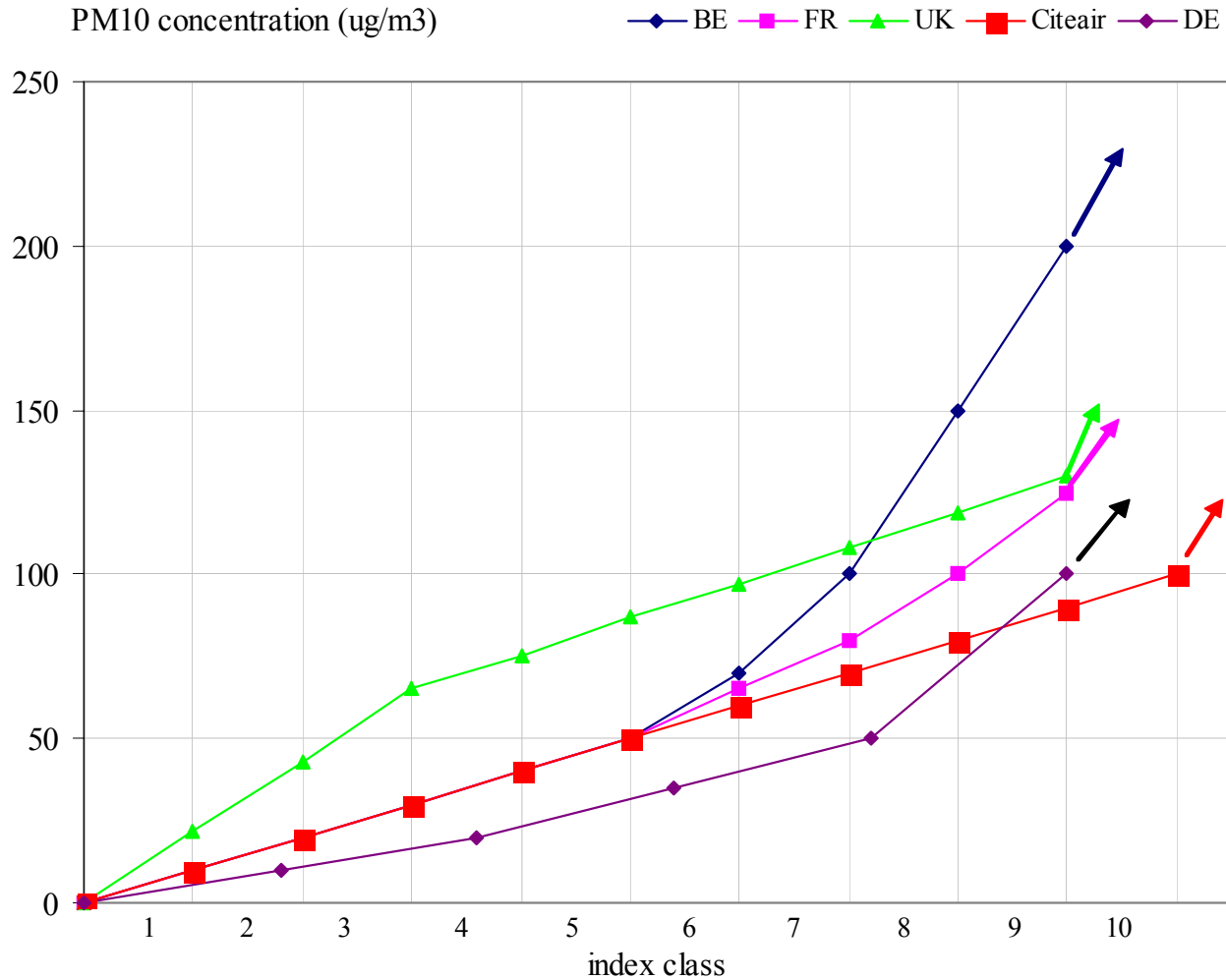
	Belgium	France	Germany	UK	Citeair
# numerical levels, (scale)	10 (1-10)	10 (1-10)	6 (1-6)	10 (1-10)	5 (0- >100)
# colours	10	3	6	4	5
# verbal classes ¹	10	6	6	4	5
component averaging time	PM ₁₀ 24h mean	PM ₁₀ 24h mean	PM ₁₀ 24h mean	PM ₁₀ daily max of 24h running means	PM ₁₀ daily max of 1h means or 24h mean
component averaging time	O ₃ daily max of 8h running means	O ₃ daily max of 1h means	O ₃ daily max of 1h means	O ₃ daily max of 1h means or of 8h running means	O ₃ daily max of 1h means
component averaging time	NO ₂ daily max of 1h means	NO ₂ daily max of 1h means	NO ₂ daily max of 1h means	NO ₂ daily max of 1h means	NO ₂ daily max of 1h means
component averaging time	SO ₂ 24h mean	SO ₂ daily max of 1h means	SO ₂ daily max of 1h means	SO ₂ 15 minute means ⁴	SO ₂ daily max of 1h means
component averaging time			CO daily max of 8h running means	CO daily max of 8h running means	CO daily max of 8h running means



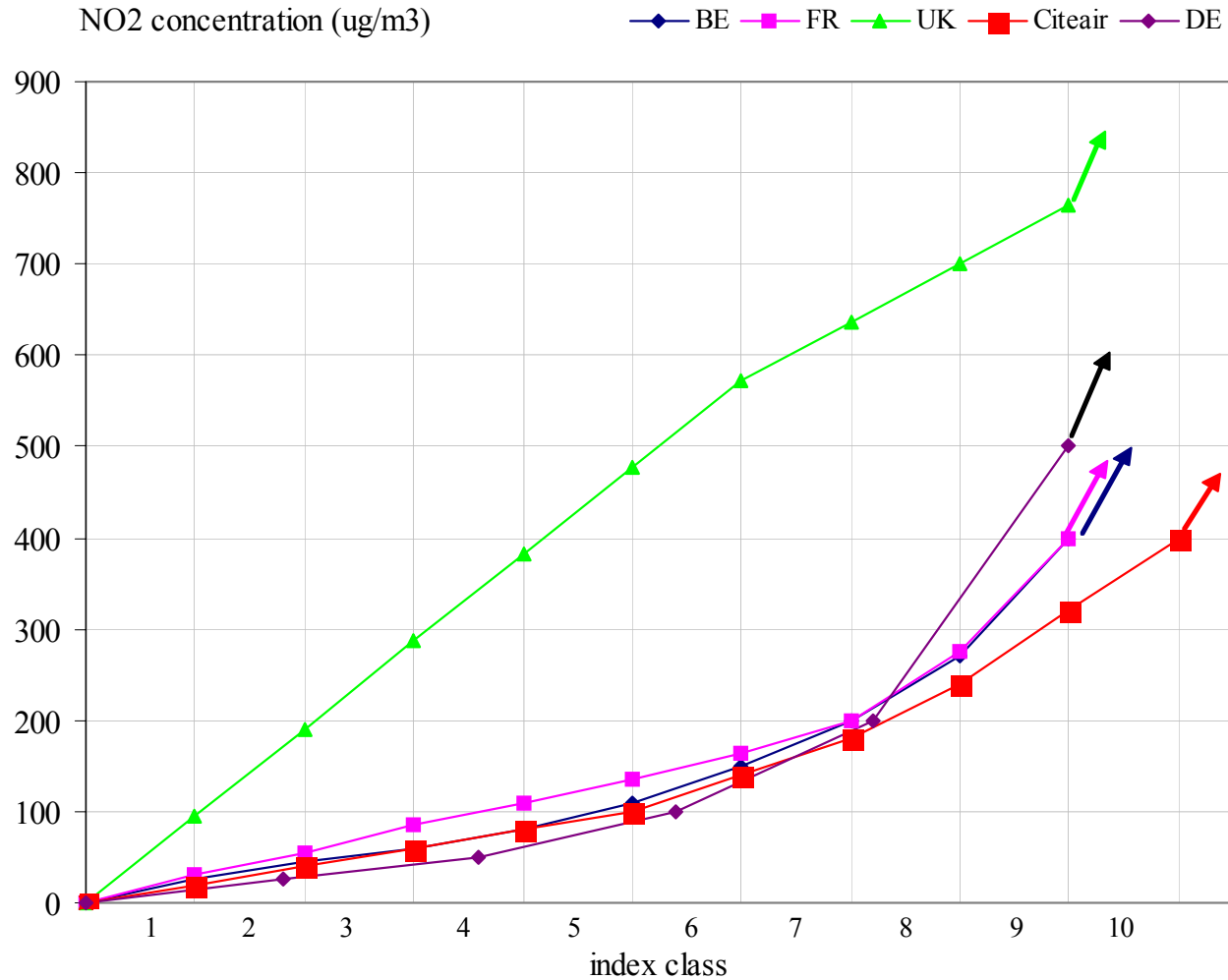
Class boundaries ozone



Class boundaries PM10

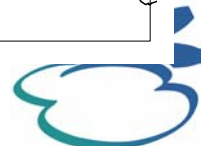
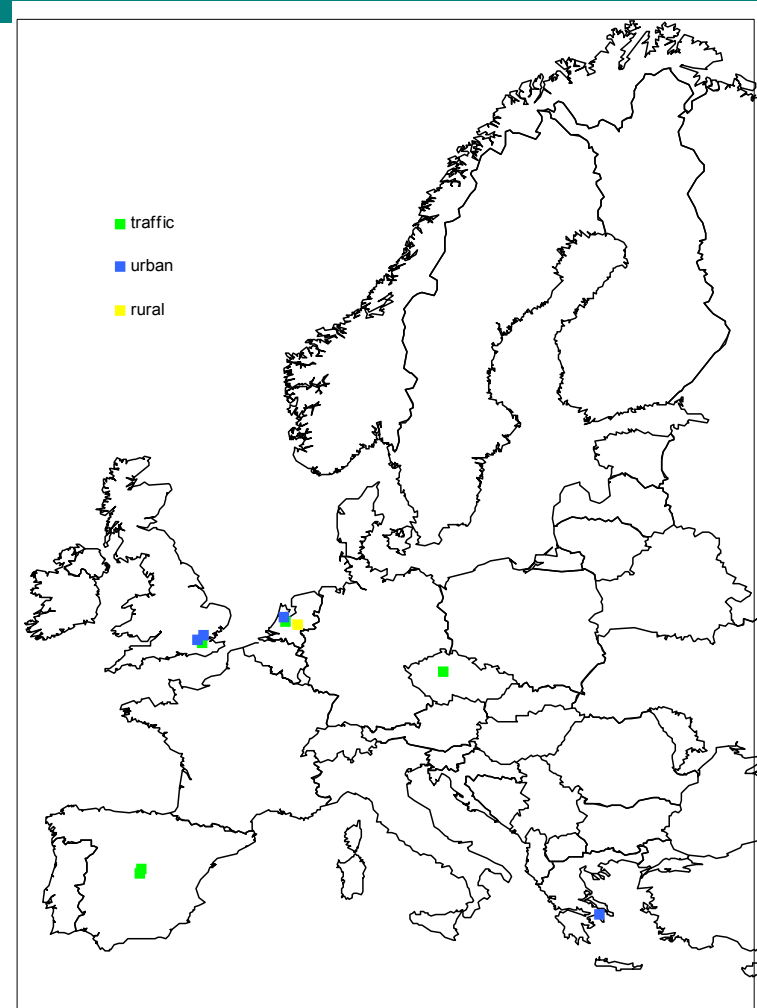


Class boundaries NO2

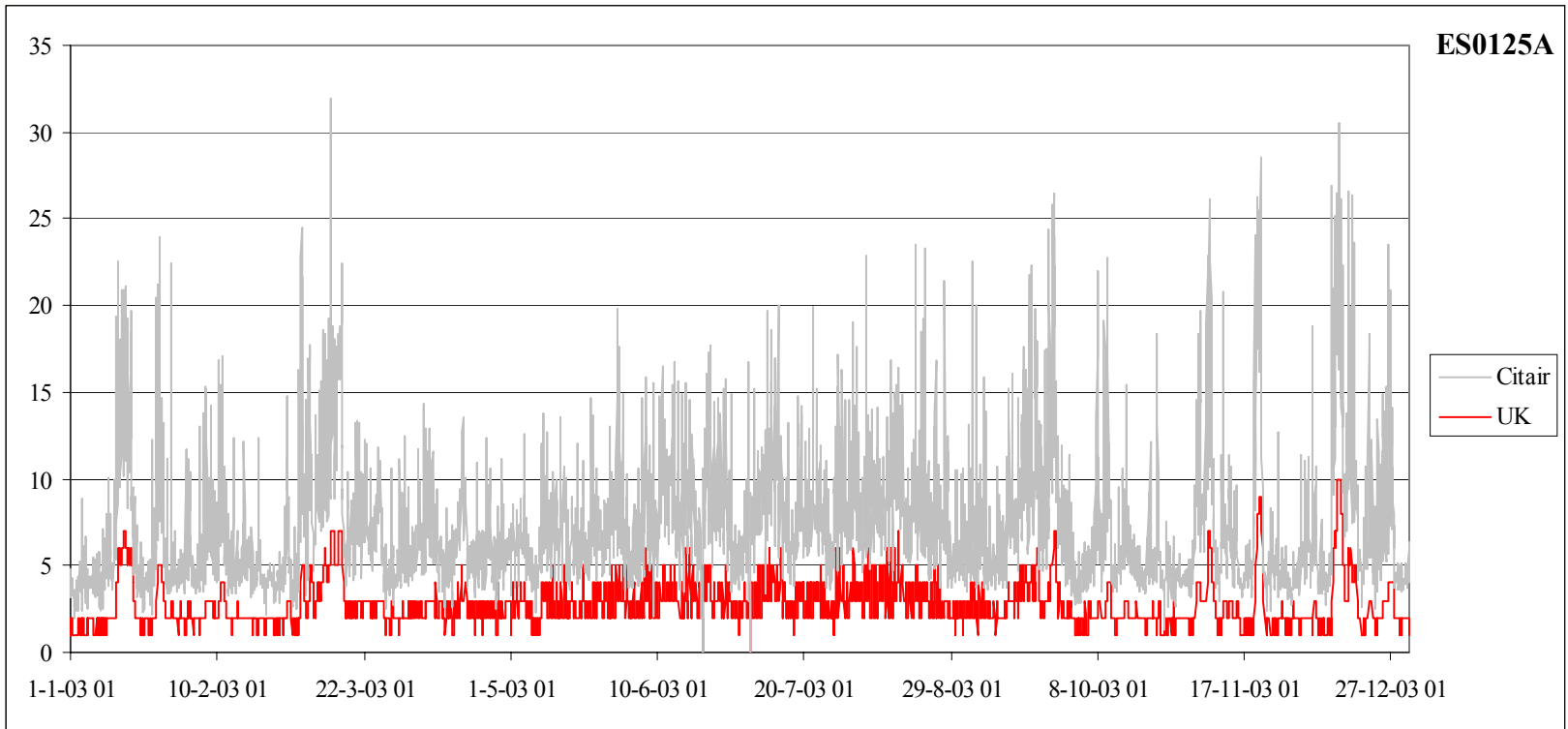


Comparing the AQIs

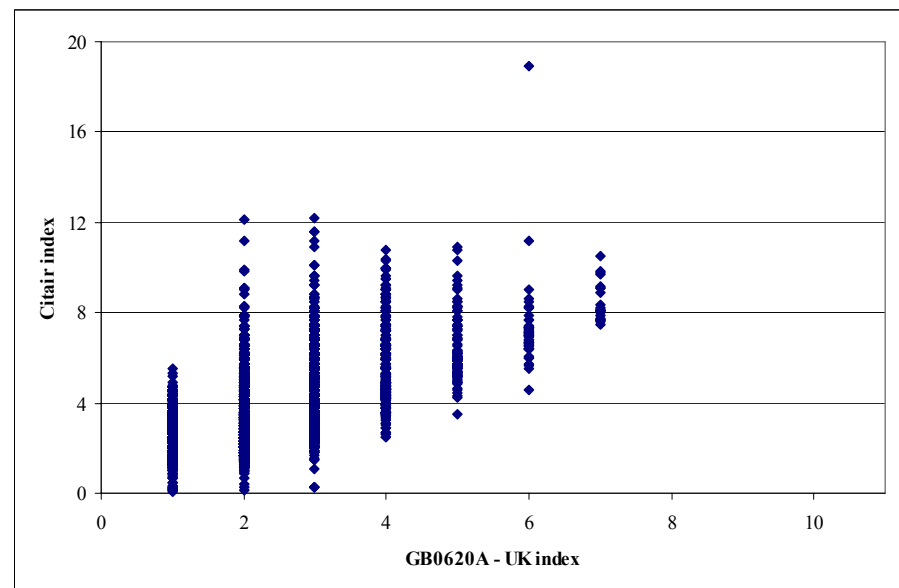
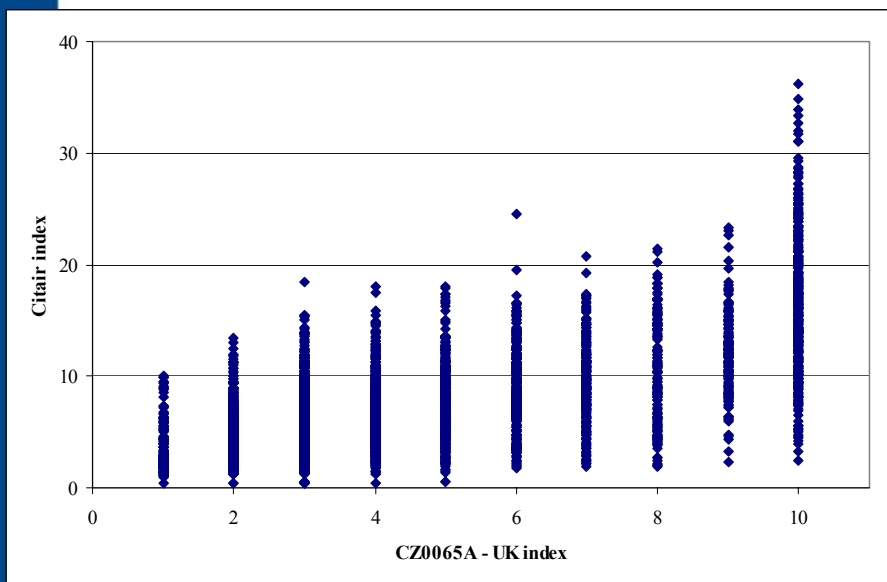
- 10 station from AirBase, 2003 data
- 4 + 1 traffic
- 4 (sub)urban
- background
- 1 rural background



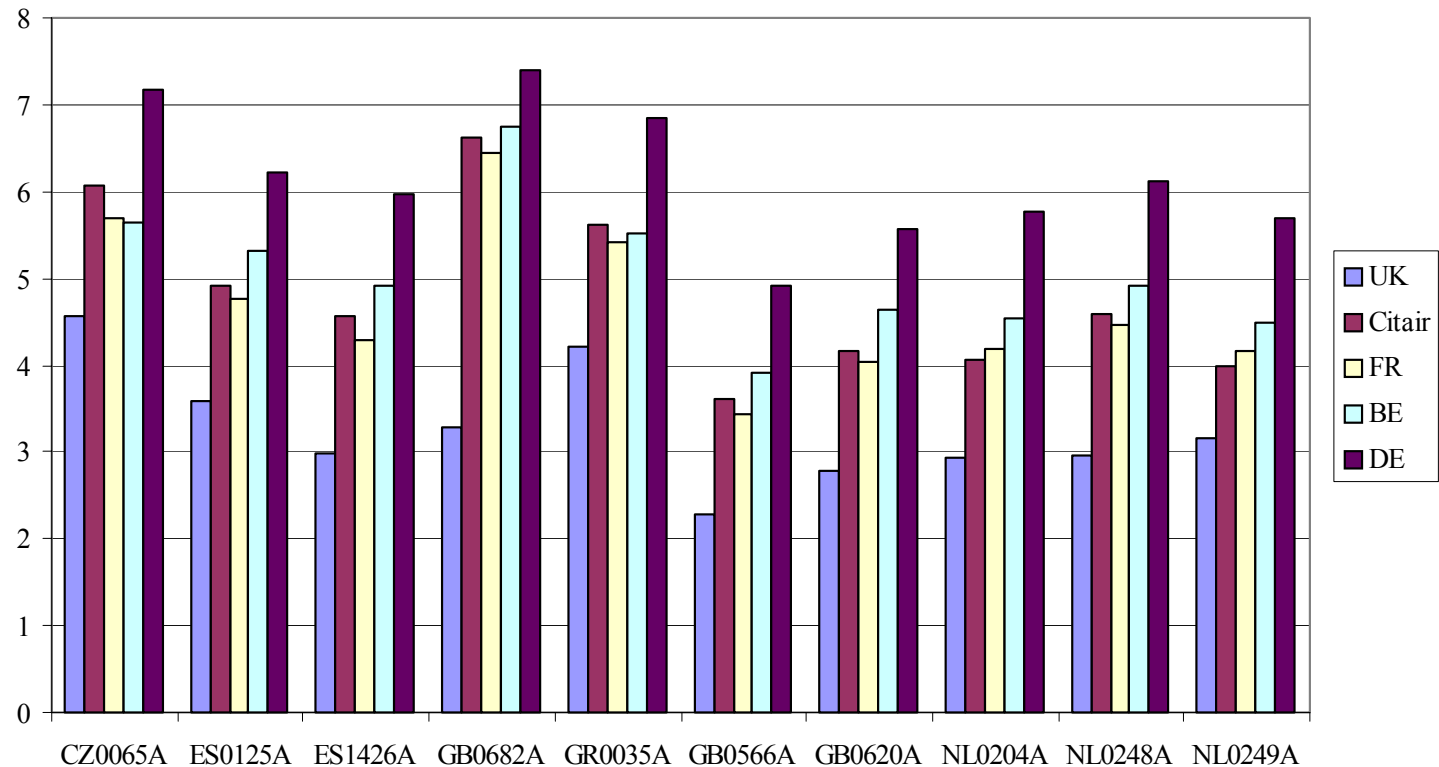
Madrid, traffic station



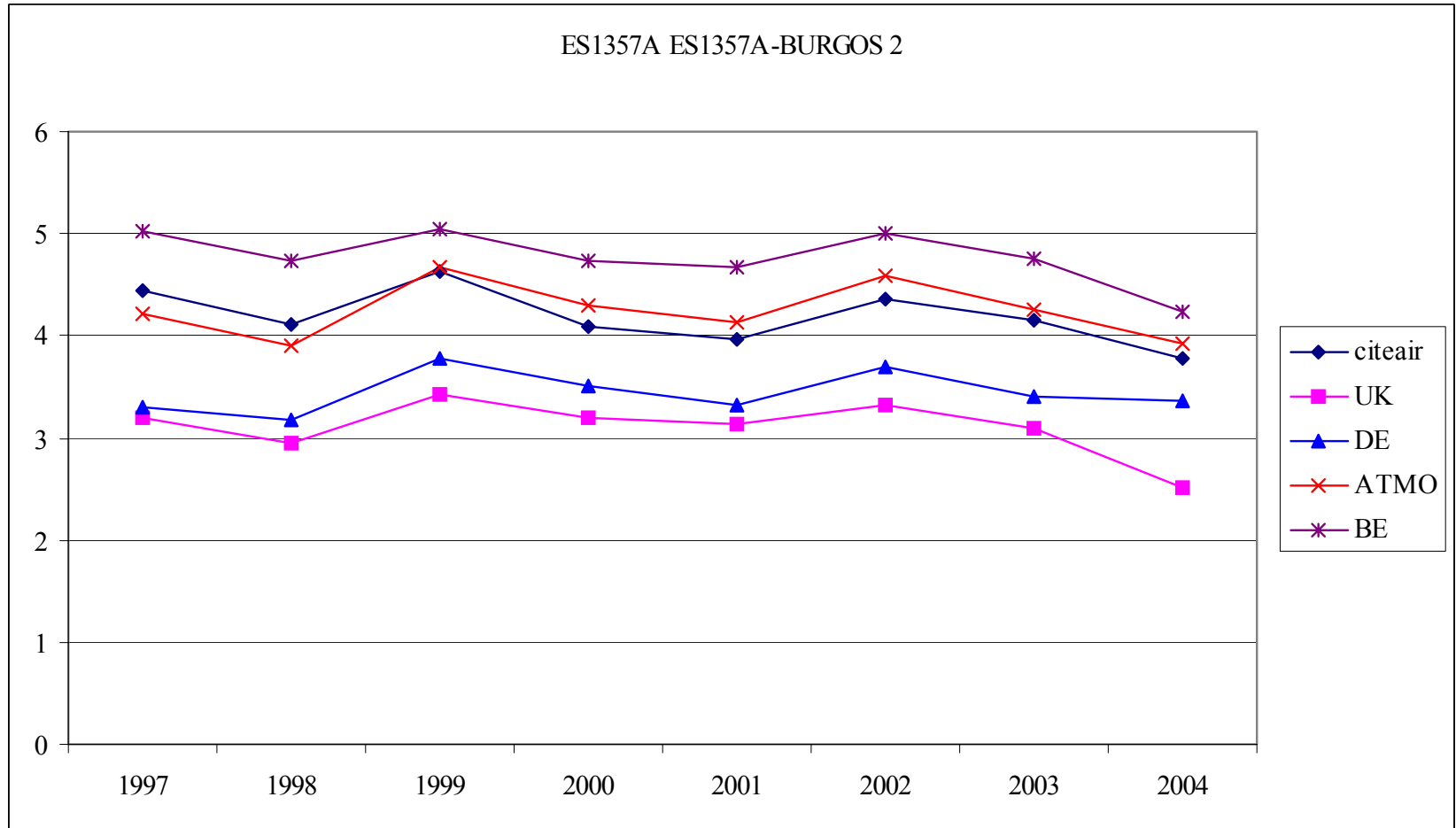
Prague-traffic; London background



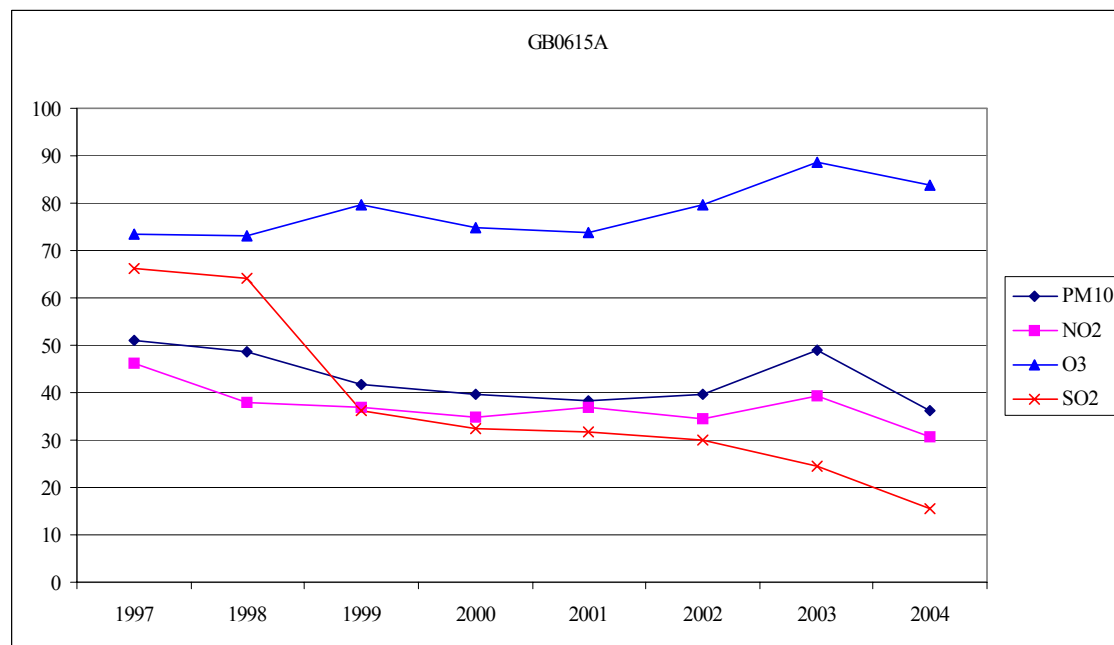
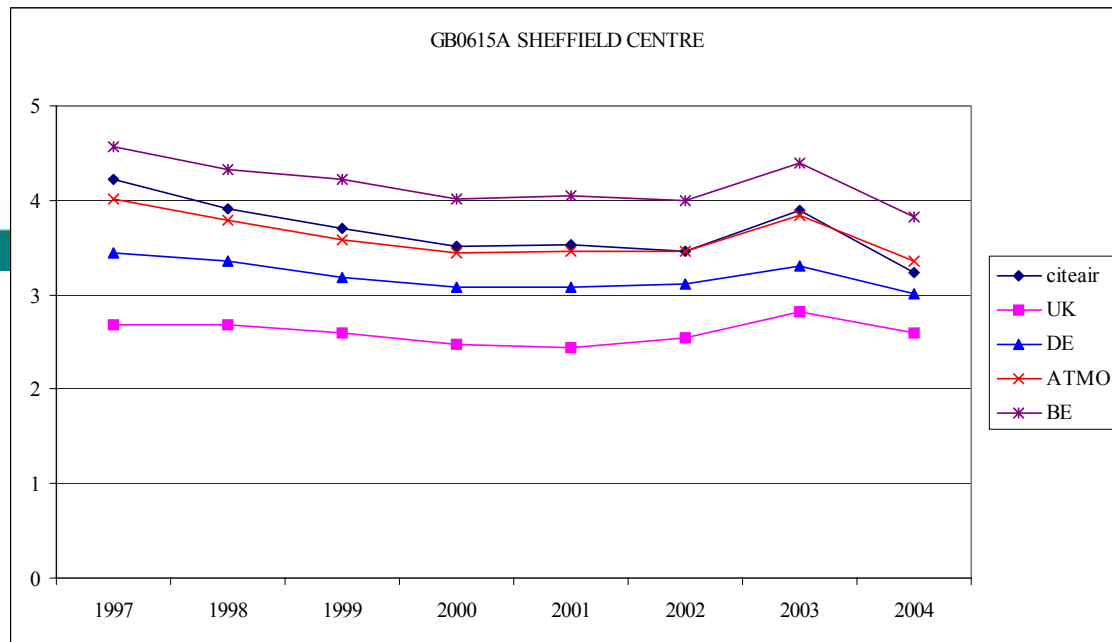
Comparison at daily base

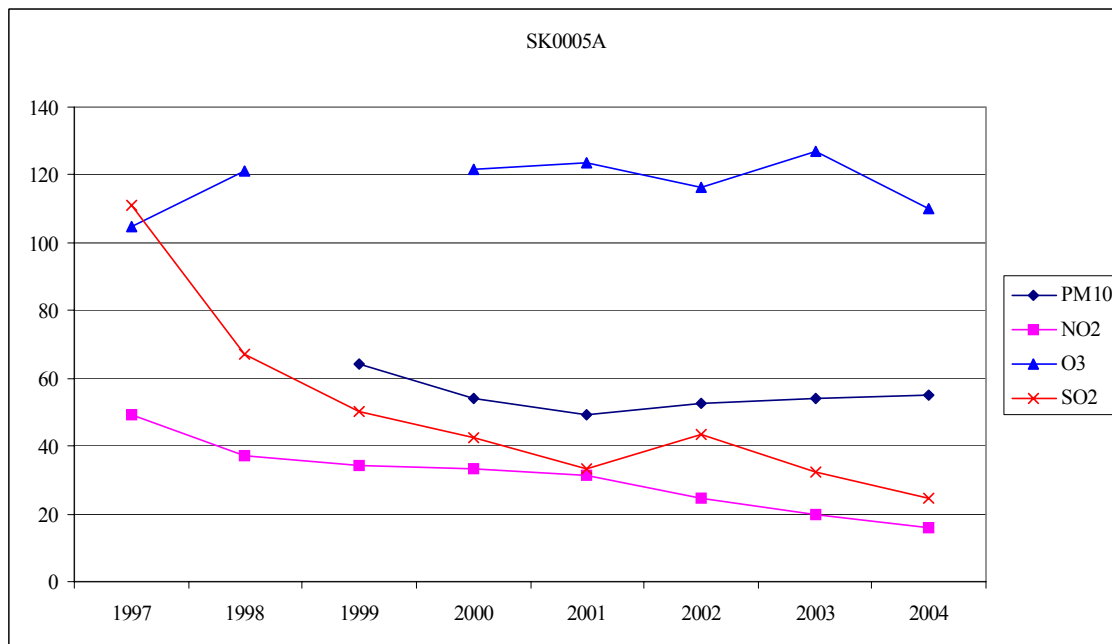
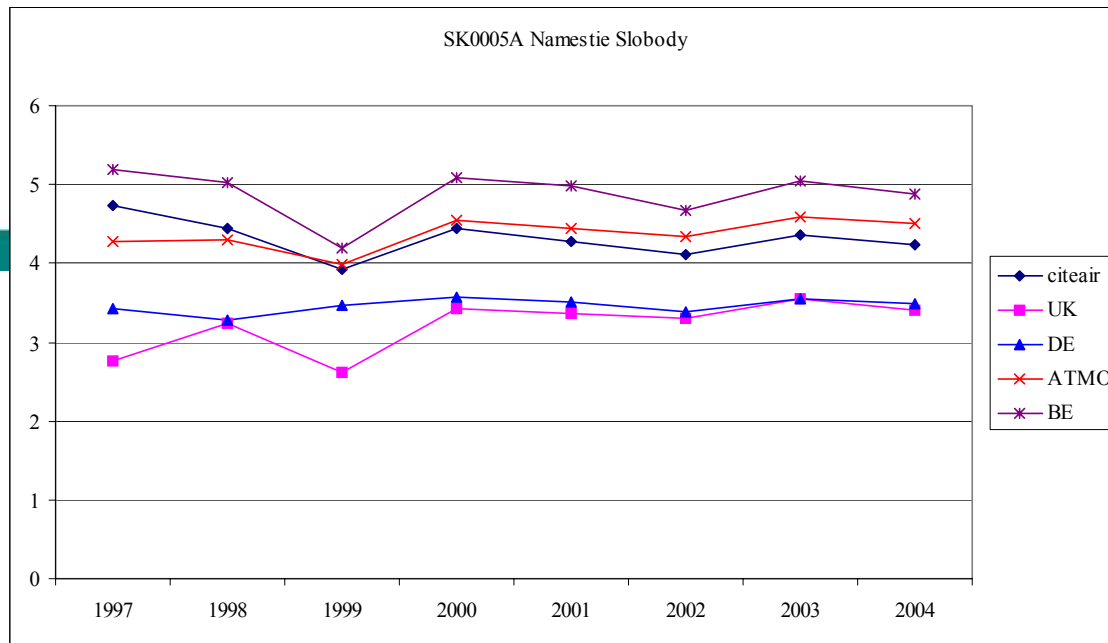


Long-term application



AQI-trend compared with trend in concentration





Conclusions on AQI

- Similar concepts but widely different implementation
- resulting sometimes in conflicting information
- while blaming different pollutants
- although correlation is good.
- Index values sensitive for choice of PM10 correction factors?
- trend in AQI and in air quality may differ
- CO and SO2 of minor importance



AirBase

AirBase as an aid to understanding and protecting the environment

AirBase offers both the expert and the interested public a tool for easy Internet access to air quality information. Results in the form of tables, graphs and maps can be downloaded to your PC. The expert interested in large amounts of data can access AirBase via XML dumps which can be imported in a Web browser or in MS Excel.

AirBase facilitates the evaluation of representative trends in air quality at both EU and pan-European levels.

This example shows how AirBase data is used.

Exceedence of the 100 µg/m³ Ozone Information Threshold

Network Panel Screen 2003/04 (European)



Based on data from AirBase: Number of days with exceedence of the 100 µg/m³ ozone threshold in summer 2003 (April-August). Source: ESA report on "Air pollution by ozone in Europe in summer 2003".

AIRBASE

AIRBASE

AirBase is a web-based database of information and data on air quality across Europe

NEW VERSION OF INTERACTIVE WEB INTERFACE AIRVIEW NOW AVAILABLE!

AIRBASE offers you

- ✓ air quality measurement data
- ✓ information on monitoring networks, their stations and measurement configurations
- ✓ over 30 European countries
- ✓ 38 air quality parameters

The comprehensive source of information on air quality in Europe

Access AIRBASE at:
airbase.dione.leu.int



European Topic Centre
on Air and Climate Change

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Netherlands Environmental Assessment Agency - RIVM
the lead organization of the
European Topic Centre on Air and Climate Change



under contract to the

European Environment Agency

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3720 BA Bilthoven Tel: +31 (0)20 276 3003 (switch)
The Netherlands Fax: +31 (0)20 276 4832



AirBase Info System > Contents of AirBase

- ◆ AirBase is Web based pan European air quality database
- ◆ AirBase is publicly and freely accessible on the Internet
- ◆ Metadata of air quality measurement stations in Europe (information about networks, stations and measurement configurations)
- ◆ About 4300 stations with measurement data, about 40 components



AirBase Info System > Contents of AirBase (continued)

- ◆ Air quality measurement data (raw data, statistics, exceedances) of more than 30 countries (EEA32 + Balkan countries)
- ◆ Oldest data from 1976
- ◆ Time series up to 2004; next update-cycle (2005) data starts in October



Accessing AirBase at airbase.eionet.eu.int

- **AirView** offers interactive Web-based access with on-demand selection of information (component, stations, period etc..). Data presented in maps, graphs, tables.
- **XML-dumps**: the complete database (meta information, statistics and exceedances; raw data as ASCII-files). Excel-macro's available for easy access.

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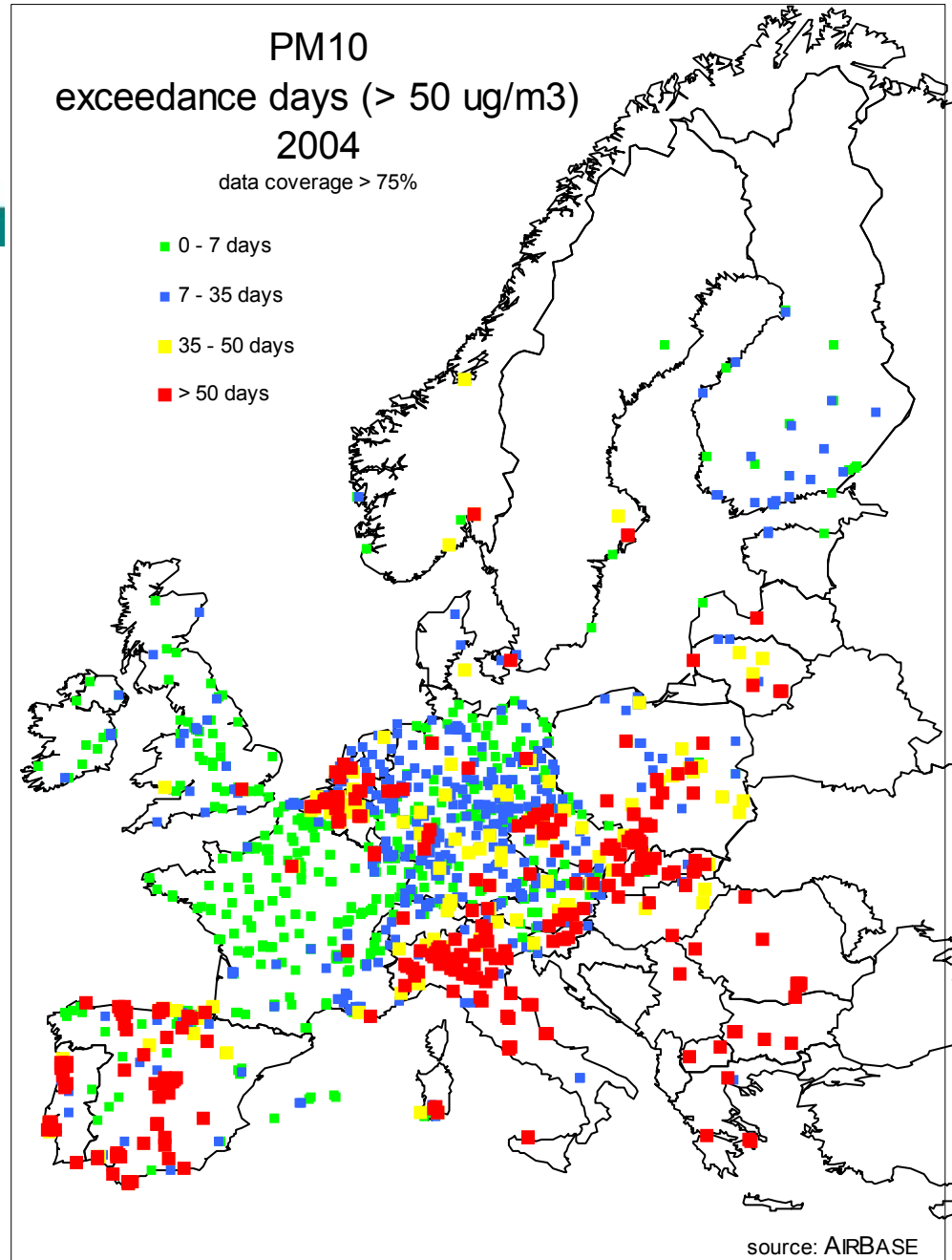
Download the MS Excel/MS Access database



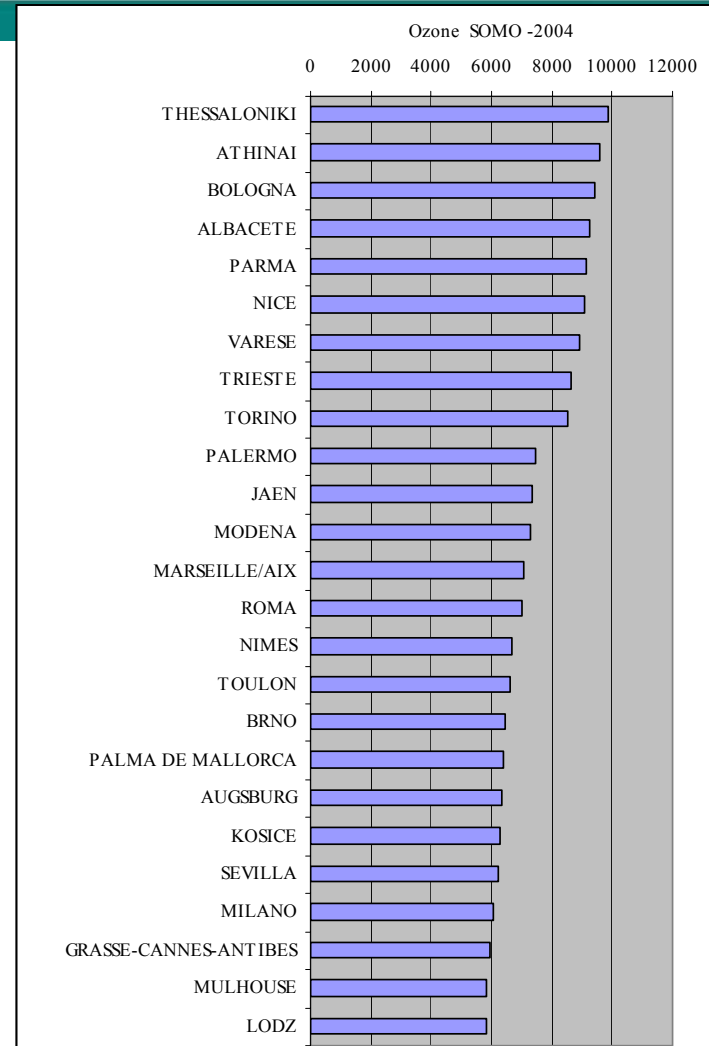
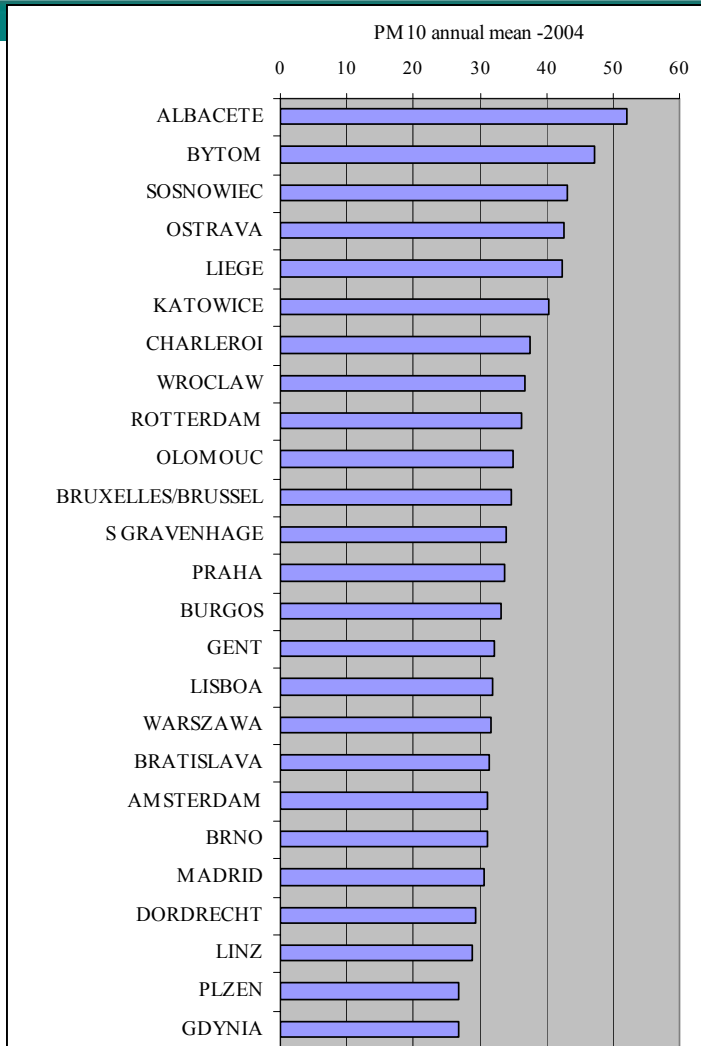
Find out more about AirBase. Number of days with exceedance of the legal limit. Number of exceedance days. Number of days with exceedance of the legal limit. Number of exceedance days. Number of days with exceedance of the legal limit.

A promotional banner for AirBase. It features the AirBase logo at the top left, which includes the text 'AIRBASE' and 'AIRBASE' with a green leaf icon. Below the logo, there is a list of services offered: 'Air quality measurement data', 'Information on monitoring networks, their stations and measurement configurations', 'Over 30 European countries', and '38 air quality parameters'. To the right, it states 'The comprehensive source of information on air quality in Europe'. At the bottom, it provides contact information for the European Topic Centre on Air and Climate Change and the European Environment Agency, including their addresses, phone numbers, and fax numbers.

Some examples



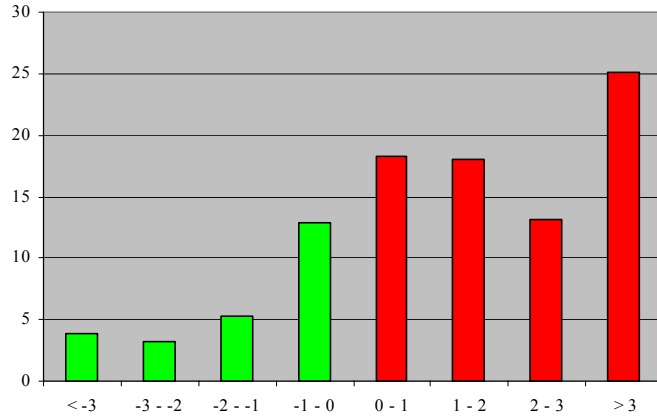
Top 25 most polluted cities (> 100 000 inh)



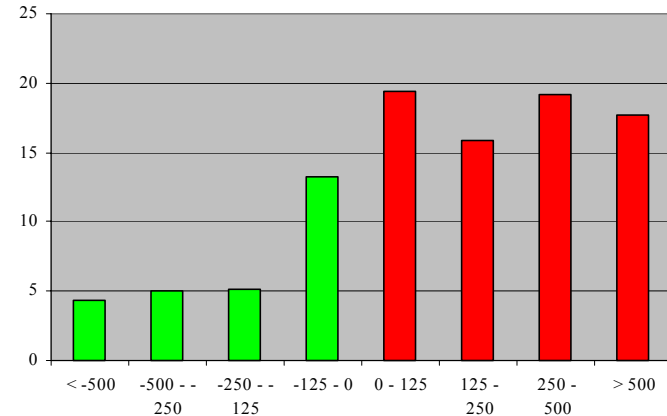
Ozone trend 1999-2004; c. 1040 stations

%-tage of stations

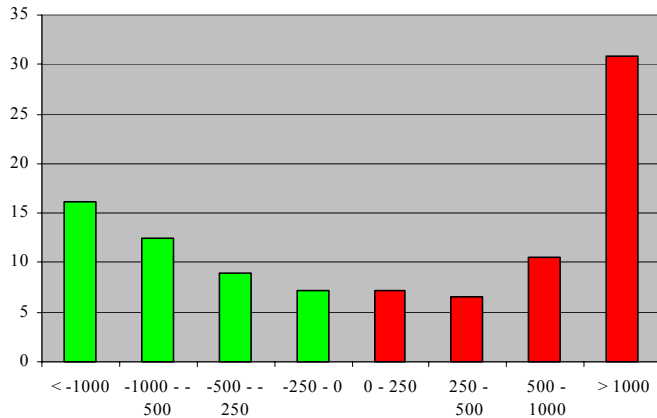
26th highest daily max (ug/m3)/yr



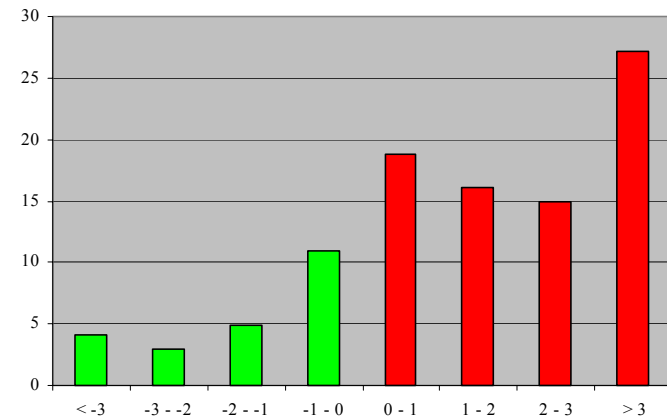
SOMO35, (ug/m3).day/yr



AOT40, rural stations; (ug/m3).h/yr



98-percentile hourly values (ug/m3)/yr



change in concentration per year

