

Topic report 7/2000

Air Quality

Annual topic update 1999

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Summary

This report provides an overview of work in the field of air quality conducted in 1999 by the European Topic Centre on Air Quality in cooperation with the Phare Topic Link on Air Quality as part of the EEA work programme. Products are listed and plans for 2000 are described.

1. Introduction

1.1. The European Environment Agency

The European Environment Agency (EEA), based in Copenhagen, was established in 1990 by a Council Regulation of the European Union (1210/90/EC), later amended by Regulation 933/1999/EC. The main objective of EEA is:

‘...to provide the Community and the Member States with:

- *objective, reliable and comparable information at European level enabling them to take the requisite measures to protect the environment, to assess the results of such measures and to ensure that the public is properly informed about the state of the environment,*
- *to that end, the necessary technical and scientific support.’*

One of the major tasks of EEA is the coordination and further development of the European Environmental Information and Observation Network, EIONET, consisting of coordinating institutes (National Focal Points) and expertise centres (National Reference Centres) in the 18 EEA member countries, as well as European Topic Centres (ETCs). These ETCs work on behalf of EEA with the countries and the European Commission in specific environmental areas.

With support from the EU PHARE programme, the EEA work programme on air quality and other topics continued with 13 central and eastern European countries and hence cover 31 European countries in total.

For more information on EEA and EIONET visit the EEA website <http://www.eea.eu.int/>.

1.2. The European Topic Centre on Air Quality

The European Topic Centre on Air Quality (ETC/AQ) was established by EEA at the end of 1994. The goal of ETC/AQ is to support EEA in all its tasks relating to air quality.

A consortium of four institutes was contracted for two consecutive periods, 1995-1997 and 1998-2000:

- National Institute of Public Health and the Environment (RIVM), Bilthoven, the Netherlands (lead institute)
- Norwegian Institute for Air Research (NILU), Kjeller, Norway
- National Observatory of Athens (NOA), Athens, Greece, supported by the University of Athens and the University of Thessaloniki.
- Norwegian Meteorological Institute (DNMI), Oslo, Norway

A Steering Group consisting of the lead contact persons from each of the participating institutes supports the current ETC Leader, Bert Bannink (RIVM).

In the framework of the EEA-PHARE collaborative project, a consortium was contracted in September 1997, for a period of two years, to form the PHARE Topic Link on Air Quality (PTL/AQ) and extend the work on air quality to the Phare countries. The consortium for this period consisted of:

- AEA Technology (AEAT), United Kingdom
- Czech Hydrometeorological Institute (CHMI), Czech Republic
- Slovak Hydrometeorological Institute (SHMI), Slovak Republic
- Decision and Systems Management Ltd. (DASY), Hungary

This EEA - PHARE work was extended for one year from October 1999 with a focus on ten PHARE Accession countries under coordination of the Water Research Centre (UK) with a slightly modified consortium with the Hungarian Meteorological Services, HMS as the Hungarian partner. The PTL/AQ leader is Jaroslav Fiala (CHMI).

The PTL/AQ cooperates closely with ETC/AQ under the coordination of the ETC leader to ensure that the two consortia work effectively as one joint extended Topic Centre.

(More information on ETC and PTL can be found on the Web at: <http://www.etcaq.rivm.nl/> and <http://www.chmi.cz/uoco/isko/ptl/>)

This report presents a summary of ETC activities and products in 1999. The work of the extended ETC is derived from the EEA Multi-annual Work Programme, and, more specifically in the context of this report, from the EEA Annual Work Programme 1999.

Joint task teams composed of team members from the ETC and PTL institutes, and led by one task leader who is responsible for the task and its deliverables, carry out the work on each of the tasks as defined in the work plans.

In the ETC Management Committee, which consists of the Steering Group and the task leaders and meets twice per year, the planning and progress of work and plans for future work are discussed and endorsed.

Information on the work programme, progress and products of the ETC/AQ in 1995, 1996, 1997, and 1998 can be found in Annual Summary Reports 1995 and 1996 (EEA Topic Reports 22/1996 and 5/1997), and Annual Topic Update 1997 and 1998 respectively (EEA Topic Report 3/1997, 7/1999).

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1.3. Primary Contact Points on Air Quality

The list of officially appointed national Primary Contact Points (National Focal Point or National Reference Centre) for EEA member countries and the list of PHARE National Focal Points are presented in Annex B.

2. Progress in 1999 ¹

2.1. General

Since the work of the Topic Centre is cooperative and international in nature, intensive and regular contacts were made with international organisations and a variety of institutions throughout the year.

Inside EEA, contacts were numerous; particularly, collaboration with the European Topic Centre on Air Emission (ETC/AE) has been important, mainly regarding the support provided to the European Commission DG Environment in the Auto-Oil II Programme and the production of the first EEA indicator report Environmental signals 2000 (EEA Environmental Assessment Report No. 6)

Contacts were frequent and intensive with DG Environment, Unit D3, and less frequently with JRC-ERLAP.

In collaboration with ETC Inland Waters and other partners, and supported by the ETC Catalogue of Data Sources, the IRENIE project under the EC Telematics Applications Programme was carried out.

Connections to the Convention on Long-Range Transboundary Air Pollution, particularly the EMEP programme, are traditionally strong: two ETC partner institutes also act as EMEP Coordinating Centres, and the (former) ETC leader (now EEA project manager) is a member of the EMEP Bureau. Efforts were taken to ensure compatibility enabling exchange of data between the ETC air quality information system AIRBASE and the EMEP database EBAS.

Collaboration with WHO was mainly through the WHO European Centre for Environment and Health in Bilthoven.

Contacts with research communities included the European Commission DG Research and EUROTRAC.

2.2. Air quality aspects of EIONET

National Focal Points (NFPs) and National Reference Centres (NRCs) for air quality were involved in the work of ETC/AQ in a number of ways.

Firstly, NFP were involved in discussions on the work plan. Work plans and developments were presented or otherwise made available at NFP/EIONET meetings in Copenhagen and at the Fourth EIONET Workshop on Air Quality Management and Assessment. ETC/AQ organised this Workshop in Santorini, Greece in September 1999. Representatives from 13 EEA member countries, 13 PHARE countries, plus Azerbaijan, attended the workshop.

Representatives from EEA and ETC/AE, from DGENV, JRC Ispra and WHO were also present. (See Box 1).

¹ An overview of products delivered by the ETC, with emphasis on 1999, can be found in Annex A

Box 1. The 4th EIONET Workshop on Air Quality Management and Assessment

The 4th annual EIONET Workshop on Air Quality Management and Assessment organised by the European Topic Centre on Air Quality (ETC/AQ) in close collaboration with the Phare Topic Link on Air Quality (PTL/AQ) was held at Santorini, Greece, on 23-24 September 1999. Invitations to participate were sent to all National Focal Points (NFP) and National Reference Centres for air quality (NRCs/AIR) in EEA and PHARE countries, as well as contact points and persons in all other European countries, and also to institutions and organisations cooperating with the ETC/AQ.

The workshop was attended by 50 participants from 27 European countries, DGENV, JRC Ispra, EMEP, WHO and EEA.

The main areas addressed during the Workshop included topics such as:

- Air quality information as a basis for air quality policy
- Air quality networks, data and reporting
- EUROAIRNET and AIRBASE/DEM status
- Data and information flow; harmonisation
- The European Environmental Reference Centre (E2RC) and its air-related contents
- Urban air quality management and assessment

The main conclusions and recommendations of the Workshop were:

- In Urban Air Quality assessments the main effort should be at the European level. Main contacts are recommended to be with national experts; local AQ managers may be contacted for additional information.
- Air Quality information should be made easily accessible for experts and the public alike. While real time information is the most interesting for the public, all information should be available for the expert.
- ETC/AQ should assist in harmonisation of data and information reporting tasks of countries; countries are invited to complement reported data sets with historical data, to facilitate trend and spatial analysis.
- The criteria for EUROAIRNET need further improvements, particularly regarding spatial and functional representativeness and coverage of stations, classification of stations (meta-data specifications), Data Quality Objectives, and data needs following EU Directives.
- Countries gave feedback on the use of the Air Quality Data Exchange Module (DEM) in practice through the DEM help desk, which was used intensively. The overall user-friendliness of the DEM was rated satisfactory, but the data file import module proved to be much too slow. DEMv2, released in June 1999, was partly re-designed resulting in a run time shortening by a factor 10-60. The system is now largely consistent with the EMEP (EBAS) NASA-AMES format. The new ISO-7168-2: 1999 file format is also implemented in DEM. Still, a number of improvements and extensions could be implemented to further increase the user-friendliness of the DEM; priorities will be set after a questionnaire-based user consultation.
- The number of countries reporting and amount of information and data transmitted (1997 data reporting cycle) has increased significantly: 22 countries used the Data Exchange Module (DEM v1) for the 1997 data reporting cycle. Still, gaps exist in the database and some countries did not provide any information. A historical overview of AIRBASE contents was made in order to help data suppliers identify data gaps.
- The new AIRBASE web access facility (JAVA applet AirView) has extended the air quality information functionality (data search and visualisation). The final release of the applet will enable users to generate graphs, maps and tables based on highly interactive queries.

Three draft reports (Annual Topic Update 1998, EUROAIRNET Status Report 1999, and AIRBASE Status 1999) prepared by ETC/AQ in 1997/1998 were submitted for comments to participants, and useful comments were received and used.

Upon request NFPs and/or NRCs delivered national air quality data to ETC/AQ. Most of these were provided under the EU Exchange of Information Decision (EoI) and the EU Ozone Directive; the procedures for non-EU members were synchronised with EoI, and the same formats and procedures were used.

Two newsletters on activities in the ETC were produced and mailed in 1999 to some 1000 addresses across Europe.

A programme for visiting countries has been continued. In these visits, often combined with national meetings of regional institutions for air quality monitoring and assessment,

emphasis is on monitoring networks, particularly in relation to EUROAIRNET, Quality Assurance, and information systems. The national infrastructures were discussed, and prospects for intensified collaboration were explored. These visits were considered very useful, both by the ETC and the national experts. The PTL partners also initiated country visits in PHARE countries. Countries visited in 1999 include Belgium, Iceland, Portugal, Slovenia, Latvia, Lithuania, Estonia and Poland.

Parts of the ETC website (<http://www.etcaq.rivm.nl>) were updated regularly during 1999. The site features news and events, information on EEA, ETC and PTL, newsletters, databases (AIRBASE, Air Quality Data Exchange Module, Model Documentation System) and reports and publications.

2.3. Ad hoc technical support

On request of EEA, ETC/AQ attended and contributed to various meetings and conferences to interact with national, Commission, and international organisation representatives on AQ assessment and management. This included:

- The Air Quality in Europe Conference, Venice (19-21 May);
- The WMO/EMEP Workshop in Dubrovnik (4-5 October) presentation: 'EMEP and EEA: a natural cooperation'
- The 4th Meeting of the Eurotrac2 Environmental Assessment Group (EAG), Laxenburg, (29-30 April): presentation 'EEA, the ETC/AQ and ETC/AE'.
- The VDI Air Quality Conference, Heidelberg (26 April); presentation 'From data to information, the role of the ETC/AQ in European assessments'
- EMEP Steering Body, Geneva (6-8 Sept).

The ad hoc support budget was further used for PTL contributions to various EEA and ETC meetings, and for unforeseen additional work by DNMI for AOP2 and EC Working Group on Metals.

2.4. The air quality monitoring network EUROAIRNET

EUROAIRNET is the working acronym for the European Air Quality Monitoring Network that is being established by European countries under the coordination of ETC/AQ. It should form the basis for annually reporting on the assessment of European air quality in the preceding year. The network is primarily built on existing sites selected by countries on the basis of criteria documented by ETC/AQ, to ensure adequate coverage and representativeness at the European level. In EU Member States, the sites largely coincide with those selected for reporting under the EoI Decision. Data quality and station representativeness are key parameters; QA/QC procedures are documented, and data quality objectives are derived from the monitoring objectives. Data from this network is transferred annually to the air quality database AIRBASE. The emphasis of EUROAIRNET is on urban air quality but regional stations are included as well.

Country visits were conducted to NFP/NRC to obtain updated information on national networks and stations, and to discuss matters as selection of stations, selection criteria, data availability, national reporting, etc. In 1999, ETC/AQ conducted visits to Iceland, Portugal, Slovenia, Latvia, Lithuania, Estonia and Poland.

In 1999, EUROAIRNET developed significantly; several more countries completed the first selection of stations according to the criteria that have been developed (EEA Technical Report 12). A EUROAIRNET Status Report 1999 was drafted and presented at the 4th EIONET workshop. This report contains an evaluation of the EUROAIRNET selection of all countries,

including also a summary report for each of the countries. Some of the main results of this evaluation, summarised over all countries are:

- ❑ The selection of cities almost fulfils the EUROAIRNET criteria. Some large European cities are still missing, mostly in those countries that still have to make their selection.
- ❑ Countries have made their own evaluation of their networks to determine the level of their QA/QC procedures. In this self-evaluation, most networks have been put in the 1-3 QA/QC classes, which should ensure acceptable data quality, while 9 countries have selected stations in networks with a less-than-acceptable level of the QA/QC procedures. These networks must upgrade their QA/QC to remain in EUROAIRNET.
- ❑ Reference methods are mainly used but some countries need to show the equivalence of their national methods.
- ❑ In some countries, the station type distribution should be improved (from too many/few stations of certain types).
- ❑ Additional effort is needed to enhance pollutant coverage: for example, benzene and PM_{2.5} are not well covered.
- ❑ Station selection in rural areas, as well as the selection of stations representative for assessment of material damage should be re-evaluated in most countries.

An important test of the degree of implementation of EUROAIRNET is the extent of reporting of data from the stations to AIRBASE. Data reporting has been substantially improved from the 1997 reporting (of 1996 data) to the 1998 reporting (of 1997 data). As of September 1999, the extent of data reported to AIRBASE was as follows:

- Data on 566 stations from 20 countries is included in AIRBASE. Data was reported as part of the Exchange of Information (EoI) process. (In addition, data from Germany and Austria, with a large number of stations, is being installed, but is delayed because of data format problems);
- Pollutant coverage: sulphur dioxide and nitrogen dioxide at about 300 stations, ozone at about 250 stations, particulate matter (PM₁₀) and carbon monoxide at about 150 stations;
- 390 of these stations are included in the 1233 stations selected for EUROAIRNET.

2.5. The air quality information system AIRBASE

AirBase

Air quality information and information on monitoring networks and stations, as collected by ETC/AQ, is stored and made widely available by means of a three-layer air quality information system AIRBASE, accessible on the Internet². Data and information is submitted primarily from EUROAIRNET and under the EU Exchange of Information (EoI) Decision; AIRBASE is intended to also incorporate data submitted under the EU Ozone Directive, as well as data collected for EEA periodical reports.

AIRBASE is the official information system under the EU EoI Decision.

A relational database at ETC/AQ forms the basic layer of AIRBASE, and an Web access facility serves as the top layer. The intermediate layer is the Data Exchange Module (DEM), a PC application with a copy of the basic layer, allowing countries to update information on networks and stations and to submit data under quality assured data transfer procedures.

Data Exchange Module

DEM version 2.0 was released and made widely available in June 1999. Several shortcomings in the previous version were corrected, and processing time was dramatically improved.

² See <http://www.etcaq.rivm.nl/airbase/index.html>

Web access

In 1999, web access facilities continued to be developed. ETC/AQ, by means of a questionnaire, invited national experts and the Commission to indicate their priorities on a list of proposed extensions of the Web access functionality. Priorities were selected and substantially implemented in 1999. (See IRENIE, below)

Helpdesk

The ETC operated a helpdesk, which was frequently used, and provided information on problems and solutions in using the DEM on the ETC/AQ website.

Irenie

As part of the IRENIE project, co-financed by EEA and the EC Telematics Application Programme, ETC/AQ is developing a module (JAVA applet) that provides Internet access to AIRBASE. An operational prototype was released in June, the final release in December. The applet allows users to post detailed queries to AIRBASE and to visualise and save results in the form of maps, graphs and tables.

Update of AIRBASE

By the end of 1999, data on monitoring results obtained in the preceding year, was received from 24 countries and 17 of these datasets were uploaded onto AIRBASE; the others will be uploaded early 2000. The second version of the Data Exchange Model greatly supported the submission of data suitable for further (digital) processing.

ETC Website

In 1999, EEA launched a new Website as part of the European Environmental Reference Centre (E2RC) <http://eionet.eea.eu.int>). The ETC/AQ website, including the database section, forms an integral part of the Reference Centre. It is foreseen that the database section will be extended with reports presenting aggregated air quality information in order to better serve policy makers and the general public.

EUROAIRNET Status 1999

The status of EUROAIRNET by the end of 1999 may be summarised as follows:

- 29 of 32 possible partner countries have selected an EUROAIRNET network
- EUROAIRNET encompasses 355 cities, 46 industrial areas and 218 rural/remote stations in total
- EUROAIRNET comprises 1233 stations in total, 770 of which are in cities
- Most of these stations have been selected to assess population exposure, about 230 represent ecosystem exposure, and about 200 represent exposure of materials

The pollutant coverage in terms of the number of stations is:

- Sulphur dioxide: 770
- Nitrogen dioxide: 638
- Ozone: 535
- Carbon monoxide : 290
- Particulate matter (PM10): 190
- Benzene: 59

Country	Urban and industrial		Rural
	cities	stations	stations
Austria	5	80	36
Belgium	12	75	23
Bulgaria	21	74	
Czech Republic	18	58	18
Denmark	3	9	3
Estonia	1	6	3
Finland	3	27	2
F.Y.R.of Macedonia	9	31	
Germany	104	268	46
Greece	7	37	1
Hungary	6	15	
Iceland	1	8	2
Ireland	6	14	3
Italy	8	82	
Latvia	1	4	2
Liechtenstein	1	1	
Lithuania	1	4	1
Luxembourg	1	5	2
The Netherlands	9	20	
Norway	3	18	11
Poland	8	31	10
Portugal	2	12	
Romania	9	54	
Slovak Republic	5	16	7
Slovenia	3	5	2
Spain	60	132	21
Sweden	9	10	
Switzerland	10	34	6
United Kingdom	29	103	19
TOTAL	357	1233	218

2.6. Modelling infrastructure and applications

ETC/AQ aims at improving the information and documentation on air pollution models and at providing guidance to model users in the selection of appropriate models for the

intended application. To that end, ETC/AQ established the Air Pollution Model Documentation System³. The system was further developed and updated in 1999.

An essential element in this documentation is information on the uncertainty associated with model results, especially if the model is to be used in policy-oriented air quality assessments. ETC/AQ seeks to include in the Model Documentation System information related to model evaluation (model validation activities, comparison against reference data sets etc.). Next to uncertainties in the model itself, uncertainties in model input data determine the overall uncertainty of modelling results.

In the light of the above, on the occasion of the 6th 'Model Harmonisation' Conference in Rouen, ETC/AQ organised a Workshop on Model Uncertainty Analysis Methodology with emphasis on modelling studies included in air quality assessments (see Box 2).

Box 2. Workshop on Model Uncertainty Analysis Methodology

The Workshop on Model Uncertainty Analysis Methodology organised by the European Topic Centre on Air Quality was held in Rouen, France, on 12 October 1999. Fifty participants from ten countries, EMEP and ETC/AQ attended the workshop. Specific aims of the workshop were:

- Discussion on the methodology proposed by ETC/AQ (see below)
- Identification of policy issues for the application of this methodology
- Definition of steps towards applying the methodology to various models and several situations for selected policy issues

The methodology developed by ETC/AQ for analysing the uncertainty of modelling studies included in air quality assessments was the subject of an oral presentation during the conference. The discussion during the workshop allowed the definition in more detail of the individual steps of the methodology:

1. Definition of the 'target output' value for the modelling study and identification of the corresponding limit value
2. Agreement on the situations to be treated by the model.
3. Collection of the necessary input data
4. Specification of input data uncertainty ranges
5. Selection of sensitivity analysis method to be applied
6. Performing the uncertainty analysis
7. Assessment of target output uncertainty range
8. Derivation of input data quality objectives

There was wide agreement among the workshop participants both on the suitability of the methodology and on its applicability to various policy issues. Among others, the following issues were mentioned in the discussion:

- Urban ozone
- Short-range dispersion
- Air pollution in street canyons
- Long-range transport
- Particulates
- Heavy gas dispersion

As a prerequisite for the application of the methodology it was agreed that for each policy issue a working group should be formed, preferably representing a larger modellers' community. Apart from inviting modellers to participate, this group should steer the overall uncertainty analysis and inform ETC/AQ on progress. The Topic Centre would then disseminate in a harmonised way non-confidential results for each policy issue.

³ See web page: <http://aix.meng.auth.gr/lhtee/database.html>

2.7. Assessments and support of EU, international organisations and EEA member countries

Reporting for the Commission under the EU Ozone Directive

On request from DGENV the ETC prepared the reports *Exceedance of EC ozone threshold values in Europe in 1998* and *Air pollution by ozone in the European Union; overview of the 1999 summer season (April-August)*. The reports were delivered to the Commission and will be published together in 2000 as one EEA Topic Report. See also Box 3.

Participation in EC Guidance Working Group

The Guidance Working Group, established by the European Commission, is developing recommendations on assessment of air quality under the new Air Quality Directives. It can be regarded as a follow-up to a similar working group on Preliminary Assessment, which published its results in 1998. The current group expects to report by spring 2000; interim results are to be discussed in the Steering Group on Air Quality. The ETC actively participates in this work.

Support under the EU Exchange of Information Decision

The working group on 'Revision of Exchange of Information', established by the European Commission, aims at improving the efficiency of data and information exchange under the Exchange of Information Decision (97/101/EC). Already now, a few years after its entering into force, adaptation to new legislation and standardisation is necessary. Simplification and efficiency improvements should result in reduction in the reporting effort. The working group will advise the Commission on further harmonisation of data reporting in the framework of the EoI Decision and Air Quality Daughter Directives. ETC/AQ, given its task to manage and report the EoI information and making it widely accessible, actively contributed to the working group.

Supporting harmonisation of European air quality reporting

ETC/AQ supports the European Commission in the management, processing and analysis of the monitoring data and network information, as reported by Member States. This effort currently extends to data submitted voluntarily by other EEA countries and Phare countries. Apart from this, countries have several additional air quality data reporting obligations (to EMEP, WHO, OECD etc). This all adds to the reporting burden in the countries, also because such reports require different air quality statistics, use of different formats, and follow different procedures.

To reduce the reporting burden and minimise duplication, EEA initiated steps to harmonise the reporting requirements and procedures. As an example, the AQ Data Exchange Module is presently under revision to also support the EMEP data reporting in the NASA-Ames format. EMEP and ETC/AQ are cooperating to enhance compatibility of the air quality reporting procedures. This action could also help to streamline, possibly even combine, reports on the data collected.

Support to the Auto Oil II Programme

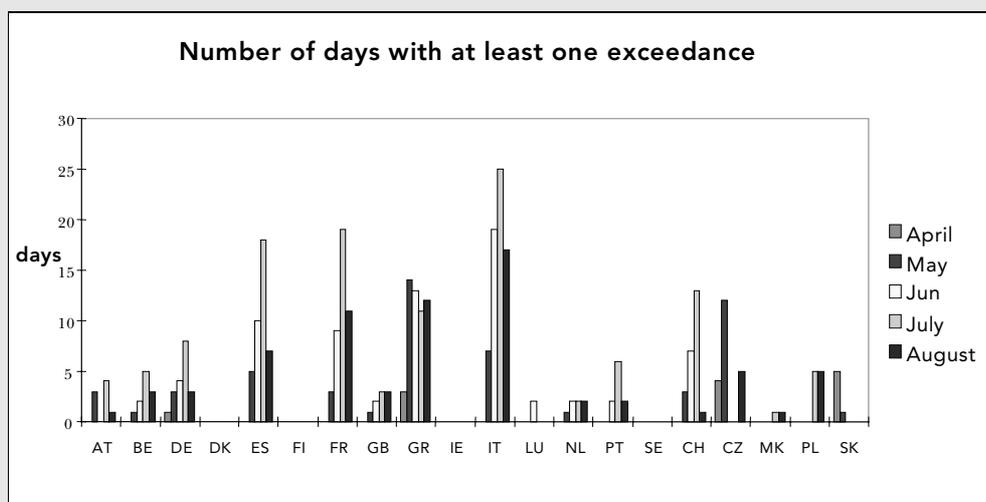
The ETC finalised its contribution to the Auto Oil-II Programme. In close collaboration with ETC/AE the Generalised Empirical Approach (GEA) was developed. GEA is a generic approach for assessing air quality in European cities in relation to transport and other source sectors. The work was presented at several meetings during 1999 (JRC Technical Support Group on Modelling, Auto-Oil II Working Group I and Contact Group). See also Box 4.

Box 3. Air pollution by ozone in Europe in 1998 and summer 1999

The annual report is based on information submitted by the Member States to the Commission in the framework of the Council Directive 92/72/EEC on air pollution by ozone. Other European countries provided information on a voluntary basis; the geographical coverage of the report now extends to 26 (for the year 1998) or 25 (for summer 1999) countries. In 1998-1999 about 1400 ozone stations within the EU and 130 stations in other countries were operational.

From an evaluation of the exceedances and annual statistics, the following was concluded:

- ❑ In 1998 the threshold value set for the protection of human health ($110 \mu\text{g m}^{-3}$ for 8-hourly average concentrations) was exceeded substantially and in all reporting countries. On average, this threshold is exceeded on more than 24 days per year at each station.
- ❑ In 1998 the threshold value of daily average concentrations set for the protection of vegetation ($65 \mu\text{g m}^{-3}$) was exceeded substantially (by up to a factor 3), widely (in all reporting countries) and frequently. The threshold value of hourly average concentrations set for the protection of vegetation ($200 \mu\text{g m}^{-3}$) was exceeded largely and widely (reported by 11 EU Member States and in four other European countries) on a limited number of days.
- ❑ In 1998 the threshold value for providing information to the population ($180 \mu\text{g m}^{-3}$ for hourly values) was exceeded during a limited number of days in 18 countries, of which 11 are EU Member States. During summer 1999 the number of days on which at least one exceedance was observed in the EU ranged from two in Luxembourg to 68 in Italy. 27% of all stations reported one or more exceedance.
- ❑ In 1998 exceedance of the threshold value for warning of the population ($360 \mu\text{g m}^{-3}$ for hourly values) was reported from nine stations of which eight stations are located in three Member States (three stations in Greece, four stations in Italy, one station in France and one station in Bulgaria). No exceedance of the warning threshold was reported in summer 1999.
- ❑ Spatial coverage and documentation on monitoring data quality has improved compared to previous reporting periods but still needs further improvement. The geographical coverage of the rural stations is quite adequate in north-west and central Europe but in other regions gaps are noted.



Box 4. Air Quality in larger conurbations in the European Union

This report summarises work on the 'Generalised Empirical Approach' (GEA) for air quality evaluation in the second Auto Oil Programme (AOP-II).

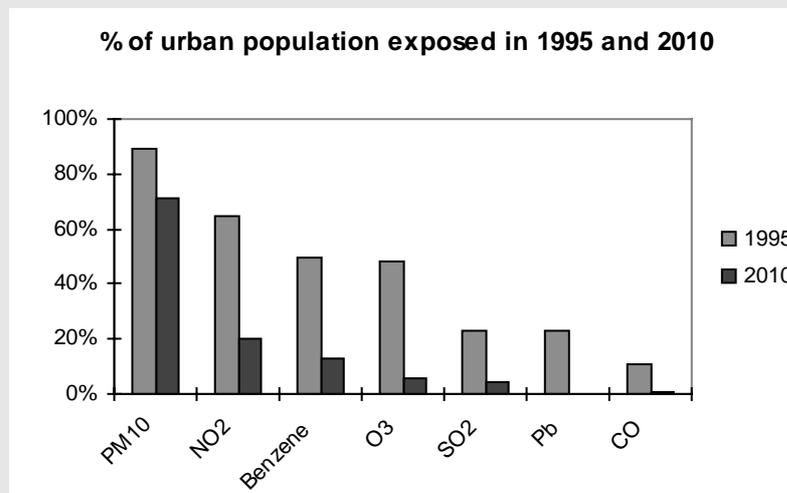
The goal of GEA is to estimate the size of the urban population living in cities within the European Union that are not in compliance with air quality objectives in future years and to estimate additional emission reductions needed to reach compliance.

In the GEA approach, simple tools are used to calculate, in a consistent way, air quality in a relatively large number of cities. This allows for a generalisation of the results on the scale of the whole European Union. The projected air quality gives information on the frequency and severity of exceedance of air quality objectives and on the fraction of EU urban population potentially exposed.

In this study, air quality in about 200 urban agglomerations within the EU was calculated for a reference year (1995 or 1990) and for the year 2010, assuming the Auto Oil base case scenarios. The parameter calculated is the urban background concentration, which is representative for the concentration in most of the urban area, with the exception of places under direct influence of sources, such as streets.

Pollutants considered are sulphur dioxide, nitrogen dioxide, particulate matter (PM10), lead, ozone, carbon monoxide, and benzene; some results are also reported for benz(a)pyrene. All these pollutants, except ozone, were considered as 'inert'. Strictly speaking this is not correct; since all pollutants are subject to (photo)chemical conversion. However, compared to the residence time over an urban area, the (photo)chemical lifetime of these pollutants is large and chemical degradation can be neglected. Nitrogen dioxide is a special case; its concentration is derived from the concentration of nitrogen oxides (handled as inert) using an empirical relation.

In 2010 the urban background concentrations will decrease substantially in the set of 200 cities modelled. It is projected, however, that the agreed or proposed air quality standards will still be exceeded in the future. The most serious problems are exceedances of the short- and long-term objectives for PM10 and exceedance of the long-term objective for NO₂. The projected improvement in urban air quality in 2010 is shown in the figure below in comparison with 1995.



2.8. Contributions to periodical assessment reporting

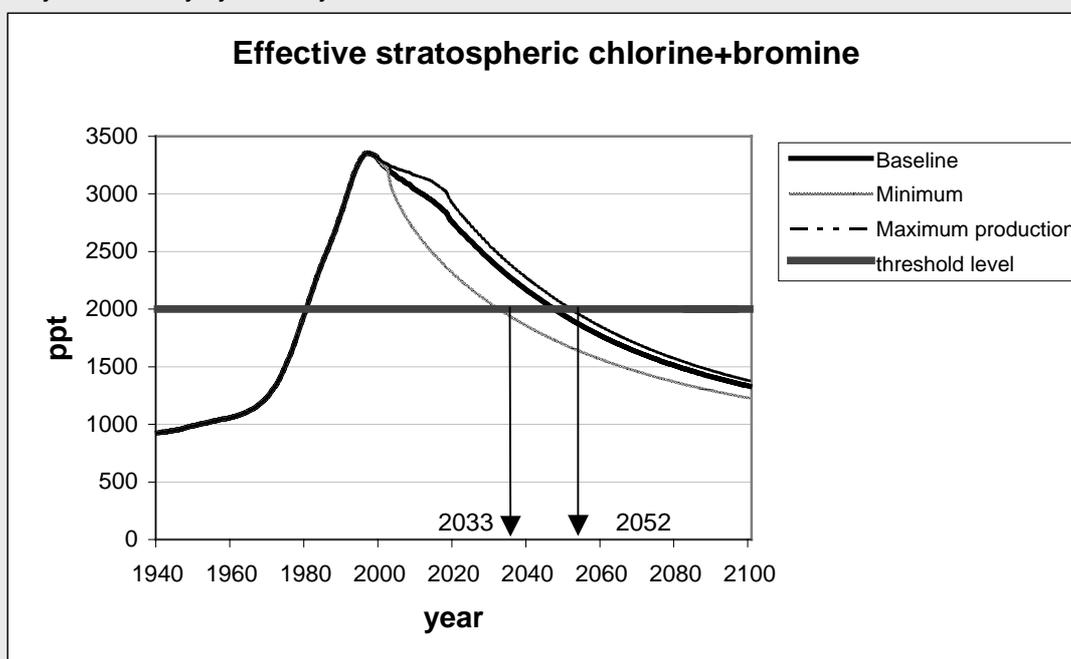
The turn of the century report

ETC/AQ contributed to the EEA report 'Environment of the European Union at the turn of the century' by collecting and analysing data, drafting of the chapters 'Stratospheric Ozone Depletion' and 'Transboundary Air Pollution', and contributing to the chapter on Urban Stress. As an example, summary information from the Stratospheric Ozone Depletion chapter is presented in Box 5.

Box 5. Stratospheric Ozone Depletion

The main message of the chapter Stratospheric Ozone Depletion is that the international regulations to protect the ozone layer (Montreal Protocol) are working. The global production and emissions of ozone depleting substances have decreased significantly. The total potential chlorine concentration in the lower atmosphere has decreased since its maximum in 1994. However, recovery of the ozone layer is still a long way off. It is expected to start around 2000, but a complete recovery is not expected before 2050. Over the Antarctic and Arctic extensive depletion of ozone will therefore continue to occur in spring in the coming decades. Increased levels of UV radiation will also continue. The associated damaging effects, on humans and ecosystems, are likely to persist beyond the period of depletion of the ozone layer.

Within the international regulations of the Montreal Protocol several scenarios of the future ozone layer can be constructed. The figure below shows the baseline, minimum and maximum scenario for the effective stratospheric chlorine + bromine, a quantity that is directly related to ozone depletion. The 2000 ppt level is considered as the threshold for ozone depletion; when the effective chlorine + bromine levels drop below this level, the ozone layer is expected to be recovered. Ozone depletion is expected to cease around 2050. With a complete stop in all emissions the physically fastest recovery may occur around 2033, while some additional use of ozone depleting substances may delay the recovery by several years.



The baseline, minimum and maximum scenario for the effective stratospheric chlorine + bromine. The 2000 ppt level is considered as the threshold for ozone depletion.

Environmental indicators

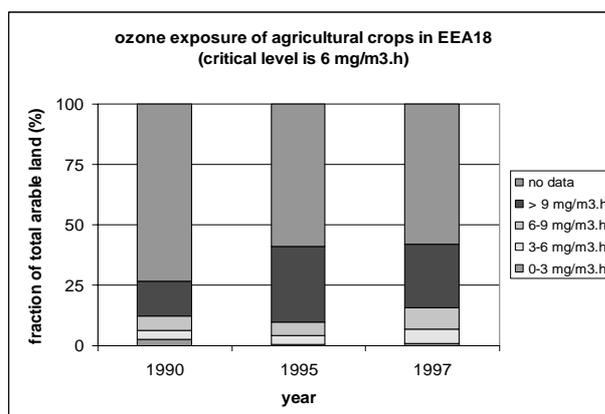
In 1999 EEA started work on a new type of report that aims at tracing the progress and accomplishments of environmental policies. The report is primarily addressed to decision-makers and the general public. The initiative for EEA's new indicator-based report originates from the recognised need for generally accepted environmental indicators so that environmental issues can occupy their proper place in the political and social debate on sustainable development.

The indicators included in the first EEA indicator-based report *Environmental signals 2000* have been selected to address the main policy questions and to be few in number, up-to-date, easy to interpret and representative. The environmental issues of concern, climate change, stratospheric ozone depletion, local and transboundary air pollution, waste, water quality, wetlands, and coastal zone management have been analysed and the contributions of different societal sectors such as agriculture, industry, energy and transport have been quantified. In all cases, the challenge has been to provide both clear and simple information on the progress towards achieving environmental goals.

Environmental signals 2000

ETC/AQ in close collaboration with ETC/AE was responsible for the elaboration of environmental indicators on stratospheric ozone depletion and local and transboundary air pollution. The approach used has followed the DPSIR assessment framework that links human activities to their ultimate environmental impacts and the societal responses to these impacts. To ensure the credibility of selected indicators, ETC/AQ initiated a dialogue with scientists and research groups in Europe. The current choice of environmental indicators is far from definitive; refinement requires cooperation between different management and scientific levels. Monitoring and other relevant data have been collected and fact sheets documenting the air quality indicators have been delivered.

An example of an indicator presented in the *Environmental signals 2000* report is given below. The extent to which ozone critical levels have been exceeded, provides a good indication of how effective EU legislation and the UNECE Convention on Long-Range Transboundary Air Pollution have been in reducing the impact of local and transboundary air pollution. The indicator also shows that insufficient data coverage prevents drawing conclusions for 60% of the arable land.

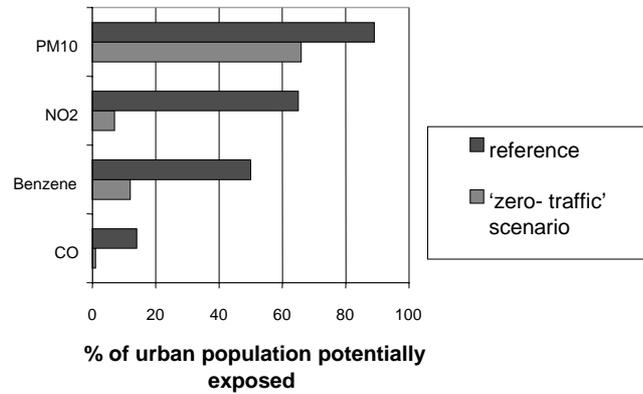


Ozone exposure of crops in EEA 18. The EC proposed long term critical level is 6 mg/m³.h (AOT40). (Source: EEA-ETC/AQ and EMEP/CCC)

Transport and Environment Reporting Mechanism (TERM)

The ETC has delivered transport related air quality indicators as a contribution to the EEA report *Are we moving in the right direction?* (EEA Environmental issues series No 12).

As an example the figure below shows estimates of potential population exposure to ambient air concentrations of several pollutants above agreed limit values calculated for a reference case and assuming zero pollution from road transport in the cities considered.



Urban population exposed to air pollution in excess of limit values for a reference case and for a 'zero traffic' scenario (reference year 1995)

3. Plans for 2000

3.1. Air quality aspects of EIONET

An important highlight will be the 5th EIONET Workshop on Air Quality Assessment and Management which, as in previous years (see also §4.2), will be held with all EEA/PHARE countries in September. During the year, all countries will be kept informed about work planning and progress. There will be two joint newsletters, and the website will be updated frequently. The Annual Topic Update report 2000 will be produced in December 2000.

3.2. EuroAirnet

The acceptance of new sites and documentation of QA/QC procedures in EUROAIRNET is to be continued, together with evaluation of EoI networks, leading to proposals for improvement. Visits to EEA member countries and PHARE countries are scheduled, where the status of selected national sites, QA/QC and data availability will be discussed with national experts. A status report on EUROAIRNET will be presented to 5th EIONET Workshop on Air Quality Assessment and Management, summarising progress in site selection, results of country visits, and international monitoring.

3.3. AirBase

The year 2000 will be a year of consolidation and improvement for AIRBASE. Subject to agreement with other parties (EEA, EMEP, EC), further adjustments will be made.

The ETC plans to develop Version 3 of the Data Exchange Module (DEM v3), to be released in time for the year 2000 reporting cycle. The facilities to be upgraded or extended will be based on user feedback (questionnaire, workshop, helpdesk), the list of DEM extensions not yet implemented and on EUROAIRNET requirements.

All work on the database, data and associated software will be consolidated, documented and delivered to EEA.

The helpdesk function will be continued.

The contents of AIRBASE will be updated with 1999 data from the Exchange of Information Decision (EoI), the data under the Ozone Directive, and data from EUROAIRNET.

Together with national data suppliers, ETC/AQ will try to further increase the quality and contents of AIRBASE, by providing feedback to countries in the form of status overviews.

3.4. Modelling infrastructure and applications

The air quality model documentation system will be integrated with AIRBASE using a common user interface. The system will be updated with additional model descriptions as received. Changes to the system will be implemented in agreement with the recommendations received from the earlier evaluation workshop.

ETC/AQ will contribute to the EUROTRAC Symposium 2000 in Garmisch-Partenkirchen and participate in panel discussions relevant to atmospheric dispersion modelling for regulatory purposes. The intended paper on guidance of model validation, based on Model

Uncertainty Analysis Methodology (MUAM), will be prepared and presented in cooperation with PTL.

Building upon the systems in place for Auto Oil II, ETC/AQ will contribute to a EU air pollution baseline modelling system in collaboration with ETC/AE, EMEP, JRC, IIASA, and others as appropriate.

3.5. Assessments and support of EU, international organisations and member countries

ETC/AQ will continue to support DGENV and Member States in their work on developing new Air Quality Directives and implementing existing ones. Contributions are scheduled to the EC Working Groups on mercury, metals, polycyclic aromatic hydrocarbons, Guidance on Assessment, and Exchange of Information.

ETC/AQ will contribute to the Clean Air For Europe (CAFE) programme, as planned by the Commission by supporting the feasibility study, participating in meetings and offering expertise, experience and infrastructure.

Depending on resources, ETC/AQ will extend the development of an open website with near real time ozone data, in cooperation with NETCEN (UK). In close coordination with DGENV and MS, the website will be adapted to the interest of users, particularly the public. ETC/AQ will participate and contribute to a workshop on operational ozone forecasting organised by EUMETNET/ Deutsche Wetterdienst.

Steps will be taken towards a further harmonisation of data reporting in the framework of the Exchange of Information Decision, EUROAIRNET, OECD, EMEP, WMO and WHO. ETC/AQ will prepare a report, and/or use its website, identifying specified data needs, reporting procedures and contact persons. ETC/AQ may, subject to agreement with the collaborating organisations and upon their specification, also prepare data summaries from data already stored in AIRBASE.

3.6. Contributions to periodical assessment reporting

ETC/AQ will contribute to the next EU Transport and Environment Reporting Mechanism indicator based report with development of indicators, data collection, analysis and writing.

The ETC will contribute to the further development of the Environmental signals reports, including data collection, analyses of the relevant information, producing fact sheets and drafting.

A summary report on ozone exceedances during summer 2000 will be delivered in October 2000. This report will include an overview of exceedances in previous years.

The report on air quality based on 1999 EoI information, and a technical report on the submission of data and information are intended to be combined with the 1999 annual ozone report and the report on EUROAIRNET data into one EEA Topic report on Air Quality in Europe 1999, to be published in 2001.

As far as available, data from non-EU European countries will be included in these reports.

Annex A: ETC products in 1999

Reports published in print by EEA in 1999

- Annual Topic Update 1998, Topic Report 7/1999
- Tropospheric ozone in the European Union. The consolidated report (joint with DGENV/EEA) , Topic Report 8/1998
- Air pollution by ozone in Europe in 1997 and summer 1998. Topic Report 3/1999
- Second EIONET workshop on air quality monitoring and assessment. Workshop proceedings, Technical Report 13
- Third EIONET workshop on air quality management and assessment. Workshop proceedings, Technical Report 21
- Criteria for EUROAIRNET. The EEA air quality monitoring and information network, Technical report 12.
- EUROAIRNET site selection 1998, Technical report 16.

Reports submitted to EEA for publication in 2000

- EoI Pilot Technical Report (1996 meta-data)
- Guidance on model applications
- Criteria for selection of atmospheric dispersion models in ETC/AQ applications
- Air quality in larger conurbations in the European Union
- National ozone forecasting systems and international data exchange in Central Europe. Joint PTL-ETC/AQ report TWG-DFO
- Air quality in the PHARE Countries, 1997
- Air pollution modelling in Phare countries
- Air pollution by ozone in Europe in 1998 and summer 1999

Reports submitted to EEA and EC for joint publication

- Guidance Report on Preliminary Assessment under EC Air Quality Directives (with DGENV, ETC/AE and JRC). Published on EEA website (Technical report 11). DGENV will publish printed version.
- Exceedance of EC ozone threshold values in Europe in 1998. Summary based on the information reported in the framework of the Council Directive 92/72/EEC on air pollution by ozone

Final draft reports presented at the fourth EIONET workshop for EEA publication in 2000

- European air quality in 1996
- AIRBASE. The EEA air quality information system. 1999 status and developments foreseen. 4th EIONET workshop on air quality management and assessment. Santorini, 23-24 September 1999
- Pilot technical report on meta information and air quality data collected for 1996
- Pan-European 1999 status report on EUROAIRNET.

Draft reports/notes presented and discussed in 1999 at EC meetings with Member States for EEA publication in 2000

- European air quality and monitoring information 1997, presented at the EC EoI meeting on 30 June, 1999
- On the harmonisation of requirements to networks and data transfer in the EU Air Quality Directives and Decisions, discussed at the Working Group on EoI
- Air quality in larger conurbations in the European Union, report presented at the Auto-Oil II WG1 meeting, 6 July 1999

Other draft reports/contributions submitted to EEA

- Country visit reports were drafted for Belgium, Iceland, Portugal, Slovenia, Latvia, Lithuania, Estonia and Poland.

Papers presented in 1999

- From data to information, the role of the ETC/AQ in European assessments. Paper presented at the VDI Air Quality Conference in Heidelberg, 28 April, 1999
- Harmonisation the uncertainty analysis of modelling studies used in AQ assessments. Paper presented at ETC/AQ workshop – part of the Rouen Conference.

Other products delivered in 1999

- Fourth EIONET workshop on Air Quality Assessment and Management, Santorini, 23-24 September 1999 (Proceedings to be published in 2000)
- ETC/AQ newsletters no. 7 and no. 8
- Data exchange module version 2.0 (Website and CD-ROM)
- AIRVIEW 2.0
- Software for checking data submitted under the ozone Directive. Forwarded to DGENV and to PTL for dissemination to countries

Annex B: National Primary Contact Points on air quality

Table B1. National Reference Centres/National Focal Points of the EEA countries

EEA Country	Status	Contact person	Institution/Address	Tel./Fax/E-mail
Austria	NRC	Johannes Mayer	Umweltbundesamt Wien, Dept. Internat. Org. Inf. Spittelauer Lände 5 A-1090 Wien	Tel: +43-1-31304 3240 Fax: +43-1-31304-5400 E-Mail: mayer@ubavie.gv.at
Belgium	NRC/ NFP	Alain Derouane	IRCEL/CELINE Avenue des Arts 10-11 B-1210 Bruxelles	Tel: +32-2-2275 701 Fax: +32-2-2275 699 E-Mail: nfp@irceline.be
Denmark	NRC	Niels Zeuthen Heidam	Danmarks Miljøundersøgelser Frederiksborgvej 399 DK-4000 Roskilde	Tel: +45-46-30 1200 Fax: +45-46-30 1114 E-Mail: nzh@dmu.dk
Finland	NFP	Tapani Säynätkari	Finnish Environment Institute P.O. Box 140 FIN-00251 Helsinki	Tel: +358-9-4030 0664 Fax: +358-9-4030 0690 E-Mail: tapani.saynatkari@vyh.fi
France	NRC	René Guillermo	Ecole des Mines de Douai Département Chimie et Environnement Rue Charles Bourseul 941 F-59508 Douai	Tel: +33-2-793 2043 Fax: +33-2-793 2331
Germany	NRC	Wolf Garber	Umweltbundesamt, Deutsche Kontaktstelle EEA für Luftqualität Bismarckplatz 1 D-14193 Berlin	Tel: +49-30-8903 2582 (Secr 2078) Fax: +49-30-8903 2285 E-Mail: wolf.garber@uba.de
Greece	NRC	Michael Petrakis	National Observatory of Athens IMPAAE Lofos Nymfon, Thision GR-11810 Athens	Tel: +30-1-34 90 114 Fax: +30-1-34 90 113 E-Mail: mike@env.meteo.noa.gr
Iceland	NRC	Ólafur Pétursson	Environment and Food Agency Air Pollution Department Ármúla 1a, P.O. Box 8080 IS-128 Reykjavik	Tel: +354-568 8848 Fax: +354-568 1896 E-Mail: olafurp@hollver.is
Ireland	NRC	Michael McGettigan	EPA Regional Inspectorate Dublin St. Martins House, Waterloo Road 4 Dublin Ireland	Tel: +353-1-667 4474 Fax: +353-1-660 5848 E-Mail: m.mcgettigan@epa.ie
Italy	NRC	Franco Desiato	ANPA Via Vitaliano Brancati 48 I-00144 Rome	Tel: +39-06-5007 2969 Fax: +39-06-7725 7005
Liechtenstein	NFP	Petra Bockmühl	National Office for Forests, Nature and Landscape St. Florinsgasse 3 FL-9490 Vaduz	Tel: +41-75-2366 401 Fax: +41-75-236 6411 E-Mail: Petra.Bockmuehl@awnl.llv.li
Luxembourg	NRC	Théo Weber	Administration de l'Environnement, Division Air – Bruit Rue Bender, 1 L-1229 Luxembourg	Tel: +352-405-656 244 Fax: +352-48 5078
The Netherlands	NRC	Dick van Lith	National Institute of Public Health and the Environment P.O. Box 1 3720 BA Bilthoven The Netherlands	Tel: +31-30-274 2498 Fax: +31-30-228 7531 E-Mail: dick.van.lith@rivm.nl
Norway	NRC	Steinar Larssen	NILU P.O. Box 100 N-2007 Kjeller	Tel: +47-63-89 8070 Fax: +47-63-89 8050 E-Mail: steinar.larssen@nilu.no
Portugal	NRC	Filomena Boavida	Direccao Geral do Ambiente Rua da Murgueira – Zambujal P-2720 Amadora	Tel: +351-1-472 8382 Fax: +351-1-471 9074 filomena.boavida@dga.min-amb.pt

EEA Country	Status	Contact person	Institution/Address	Tel./Fax/E-mail
Spain	NRC	Pedro de Pablo Ricote	S.G. de Protección del Medio Atmosferico (MOPTMA) Paseo de la Castellana, 67, E-28046 Madrid Spain	Tel: +34-1-597 7494 Fax: +34-1-597 8515
Sweden	NFP	Ebbe Kvist	Swedish Environmental Protection Agency Blekholtsterrassen 36 S-10648 Stockholm	Tel: +46-8-698 1000 Fax: +46-8-698 1585 E-Mail: ebb@environ.se
United Kingdom	NFP	Paul Swallow	Department of the Environment, Transport and the Regions, Environmental Protection Statistics Division, Ashdown House 123 Victoria Street London SW1E 3DE	Tel: +44-1-71 890 6502 Fax: +44-1-71 890 6489 E-Mail: paul.swallow@nfp-gb.eionet.eu.int

Table B2. National Focal Points of the Phare countries

NPF of	Name	Institution/Address	Tel./Fax/E-mail
Albania	Ermira Basha	National Environmental Agency Bulevardi 'Bajram Curri' AL-Tirana	Tel: +355-42-64 903 Fax: +355-42-65 229/646 32 Email: cep@cep.tirana.al
Bosnia and Herzegovina	Mehmed Cero General Secretary	Federal Ministry for Physical Planning and Environment Marsala Tita 7a BA-71000 Sarajevo	Tel: +387-71-663 548 Fax: +387-71-473 124 Tel/fax: +387-71-522 677
Bulgaria	Yordanka Stoyanova Director	EC Phare PMU Ministry of Environment and Water 67 W. Gladstone Str. BG-1000 Sofia	Tel: +359-2-987 8342 Fax: +359-2-980 3317 Email: pharemew@mail.techno-link.com
Czech Republic	Vaclav Krejci Phare- PMU Coordinator	Foreign Relations Department Ministry of Environment Vrsovicka 65 CZ-100 10 Prague 10	Tel: +420-2-67 122 355 Fax: +420-2- 739 411 Email: Vaclav_Krejci@env.cz
Estonia	Leo Saare Director	Estonian Environment Information Centre Mustamae tee 33 EE-10616 Tallinn	Tel: +372-6-564 151 Fax: +372-6-564 071 Email: saare@ic.envir.ee
F.Y.R.O.M.	Strahinja Trpevski Undersecretary	Ministry of Urban Planning, Construction and Environment 14, Dame Gruev St. MK-91000 Skopje	Tel: +389-91-117 288/ ext. 330 (mobf. 389.70. 220 137) Fax: +389-91-117 163 Email: trpevski@unet.com.mk
Hungary	Pal Bozo Chief Information Officer	Ministry of Environment Fo utca 44-50 HU-1011 Budapest	Tel: +36-1-457 3369 Fax: +36-1-201 4361 Email: pal.bozo@ktm.x400gw.itb.hu
Latvia	Ilze Kirstuka Director	Latvian Environment Data Centre Straumes str. 2, LV-2015 Jurmala	Tel: +371-7-762 282 Fax: +371-7-764 439 Email: Ilze.Kirstuka@vdc.lv
Lithuania	Liutauras Stoskus Head of Science and Environmental Research Coordination Division	Joint Research Centre Ministry of Environmental Protection Juozapavicius Str.9 LT-2600 Vilnius	Tel: +370-2-722 554 Fax: +370-2-723 202 Email: Liutauras.Stoskus@nt.gamta.lt
Poland	Zbigniew Kamienski Deputy Chief Inspector for Environmental Protection	State Inspectorate for Environmental Protection Wawelska 52/54 PL-00 922 Warsaw	Tel: +48-22-8-254 859 Fax: +48-22-8-254 129 Email: zbigkam@pios.gov.pl
Romania	Radu Paunescu European Integration, Programs and International Relations	Ministry of Waters, Forestry and Environmental Protection 12 Bd Libertatii Sector 5 RO-70005 Bucharest	Tel: +40-1-312 2599 Fax: +40-1-312 5507 Email: deipir@menvi.ion.pcnet.ro
Slovak Republic	Jan Jezny Head of Unit	Ministry of the Environment Namestie L'udovita Stura1 SK-812 35 Bratislava	Tel: +421-7-5956 2516 Fax: +421-7-5956 2511 Email: nfpeea@flora.lifeenv.gov.sk
Slovenia	Anita Velkavrh Counsellor to the Minister	Ministry of the Environment and Physical Planning Vojkova 1b SI-1000 Ljubljana	Tel: +386-61-178 4534 Fax: +386-61-178 4051 Email: anita.velkavrh@gov.si