

Topic report 9/2001

Air quality

Annual topic update 2000

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Summary

This report provides an overview of work in the field of air quality conducted in 2000 by the European Topic Centre on Air Quality (ETC/AQ) in cooperation with the Phare Topic Link on Air Quality (PTL/AQ).

Work on the European air quality monitoring network, Euroairnet, and the air quality information system, Airbase, was continued and has resulted in significant improvements. Some progress was made towards harmonisation of data reporting. The ETC/AQ supported the Commission and the Member States in framing and implementing EU legislation, and contributed to indicator-based EEA reports. The ETC/AQ, as part of a consortium, evaluated and explored air pollution outlooks in a pilot study integrating air pollution and climate change issues.

Since 2000 was the final year of this topic centre, this report concludes its series of annual reports. The new European Topic Centre on Air and Climate Change will carry forward activities on air quality, air emissions and climate change.

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 No 933/1999/EC. The main objective of the 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 the 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 (ETC). These ETCs work on behalf of the 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 was extended to 13 central and east European countries and hence covered 31 European countries in total; focus was given to the 10 Phare candidate countries: Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic and Slovenia.

For more information on the EEA and EIONET you are invited to visit the EEA web site (<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 the EEA at the end of 1994. The goal of ETC/AQ is to support the EEA in all its tasks relating to air quality.

A consortium of four institutes was contracted for two consecutive periods, 1995–97 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 supported the ETC leader, Bert Bannink (RIVM).

From October 1999, the Phare Topic Link on Air Quality (PTL/AQ) continued its work under the Phare project ‘Strengthening capacity in Phare accession countries in environmental reporting’.

This PTL/AQ consortium consisted of four partners:

- Czech Hydrometeorological Institute (CHMI), Czech Republic
- Slovak Hydrometeorological Institute (SHMI), Slovak Republic
- Hungarian Meteorological Service (HMS), Hungary
- AEA Technology (AEAT), United Kingdom

The continuation of PTL/AQ activities was built on the already existing organisational structure of Phare EIONET and the EEA work programme and supported further development and strengthening towards the candidate countries on air quality issues. The PTL/AQ continued to actively involve and keep informed NFPs, NRCs and MCEs in these countries on EEA activities related to air quality.

PTL/AQ worked under the technical coordination of the PTL leader, Jaroslav Fiala (CHMI). Its main objectives were:

- to assist the candidate countries in continuing their work on air quality with the EEA;
- to build up activities on the existing set-up and organisational structure of the Phare EIONET and the EEA and support future development in the area of air quality;
- to support these countries on yearly indicator-based reporting for air quality related issues;
- to support further implementation and development of Euroairnet and Airbase in the member countries.

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

The work of the ETC/AQ is derived from the EEA multiannual work programme, and, more specifically in the context of this report, from the EEA Annual Work Programme 2000. The associated ETC/PTL work plans define in more detail tasks, products and time schedules.

The ETC Management Committee, which consisted of the Steering Group and the task leaders, met twice in 2000. Planning and progress of work and ideas for future work were discussed and endorsed.

Information on the work programme, progress and products of the ETC/AQ in 1995 through to 1999 can be found in annual summary reports 1995 and 1996 (EEA topic reports 22/1996 and 5/1997), and annual topic updates 1997, 1998 and 1999 respectively (EEA topic reports 3/1998, 7/1999, and 7/2000). The current report presents a summary of the results of the work in 2000.

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1.3 Primary contact points on air quality

The list of officially appointed national primary contact points (national focal points or national reference centres) for EEA member countries and the list of Phare national focal points are presented in Annex A.

2. Progress in 2000

2.1. General (1)

The work of the topic centre is cooperative and international in nature, so frequent contacts were made with relevant international organisations and a variety of institutions throughout the year.

Inside the EEA, contacts were regular; particularly with EIONET partners and with the European Topic Centre on Air Emissions (ETC/AE). Intensive cooperation was mostly realised during the phase of data delivery by countries, during preparation and implementation of the fifth EIONET workshop on air quality management and assessment, and during the production of indicators for the EEA report *Environmental signals 2001*, for the *TERM 2001* report under the transport and environment reporting mechanism, and for updating of the so-called headline indicators.

Regular contacts were maintained with relevant staff of the Environment DG. ETC experts participated on behalf of the EEA in several advisory, expert and working groups, mostly initiated by the Commission (e.g. on the exchange of information, the framework directive, mercury, metals, PaH).

Cooperation with the Convention on Long-range Transboundary Air Pollution, particularly the EMEP programme, was strengthened further in 2000. A note by the EEA air quality project manager to the EMEP Steering Body on the natural cooperation between the EMEP and EEA was accepted as a basis for further and closer cooperation. The ETC/AQ and EMEP made a joint set of requirements for common reporting software for data delivery by countries to Airbase, the ETC air quality information system and EBAS, the EMEP database. A basis for the data exchange module (DEM) version 4 to be used in the EMEP community thus had been laid.

Collaboration with WHO was mainly through the WHO European Centre for Environment and Health in Bilthoven, providing Airbase data for a European air pollution health impact study. WHO delivered a presentation of the results at the fifth EIONET AQ workshop.

The year 2000 was also the final year of the cooperative Irenie project under the Community telematics applications programme with financial support from the Commission; the ETC finalised reports and demonstrations of DEM version 2 and the Airbase Internet access facility Airview. A revised DEMv3 with more user-friendly options could be produced and made ready for use in 2000, under the Teresa-2 IDA/EINRC framework.

Contacts with air quality research communities included Eurotrac amongst others.

2.2. Air quality aspects of EIONET

National focal points (NFP) and national reference centres (NRC) for air quality were involved in the work of the ETC/AQ in a number of ways.

(1) An overview of products delivered by the ETC, with emphasis on 2000, can be found in Annex B.

Firstly, NFPs 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 fifth EIONET workshop on air quality management and assessment. The ETC/AQ organised this workshop in Prague, Czech Republic in September 2000. A total of 62 participants from 32 European countries, and representatives from the EEA, ETC/AE, the Environment DG, JRC and WHO attended the workshop. (See Box 1).

Previews were given of the draft reports 'Euroairnet status report 2000', and 'Airbase status 2000', both prepared in 2000. The 'Annual topic update 1999' report was announced available at the ETC/AQ Interest Group, to be printed in due course.

In response to a yearly request made by the Environment DG and EEA, NFPs and/or NRCs delivered national air quality data to the ETC/AQ. Most of these were provided under the EU exchange of information decision (EoI) and the EU ozone directive. 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 2000 to some 1 000 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 and stimulating, both by the ETC or PTL and the national experts. Countries visited in 2000 include Sweden and the Netherlands (remaining visits of the 1999 programme), Greece, Italy, Bulgaria, Hungary, Latvia, Poland, Romania and the Slovak Republic.

A major revision of the ETC/AQ web site (<http://www.etcaq.rivm.nl>) was performed in the first quarter of 2000, bringing the site under new EEA templates. Starting in May, regular updates were added during 2000. The site features news and events, information on the EEA, ETC and PTL, newsletters, databases (Airbase, and Internet access facility Airview, the air quality data exchange module (DEMv3), the model documentation system) and a list of reports and publications.

During 2000, a first attempt was made to evaluate the performance of EIONET in exchanging views, information and data regarding the assessment and management of air quality in Europe. A first presentation of results was made at the fifth EIONET AQ workshop and in the ETC/AQ newsletter.

A provisional report is made available at the EEA Circle pages of NFP/EIONET (<http://air-climate.eionet.eu.int/reports>)

Main conclusions of the EIONET/AQ evaluation were the following:

- Considerable progress has been made in terms of process, contents and coverage of exchanging air quality information. Still, there is potential to benefit more from the EIONET/AQ.
- For air quality, most data as presently reported are judged relevant; where adequate networks and reporting systems are in place for 'modern' parameters (such as PM₁₀/2.5, or benzene, metals), economising on the

reporting of 'classic' parameters (such as 'black smoke', or strong acidity) seems possible.

- Data delivery lags behind the process of the framing of new policies at the European level. Rapid extension of existing reporting systems with data on new components is needed for indicators in support of the framing of new policies. Such data, although available at the national level, are not reported sufficiently quickly.

Box 1. The fifth EIONET workshop on air quality management and assessment

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

- Air quality assessments at the European level;
- The accession process: transposition to EU legislation;
- The changing role of EIONET (from BAI to BNI);
- Towards an integrated structure for air pollution and climate change;
- Euroairnet and Airbase/DEM status;
- Data and information flow; harmonisation.

The main conclusions and recommendations of the workshop were:

- A shift is needed toward more integrated and forward-looking information, forming an improved base for framing and implementing policies. There is an increasing need for information that is linked to objectives of policies, both in scenario-based studies and in policy-effectiveness studies.
- The Commission is now setting up the CAFE programme with the following objectives:
 - to review implementation, current air quality, and evidence of effects;
 - to predict trends in economic activity, future emissions and air quality;
 - to propose new /revised AQ-objectives, and cost-effective measures.
- A coherent vision of the Environment DG and EEA on integrated assessment and indicators is growing; contributions are needed from many sides: WHO, WMO, EMEP, JRC.
- The high priority given in the EU to the climate change issue may reduce the attention paid to air quality policies. However, measures to reduce emissions of greenhouse gases may well result in the simultaneous reduction of emissions of air pollutants (spill-over effects).
- Environmental objectives and indicators for progress of current policies should form a basis for data and information collection (best needed information — BNI). The EIONET/AQ evaluation has been based on this approach.
- Best needed information, as defined above, should be collected through international collaboration. A review of current information flows can identify priorities.
- The transposition and implementation of EU legislation by the Phare accession countries is a key process in these countries, and coordinated by national ministries. PHARE accession countries do not have sufficient access to guidance in the relevant EU working groups and other indispensable sources of information and interaction. The EU should give priority to such guidance. Participants adopted a resolution to urge the Commission to take action.

2.3. Ad hoc technical support

On request of the EEA, the 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:

- a presentation given at the VDI Air Quality Conference on Ozone, Braunschweig (8–10 February);
- the Symposium on Urban Air Quality and Traffic Emissions, London (23–24 February);
- a presentation given at the Workshop on Heavy Metals, Italy (8–10 May);

- the EMEP Workshop on Analysis of Ozone Trends, Cologne, (9–11 November);
- a presentation given at the ANPA Symposium, Italy (12 December).

2.4. The air quality monitoring network, Euroairnet

Euroairnet is the acronym for the European air quality monitoring network that is being established by European countries under the coordination of the ETC/AQ. It should form the basis for annual reporting on the assessment of European air quality in preceding year. The network is primarily built on existing sites selected by countries on the basis of criteria formulated by the ETC/AQ, to ensure adequate coverage, quality 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/NRCs to obtain updated information on national networks and stations, and to discuss matters such as selection of stations, selection criteria, data availability, national reporting, etc. In 2000, the ETC/AQ conducted visits to Greece, Italy, Bulgaria, Hungary, Latvia, Poland, Romania, and Slovakia.

In 2000, Euroairnet built on results obtained in 1999, and gradually developed further; several more countries completed their first selection of stations according to developed criteria (EEA technical report 12). A Euroairnet 'Status report 2000' was drafted, and major observations and conclusions were presented at the fifth EIONET AQ workshop. This report contains an evaluation of the Euroairnet selection of all countries, also including a summary report for each of the countries. Some of the main results of this evaluation, summarised over all countries, are the following:

- The Euroairnet criteria for selection of urban areas are largely fulfilled.
- Compound coverage is extensive, but some shortcomings exist, such as coverage of priority compounds on ecosystems and material exposure stations. In relation to 'best needed data' and to relevant indicators, there still is potential for making air quality monitoring in Europe more cost effective.

An important test of the degree of implementation of Euroairnet is the extent of reporting of data from the stations to Airbase (For the level of data reporting, see next paragraph).

2.5. The air quality information system, Airbase

AIRBASE

Airbase is the official information system under the EU EoI decision.

Air quality information and information on monitoring networks and stations, as collected by the ETC/AQ, is stored and made widely available by means of a three-layer air quality information system Airbase, accessible on the Internet ⁽²⁾.

(2) See (<http://www.etcaq.rivm.nl/Airbase/index.html>).

A relational database with the ETC/AQ forms the basic layer of Airbase, and a 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 and information is submitted primarily under the EU exchange of information (EoI) decision and from Euroairnet; the Airbase web pages also incorporate data submitted under the EU ozone directive, as well as air quality data collected for EEA periodical reports.

Data exchange module

A tender by the ETC for financing of the further development of the DEM was successful: the extension of DEM to version 3.0 became part of the contract between TietoEnator and the Enterprise DG.

A questionnaire was sent to all countries supporting Euroairnet, proposing options for next improvements of the DEM. The responses received from six EU countries, six Phare countries and Switzerland determined the final selection. These options were (selected options in bold):

- import module (meta-info and AQ data) for the revised ISO-7168 (1999) extended format;
- batch processing of data files;
- bulk entry of meta-information
- visualisation module for imported time series;
- DEM content overview module;
- multilingual support;
- European (EoI) station identifiers;
- regional copies of DEM;
- improved layout of report function DEM.

DEM version 3.0 was released and made available in June 2000 to the Environment DG for distribution to EU Member States and to EFTA and Phare countries.

Web access

In 2000, bugs in the web access facility Airview were removed. Not all users behind company firewalls can get access to Airview; this remains a matter for attention in 2001.

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 web site. Most aggravating technical difficulties were collected to form a shortlist for future software updates.

Update of Airbase

By November 2000, data on monitoring results obtained in the preceding year were timely received for further processing from 16 countries (eight EU) and could be uploaded onto Airbase; data from five countries (two EU) were received after the deadline and will be uploaded early 2001. Updates not containing 1999 data were received from nine (four EU) countries. No data were received from seven countries (one EU). In more detail:

- Meta-data on 7 032 stations from 31 European countries had been entered into Airbase; updates to 1999 data were received on 4 453 stations from 22 countries.
- The total number of time series for 1999 data delivered to the ETC/AQ before 1 October 2000 did not increase compared to 1998; it stabilised at about 5 600 series.
- Daily 1999 values from 1 505 stations from 16 countries were included in Airbase. This number will still increase as data arriving from six more countries beyond the deadline will be processed.
- Pollutant coverage: sulphur dioxide and nitrogen dioxide reported at about 1 000 stations, ozone at about 700 stations, particulate matter (PM₁₀) and carbon monoxide at about 300 and 500 stations respectively.

Data reporting in relation to Euroairnet:

An important test of the degree of implementation of Euroairnet is the extent of reporting of data from the selected stations to Airbase. After the major improvement of reported data when comparing the 1997 reporting (of 1996 data) to the 1998 reporting (of 1997 data), a further improvement could be obtained in 1999 (1998 data) and again in 2000 (1999 data).

Daily values, monitored in 1999, reported to Airbase by 1 November 2000

	Number of stations	Number of stations SO ₂	Number of stations PM ₁₀	Number of stations O ₃	Number of stations CO	Number of stations NO ₂	Number of countries
Total	1 505	1 037	226	—	—	1 079	16
Eol	784	391	104	—	—	407	10
Euroairnet	553	351	125	—	—	376	13
Eol or Euroairnet	839	430	125	—	—	456	13

Hourly values, monitored in 1999, reported to Airbase by 1 November 2000

	Number of stations	Number of stations SO ₂	Number of stations PM ₁₀	Number of stations O ₃	Number of stations CO	Number of stations NO ₂	Number of countries
Total	1 276	922	113	802	567	1 045	17
Eol	546	372	80	296	188	391	10
Euroairnet	520	293	82	273	172	343	14
Eol or Euroairnet	594	372	82	327	204	423	14

ETC web site

Following the launch of the new EEA web site in 1999 to shape the European Environmental Reference Centre (E2RC) (<http://EIONET.eea.eu.int>), a major revision of the ETC/AQ web pages was carried out in June 2000. Using consistent EEA templates, the ETC/AQ web site including the database section now forms an integral part of the reference centre.

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

Transfer of source codes and IT info to the EEA

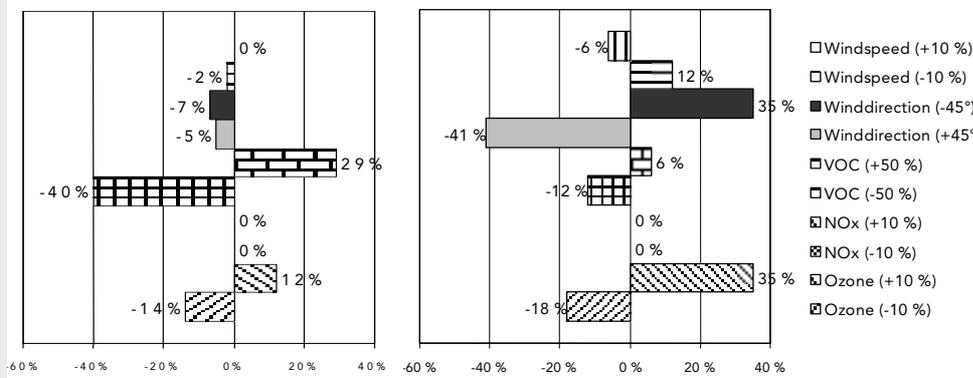
After completion of the inclusion of timely delivered 1999 data, Airbase was copied onto CD-ROMs and transferred to the EEA, together with a copy of its structure, the source codes of the ETC/AQ web pages, and the source code and contents of the air pollution model documentation system.

Box 2. Model uncertainty analysis methodology (MUAM)

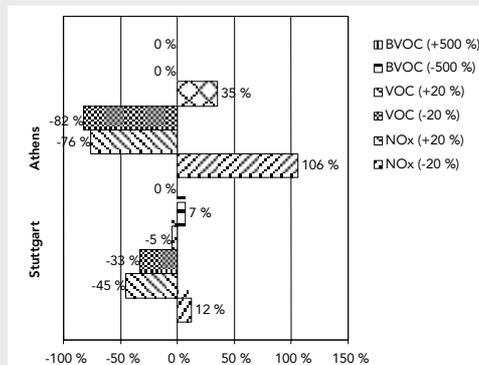
Application of the MUAM using OFIS as an urban scale demonstration model

Effect of input data uncertainties on the prediction of ozone exceedance days in the urban areas of Stuttgart (left) and Athens (right):

(a) Variation of meteorological data and boundary conditions.



(b) Variation of emission data.



Effect of meteorological data uncertainties

A 10 % variation in the wind speed and the variation of the wind direction have a rather small influence on the target value in the case of Stuttgart. On the contrary, the same variations appear to affect substantially the target value in the case of Athens. This stronger dependence is related to the meteorological characteristics of air pollution episodes in the Greater Athens Area. Although most episodes are associated with the development of a sea breeze, the situation is probably even worse in the case of stagnant conditions. Consequently, a relatively small change in wind speed or direction may lead to strong target value changes.

Effect of boundary concentrations uncertainties

In both Stuttgart and Athens, the variation of the NO_x boundary concentrations only has a marginal effect on the maximum 8-h mean ozone concentration and the averaged concentration on exceedance days. This is not surprising in view of the fact that the NO_x fluxes through the boundaries are low compared to the emission strengths. This is, however, not the case of the VOCs (Volatile Organic Compounds), especially in the case of Stuttgart: The impact on the target value may reach the order of the uncertainty. Ozone long-range transport is found to have an even stronger influence on the target value, mainly in the case of Athens.

Effect of emission data uncertainties

The target value appears to be most sensitive to the assumed emission data. In the case of Athens, 20 % lower NO_x emissions may lead to a doubling of the exceedance days, whereas 20 % higher NO_x emissions lead to a target value reduction by more than 75 %. The impact of NO_x emission variations is less pronounced in the case of Stuttgart. Lower VOC emissions are found to have an impact which is comparable to that of higher NO_x emissions in both cities. On the contrary, higher VOC emissions appear to have a relatively small influence on the target value. Finally, there appears to be only a marginal influence of biogenic emission uncertainties on the number of exceedance days.

2.6. Modelling infrastructure and applications

The 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, the ETC/AQ established the air pollution model documentation system ⁽³⁾. The system was further developed and updated in 2000.

Information on uncertainty associated with model results remains essential in this documentation, especially if the model is to be used in policy-oriented air quality assessments. The 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, three presentations were made at the Eurotrac Symposium 2000, in Garmisch-Partenkirchen (27–31 March, 2000) on (i) the methodology for assessing the impact of input data inaccuracies to model output uncertainty; (ii) the evaluation of functionality and comprehensiveness of the model documentation system; (iii) summary of the work on the generalised empirical approach. Furthermore, panel discussions were organised on model quality assurance. The proposed model uncertainty analysis methodology (MUAM) was demonstrated using the exceedance statistics based on the 8-h mean ozone concentration of 120 µg/m³ as an example (see Box 2).

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

Support under the EU exchange of information decision

The ETC/AQ contributed to the ad hoc working group on exchange of information (third meeting: Berlin, 17 and 18 February 2000, Meeting of ad-hoc group to produce guidance paper related to the new modified annexes to the decision: Brussels, 7 December). Contributions were made to the revision of the decision, especially on the procedures in support of the role of the ETC/AQ in the further processing of exchanged data, and contributions to the planning and contents of the guidance note.

Contribution to the EU working group Hg

The ETC has participated and contributed to the EU working group on mercury, established by the steering group air quality.

Contribution to the EU working group PAH

The ETC participated and contributed in the working group on PAH (polycyclic aromatic hydrocarbons), established by the air quality steering group of the Commission.

Participation in EC guidance working group

The guidance working group was established by the European Commission to develop recommendations on assessment of air quality and reporting 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. A final draft

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

of the report, 'Guidance on assessment under the EU air quality directives' was delivered to the Commission in June 2000, with subsequent discussions in the steering group on air quality. The ETC/AQ participated actively in this work.

Support to near real-time ozone information exchange

Unfortunately, developments to produce a thematic web site on ozone, displaying near real-time ozone results from monitoring and modelling efforts across Europe, came to a halt, awaiting external additional financing. However, such funds were obtained during 2000 enabling work to be recommenced in 2001.

Supporting harmonisation of European air quality reporting

Only limited progress was made in the further harmonisation of data submissions by countries to international organisations. For a few years now, air quality data have been submitted to the EU and ETC/AQ by EEA countries and Phare countries. Apart from this, countries have several additional air quality data reporting obligations (to the EMEP, WHO, OECD, etc.). This all builds up to a significant reporting burden in the countries, partly as data reports require different air quality statistics, use of different formats, and follow different procedures. To reduce the reporting burden and minimise duplication, the EEA initiated steps to harmonise the reporting requirements and procedures. In 2000, contacts were made with OECD and EMEP, but no solid actions towards progress could be achieved. A beginning was made by making information available on the Internet on data reporting to Euroairnet/Airbase (which data is to be delivered by whom, to whom, by which date(s), etc.): a draft web site to this end has been designed and opened for discussions with the EEA on contents.

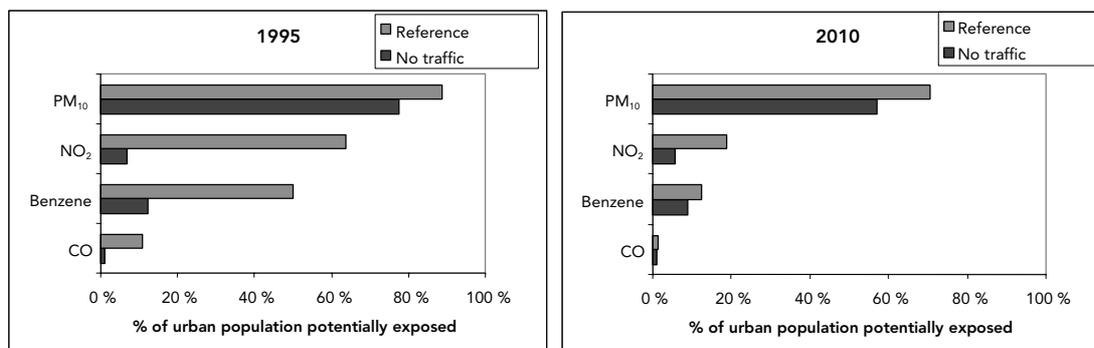
In addition, EC funding was obtained to include EMEP data profiles (reporting in the NASA-Ames format) into the data exchange module (DEM). The EMEP and ETC/AQ completed the specifications for this software revision. The DEM can become the vehicle for a harmonised delivery of data from countries to the EU/EEA and EMEP. However, delivery procedures (dates, deadlines) have yet to be harmonised.

2.8. Contributions to periodical assessment reporting

Transport and environment reporting mechanism (TERM); headline indicators

The ETC/AQ has contributed to indicators on urban air quality within the EU transport and environment reporting mechanism. The contribution is largely based on the results obtained from the generalised empirical approach in the framework of the Auto-Oil II programme. Special work was done to estimate the impact of road transport on the urban air quality. In Figure 2.8.1, the results for 1995 and 2010 are presented.

Figure 2.8.1: Calculated urban population potentially exposed to exceedances of (proposed) EU urban air quality standards. The figure indicates 'potential exposure' as estimates are based on the assumption of exposure for a person permanently in ambient air (i.e. not taking into account the indoor exposure). Results are presented for the reference years 1995 and 2010, assuming the Auto-Oil II emission scenario and under the assumption of zero traffic emissions.



Environmental signals

The regular Environmental signals indicator reports produced by the EEA aim at tracing the progress and accomplishments of environmental policies. The reports are primarily addressed to decision-makers and the general public. Despite expectations, not much progress could be made in 2000 by the ETC in developing a set of stable indicators on air quality, to be selectively used for EEA reporting. The following indicators were updated with recently obtained data from Airbase:

- the exposure of the population in cities of EU Member States to levels of ozone, particulate matter and NO₂ above EC targets;
- the percentages of ecosystem areas exposed to acidification and to eutrophication.

Reporting for the Commission under the EU ozone directive

On request of the Environment DG the ETC has prepared the report 'Air pollution by ozone in Europe in 1999 and summer 2000'. The report was delivered to the Commission in advance of the October meeting of the Environment Council. The report will also be published as an EEA topic report. (Box 3).

Box 3. Air pollution by ozone in Europe in 1999 and summer 2000

The report is based on information reported in the framework of the Council Directive 92/72/EEC on air pollution by ozone and summarises the annual information on ozone monitoring stations and exceedances of ozone threshold values during 1999 and summer 2000 (April–August). In 1999/2000, about 1 300 ozone stations within the EU and 150 stations in other countries were operational.

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

- In 1999 the threshold value set for the protection of human health ($110 \mu\text{g}/\text{m}^3$, 8-h average) was exceeded substantially in all reporting countries. The threshold was exceeded on average on 25 days at each reporting station and during an exceedance the average concentration was about $126 \mu\text{g}/\text{m}^3$.
- In 1999 the threshold values set for the protection of vegetation were exceeded substantially and in almost all EU Member States. The threshold value of $65 \mu\text{g}/\text{m}^3$ (24-h average) was reported to be exceeded substantially (by up to a factor 3), widely (in all reporting countries) and frequently (nearly all countries report exceedances during more than 100 days at one or more of their stations). The threshold value of $200 \mu\text{g}/\text{m}^3$ (hourly average) was exceeded largely and widely (in total 16 countries, 11 EU Member States) on a limited number of days.
- In 1999, exceedance of the threshold value for warning of the population ($360 \mu\text{g}/\text{m}^3$ for hourly values) was reported from eight stations (Spain, Italy, Bulgaria). At least part of the exceedances was possibly caused by interference of malfunctioning of the monitoring system. In 2000, this threshold has not been exceeded. Exceedance of the information threshold value of $180 \mu\text{g}/\text{m}^3$ (1-h average) was reported in 1999 for stations in 19 countries of which 12 were EU Member States. In 2000, exceedances of this threshold value occurred slightly less.

The 1994–98 data submitted under the ozone directive has been re-analysed for a possible trend in statistical parameters (50 and 98 percentiles) and number and severity of exceedances. Time series are relatively short but the data suggest that there might be a small increasing trend in the 50 percentile values. The ozone peak values, expressed as 98 percentile values or as number of exceedance days tend to decrease in the period 1994–98 (see summary table). However, these conclusions must be interpreted carefully as on the short time scales considered here meteorological variations and inter-annual changes may play an important role. The decrease in peak values is most likely caused by the decrease in European ozone precursor emissions since 1990; insufficient data are available to explain the increasing 50 percentile values. Possible explanations are an increase in tropospheric ozone background values caused by a worldwide increase in CH_4 , CO and NO_x emissions or a reduced ozone titration by reduced NO_x emissions on the local scale. The data submitted under the ozone directive is insufficient to provide firm conclusions on this point.

Summary of trend evaluation of 50 and 98 percentile values of hourly averaged concentrations and of number of exceedance days of the threshold levels of $180 \mu\text{g}/\text{m}^3$ (1 h), $110 \mu\text{g}/\text{m}^3$ (8 h) and $65 \mu\text{g}/\text{m}^3$ (24 h); monitoring period 1994–98 (de Leeuw, 2000).

	50 P	98 P	$180 \mu\text{g}/\text{m}^3$ (1 h)	$110 \mu\text{g}/\text{m}^3$ (8 h)
Number of reporting stations	1 269	1 269	1 382	1 207
Number of stations with four or five monitoring years	575	575	609	559
Number of stations with significant upward trend	50	6	2	7
Number of stations with significant downward trend	8	110	32	107
Number of stations in compliance with threshold during the period 1994–98	—	—	63	1

Air quality in Europe

For 1997 and 1998 data, as reported under the exchange of information decision (EoI), reports on air quality in Europe have been prepared by the ETC. To streamline reporting and reduce the number of reports to be produced, the 1999 EoI-data will be discussed in a newly defined report on air quality in Europe, to present and discuss EoI-data, data acquired under the ozone directive, and comparable data from non-EU countries in Europe (EFTA and Phare countries reporting such data voluntarily). Under the 2000 work programme, therefore, a memo was prepared containing a proposal for such a report, by means of an annotated table of contents. The prepared note reflected discussions, in which two alternative lines of thought were followed: in one approach, preference is given to

presenting considerations per air quality parameter, in the alternative approach, analysis should follow the DPSIR assessment framework, that should provide information better tuned to the needs of policy-makers. To aid the new ETC in producing such a report, the ETC/AQ already produced tables, graphs and maps based on the EoI/Euroairnet information received on data measured in 1999.

Air pollution outlooks — An evaluation

The EEA initiated a study to evaluate and appraise its past experience in environmental projections underpinning the report 'Environment in the European Union at the turn of the century'. The study was conducted by a consortium of the ETC/AQ (RIVM, ATh), IIASA, NTUA and the ETC/AE (TNO, ATh). Box 4 provides more information.

Box 4. (Part 1) Air pollution outlooks — An evaluation

The study was set up to evaluate and appraise EEA experience in environmental projections underpinning the report 'Environment in the European Union at the turn of the century'.

The study consolidated the experience gained and helped to outline a long-term strategy for integrated assessment/prospective analysis. The study focused primarily on air quality (urban and transboundary) and greenhouse gas emissions. The main effort was focussed on learning, using and improving the integrated assessment methods and tools, and producing projections for an updated scenario (ShAIR) on air pollution and greenhouse gases based on the shared analysis scenario. The main findings of the ShAIR scenario are listed below. The recommendations on the strategy helped the EEA in defining the work programme for the new European Topic Centre on Air and Climate Change.

Greenhouse gases

In the ShAIR scenario, the emission of the six greenhouse gases for the EU as a whole are in 2010 about 4 % above the 1990/1995 level, and hence significantly above the Kyoto goal of – 8 %. This is mainly due to a rise in CO₂ emissions in the period of 1990 to 2010 by about 7 %. The EU-ACEA agreement on CO₂ emissions of cars was not included in ShAIR: this might result in an emission reduction of 2 %. The emissions of CH₄ and N₂O decline significantly in the same period, while the emissions of HFC, PFC and SF₆ rise.

The projected greenhouse gas emissions are lower than in the baseline projection of the turn of the century report; this is due to the use of a more recent energy scenario and the inclusion of new policies and measures for CH₄ and N₂O.

The shared analysis energy scenario has, as part of the study, been updated on energy prices and taxes, transport volume and inclusion of the EU-ACEA agreement (a voluntary agreement between EU and car manufacturers). This results in about 2 % fewer CO₂ emissions in the year 2010 than in the ShAIR scenario.

On the basis of the updated energy scenario, two variants have been considered: a further liberalisation of the electricity markets and more optimistic assumptions on renewables. The further liberalisation of the electricity market does affect the fuel mix, but the CO₂ emission total remained almost unchanged. With more favourable assumptions on the technical and economic performance of renewables, the share of wind energy in 2010 might be more than 50 % higher than in the updated scenario. The effect on CO₂ emissions is a reduction of 1 % in 2010. In 2020, the extra renewables input results in a decrease of CO₂ emissions of about 5 % compared to the updated scenario.

Box 4. (Part 2) Air pollution outlooks — An evaluation (continued)

Transboundary air pollution

The emissions of SO₂, NO_x, VOC, NH₃ and PM10 in 2010 decrease considerably compared to 1990. However, in the ShAIR scenario, the ceilings of the Gothenburg Protocol for these substances under current legislation are not met by a number of countries within and outside the EU. Main discrepancies between current legislation and the Gothenburg objectives occur in the emission of VOC and SO₂ in the EU Member States.

The emission projections in the ShAIR scenario show lower emission levels than the turn of the century baseline scenario. This is due to recent legislation, the inclusion of the Gothenburg Protocol and, a little, to lower energy projections. A comparison of the transport emissions in ShAIR with the baseline Auto-Oil II scenario shows differences in 2010 of about 10 % for NO_x and 15 % for VOC for nine EU countries. These differences are due to differences in the energy figures for the base year 1990 and to differences in sectors included.

The emission reductions result in a substantial improvement in the indicators for acidification and ozone. Eutrophication will, however, remain a problem even after 2020. This is due to the limited controls put on ammonia emissions. According to the ShAIR scenario, in 2020 more than 50 % of nitrogen deposition in Europe will originate from ammonia emissions.

An anticipated implementation of EU environmental legislation by accession countries, especially for the transport sector, will play a decisive role for their future emission levels. The emission reductions in the accession countries have also a positive impact on the state of the environment in the present EU Member States.

Urban air quality

In the ShAIR scenario, urban air quality is strongly improving but violation of (proposed) air quality objectives are still expected in 2020. Major problems with SO₂ exposure are found in eastern Europe; in a limited number of cities, a major deterioration in air quality between 2010 and 2020 is projected. The estimated number of excess deaths attributed to SO₂ exposure shows a sharp decrease between 1990 and 2010; over the 2010–20 period, a further decrease to about six excess deaths per 100 000 inhabitants is estimated. Compared to the scenarios developed for turn of the century and Auto-Oil II, the current results show more exceedances.

Sensitivity calculations show that the modelled concentrations are sensitive to meteorological conditions (for SO₂ concentration this is about 6 % for annual mean and 10 % for the 98-percentile). However, in considering compliance with air quality objectives, the sensitivity will depend strongly on the ratio between threshold value and current concentrations. The required reduction in urban emissions needed to meet the air quality objectives may vary up to 50–60 % depending on the selected meteorological year.

Improving the model network

Improvement of models themselves is costly and time consuming, and not within reach of the EEA work programme itself. However, the EEA could support model development by focussing on the consistency and coherence of the model and the institutional network.

Future baseline projections can be made by means of the model network used for the ShAIR scenario. However, the model network needs several improvements, such as:

- adding a model on agriculture scenarios;
- adding a model on non-CO₂ greenhouse gases;
- expanding the greenhouse gas models to all European countries;
- integrating PM in the model network;
- improving the link between transboundary and urban air quality:
- improving the link between the energy model and RAINS;
- improving the consistency between energy and transport models;
- improving the module on urban emissions;
- obtaining a better understanding of the state of current policies and measures.

Annex A: National primary contact points on air quality

Table A1: 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) 31304-54 00 E-mail: mayer@ubavie.gv.at
Belgium	NRC/ NFP	Alain Derouane	IRCEL/CELINE Avenue des Arts 10-11 B-1210 Brussels	Tel. (32-2) 227 57 01 Fax (32-2) 227 56 99 E-mail: nfp@irceline.be
Denmark	NRC	Niels Zeuthen Heidam	Danmarks Miljøundersøgelser Frederiksborgvej 399 DK-4000 Roskilde	Tel. (45-46) 30 12 00 Fax (45-46) 30 11 14 E-mail: nzh@dmu.dk
Finland	NFP	Tapani Säynätkari	Finnish Environment Institute P.O. Box 140 FIN-00251 Helsinki	Tel. (358-9) 40 30 06 64 Fax (358-9) 40 30 06 90 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 20 43 Fax (33-2) 793 23 31
Germany	NRC	Wolf Garber	Umweltbundesamt, Deutsche Kontaktstelle EEA für Luftqualität Bismarckplatz 1 D-14193 Berlin	Tel. (49-30) 89 03 25 82 (Secr. 2078) Fax (49-30) 89 03 22 85 E-mail: wolf.garber@uba.de
Greece	NRC	Michael Petrakis	National Observatory of Athens IMPAE Lofos Nymfon, Thision GR-11810 Athens	Tel. (30-1) 349 01 14 Fax (30-1) 349 01 13 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 88 48 Fax (354) 568 18 96 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 44 74 Fax (353-1) 660 58 48 E-mail: m.mcgettigan@epa.ie
Italy	NRC	Franco Desiato	ANPA Via Vitaliano Brancati 48 I-00144 Rome	Tel. (39-6) 50 07 29 69 Fax (39-6) 77 25 70 05
Liechtenstein	NFP	Petra Bockmühl	National Office for Forests, Nature and Landscape St. Florinsgasse 3 FL-9490 Vaduz	Tel. (41-75) 236 64 01 Fax (41-75) 236 64 11 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) 405-656244 Fax (352) 48 50 78
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 24 98 Fax (31-30) 228 75 31 E-mail: dick.van.lith@rivm.nl
Norway	NRC	Steinar Larssen	NILU P.O. Box 100 N-2007 Kjeller	Tel. (47-63) 89 80 70 Fax (47-63) 89 80 50 E-mail: steinar.larssen@nilu.no
Portugal	NRC	Filomena Boavida	Direcção Geral do Ambiente Rua da Murgueira – Zambujal P-2720 Amadora	Tel. (351-1) 472 83 82 Fax (351-1) 471 90 74 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 74 94 Fax (34-1) 597 85 15
Sweden	NFP	Ebbe Kvist	Swedish Environmental Protection Agency Blekhölmsterrassen 36 S-10648 Stockholm	Tel. (46-8) 698 10 00 Fax (46-8) 698 15 85 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. (44-20) 78 90 65 02 Fax (44-20) 78 90 64 89 E-mail: paul.swallow@nfp-gb. EIONET.eu.int

Table A2. 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) 649 03 Fax (355-42) 652 29/646 32 E-mail: 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) 66 35 48 Fax (387-71) 47 31 24 Tel/fax (387-71) 52 26 77
Bulgaria	Yordanka Stoyanova Director	EC Phare PMU Ministry of Environment and Water 67 W. Gladstone Str. BG-1000 Sofia	Tel. (359-2) 987 83 42 Fax (359-2) 980 33 17 E-mail: pharemew@mail.techno-link.com
Czech Republic	Vaclav Krejci Phare- PMU Coordinator	Foreign Relations Department Ministry of Environment Vrsovicke 65 CZ-100 10 Prague 10	Tel. (420-2) 67 12 23 55 Fax (420-2) 73 94 11 E-mail: Vaclav_Krejci@env.cz
Estonia	Leo Saare Director	Estonian Environment Information Centre Mustamae tee 33 EE-10616 Tallinn	Tel. (372-6) 56 41 51 Fax (372-6) 56 40 71 E-mail: 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) 11 72 88-330 (mob. (389-70) 22 01 37) Fax (389-91) 11 71 63 E-mail: trpevski@unet.com.mk
Hungary	Pal Bozo Chief Information Officer	Ministry of Environment Fo utca 44-50 HU-1011 Budapest	Tel. (36-1) 457 33 69 Fax (36-1) 201 43 61 E-mail: pal.bozo@ktm.x400gw.itb.hu
Latvia	Ilze Kirstuka Director	Latvian Environment Data Centre Straumes str. 2, LV-2015 Jurmala	Tel. (371-7) 76 22 82 Fax (371-7) 76 44 39 E-mail: Ilze.Kirstuka@vdc.lv
Lithuania	Liutauras Stoskus Head of Science and Environmental Research Coordination Division	Joint Research Centre Ministry of Environmental Protection Juozapaviciaus Str.9 LT-2600 Vilnius	Tel. (370-2) 72 25 54 Fax (370-2) 72 32 02 E-mail: 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) 825 48 59 Fax (48-22) 825 41 29 E-mail: 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 25 99 Fax (40-1) 312 55 07 E-mail: deipir@menviron.pcnet.ro
Slovak Republic	Jan Jezny Head of Unit	Ministry of the Environment Namestie L'udovita Stura1 SK-812 35 Bratislava	Tel. (421-7) 59 56 25 16 Fax (421-7) 59 56 25 11 E-mail: 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 45 34 Fax (386-61) 178 40 51 E-mail: anita.velkavrh@gov.si

Annex B: ETC products in 2000

Reports published by the EEA in 2000

Air pollution by ozone in Europe in 1998 and summer 1999 — Topic report No 10/2000

This report is based upon data submitted to the European Commission under Directive 92/72/EEC on air pollution by ozone. In this topic report, the annual 1998 and summer 1999 reports as presented to the Commission are reproduced in an updated version. New information that became available after the preparation of the initial separate reports to the Commission has been included in this topic report. *Published 20.11.2000.*

Air quality annual topic update 1999 — Topic report No 7/2000

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. *Published 10.10.2000.*

Evaluation of the air quality model documentation system — Technical report No 48

The Internet air quality model documentation system (MDS) has been developed by the ETC/AQ to provide information and guidance to users in selection of air pollution models for a specified application. After three years of operation, its functionality and utility is evaluated through a survey of its users. The report summarises answers to a questionnaire from 41 respondents. *Published 4.10.2000.*

Air pollution — Environmental signals 2000 (Chapter 10)

The fifth environmental action programme emission reduction targets for 2000 will be achieved for sulphur dioxide, but are unlikely to be met for nitrogen oxides and volatile organic compounds (VOCs). The proposed EU and national 2010 targets for sulphur dioxide appear achievable, but reaching those for nitrogen oxide, ammonia and VOC emissions will require substantial further reductions and additional policies and measures in most Member States. *Published 2.5.2000.*

Workshop proceedings — Fourth EIONET workshop on air quality management and assessment — Technical report No 57

The fourth EIONET workshop on air quality management and assessment was held in Santorini 23 and 24 September 1999. This report deals with the discussions on the current European air quality issues and the work of the European Topic Centre on Air Quality (ETC/AQ) and its partners in the Phare Topic Link on Air Quality (PTL/AQ) with institutions and experts from European countries, the European Commission, and with collaborating international institutions. *Published 31.5.2001.*

Air pollution by ozone in Europe in 1999 and the summer of 2000 — Topic report No 1/2001

This report is based upon data submitted to the European Commission under Directive 92/72/EEC on air pollution by ozone. It summarises the annual information on ozone monitoring stations and exceedances of ozone threshold values during 1999 and gives a first evaluation of the observed exceedances of the thresholds during the summer of 2000 (April–August). The analysis for the year 1999 presented in this report is based on information made available not later than 18 August 2000. *Published 28.6.2001.*

Air quality in larger cities in the European Union — Topic report No 3/2001

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

Reports submitted to the EEA for publication in 2001

- *Air pollution outlooks — An evaluation — Integrated assessment methodologies and tools applied to air pollution and greenhouse gases* (edited final draft, December 2000), five technical background reports were produced, underlying this overall report:
 - Cofala, J., C. Heyes, Z. Klimont, M. Amann (2000), 'Integrated assessment of acidification, eutrophication and tropospheric ozone impacts in Europe', IIASA, Laxenburg, Austria.
 - Capros, P., N. Kouvaritakis, L. Mantzos (2000), 'Projections for energy related CO₂ emissions in the EU', NTUA, Athens, Greece.
 - Woerden, J. (2000), 'Mapping and documentation of information streams, data flows and models for climate change, acidification, urban air quality', RIVM, Bilthoven, the Netherlands.
 - De Leeuw, F., N. Moussiopoulos (2000), 'Partial sensitivity analysis of urban air quality', ETC/AQ.
 - Turlou, P. M., Z. Samaras (2000), 'Task B.3 Partial sensitivity analysis', ETC/AE, LAT/AUTH, Thessaloniki, Greece.
- 'Euroairnet 1999 status report'.
- 'Airbase. The EEA air quality information system. 1999 status and developments foreseen'.
- 'European air quality in 1997' (final draft, 10 March 2000; pilot version).
- 'Technical EoI report on the 1998 reporting cycle' (1997 data/meta-data).
- 'European air quality in 1998' (final draft, 10 November 2000).
- 'Technical EoI report on the 1999 reporting cycle' (1998 data/meta-data).
- 'Criteria for selection of models applied by the ETC/AQ', technical report.

Draft reports presented at the fourth EIONET workshop

- 'European Air Quality in 1998'.
- 'Pan-European 2000 status report on Euroairnet'.
- 'Airbase. The EEA air quality information system. 2000 status and developments foreseen', fourth EIONET workshop on air quality management and assessment. Prague, 18 and 19 September 2000.
- 'Technical report on meta-information and air quality data collected for 1998'.

Other draft reports/ contributions submitted to the EEA

- 'A draft note on the possible future contribution of the ETC to CAFÉ'.
- 'A draft note containing the annotated contents of future reports on air quality in Europe'.
- 'Country visit reports on visits to Italy and Greece'.

Papers/posters presented in 2000

- ‘Exceedance of EC ozone thresholds in Europe in 1997’, Frank de Leeuw, VDI Symposium on Tropospheric Ozone, Braunschweig, 8 and 9 February.
- ‘The generalised empirical approach (GEA) for assessment of air quality for larger conurbations in the European Union’, Peter Sahm, Nicolas Moussiopoulos, Frank de Leeuw, Alena Bartonova, Eumetnet workshop on ground-level ozone forecasting, Langen (D), 21–23 February.
- ‘Urban air quality: European assessment of local pollution’, Frank de Leeuw, Symposium on Health effects of Vehicle Emissions, London, 23 and 24 February.
- (i) ‘The methodology for assessing the impact of input data inaccuracies to model output uncertainty’; (ii) ‘The evaluation of functionality and comprehensiveness of the model documentation system’; (iii) ‘Summary of the work on the generalised empirical approach’, Nicolas Moussiopoulos, Eurotrac Symposium, Garmisch-Partenkirchen, 27–31 March.
- ‘Emissions and air pollution by heavy metals — recent European assessments; from the perspective of the European Environment Agency’, Knut Breivik, Roel van Aalst, workshop on harmonisation of sampling and analysis methods for heavy metals, Ispra, Italy, 8–10 May.
- ‘Ozone trends and policy implementation’, Frank de Leeuw and Roel van Aalst, EMEP workshop on ozone trends, Cologne, 9 and 10 November.
- ‘Trends in ground level ozone concentrations over Europe in 1994–99’, Frank de Leeuw, EMEP workshop on ozone trends, Cologne, 9 and 10 November.
- ‘Europe’s atmospheric environment and the European Environment Agency’, Nicolas Moussiopoulos, ANPA Symposium on the Final Results of Meteonet, Rome, 12 December.

Other products delivered in 2000

- The web sites of the ETC/AQ and PTL received a thorough revision; Airview 2.0-beta was included.
- The ozone exceedances summary table, summer season 2000, was updated on the ETC web pages.
- ETC/AQ Newsletter No 9 and No 10 were prepared and sent to 1 000 subscribers.
- AQ-DEM v3 was shipped to all EU, Phare and EEA countries. A fully revised DEM manual was included. DEM web pages were revised.
- Model documentation system updated (version 3.1); usage statistics updated.
- Papers on MDS evaluation, on model uncertainty analysis and on the generalised empirical approach (GEA) were submitted for inclusion in the proceedings of the Eurotrac Symposium.
- The draft Euroairnet web pages were delivered to the EEA, pages to facilitate the harmonised data delivery by Member States.
- A complete back up was prepared on CD and sent to the EEA of Airbase (structure and data), DEMv3, MDS (structure and info), and the ETC/AQ web site.