

Air Quality Framework Implementation in Greece

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Implementation in Greece

- Specific characteristics
- Administrative structure
- What's new with view to the implementation of AQF directive
- Air-pollution trends

Specific characteristics-1

- Over-concentration of population and activities on large cities, especially in Athens greater area (almost: 40% of entire Greek population, 60% of private cars, 40% of total industrial production, more than 50% contribution on GDP)
- Development of urban areas without proper land and physical planning during the past decades

Specific characteristics-2

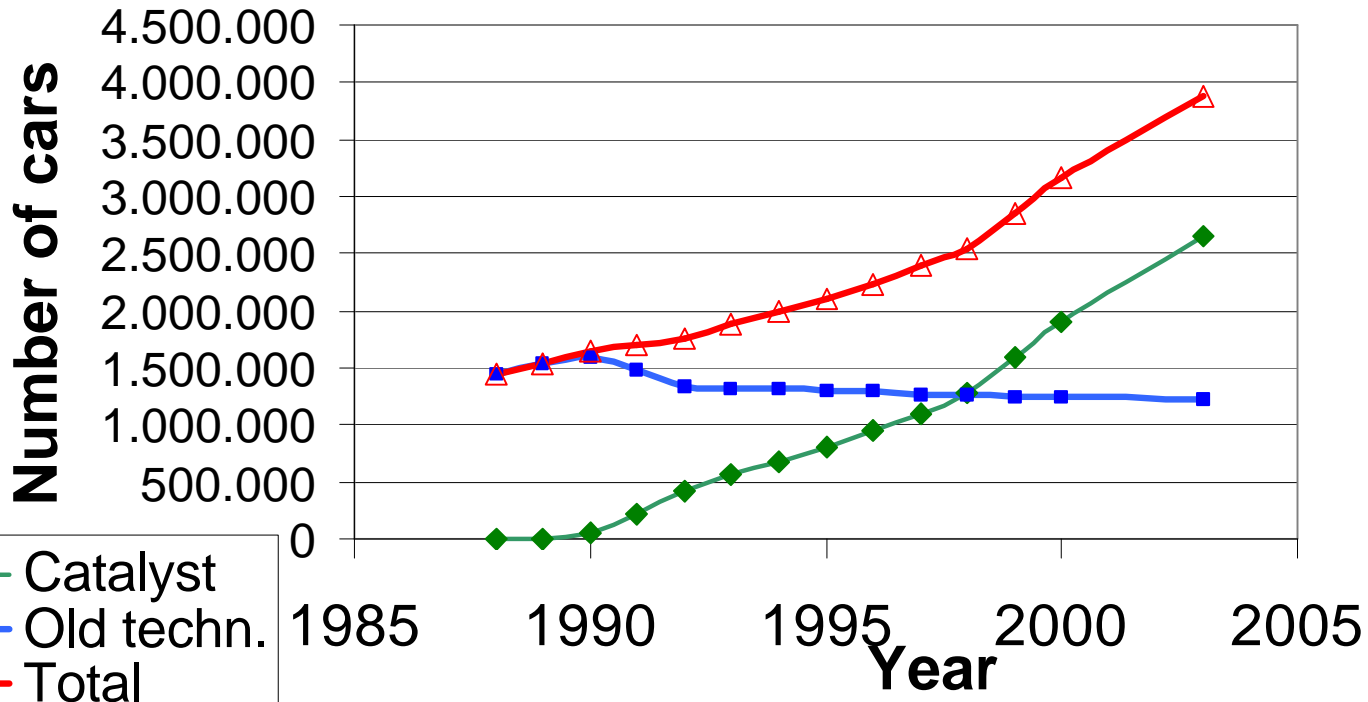
- Meteorological conditions that favor the pollutant concentration (temperature inversions, high levels of sunshine --> intense photochemical activity, high ozone background values)



- Closed topography (especially in the greater Athens area)

- Not completed replacement of old (without catalytic converter) private cars

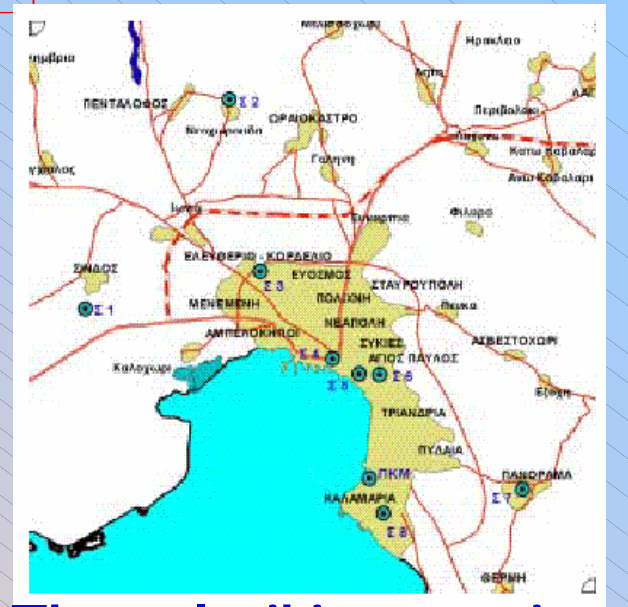
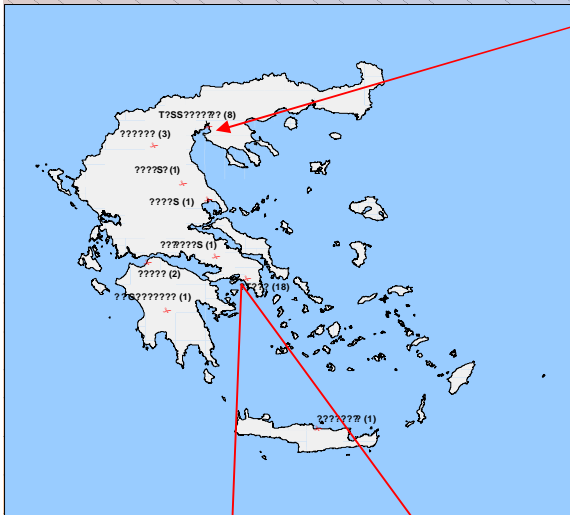
Fleet of private cars in Greece (Dec-2003)



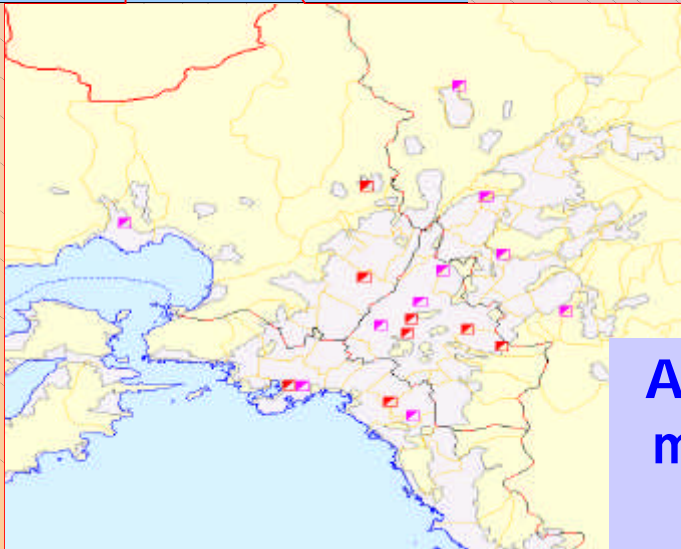
Administrative structure for the Air pollution assessment

- In the greater Athens area (capital city), the Ministry for the Environment is responsible. It has also the responsibility for overall planning and central reporting to international organizations
- **In the other regions**, the local (regional) environmental authorities have the responsibility for the operation and maintenance of measuring networks, data acquisition, public information and awareness, reporting to public, etc.

National Network for air pollution monitoring

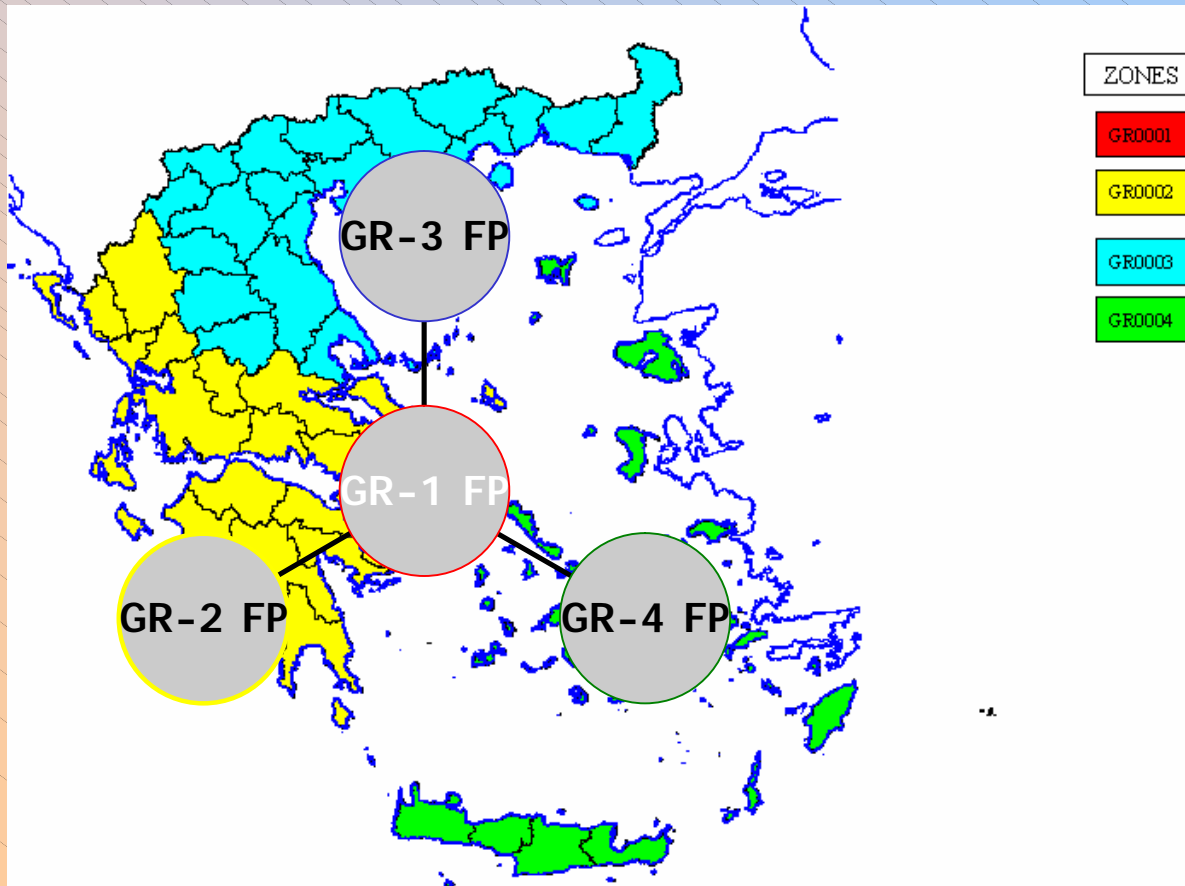


Thessaloniki-area air quality monitoring network (8 stations)



Athens-area air quality monitoring network (18 stations)

Preliminary Assessment on Air Quality



The Hellenic Air-Pollution Monitoring Network **before** the implementation of AQF directive

The Greek Air-Pollution Monitoring Network consisted of:

- **10** stations in Athens
- **5** stations in Thessaloniki
- **8** stations in the rest of the territory **Total: 23**

Only the conventional pollutants were monitored: ozone, sulphur dioxide, nitrogen oxides, carbon monoxide, TSP and black smoke.

At two stations, measurements of lead were acquired.

The implementation of AQF directive (1)

- Extension of the Air Pollution Monitoring Network. Stations added:
 - 8 stations in Athens
 - 3 stations in Thessaloniki
 - 2 stations in the rest of the territory
 - In addition 3 more stations are planned to be installed in urban environments covering moderate Greek cities without any record of air pollution monitoring, 1 rural station and 1 more station in an ecosystem near the river Axios (2008).

The implementation of AQF directive (2)

New pollutants have been monitored since 2001:

- PM10
- BTX

New pollutants are currently monitored:

- PM2.5 in replacement of TSP
- Heavy metals (Cd, Ni, As, Hg)
- Benzo(a)pyrene

The implementation of AQF directive

(3)

- Improvement of the Air Pollution Monitoring Network. Up to date, the following new instruments were added:
- 22 new SO₂ analysers
- 26 new NO_x analysers
- 15 new CO analysers
- 23 new O₃ analysers
- 17 PM₁₀ analysers
- 8 PM_{2.5} analysers
- 2 BTX analysers
- meteorological data (wind speed and direction, air temperature, rel. humidity)

The implementation of AQF directive (4)

- Development of data acquisition system, by using a telecommunication system with the capability of collecting real time data.
- Development of appropriate software to calculate the required statistical data (in order to fill in the relevant EU questionnaires), to exhibit any exceedances of the limits, alert values and assessment thresholds and to perform remote calibration of the instruments

The implementation of AQF directive (5)

A number of studies was carried out on:

- the needed number of the sampling points
- the location of the new sampling points
- the need of new laboratory/ies that have to be established (expected in 2007) for:
 - the chemical analysis of heavy metals
 - QA/QC purposes

The implementation of AQF directive (6)

- **QA-QC procedures (measurements)**
 - In situ calibration (on monthly basis)
 - Remote (via PC) calibration (on weekly basis)
 - Flow rate check using portable and lab. based electronic flow meters
 - Development of measurement's and calibration's protocols

The implementation of AQF directive (7)

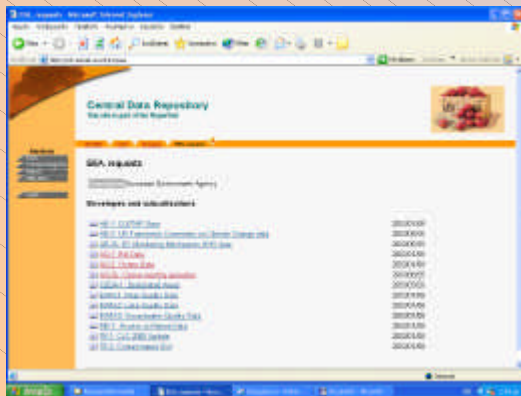
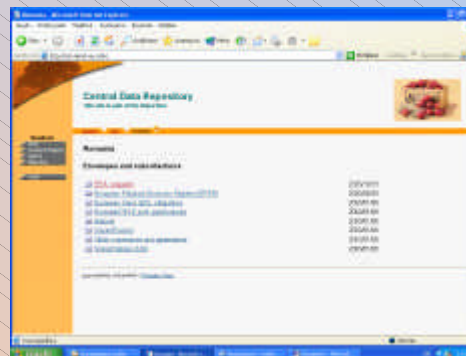
- QA-QC procedures (data validation)

Three stages of data validation:

- 1. On hourly basis during the data transmission from remote stations to central unit
- 2. On daily basis
- 3. On monthly basis (based on calibration findings)

Reporting procedures

- Annual reporting to EU (through AirBase)
- Monthly reporting on ozone exceedances
- EEA – ETC/ACC



Public Information Procedures

- ❖ By fixed phone message (tel. Nr. 1448, three messages per day)
- ❖ Via INTERNET (www.minenv.gr) (in greek and english) on daily basis:
 - Analytical description of air quality situation, max. and average pollutants values for the present day and the previous one,
 - Forecasting of air pollution levels for 24 hours
 - Extended presentation of ozone exceedances
- ❖ Monthly and yearly reports
- ❖ In case of air pollution episode: Information on the evolution on hourly basis through INTERNET - Radio and TV messages - implementation of relevant measures (directions to people affected etc)

Hellenic Ministry for the Environment, Physical Planning and Public Works - Υ.Π.Ε.ΧΩ.Δ.Ε. - Microsoft Internet ...

Αρχείο Επεξεργασία Προβολή Αγαπημένα Εργαλεία Βοήθεια

Πίσω Αναζήτηση Αγαπημένα Μέσα

Διεύθυνση <http://www.minenv.gr/> Μετάβαση Συνδέσεις

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HELLENIC
MINISTRY for the
ENVIRONMENT
PHYSICAL PLANNING
and PUBLIC WORKS

Ελληνικά English

έναρξη Εισερχόμενα - Ου... Hellenic Ministry f... RTP Microsoft PowerP... EN 1:41 μμ

Daily Report of Air Pollution Levels

Athens, 03/09/2004

The daily air pollution report is updated every day at around 2 p.m.

	Today on 03/09/2004 the levels varied:	Yesterday on 02/09/2004 the levels varied:
 Ozone	<ul style="list-style-type: none"> from 1 $\mu\text{gr}/\text{m}^3$ at the GEOPONIKI station to 146 $\mu\text{gr}/\text{m}^3$ at the THRAKOMAKEDONES station 	<ul style="list-style-type: none"> from 1 $\mu\text{gr}/\text{m}^3$ at the ATHINAS station to 151 $\mu\text{gr}/\text{m}^3$ at the THRAKOMAKEDONES station
	Public information level 180 $\mu\text{gr}/\text{m}^3$ -- Alarm level 240 $\mu\text{gr}/\text{m}^3$ (For three consecutive hours). Hourly mean values	
 Nitrogen Dioxide	<ul style="list-style-type: none"> from 2 $\mu\text{gr}/\text{m}^3$ at the THRAKOMAKEDONES station to 121 $\mu\text{gr}/\text{m}^3$ at the PATISION station 	<ul style="list-style-type: none"> from 1 $\mu\text{gr}/\text{m}^3$ at the THRAKOMAKEDONES station to 137 $\mu\text{gr}/\text{m}^3$ at the ????S-1 station
	Alarm Level 400 $\mu\text{gr}/\text{m}^3$ (For three consecutive hours). Hourly mean values.	
 Sulfur Dioxide	<ul style="list-style-type: none"> from 2 $\mu\text{gr}/\text{m}^3$ at the PATISION station to 18 $\mu\text{gr}/\text{m}^3$ at the PATISION station 	<ul style="list-style-type: none"> from 2 $\mu\text{gr}/\text{m}^3$ at the ????S-1 station to 124 $\mu\text{gr}/\text{m}^3$ at the GEOPONIKI station
	Alarm Level 500 $\mu\text{gr}/\text{m}^3$ (For three consecutive hours). Hourly mean values.	
 Sulfur Dioxide		<ul style="list-style-type: none"> from 2 $\mu\text{gr}/\text{m}^3$ at the ????S-2 station to 22 $\mu\text{gr}/\text{m}^3$ at the GALATSI station
	Limit value 125 $\mu\text{gr}/\text{m}^3$ -- Not to be exceeded more than 3 times per year. 24 hourly values.	
 Carbon Monoxide	<ul style="list-style-type: none"> from 0.1 mgr/m^3 at the LIKOBRISI station to 2.4 mgr/m^3 at the ATHINAS station 	<ul style="list-style-type: none"> from 0.1 mgr/m^3 at the LIKOBRISI station to 2.7 mgr/m^3 at the ATHINAS station
	Limit value 10 mgr/m^3 . 8 hourly values	
 Black Smoke		34 $\mu\text{gr}/\text{m}^3$ at the PATISION station
	Public information Level 250 $\mu\text{gr}/\text{m}^3$ -- Alarm Level 300 $\mu\text{gr}/\text{m}^3$. 24 hourly values.	
 Particulate Matter		<ul style="list-style-type: none"> from 35 $\mu\text{gr}/\text{m}^3$ at the THRAKOMAKEDONES station to 69 $\mu\text{gr}/\text{m}^3$ at the LIKOBRISI station
	Undefined Alarm level. Limit value 50 $\mu\text{gr}/\text{m}^3$ -- not to be exceeded more than 35 time per year. 24 hourly values.	

General Forecast of Air Pollution

According to the morning measurements, the air pollution in Athens varied at low levels.

During the weekend, according to the Hellenic National Meteorological Service forecast, the air pollution in Athens will vary at low levels.

Analytical Report of Yesterday Pollution levels (max values)

	 Ozone	 Nitrogen Dioxide	 Sulfur Dioxide	 Sulfur Dioxide	 Carbon Monoxide	 Black Smoke	 Particulate Matter
sun	76	115	41	13	2.4	34	
sun - 1	36	137	5	3	2.1		58
sun	62	113	54	20	2.7		
sun	112	91	124	21	0.6		
sun	52	67	7	6	0.9		
sun	120	128	48	13			
sun	127	43	28	14	0.5		
sun	121	109	94	21	0.7		
sun		105	6	3			60
sun	138	52			0.3		69
sun	123	42	13	9			40
sun	144	42	39	19			46
sun	151	5					35
sun	98	77	13	9			
sun	110	64	58	22			
sun		78					
sun - 1		109	2	2			

* The units of pollution substances are calculated in $\mu\text{gr}/\text{m}^3$ except the CO which is calculated in mgr/ m^3

OZONE EXCEEDANCES TABLE

From 2/9/2004 14:00 to 3/9/2004 13:00

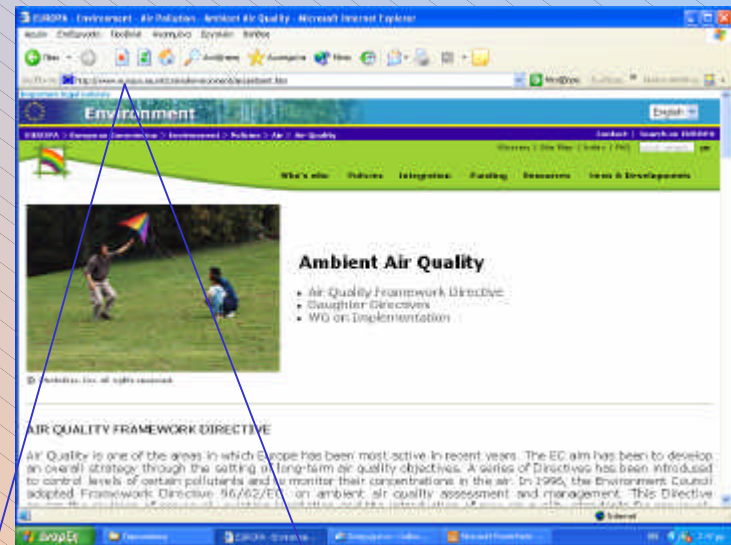
Levels

Locations	Public information level (Hourly values > 180 µg/m ³)			Public information level (Hourly values > 240 µg/m ³ for 3 consecutive hours)			Long-term objective of health protection (8-hour max value > 120 µg/m ³)
	Starting time of the exceedance period	Total number of exceedance hours	Max value	Starting time of the exceedance period	Total number of exceedance hours	Max value	8-hour max value > 120 µg/m ³
Station	-	-	-	-	-	-	-
Stations - 1	-	-	-	-	-	-	-
Stations	-	-	-	-	-	-	-
Stations - 1	-	-	-	-	-	-	-
Stations - 1	-	-	-	-	-	-	-
Stations - 1	-	-	-	-	-	-	-
Stations - 1	-	-	-	-	-	-	122
Stations - 1	-	-	-	-	-	-	-
Stations - 1	-	-	-	-	-	-	131
Stations - 1	-	-	-	-	-	-	-
Stations - 1	-	-	-	-	-	-	140
Stations - 1	-	-	-	-	-	-	144
Stations - 1	-	-	-	-	-	-	-
Stations - 1	-	-	-	-	-	-	-
Stations - 2	-	-	-	-	-	-	-

Critical collaborations

- JRC – ISPRA (intercomparisons, intercalibrations, technical advises.....)
- Bilateral or multi-national projects

Sources of information:



<http://www.europa.eu.int/comm/environment/air/ambient.htm>

On going activities: Site - specific Projects

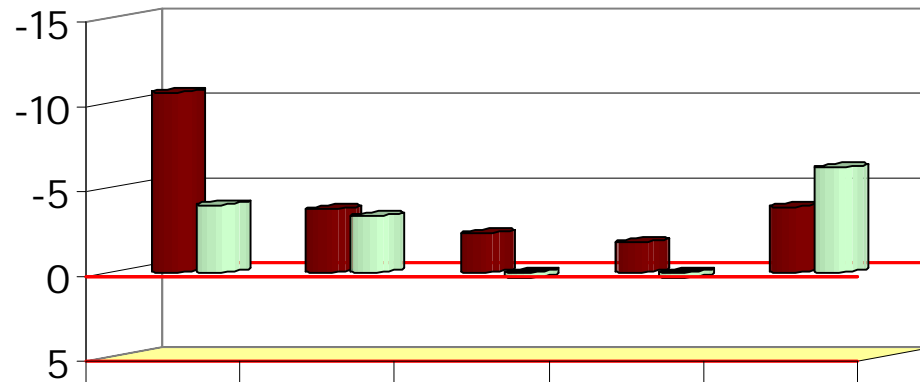
- Implementation of specific projects for the 10 major Greek cities.

Outcomes:

- > Main sources of exceedances
- > Proposals of needed measures and actions

Air-pollution trends

Variation of annual trend as percentage of the mean value

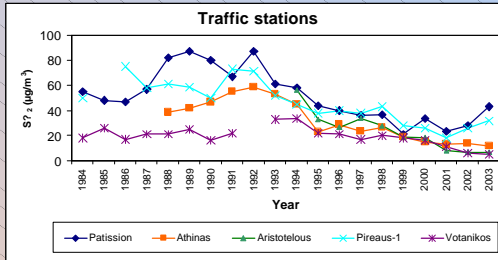


	SO2	black smoke	O3	NO2	CO
■ traffic stations	-10,6	-3,7	-2,3	-1,8	-3,84
□ urban background stations	-3,9	-3,3	0,33	0,3	-6,17

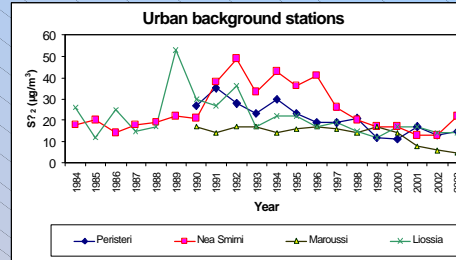
Variation of annual trend (as percentage of the mean value) of main pollutants, for traffic and background stations in the greater Athens area. Period of data: at least 10 years for each station/pollutant.

SO₂

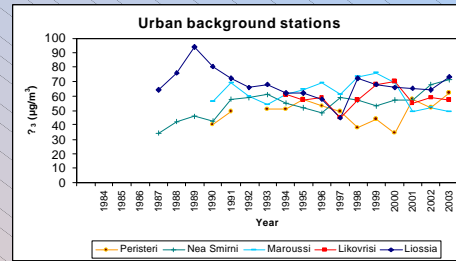
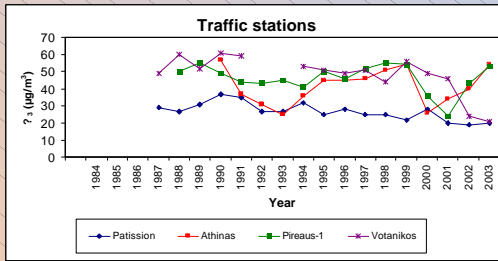
Traffic stations



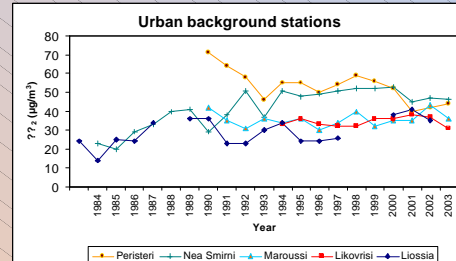
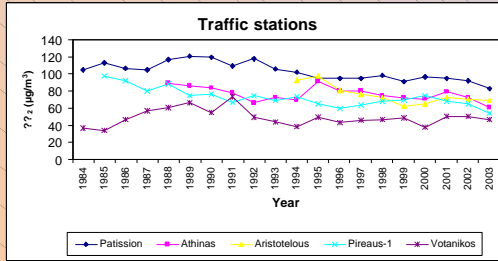
Urban background stations



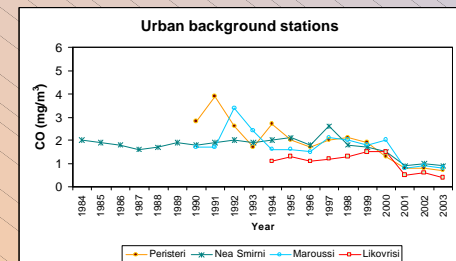
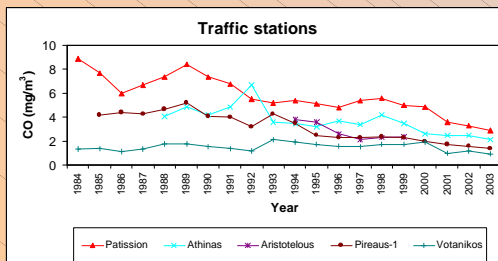
O₃



NO₂



CO



Variation of annual mean concentrations of measured pollutants in the Greater Athens Area

Measures to alleviate the problem

To alleviate the problem of atmospheric pollution, short- and long-term action plans are required in the following two directions:

1. INTERVENTIONS TO THE SOURCES OF AIR POLLUTION
2. INTERVENTIONS TO THE TRAFFIC

These interventions consist of:

INTERVENTIONS TO THE SOURCES OF AIR POLLUTION

• STATIONARY SOURCES OF POLLUTION

- Industrial installations (national emission ceilings, application of Best Available Technologies, inspection and control of gas emissions, use of natural gas)
- Central heating and combustion installations (upgrade of emission-control system, use of natural gas in the domestic sector)
- Fuel-quality control

• MOBILE SOURCES OF AIR POLLUTION

- Vehicles (renewal of public transport media, renewal of taxis' fleet, improvement of the emission-control-system of vehicles, upgrade of the system at Vehicle-technical-inspection centers)

INTERVENTIONS TO THE TRAFFIC

- Centre of Traffic Management, extension of the underground, tram, extension of bus lanes.

A station of the monitoring network



A station of the monitoring network



A station of the monitoring network



A station of the monitoring network



Thank you