PROCEEDINGS

Twelfth EIONET Workshop on Air Quality Management and Assessment

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European Topic Centre
on Air and Climate Change

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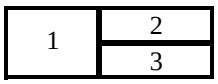

1. Pollution information board at Nicosia (S. Kleanthous)
2. Cyprus mosaic (S. Larssen)
3. Participants on excursion (S. Kleanthous)

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SUMMARY

The EIONET workshop on Air Quality Assessment and Management represents the annual meeting place between Member Country representatives, EEA, the ETC/ACC, and associated and interested institutions for exchange of news, results of studies and the activities of the annual work programme of the ETC/ACC. The 12th EIONET workshop was held in Limassol in Cyprus on 15-16 October, 2007. There were 76 participants from 29 countries and 9 organisations. 24 presentations were made in 5 sessions.

The workshop was hosted by the Department Of Labour Inspection (DLI) of the Cyprus Ministry of Labour and Social Insurance. The Local organiser, Mr. Savvas Kleanthous, DLI welcomed the participants on behalf of the Minister of Labour and Social Insurance.

The participants where then welcomed by Mr. Jeff Huntington, the Head of the EEA Environmental Assessment Programme. He underlined the need to continuously improve information to policy-makers and the public in the field of air quality, and emphasised the fundamental importance of cooperation within the EIONET and the support of the ETC/ACC in achieving this goal.

Session 1 dealt with air quality directives and data reporting. *An update from the Commission* stated that although 40% of zones and agglomerations in Europe had exceedances of limit and target values, infringement procedures will not be commenced pending the new Directive, which was to have the 2nd reading in the Parliament in mid December 2007. In the future more emphasis will be put on exposure reductions rather that limit value compliance, and it recognised that there are needs to improve guidance on assessment methodologies.
The *data exchange group (DEG)* is developing the new reporting provisions. More emphasis will be put on IT solutions and near-real-time data reporting.
The *4th daughter directive preliminary assessments* revealed methods and assessment inconsistencies: The spatial coverage of data reporting on heavy metals and PAH is still not good enough to assess the European situation.
The 'Air Pollution in Europe 1990-2004' Report was launched at the workshop. The report presents and analyses changes in air pollutant emissions and their possible health or ecosystem impacts in Europe covering the period 1990–2004. Although emissions of all air pollutants fell substantially during the period 1990–2004 in the 32 EEA member countries (EEA-32), resulting in improved air quality over the region, ambient concentrations of particulate matter and ozone have not shown any improvement since 1997, despite the decrease in emissions. Possible reasons for the discrepancy are discussed in the report.
The *PM10 concentrations in the Netherlands* are so high that they stifle infrastructure and economic development. It revealed that the lack of harmonised data treatment procedures after monitoring affects strongly the reported concentrations and the exceedance assessment.

The main topic of the Session 1 discussions was on the need to harmonise the data treatment procedures after the monitoring, triggered by the Dutch PM10 presentation. The Commission should take the responsibility for bringing this topic further.

Session 2 dealt with the Air Quality data flows. By 11 October, *the 2006 EoI data* had been reported to AirBase by 29 Member Countries. The data should be freely available by 1 March 2008, after QA/QC procedures and country feedback. Various IT- and data quality related issues were discussed.

Plans for *future AirBase improvements* were presented. AirView has been further developed by EEA , now called AQ Viewer, of which there exist a test version, also coupled to Google Earth for improved mapping facilities. A request was to allow for separate data dumps of meta data, since the full data dumps for large countries are very large, and time and work consuming.
The mapping of the air quality zones in Europe is a very complicated process. Of importance is e.g. the consistent use of zone coding, and that the spatial scale precision of country and zone borders should (must) match. The presentation gave some of the important points that the countries must adhere to when reporting zone data.
The *Air Quality reporting questionnaire*, now an unprotected excel book with 67 sheets, needs improvement and better guidance to reduce trivial as well as non-trivial errors and shortcomings. Some countries reported having produced software for automatically filling of the Q.
In order to contribute to improving the timeliness and correctness of the countries' monthly *summer ozone data reporting*, the presentation gave information on QA/QC procedure of the summer ozone data processing, common inaccuracies and mistakes in the delivered data, suggestions for improving, as well as preliminary 2007 summer results. The data suppliers are asked to correct inconsistencies and errors (i. e. upload amended reports) in feedback reports on CDR (Central Data Repository).
The use of the near-real-time ozone data reporting to the ozone web also for the summer ozone reporting is a topic being discussed at the EEA. An example using data from the Netherlands indicated that this could be done with acceptable accuracy.
The Shared Environmental Information System (SEIS) is being developed at EEA. The different main environmental data flow infrastructures in Europe, INSPIRE, GMES and SEIS have different focus; INSPIRE: infrastructure and obligation; GMES: Services and business; SEIS: Contents. The first step in the SEIS development is the development and implementation of the Air Data Centre . This will be developed with assistance from ETC/ACC, NRCs, DGENv, Eurostat and JRC. The 2008 projects related to this are: the extension of the ozone web (n-r-t summer ozone and PM), as well as the AQ data service (the Questionnaire data flow and AirBase), and GHG indicators and assessments.
The presentation on *the Cyprus air pollution situation* showed that PM is the main air pollution problem on the island, exceeding AQ Limit values considerably, due to both local exhaust and dust resuspension sources and Sahara dust episodes. Cyprus has a established state-of-the-art national monitoring and near-real-time data dissemination system. Plans and programmes for reducing the air pollution exposure have been developed.

Main topics in the **Session 2 discussions** were on the SEIS and on the representation of AQ in zones on zone maps.
Some countries indicated a reluctance to take on the extra work it would be to fill SEIS with contents, on top of the INSPIRE work. The EEA says clearly the need to cooperate with the MS on this, and also sees the need to bring INSPIRE, SEIS and GMES together in terms of data flow and contents work.
Another important discussion point was on the representation of air quality in the zones. In AQ zone maps, sometimes large zones show up red while exceedances are limited to hot-spots. Should zone boundaries be defined in a way so that the actual exceedance area is better represented? The present way was considered by many as not a proper way to show exceedance maps. In some countries zone are redefined regularly according to the actual exceedance area.

Session 3 dealt with the exchange of near-real-time data in Europe. *GMES Atmosphere services* of interest to EIONET include Air Quality, Climate forcing, Ozone and UV.
PROMOTE is a GMES Atmosphere service element project dedicated to provide air quality related services. So far 60 AQ related service level agreements have been set up.
The *ozone web status and plans* were presented. Most countries except Balkan countries deliver ozone data to the web now. The case for using n-r-t data as a vehicle for summer ozone reporting was strengthened by presenting an analysis covering 6 countries. The 2008 plans include to set up a n-r-t- summer ozone pilot reporting, and also include a n-r-t PM10 reporting pilot. Countries were asked to sign up for the n-r-t summer ozone pilot.
COST ES602 "Towards a European Network on Chemical Weather Forecasting and Information Systems " focuses on AQ forecasting and to effectively disseminate the forecasts. It is obvious that as far as input data are concerned, this activity needs to feed off from the same data flows as the near-real-time flows used and established by the EEA. It is obvious that EEA needs to link to this COST activity to ensure coordination and avoid duplication, and also to join forces regarding data provision. Each member country should also consider to take part.

The session 3 discussion centred around the ozone web and the possibilities for using the near-real-time ozone data reported to the web as basis for the summer ozone reporting.

Session 4 was on the EIONET air quality modelling network. The European Environment Agency (EEA) and the European Commission Joint Research Centre (JRC) were activated in 2006 towards setting up a Modelling Network to promote synergy between the users of AQ models at a local and national level and model developers, as well as exchange of relevant information. As a result, ETC/ACC has a task to establish an EIONET modelling network, while JRC has activated a network of modellers to improve on the scientific and quality of results of AQ models for regulatory purposes.
EEA and JRC have agreed to form a common network with common goals. The objectives and plans for the activation of the network was presented by ETC/ACC and JRC.

In the discussion, important points where raised by the participants:
- On the usefulness of CITY-DELTA results for assessment purposes, since in AQ assessments and exceedance discussions one quickly gets down to the very local scale.
- How to ensure that this network activities do not replicate work already done.
- The importance that the network should NOT constrain the use of models rather it should ENABLE model use.
- Whether other assessment tools that dispersion models would be considered, such as mapping approaches.
- Whether the data currently in AirBase is sufficient for model the validation activities foreseen.

These points will be taken on board in the following activities to activate the network. The first network assembly is planned for Spring 2008.

Session 5 dealt with air quality assessment by monitoring and modeling and combination. A common topic in this session was the spatial assessment and mapping of air quality.

Under a EC service contract, UBA-Wien had attempted to set up *a classification scheme for AQ monitoring stations* using surrogate data such as emissions density and activity data such as traffic and domestic heating, and had also developed and tested station representativeness definitions.
The presentation *on 'Spatial mapping of air quality for European impact assessments'* showed examples of development of exposure distributions (for health and ecosystem effects) as well as effects assessments, based upon spatial mapping and detailed additional data, such as population data, including its stratification (age groups).
One presentation showed how land cover and traffic density data can be used as a means to specify representativeness of stations, as well as to down-scale modelling results for comparison with measurements.
The presentation 'New web tools for mapping of air quality at different scales in Europe – illustrative examples of near-real-time applications' showed examples of mapping of urban and local concentrations based upon modelling. Emphasis was put on the need to conform with the new AQ and INSPIRE directives' requirements regarding data reporting, sharing and spatial assessments in zones.

In the discussion, the potential great benefit from satellite derived data was underlined, and its importance for basic research and for modelling support. The Agency and EIONET should state as clearly as possible what services are needed. It was a view that what is needed is not delivery of actual data, rather what is needed is developed assessment products. The EIONET community should express what type of products they need from the data.

Conclusions and recommendations

- The presentation of Implementing Provisions (IP) being developed by the DEG briefed the NRCs participating at the workshop on the expected modification of air dataflows of the CAFE directive. It was appreciated as important communication to the NRCs which will be responsible for the practical implementation of a data exchange decision based on IP.
- The need was seen to strengthen further the cooperation with AQUILA with relevant inputs to the DEG (harmonisation of reporting of metadata on measurement method/configuration ~ DL, uncertainty of methods reported to Comm./AirBase) with the ultimate goal to improve quality of European assessments.
- 4th DD Preliminary assessments (PA) evaluation indicated discrepancy in the EoI reporting of 4th DD pollutants and in the AQ data presented in PA. The spatial coverage should be improved as well as the quality of the reported data, such as application of reference methods or demonstration that equivalent methods are used.
- Participants identified an increasing need to further harmonise assessment procedures and reporting required according to AQ FWD – questionnaires (2004/461/EC) and see important role of EEA (and ETC/ACC).

- GMES bureau should liaise actively with EIONET through EEA to ensure that its pilot atmosphere projects do not duplicate existing in-situ infrastructures and address gaps in an efficient and effective way as well as making best use of existing environmental information capacities and standards". Participants were requested to get in touch with their GAC representatives, in particular to review the outcomes of the September Council on in-situ.

- Countries interested in making use of near real-time ozone data to replace the monthly and seasonal ozone reporting were requested to provide feedback on

the requirements document in preparation for a pilot in 2008, and to consider actively participating in the determination of requirements as well as in the pilot.

Contents

INTRODUCTION

The presentations and background documents at the workshop can be found at this link: http://air-climate.eionet.europa.eu/docs/meetings/071015_12th_EIONET_AQ_WS/meeting071015.html.
Abstracts from the presentations have been included in the sections below; please consult the slides in the web link above for details of the presentations.

Web links to each presentation are also included under each presentation abstract. Do revisit them, there is lots of information there.

A section summary is presented at the start of each section chapter. Discussions, questions and answers are also summarised.

Opening of the meeting

Savvas Kleanthous

On behalf of the Minister of Labour and Social Insurance Savvas Kleanthous welcomed the participants. Hosting of the workshop has been made possible thanks to the logistic and financial support of the Cyprus Ministry of Labour and Social Insurance, the Electric Authority of Cyprus (EAC), the Cyprus Telecomunication Authority (CYTA) and the Cyprus Tourism Organisation (CTO)

Welcome, scope and goal of the meeting

Jeff Huntington, EEA

The Head of the EEA Environmental Assessment Programme, Jeff Huntington, welcomed participants to the workshop and expressed his personal pleasure in being in Cyprus again. While recognising the good work already done he

- underlined the need to continuously improve information to policy-makers and the public in the field of air quality
- emphasised the fundamental importance of cooperation within the Eionet and the support of the ETC/ACC in achieving this goal.

He informed participants of the latest achievements in the development of the Shared Environmental Information System for Europe (SEIS) and of the EEA as data centre for five thematic areas (air, climate change, water, biodiversity and land use). EEA activities in 2008 will continue to evolve around the development of the air data centre focusing on collection, management, quality-assurance and web presentation of air emission and air quality data. This process has been constantly improving over the last years, due to the efforts both of the member countries and of the EEA together with the ETC/ACC. Attention will be paid to consolidating and expanding the near-real time air quality data exchange as a substantial component of SEIS and to streamline this activity with summer ozone exceedance reporting linked to the ozone data website (http://www.eea.europa.eu/maps/ozone/map).

Finally, he reminded participants of the latest outputs from the EEA based on air quality data provided by AQ NRCs: Summer ozone report, Belgrade report, and Air pollution report.

Jaroslav Fiala (EEA)

then welcomed the participants on behalf of Air and Transport group of EAS programme. He mentioned that the 12th EIONET AQ workshop was his last AQ workshop in his position in EEA as the air quality project manager. His successor in this task is Anke Lükewille.
He welcomed invited experts from DG Env (Anne Karin Lund), EC GMES bureau (Arno Kaschl), from WHO Berlin (Hans Guido Műcke), from JRC Ispra/AQUILA (Michel Gerboles), and Panagiota Dilara of JRC Ispra (representing the FAIRMOD modelling network), Helge Olesen, NERI Denmark (Model Harmonization Initiative) and Robert Höller, UBA Austria (PROMOTE-2 project).

Further he reminded the scope and goal of the workshop. Main EEA activities in air quality area, planed for 2008, were topics on the agenda and would be presented and discussed during the workshop. There were no comments to the proposed agenda and the workshop proceeded according to the adopted agenda of the workshop.

Link to presentation: http://air-climate.eionet.europa.eu/docs/meetings/071015_12th_EIONET_AQ_WS/01_welcome_huntington.pdf

SESSION 1
AIR QUALITY DIRECTIVES AND MS'S REPORTING TO EC

Session chair: Jaroslav Fiala, EEA

Summary of session 1

The session included presentations regarding the EU AQ legislation update, implementing provisions for reporting of air quality to the Commission, status of reporting: the AQ questionnaire as well as under the 4th DD, and some technical aspects of PM and metals measurement quality.

In the session, the Air Pollution Report 1990-2004 was launched.

On the legislation update, it is clear that for 2005 about 40% of the zones were in non-compliance for PM10. Infringement procedures will not started, however, in wait for the new directive. The new directive will feature PM2.5, as we know. It will also probably give possibilities for time extension up to 5 years for reaching a limit value, under given conditions. The new Directive undergoes 2nd reading procedures, and is planned for discussion at Parliament on 12 December this year (2007). The Directive will be reviewed (probably in 2011-13). Emphasis in the future will be on exposure reduction, not just to reach limit values. The Commission regards that there are still problems to be solved re. air quality legislation: improvements on assessment methodologies and on data quality is still needed. Also, effective national/local air pollution control plans are needed.

The Data Exchange Group (DEG) is still at work on the Implementing Provisions, which are to streamline the reporting of data to the Commission under EoI, O3 and

AQ Report schemes. New and improved IT solutions are to be used, and more emphasis on near-real-time reporting.

The AQ reporting using the AQ Questionnaire is improving, although there are still problems, such as late or missing reporting, and trivial and non-trivial errors (e.g. mandatory data missing, inconsistencies,…). The summary of the state is that NO2/PM10/O3 are exceeded in 44%/26%/44% of zones, and that the extent of zone exceedances is seems to be increasing! Reasons for exceedances are given by the countries mainly as traffic, local industry, and also domestic heating to some extent.

Preliminary assessments under the 4th DD was reported by 19 of 27 Member States. The reports were of varying formats and language. The reporting revealed some major problems regarding quality, and even reporting of used, methods. The spatial extent of the reporting was not complete enough to make an assessment of the European wide problems with the compounds in question (As, Cd, Ni, PAHs).

Methods for metal analysis, for which there are still no reference methods, has been studied in an inter-comparison exercise carried out by JRC. Much technical detail there on comparison statistics. A main conclusion is that they cannot conclude that the different methods used produce significantly different results, although problems were detected for some specific methods.

PM10 problems in the Netherlands were given in a dedicated presentation. PM10 levels in the Netherlands are so high that they hamper development, so PM10 data quality is a very important issue! Comparison of PM10 measured with the same instrument type but by 2 different laboratories, revealed significantly different results which could be traced back to and explained by differences in data treatment (after the actual measurement). This started off a large discussion on the need to harmonise data treatment procedures (see the discussion points above). The Netherlands had also studied PM10 correction factors for their monitor (a beta absorption monitor), giving CFs of 1.17-1.3, depending upon type of location and specific monitor type.

During the discussion it was agreed that the topic of treatment of the data, after the actual monitoring process (such as the near-zero data, which may substantially affect average values) needs to be addressed specifically in the further process, e.g. in connection with the Implementing Provisions which are being produced.

EU Air Quality directives - Update

Anna-Karin Lund, DG Environment, European Commission.

The Clean Air for Europe (CAFE) programme compiled the latest knowledge on the impacts of air pollution and developed policy responses to complement implementation of existing legislation and other activities related to air pollution abatement. The resulting 2005 Thematic Strategy on Air Pollution sets interim objectives for improvement of human health and environment through improvement of air quality up to year 2020. Need for specific measures at the community and the international level is outlined such as vehicle emission standards, shipping and the revision of the national emission ceilings directive.
The Commission has jointly with the Strategy proposed a new Directive for ambient air quality and cleaner air for Europe. It includes proposal for new fine particles $PM_{2.5}$ environmental objectives – an exposure reduction target accompanied by the $PM_{2.5}$ limit value. Experience with the implementation of the first daughter directive 1999/30/EC is reflected in proposed flexibility to address compliance with existing limit values through the possibility to request a time-extension and apply deduction

of natural contributions when assessing compliance. The Directive will replace the existing framework directive and the first three daughter Directives. Integration of the 4th daughter directive is considered at a later date.
The proposal is currently in the co-decision process by the Council and the European Parliament. As the respective positions of the Member States (common position) and the Parliament differ on several issues, a further co-decision step - second reading - has started in September. The Commission is optimistic that the agreement will be reached so the Directive can enter into force in the beginning of 2008.
The presentation will outline the main elements of the new Air Quality Directive, presenting the evolvement of the text from the original Commission proposal to the current common position, and the remaining differences.
The second part will be devoted to the related Commission's activities and the anticipated changes once the Directive enters into force. Commission supports standardisation of measurements methods under CEN and is currently leading an exercise to develop new streamline reporting provisions and provide development of further assessment support tools such as the GMES-Atmosphere service. As regards GMES-GAS as well as the joint JRC/EIONET action on air quality modelling the other speakers will provide more detail. The Commission also envisions the complete overhaul of the existing guidance documentation supporting the air quality legislation, in order to facilitate effective implementation of the new Directive.

Link to presentation: http://air-climate.eionet.europa.eu/docs/meetings/071015_12th_EIONET_AQ_WS/02_EU_AQ_legisl_AKL.pdf

Implementing Provisions to the CAFE Directive

Wolfgang Spangl, UBA Austria

The Implementing Provisions (IP) for Reporting under the new Air Quality Directive (AQD) shall give provisions about the transmission of air quality (AQ) data from the Member States to the European Commission and the European Environment Agency.

The IP shall replace the present legal requirements on air quality:

- "Exchange of Information" ("EoI", Decision 97/101/EC, revised 2001/751/EC): Basic validated AQ data and meta-information on monitoring networks, monitoring stations and measurement methods
- Monthly and Summer Ozone Reports (3rd DD on Ozone, 2002/3/EC): Preliminary information about exceedances of information, alert and target values for Ozone
- Annual AQ Report related to the 1st to 3rd DD (excel questionnaire according to Decision 2004/461/EC): Assessment of AQ based on validated data, related to limit values, target values and assessment thresholds laid down in Dir. 1999/30/EC, 2000/69/EC and 2002/3/EC.

The IP are developed in the "Data Exchange Group" (DEG), which comprises experts from DG ENV, EEA, ETC-ACC and the Members States.

The development of the IP follows the general objectives:

- ✓ streamline the information flow
- ✓ use up-to-date IT solutions
- ✓ extend reporting on spatial information ("assessment throughout the territory")
- ✓ compatible with INSPIRE
- ✓ cost-effectiveness

The IP will cover the following AQ information:

- Near-real-time (provisional) AQ data (as now reported voluntarily for OzoneWeb), to be updated according to further validation steps
- Basic validated AQ data (as now reported under EoI)
- meta-information, including information on zones
- Assessment data: Information about exceedances of limit values, target values, information and alert values
- Spatial AQ information: AQ data originating from modelling, combined with monitoring data.
- Information on the contribution of natural sources and winter sanding to PM exceedances.

The pollutants for which the 4th DD sets target values, shall be covered by the IP.

New technical approaches are already agreed or under detailed discussion for some information flows:

- ➢ Electronic reporting on zones: either as a list of LAU and NUTS units, or as shape-files.
- ➢ Monthly and Summer Ozone Reporting in Excel-tables might be replaced by near-real-time electronic submission of (preliminary) basic Ozone data, as already implemented for OzoneWeb; updating the provisional data following further validation steps is possible.
- ➢ Extend the near-real-time data transmission to other pollutants.
- ➢ The transmission/update of the information on zones and meta-information on monitoring networks, monitoring stations and measurement methods (presently reported by DEM) may be separated from the transmission of basic AQ data. This may enable an earlier update of the meta-information and zones by MSs and a faster update of AQ information in AirBase.
- ➢ The Annual Report covered by the questionnaire laid down by 2004/461/EC is in its presents state a huge Excel-file with a multitude of tables, most of which have to be filled in manually. Streamlining this information is envisaged, using the AQ data and the information on zones available in AirBase. IT solutions are proposed by ETC-ACC.

Spatial information on AQ – compatible with the INSPIRE Directive – shall be made available. Technical solutions to manage model data, to combine model and

measurement data and to submit meta-information on modelling (or other data sources) are to be developed.

Link to presentation: http://air-climate.eionet.europa.eu/docs/meetings/071015_12th_EIONET_AQ_WS/03_AQ_ImpProv_12thEIONET_0710-WSpangl.pdf

MS's Reporting on AQ in Zones using the Questionnaire: Status and Results

Edward Vixseboxse, MNP, the Netherlands (ETC/ACC)

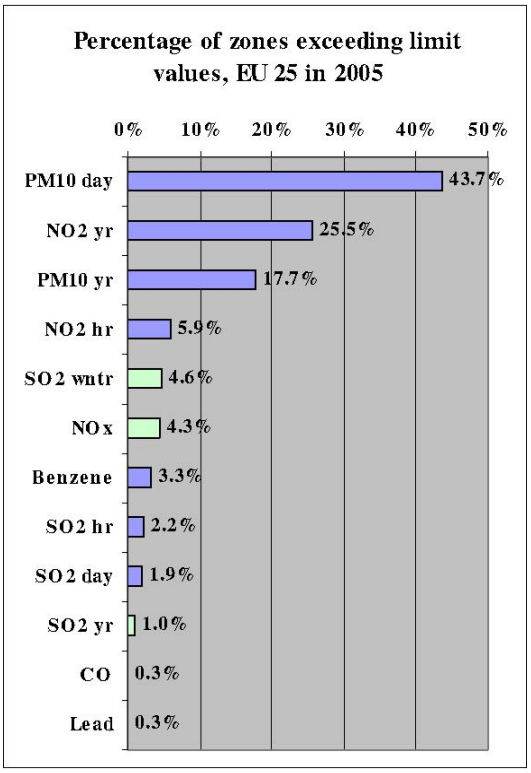
The Air Quality Framework Directive which has been adopted in 1996, describes the basic principles as to how air quality should be assessed and managed in the Member States. The directive covers the revision of previously existing legislation and the introduction of new air quality standards for previously unregulated air pollutants, setting the timetable for the development of four daughter directives on a range of pollutants.

The list of atmospheric pollutants includes sulphur dioxide, nitrogen dioxide, particulate matter, lead (first Daughter Directive, DD1); benzene and carbon monoxide (DD 2); ozone (DD 3). The pollutants included in the 4th Daughter Directive (poly-aromatic hydrocarbons, cadmium, arsenic, nickel and mercury) will be included in the near future.

Besides setting air quality limit and target values and the obligation to provide good public information, the objectives of the daughter directives are to harmonise monitoring strategies, measuring methods, calibration and quality assessment methods to arrive at comparable measurements throughout the EU.

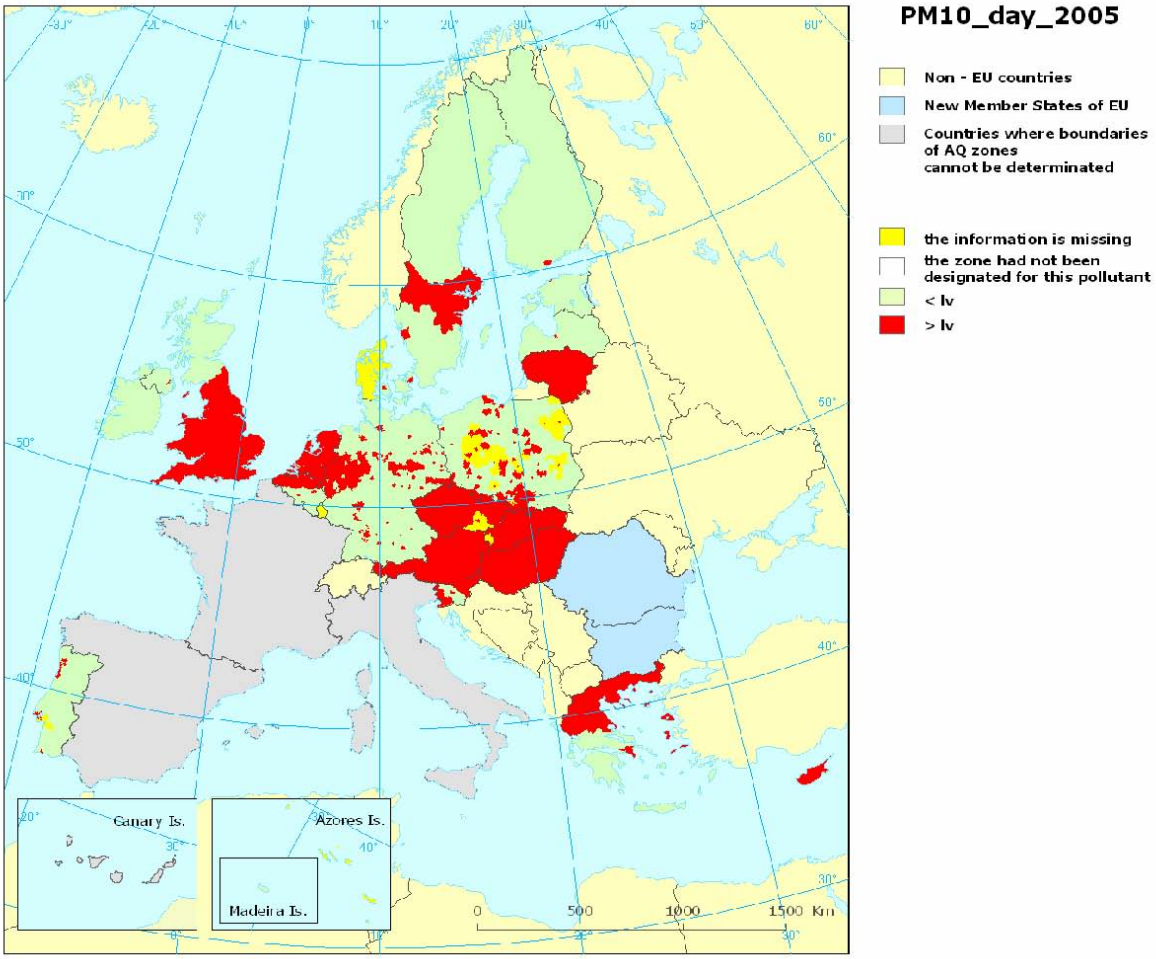
The timetable set out for Member States compliance with the numerical limit and target values of pollutants varies from 2005 (limit values for SO2; PM10; CO & Pb) thru 2010 (limit values for benzene, NO2 & Pb (specific sources); target value for ozone) to 2012 (target values for arsenic, cadmium, nickel & benzo(a)pyrene). For ozone a LTO (long term objective) is set for 2020. As agreed upon, Member States report yearly through the 'Questionnaire' on the air pollution and air quality measurements taken from stations in the zoning of their countries.

This presentation will focus on the status and preliminary results of the 2005 submissions of Member States questionnaires which are the main conclusions of the "2005 Annual reporting on ambient air quality assessment report". 2005 is the first reporting year in which the limit values for SO2, PM10, CO and Pb are in force. And 2005 is the second year in which all 25 EU members had to submit their questionnaire. In 2005 more than 43% of the zones in the EU reported above limit value for PM10 day. For nitrogen dioxide this was more than 25% of the zones. For ozone approximately 33% of the zones reported above target value. As such, these three pollutants posed the biggest problem for the air quality in 2005. A Technical Paper will be published on the ETC/ACC web site.



2005 Map with zones that are in exceedance for the limit value of the pollutant PM10.

In other words: zones with more than 50 µg/m^3 a day on more than 35 days a year.
(The map shows the information available at the ETC/ACC half September 2007; additional information (e.g. France) has become available at a later date but is not yet included in the mapping.)



Link to presentation: http://air-climate.eionet.europa.eu/docs/meetings/071015_12th_EIONET_AQ_WS/04_AQQ_FWD_zones_Vixseboxse.pdf

Preliminary Assessments under the 4th Daughter Directive

Kevin Barrett, NILU, Norway (ETC/ACC)

Directive 2004/107/EC relating to arsenic, cadmium, nickel and polycyclic aromatic hydrocarbons in ambient air is the fourth Daughter Directive to have been implemented under the Framework Directive on ambient air quality assessment and management, 96/62/EC. Its implementation requires Member States to conduct a preliminary assessment of the concentrations of these pollutants in all zones and agglomerations. This presentation describes and comments the conduct of these preliminary assessments. First the interpretation and administration of the requirements is addressed, followed by evaluation of consistency in approaches, before finally describing what is known of current air quality in respect of these pollutants.

There are considerable differences in the nature of the preliminary reports submitted by Member States, to some extent reflecting differing interpretations of the requirements. Reports varied between full assessment reports in excess of 100 pages to short emails. No preliminary assessment was available from eight of the 27 Member States.

There is a clear division between Member States that consider the requirements are for reporting of all techniques used in the preliminary assessment (such as modelling, emissions information, etc), and those that consider the requirement is limited to reporting sampling and analysis techniques. With respect to monitoring, in general the existing observation network has been used to assess the new pollutants. In some cases additional observations have been made, particularly for benzo(a)prene. Sampling and analysis techniques did not always comply with agreed Reference Methods, and it is to be noted that this is also true for some data already being reported to Airbase. Very few States have re-evaluated existing zones and agglomerations as a part of their preliminary assessments.

Most Member States have considered only those pollutants for which Target Levels have been set. Five of the 19 reporting Member States made reference also to mercury, to other PAH's than B(a)P, and to depositions.

Exceedences of Target and Threshold Values for metals across Europe do not appear to demonstrate spatial patterns. Finland, the Czech Republic, Greece and the United Kingdom exceed criteria in at least two out of the three metals, but this may reflect measurement practices as much as any particular issue. Benzo(a)pyrene appears to display greater and more widespread exceedance of criteria, with between a quarter and a third of sites exceeding the Target Value.

A Technical Paper will be published on the ETC/ACC web site.

Link to presentation: http://air-climate.eionet.europa.eu/docs/meetings/071015_12th_EIONET_AQ_WS/05_4thDD_assessm_Barrett.pdf

Q and A:

The question was raised re. the consistency of PM measurement methods used for metals measurements. Dr. Barrett responded that in the context of this assessment, there was for many countries lack of information as to the methods, and thus also in some cases as to the fraction actually sampled.

Question whether deposition of metals was included in the assessment. The answer was yes, it is included. All countries reporting deposition in their preliminary assessment used models for it.

It was discussed that data reported by the countries in the context of this preliminary assessment may differ from metals data reported under the EoI, for the reason that there are different reporting and assessment requirements under the two regimes.

A feedback discussion with the countries re. their assessment was requested. This is indeed planned, through the follow-up of the report by the Commission (Andre Kobe).

A proposal was made from the floor whether it would not be useful with a web discussion forum at the time of the questionnaire reporting, for raising questions and finding solutions. Yes, that could absolutely be a recommendation from the EIONET.

Launch of the 'Air Pollution in Europe 1990-2004' Report

Anke Lűkewille, EEA

The 'Air Pollution in Europe' report analyses and presents changes in air pollutant emissions and their possible health or ecosystem impacts in Europe covering the period 1990–2004. Emissions of all air pollutants fell substantially during the period 1990–2004 in the 32 EEA member countries (EEA-32), resulting in improved air quality over the region (http://reports.eea.europa.eu/eea_report_2007_2/en).

However, ambient concentrations of particulate matter and ozone in the air have not shown any improvement since 1997, despite the decrease in emissions. This might be due to meteorological variability and increasing long-distance transport of pollutants. Fine particulate matter (PM2.5) is now generally recognised to be the main threat to human health from air pollution.

As sulphur emissions have fallen, ammonia emitted from agricultural activity and nitrogen oxides from combustion processes have become the predominant acidifying and eutrophying agents affecting ecosystems.

Anke Lűkewille expressed her thanks to the Eionet AQ NRCs for providing the background air quality data used in the 'Air Pollution in Europe' report. She further thanked all colleagues from the ETC/ACC for their sound analyses of this data and the assessments and discussions included in the report. Thanks also to colleagues working under the LRTAP Convention for providing EEA with additional background data and to colleagues at EEA for many helpful comments on the draft report.

Intercomparison Exercise for Heavy metals on PM10 Filters (QA/QC related to monitoring requested by the 4th DD)

Michel Gerboles, JRC, Ispra

Since the adoption of the framework directive 96/62/EC[1] on ambient air quality assessment and management, the European Commission (EC) has intensively worked on the implementation of a harmonized programme for the monitoring of air pollution in Europe. With the goal of improving the quality of the measurements, stricter protocols for a series of items like definition of sampling criteria, zones, locations and data quality objectives (DQO) have been regulated. Reference methods were stated by the Commission and successively standardised by the Comité Européen de Normalisation (CEN). The improvement of reference materials, primary standards and the definition of equivalent methods are of greater interest in the EU ambient air policy programme. Furthermore, a greater emphasis has been placed on the implementation of an operative structure that can guarantee the data quality from the local network to regional, national and European level through traceability chains. Member States were invited to nominate National Reference Laboratories (NRLs) responsible for the evaluation, approval of instrumentation, the quality assurance and control of the measurements, the coordination at national level of the measurement strategy and the collaboration at European level with the Commission through the Network of Air Quality Reference Laboratories (AQUILA). All these

1 Council Directive 96/62/EC of 27 September 1996 on ambient air quality assessment and management

points have been gathered and reviewed under the recent Directive Proposal on Ambient Air Quality and Cleaner Air for Europe (the "CAFE" Directive)[2]
Since the beginning of the 90's, the Joint Research Centre (JRC) organizes laboratory intercomparison exercises (IEs). These IEs are aimed at checking the accuracy of measurements of NRLs with regards to the DQO of the Directives. Accredited NRLs also use these IEs to demonstrate proficiency as requested by ISO 170252[3]. The IEs started with the measurement of nitrogen dioxide (NO_2) and ozone (O_3) in dry air[4,5]. Finally, a routine programme has been established in which NRLs are invited to participate every 3 years. The IEs either takes place in Ispra (I) at the JRC or in Essen (LANUV-G). They consist of a 1-week laboratory exercises for NO_2, NO, NOx, CO, SO_2 and O_3[6]. In the latest IEs for inorganic gases, the effect of potential interference like water vapour and organic gaseous compounds on measurements has being also studied. JRC has organized several IEs for organic pollutants either as round robins in canisters/cylinders or with dynamic dilution of synthetic mixtures generated in a laboratory calibration bench. In 2006, the 1st IEs for Benzene, Toluene, Ethyl-benzene & *m,p,o*-Xylenes (BTEX) took place at the JRC. It was intended to provide information on states of compliance to DQO and on the major sources of uncertainty for BTEX measurements with automatic analyzers[7]. In 2007, a round robin for poly aromatic hydrocarbons was launched.
In 2006, JRC proposed to launch an IE for the determination of heavy metals in particulate matter (PM_{10}). The purpose of this IE was to inform the Directorate General for Environment (DG-ENV) of the European Commission and other stakeholders about the state of comparability and uncertainty in heavy metal determinations achieved by NRLs. The IE was focussed on the measurement of the heavy metals regulated by the 1st and 4th Daughter Directives (1999/30/EC[8] and 2004/107/EC[9]): Lead (Pb), Arsenic (As), Nickel (Ni) and Cadmium (Cd). All the NRLs members of the AQUILA network were invited to participate to the IE for Heavy metals in PM_{10}. Fourteen NRLs took part to the IE. They proposed to extend the IE to other sensitive heavy metals. First, the ones included in the EMEP programme: Copper (Cu), Chromium (Cr) and Zinc (Zn) and second other elements of interest: Aluminium (Al), Cobalt (Co), Iron (Fe), Manganese (Mn) and Vanadium (V). However, these elements were part of a 2nd priority list for whose analysis was not mandatory. The 4th Daughter Directive stated that the reference method for the determination of heavy metals in PM_{10} is either the Inductively Coupled Plasma Mass Spectrometry (ICP-MS) or the Graphite Furnace Atomic Absorption Spectrometry (GF-AAS). However among the NRLs that agreed to participate to this IE other methods were implemented like Energy Dispersive X-ray Fluorescence (EDXRF), Atomic Emission Spectrometry (ICP-AES), Optical Emission Spectrometry (ICP-OES) and Voltammetry. Even though, the equivalence of these methods to the reference methods was not demonstrated, it was decided to accept any measuring

2 Proposal for a Directive of the European Parliament and of the Council on ambient air quality and cleaner air for Europe, COM (2005) 447 (21.09.2005)

3 International standards, ISO/IEC 17025:2005, General requirements for the competence of testing and calibration laboratories, Geneva (CH)

4 European Comparison of nitrogen dioxide calibration methods quality assurance programme n°1, QAP/1 of the European directive for nitrogen dioxide, EUR 17661 EN, (1997). E. de Saeger, M. Gerboles, H. Rau, M. Payrissat,

5 E. de Saeger, A. Noriega Guerra, P. Perez Ballesta, M. Gerboles, H. Rau, L. Amantini, M. Payrissat, Harmonization of Directive 92/72 on Air Pollution by Ozone.- Intercomparison of Calibration Procedures for Ozone Measurements, EUR Report 17662 EN (1997).

6 Borowiak, A., Lagler, F., Gerboles, M., De Saeger, E., EC Harmonisation Programme for Air Quality Measurements. Intercomparison Exercises 1999/2000 for SO_2, CO, NO_2 and O_3, EUR 19629 EN, 2000.

7 P. Perez Ballesta, R. Field, E. de Saeger, Interlaboratory exercises for volatile organic compounds determination, Atmospheric Environment 2001, 35, 5729–5740, and P. Pérez Ballesta, R. A. Field, R. Connolly, F. Lagler, I. Nikolova and N. Cao, First EC-JRC aromatic (BTEX) compounds intercomparison with automatic analyzers, EUR 22523 EN, 2006.

8 Council Directive 1999/30/EC of 22 April 1999 relating to limit values for sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter and lead in ambient air, [Official Journal L 163 of 29.06.1999]

9 Directive 2004/107/EC of the European Parliament and of the Council of 15 December 2004 relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air. Official Journal L 023 , 26/01/2005 P. 0003 - 0016

methods so that the IE would be able to catch the whole picture of the data quality for heavy metals monitoring in the EU. More precisely, the design of the experiment and the data treatment aimed at meeting the following objectives:

1. To assess whether the DQO of the European Directives 1999/30/EC and 2004/107/EC relating to lead, arsenic, cadmium and nickel were met;
2. To assess if the uncertainty reported by NRLs were confirmed by the difference between their results and the reference values of the test samples (proficiency test for accredited laboratories).
3. To evaluate the repeatability/reproducibility of the methods of measurements;
4. To investigate what are the main sources of uncertainty and analytical deviations: e. g. calibration, digestion, analysis and matrix effect.

Each NRL received some samples prepared by the JRC and were supposed to analyse according to their National analytical methods. In order to ease investigating sources of possible analytical deviations, different sample types were proposed:

S_1 A liquid sample prepared using liquid Certified Reference Material (CRM). Each NRL was asked to carry out 6 replicate determinations to be repeated on 3 different days with 3 different calibrations.

S_2 A solution of a certified dust sample, digested by the JRC according to EN 14902[10]. Each NRL was asked to carry out 6 replicate determinations.

S_3 A sample of a dust CRM in a PFA vial that each participating laboratory was supposed to digest and analyse.

S_4 A solution prepared by digestion of an exposed filter (generally Whatman quartz QMA 47 mm) sent in a 25 ml PFA flask. The digestion was carried out by JRC-IES according to the procedure laid down in EN 14902. Each NRL was asked to carry out six repetitive determinations of heavy metals in the solution.

S_5 One blank and one exposed filter (generally Whatman quartz QMA 47 mm in a Petri dish). Each NRL was asked to digest and to carry out 6 replicate determinations to be repeated on 3 different days with 3 different calibrations.

The results of the intercomparison exercise will be presented. This intercomparison exercise was a pilot study for the measurements of heavy metals in PM_{10}.

Link to presentation: http://air-climate.eionet.europa.eu/docs/meetings/071015_12th_EIONET_AQ_WS/07_HM_on_pm10filters_Gerboles.pdf

Particulate Matter in the Netherlands; some recent results

Hans Berkhout, MNP, the Netherlands

PM_{10} problems in the Netherlands were given in a dedicated presentation. PM_{10} levels in the Netherlands are so high that they hamper development, so PM_{10} data quality is a very important issue! Comparison of PM_{10} measured with the same instrument type but by 2 different laboratories, revealed significantly different results which could be traced back to and explained by differences in data treatment (after the actual measurement). This started off a large discussion on the need to harmonise data treatment procedures (see the discussion points above). The Netherlands had also studied PM_{10} correction factors for their monitor (a beta absorption monitor), giving CFs of 1.17-1.3, depending upon type of location and specific monitor type. The PM10

10 European standard, 2005. Ambient air quality—standard method for the measurement of Pb, Cd, As and Ni in the PM10 fraction of suspended particulate matter. EN 14902, Brussels.

data in the national monitoring network have been re-calibrated according to the newly established correction factors.

Link to presentation: http://air-climate.eionet.europa.eu/docs/meetings/071015_12th_EIONET_AQ_WS/08_PM_NL_Berkhout.pdf

Q and A:

Hans Guido Mucke of WHO raised the question of the different data treatment between different laboratories which was raised by Berkhout is the presentation, specifically the different procedures for treating near-zero values. These different procedures apparently resulted in very different assessment of the average PM10 value, as well as of the number of exceedances reported.

The following discussion included the following observations:

- astonishment of the large differences caused by the different near-zero-value treatment.
- the need for harmonisation of this, and possibly other similar, procedures.
- the importance of resubmitting data to AirBase in case changes are made, for example, after re-calibration of the PM_{10} data.

Discussion.

Hans Guido Mucke, as a follow-up of the discussion on the near-zero-data discussion, asked how the Commission would take on board the essence of that discussion: that the quality of the data, e.g. how countries apply various data treatment procedures, affects the number of exceedances reported. This should have a bearing on the procedures that the Commission may effectuate towards the Member States.

The Commission (Anna-Karin Lund) responded that although the Commission is aware of the exceedances, the limit values are being changed, and no legal procedures are launched at this stage.
It was agreed that Mucke has a strong point, however, and that the topic of treatment of the data, after the actual monitoring process (such as the near-zero data) needs to be addressed specifically in the further process, and not to be forgotten, e.g. in connection with the Implementing Provisions which are being produced.

SESSION 2
AIR QUALITY DATA FLOWS

Session chair: Sheila Cryan, EEA

Summary of session 2

The session was dedicated to the reporting of air quality data to the Commission and the EEA, and the first-level use of the data (for mapping and web applications. The session included presentations on the EoI 2006 data reporting cycle and on future developments of AirBase, as well as status on the data exchange under the FWD Questionnaire. Then presentations regarding the problems related to mapping of air

quality zones, and reporting of ozone data (summer ozone as well as near-real-time reporting. Then the status of the development of the EEA Shared Environmental Information System (SEIS), and the session was wrapped up by a presentation of the air pollution situation in Cyprus.

The reporting of the 2006 EoI data was rather compete at the time of the workshop, 29 countries had sent in their DEM by 11 October. It is envisaged that the upload of final data, after country feedback, will be finished by 1 February, and the EoI data open for the public by 1 March. Some details about procedural changes were summarised. Further issues include questions related to zone definition in DEM, some problems/bug clarifications (e.g. re. the updating of PM10 correction factors, and on the reporting of irregular time series.

Plans for future developments of AirBase include improvements re. XML/ASCII dumps, DEM v11 improvements as well as improvements of the AirBase data base itself. Regarding the latter, the status is that the functionalities of AirView will be included in the newly developed EEA AQ Viewer, presently as a test version. AirView has been coupled with Google Earth mapping capabilities. Further developments include improvements regarding geographical information (NUTS/LAU area codes, zone numbers, EuroboundaryMap-ing and connected population/land cover data. Also, the historical data in the base will be improved by QA/QC work on pre-2002 data.

The present AQ Questionnaire is in fact an unprotected Excel workbook, with 67 sheets! The problems of the countries' reporting of data using the questionnaire were presented. There are lots of trivial errors which can be reduced by a more careful use of the questionnaire by the countries. Non-trivial errors include missing information, such as the whole territory of the country not being zone designated, and that the air quality is not reported for all zones. The unique coding in the questionnaire of the zone is also of large importance for the subsequent use of the data.

Mapping of the air quality zones in Europe is based upon the zone data in the questionnaires, as well as other data sources. This is a very complicated process dependent upon countries following the specified reporting procedures. Of importance is e.g. the consistent use of zone coding, and that the spatial scale precision of country and zone borders should (must) match. Some of the important points that the countries must adhere to, are:

•No items in the maps can be without identifiers.
• The zones/agglomerations must be defined in order to cover the whole territory for all health-related indicators.
• It should be clarified whether the zones should include also the coastal waters or not.
• All the outlines and the boundaries should match together.

The timeliness and correctness of the summer ozone data that countries report monthly is important for the effective use of the data. The presentation gave information on QA/QC procedure of the summer ozone data processing, common inaccuracies and mistakes in the delivered data, suggestions for improving, as well as preliminary 2007 summer results.
The data suppliers are asked to correct inconsistencies and errors (i. e. upload amended reports) in feedback reports on CDR (Central Data Repository). The summaries of the monthly data provided by the countries are available on the ETC/ACC website.

One of the possibilities to simplify the data reporting under the current directives is to use near-real-time ozone data reporting as a vehicle for the summer ozone reporting. Dutch data have been analyzed as a n example to see the differences between non-validated and validated data. The first level analysis showed somewhat large differences, especially concerning the exceedance of the alert threshold level. After automatic data control, the exclusion of unrealistically high hourly concentrations by setting a max level of accepted data, the difference from the validated data set was quite small. The indicated, as was concluded, that near-real-time can probably be used as a basis for reporting summer ozone data. It must, however, be secured that by such automatic data checking, one does not exclude real ozone peaks.

The Shared Environmental Information System (SEIS) is being developed at EEA. Its development is based on the partners of the system agreeing on and respecting rules re. responsibilities, infrastructure, communication and contents. The 'drivers', the main pillars of the SEIS development are contents, streamlining, and access, each of which has programems and directives behind them. The different main environmental data flow infrastructures in Europe, INSPIRE, GMES and SEIS have different focus; INSPIRE: infrastructure and obligation; GMES: Services and business; SEIS: Contents. Under the development of SEIS, there are standards at all topics and levels, with various Standardization groups.
For EEA, the first step in the SEIS development, embedded in the EEA work programme for 2008/2009, is the development and implementation of the Data Centre Air on Air, which shall contain data on air quality and emissions, as well as a whole line of other associated data. This will be developed with assistance from ETC/ACC, NRCs, DGENv, Eurostat and JRC. The 2008 projects related to this are: the extension of the ozone web (n-r-t summer ozone and PM), as well as the AQ data service (the Questionnaire data flow and AirBase), and GHG indicators and assessments.
In 2007 AirBase contents was made public through EEA data service (as it was previously public through ETC/ACC web page). The EEA air data service was 'tested' and the 2006 EoI data will be made publicly available, together with air quality maps.

The air pollution situation in Cyprus was presented. The main air pollution problem is PM, where both local sources and Sahara dust episodes creates high PM10 and PM2.5 concentrations that highly exceed the AQ limit values. Based upon the Preliminary Assessment that was carried out according to the requirements in the AQ Directives, a national monitoring system on 9 stations has been established. E reference laboratory has been established to ensure good data quality, and the data and information collected is disseminated to the public in near-real-time through a web page and information panels. The Cyprus monitoring and information system is a truly state-of-the-art system. Plans and programmes for air quality improvements have been developed. It is difficult to tackle the Cyprus PM problem because of the importance of local dust resuspension and Sahara dust episodes.

The 2006 EoI Data Reporting Cycle

Patrick van Hooydonk, MNP, NL (ETC/ACC)

According to the Directive 97/101/EC on Exchange of Information decision as revised by 2001/752/EC, the Member States of the European Union have to provide EoI Data on air quality.
The data exchange is mandatory for the Member States, but other EEA member and collaborating countries participate on voluntary basis, too.

The ETC/ACC, under the contract to the EEA, processes the yearly reported data and makes the measurement data available through AirView (an internet application) and a set of datafiles(XML_dump).
After processing of the EoI reports all data suppliers receive a country feedback in which an overview is given of the measurements received and results of some standard report-checks.

In this presentation the status and current procedure of the EoI 2007 data reporting cycle will be presented. In addition I will focus on changes of the country feedback and a proposal for improving the consistency of the statistics derived from the reported measurements.

Link to presentation: http://air-climate.eionet.europa.eu/docs/meetings/071015_12th_EIONET_AQ_WS/09_2006_data_EoI_reporting_vHooydonk.pdf

Q and A, and Discussion

For assuring the consistency of the statistical data, the ETC/ACC proposed that the ETC/ACC calculates all statistics starting from the measurements with the shortest averaging time. In general, this implies that , starting from the hourly data, daily values, percentiles, annual means and exceedances are (re)-calculated by the ETC/ACC. This procedure assures a harmonized calculation for all submitted monitoring data, also in the case where hourly data is resubmitted in replacing erroneous data. As a consequence of this procedure when a MS submits both hourly data and higher aggregated data (daily values) the higher aggregated data will be discarded. The meeting agreed with the ETC/ACC proposal.

The following main issues where discussed:

1. Where to find AQ data for Europe?

Although EoI data are available through AirView, and also through the web-based data download service from the AirBase web site, this was considered by some as needing improvements. Examples of overviews wanted: a 'summer ozone data set'; higher aggregated data, and exceedances. This type of information can be obtained by using the XML-downloads and extractions tools (Excel-based macro's). Also, the data set from the Questionnaires have not been made available yet on the web from EEA. EEA welcomes these messages, want so to know what is needed, and will work to implement needed improvements.

2. Reporting of discontinuous data to AirBase is difficult at the moment.

Although there are provisions for reporting such data in the DEM now, improvements are needed. Instructions as to how to report such data presently should be made clearer, and there may be a need to update software.

3. What about negative values in AirBase? They present a problem when doing log transformation.

AirBase is checked for negative outliers, but small negative values are kept, since measurements always fluctuate a bit around zero, at very low pollution levels. This is the same discussion as was referred to above. It was reiterated (Wolfgang Spangl) the need to clarify and harmonise data treatment procedures. Who should be

responsible for this. It was clear that the Commission should take up this responsibility.

4. Savvas Kleanthous mentioned that the TEOM PM10 monitor produces erroneous results when the relative humidity drops fast. What is the proper way of treating such data?

5. The topic of assigning uncertainty to monitored data values (raised by Libor Černikovský).

Although it is clear that there is, sometimes large, uncertainty associated with monitored AQ data values, there was not agreement as to the merit, usefulness and methods needed for doing this. Monitoring data of the pollutants covered in the Framework Directive should be in compliance with the data quality objectives as given in the Daughter Directives; however, it can not always be assured that this is indeed the case. A point was made that one should distinguish between data for scientific assessments and for policy related applications. For policy related applications, it is not certain that assigning an uncertainty to the data is information that policy makers can use, or rather, there should be guidance on how they should use such information.

Libor maintained that the discussion of assessing and assigning uncertainty to data values should be continued.

Future developments of AirBase

Wim Mol, MNP, NL (ETC/ACC)

The AirBase air quality information system consists of the AirBase database, the data delivery tool DEM (Data Exchange Module) and the dissemination tools AirView and XML/ASCII-dumps. The Web interface AirView will be replaced by the EEA Air Quality Viewer, so no big developments are expected. This year a small extension has been implemented, namely a link with Google Earth. While AirView is meant for quick analysis and limited downloads of AirBase data, the XML dumps can be used to download large quantities of AirBase data. The XML-dumps can be imported in Excel in a structured way.
Next year a new version of the DEM, DEMv11, will be available. Of course eventually found bugs will be repaired and suggestions for improvement from the DEM-users will be implemented. Other suggestions for improvement of the DEM are welcome. We also think at a kml export function in the DEM to visualize and check the station coordinates with Google Earth.
Last year we informed you that AirBase has been extended with geographical information. Stations are linked with administrative units (NUTS/LAU en EuroboundaryMap (Sabe) information). We preloaded the DEM also with zone-information from the FWD-questionnaire. Overlays have been made with landcover and population maps resulting in landcover and population data in 1 km circles around stations. More extensions of Airbase with similar information are expected.
Besides the regular yearly quality checks on the delivered data, we will proceed with quality checks on the historical data. Outlier checks have been started for the 2002-data, but we will also do checks for data before 2002. Considerable progress has been made with the quality of essential station meta data (station coordinates en classifications). Only a few stations are still positioned in the sea or in a wrong continent. With the Google version of AirView and the next DEM it is possible to check the station coordinates in a more exact way. Also we will continue to fill the space gaps (stations in the FWD questionnaire, summer ozone reports, Ozone web but not yet in AirBase) and the time gaps (gaps in historical time series).

Link to presentation: http://air-climate.eionet.europa.eu/docs/meetings/071015_12th_EIONET_AQ_WS/10_future_dev_airbase_Mol.pdf

Q and A:

Patrick Tisserant requested the possibility of extracting two different data dumps from AirBase: one for the actual data values and one for the metadata only. Since full data dumps are very large for some countries (20 MB and more).
MNP will look into this.

Data Exchange under the Framework Directive Questionnaire

Frank de Leeuw, MNP, NL (ETC/ACC)

EU Member States have to submit annual reports on air quality to the European Commission under the Air Quality Framework Directive. The reports are provided in the form of a predefined questionnaire. The questionnaire is made available in Excel format. This is an easily accessible format for the MS but it does not reject erroneous data. The questionnaire consists of more than 60 forms. Cross references between these forms are not always used in a consistent way.
During processing numerous small errors, e.g spurious spaces, had to be removed neore assessment of the data could be made. Next to these trivial errors, the reports contain inconsistencies and/or missing information.
In Form 2 of the questionnaire the zones and agglomerations for individual pollutants and types of protection targets are defined. For some Member States the reported zones that are related to health protection did not, as required, cover their entire territory. In form 8 and 9 the status of the air quality in a zone in relation to the limit or target values is reported. Comparing the information in the form 2 (designation of zones) and form 8&9 (AQ status per zone) shows that at one hand not for all zones the AQ status is reported but at the other hand some MS report the status for a non-designated zone. These, and more inconsistencies, will be discussed.

Link to presentation: http://air-climate.eionet.europa.eu/docs/meetings/071015_12th_EIONET_AQ_WS/11_AQQ_FWD_data_exchange_dLeeuw.pdf

Q and A:

1. The question of making mistakes when filling out the Questionnaire.

There are lists of possible and typical mistakes in the guidelines for using the questionnaire. ETC/ACC would like to extend them. Feedback from users is needed.

What about feedback to the countries when they make mistakes? Are mistakes just corrected without feedback? So far, yes, unless correction is not straight forward.
In 2008, there will be feedback from ETC/ACC to the countries.

France offered to share experiences in filling out the Qs. They have developed a software for automatically filling the Q. They needed this, since they have 14 networks to work with. Romania has also develop such software. This has also been developed by NILU for Cyprus.

2. Unclear rules re. the reporting of statistics data (Romania). There are seeming inconsistencies between sheets.

ETC/ACC are now updating the quidelines. Would like to work with the user's to eliminate problems.

Problems of Mapping Zones and Agglomerations

Jan Horalek, CHMI, Czech republic (ETC/ACC)

Marketa Conkova, Jana Ostatnicka, Jan Horalek
Czech Hydrometeorological Institute, CZ (ETC/ACC Consortium Partner)

The Czech Hydrometeorological Institute prepares, within the ETC/ACC project, the digital maps of AQ zones and agglomerations of the European states (suitable for processing in GIS). Currently, the maps are constructed on the basis of data presented in the Reporting Questionnaire (in Form 2) for the year 2005, pursuant to the Commission Decision 2004/461/EC.
The Member States are requested to provide separately a map of the zones (as an electronic file or on paper) to facilitate the correct interpretation of the zone data and they should provide at least either the zone borders in Form 2 or a map.
For further processing and joining the maps of zones into one map of the whole Europe it is most suitable to use the maps with these borders in digital form, preferably as a GIS layer. The final maps are processed with the use of GIS ESRI software (ArcView), and therefore it would be suitable to have the layers in the form of ESRI shapefile (shp). ArcView, however, is able to import digital layers also from other GIS systems (for example MapInfo Exchange file – mif).

Overview of the creation of digital maps (shapefile) of AQ zones and agglomerations for 2005

- *The Member States which uploaded the digital maps to www.eionet.europa.eu (CDR) – Questionnaire 2005:*

Czech Republic, United Kingdom, Greece.

- *Digital maps created with the use of Euroboundary (LAU) on the basis of the figures of AQ zones and agglomerations, or the names of AQ zones and agglomerations in the Questionnaire 2005:*

Denmark, Estonia, Latvia, Lithuania, Hungary, Poland, Slovakia, Slovenia, Cyprus, Austria.

- *Digital maps created on the basis of the coordinates from the Questionnaire 2005 (Form2):*

Belgium, Finland, the Netherlands.

- *The states which sent the ready digital maps (shapefile) on the basis of our request by e-mail:*

Germany, Norway, Portugal, Austria for ozone, Ireland, Malta, Sweden.

- *The states for which the digital maps have not been created yet:*

Spain, Italy.
(France delivered the file ZonesetAgglo_france_AEE.zip to CDR 11/10/2007.)

To create the zones and agglomerations, in the cases where there were defined only administrative units, the materials from EuroBoundaryMap (http://www.eurogeographics.org/eng/04_sabe.asp) were used.

Challenge items

The digital maps submitted by the states include also items without identifiers; these are probably water surfaces (sea bay, lake…). Similar problem arises with any enclave of a foreign territory. It is necessary to assign an identifier to each of them (see Public Circa – background material for the Questionnaire „How to report the boundaries for the zones and agglomerations reported in the questionnaire for annual reporting on ambient air quality assessment and management (Commission Decision 2004/461/EC)“, http://eea.eionet.europa.eu/Public/irc/eionet-circle/airclimate/library?l=/public/questionnaire_2004461ec/reporting_agglomerations/readme&vm=detailed&sb=Title)

For constructing the maps it is necessary to use the same codes of AQ zones and agglomerations as the codes in the Questionnaire, i.e. it is necessary to use the identical codes.

- In case there is only the list from the Questionnaire form2 (zone code) at disposal for the creation of the maps, it is necessary that the codes of the territories correspond to the codes of administrative units (LAU2 code, NUTS3 code…). If the boundaries of zones do not correspond to the boundaries of administrative units, it is necessary to precise them with the use of the GIS layer or the list of coordinates (Border coordinate pairs).
- As for the pollutants monitored with regard to the protection of human health, the zones (agglomerations) must be defined in order to cover the whole territory of the state.
- Every year, while submitting the Questionnaire, it is recommended to check or upgrade the AQ zones and agglomerations; several states change the definition of AQ zones during the years.
- The states, submitting the AQ zones boundaries as a GIS layer, must present the projection (coordinated system) of these maps.
- It should be decided whether the zones defined only for one pollutant are part of another zone for other pollutants in order to cover the whole territory of the state.
- The outlines/boundaries of the states must be constructed in such a way to allow them to lock onto each other in the maps of the whole Europe. The optimum solution is to have the maps from one source, e.g., similarly as these templates prepared on CIRCA (http://eea.eionet.europa.eu/Public/irc/eionet-circle/airclimate/library?l=/public/questionnaire_2004461ec/reporting_agglomerations&vm=detailed&sb=Title).

To be clarified

- Seaside states – will they be edged by the coastline or will the AQ zones include also the coastal waters?

Outputs of mapping

Based on the data filled in the Questionnaire, processed by Edward Vixseboxse, the maps of Europe (EU Member States) were created in GIS depicting the exceedances in AQ zones and agglomerations for the year 2005.

Link to presentation: http://air-climate.eionet.europa.eu/docs/meetings/071015_12th_EIONET_AQ_WS/12_mapping%20AQQzones_agglom_Cernikovsky.pdf

Q and A, and Discussion

1. On the representation of the air quality in zone

This discussion point was started by Arno Graff raising the point that in Germany the borders of zones are sometimes changed between years. The reason is that large zones are often red because of exceedances at some few hot-spots.
Although in the questionnaire one can specify the reason for exceedance in a zone, and specify the problem and area, the full zone is anyway red in the map.

Some views raised:
- Jaroslav Fiala: the DEG should address the topic of 'area of exceedance'.
- Wolfgang Spangl: 'Is it a desire by the Commission to harmonize zone boundaries so that it better serves the need to specify where exceedances actually are?'
- Arno Graff: 'This on/off way is not proper'.
- Rita Tijunaite: 'Vilnius looks like a very polluted city, while in fact the exceedance is only in one industrial area'.
- Libor Černikovský: 'This type of maps do not show the area of LV exceedance, but it shows the zones in which are the stations with LV exceedances (the purpose is e.g. to see for which zones the member states are obliged to prepare the plans)'

2. How to make a proper assessment?

It is possible to use combination of monitoring and modelling to assess exposure in a zone. However, there is no clear guideline on how to assess based upon monitoring (Arno Graff).

Ozone Directive: Reporting Summer data

Libor Cernikovski, CHMI, Czech republic (ETC/ACC)

According to the Directive 2002/3/EC the Member States of the European Union have to provide:
- monthly data: before the end of the following month information on the exceedances of the information and alert thresholds (i. e. 1h maximal concentrations higher than 180 and 240 $\mu g.m^{-3}$);
- April – September data: not later than 31st October information on the exceedances of long-term objective for the protection of human health (8h daily maximal concentrations higher than 120 $\mu g.m^{-3}$ and 1h monthly maximal concentrations for all stations.

The data exchange is mandatory for the Member States, but other EEA's member and collaborating countries participate on voluntary basis, too.
The European Topic Centre on Air and Climate Change (ETC/ACC), under the contract to the European Environment Agency (EEA), manages the monthly and summer ozone exceedances data. The detailed check on inconsistencies, potential errors and deviations from the suggested structure is made by ETC/ACC during data processing monthly. The data suppliers are asked to correct inconsistencies and errors (i. e. upload amended reports) in way of feedback reports on CDR (Central Data Repository, http://cdr.eionet.europa.eu).
In order to provide information on running summer ozone concentrations as timely as possible, the summaries of the monthly data provided by the countries are available on the ETC/ACC website http://etc-acc.eionet.europa.eu/databases/o3excess.

The presentation gives information on QA/QC procedure of the summer ozone data processing, common inaccuracies and mistakes in the delivered data, suggestions for improving and preliminary 2007 summer results.

Link to presentation: http://air-climate.eionet.europa.eu/docs/meetings/071015_12th_EIONET_AQ_WS/13_O3_DDir_SOR2007_Cernikovsky.pdf

Near-real-time Ozone and Potential use for Summer Reporting

Hans Berkhout, MNP, the Netherlands

One of the possibilities to simplify the data reporting under the current directives is to use near-real-time ozone data reporting as a vehicle for the summer ozone reporting. Dutch data have been analyzed as an example to see the differences between non-validated and validated data. The first level analysis showed somewhat large differences, especially concerning the exceedance of the alert threshold level. After automatic data control, the exclusion of unrealistically high hourly concentrations by setting a max level of accepted data, the difference from the validated data set was quite small. The indicated, as was concluded, that near-real-time can probably be used as a basis for reporting summer ozone data. It must, however, be secured that by such automatic data checking, one does not exclude real ozone peaks.

Link to presentation: http://air-climate.eionet.europa.eu/docs/meetings/071015_12th_EIONET_AQ_WS/14_NRT_O3_and_pot_SOR_Berkhout.pdf

Q and A:

Discussion on the checking of near-real-time data:

The need for (automatic) checking of NRT data seems to be there, to avoid for instance that unrealistically high ozone values gets through to the ozone web and map.

But, how to avoid filtering out real and correct data? Compare (automatically, too) with neighbouring stations?

Tim Haigh: We should not over-emphasize the problems related to lack of checking of NRT data. The difference between validated and un-validated data is not too large. Unreliable stations can be spotted, and not considered for the web.

However, when the data is used for compliance checking, any difference will be “too large”.

Wolfgang Spangl: the Data Exchange Group (DEG) has discussed the NRT data flow and its use. There is the need to resubmit data to remove outliers etc., for data to be used for compliance checking and assessment purposes.

Future developments: Air Quality in the Shared Environmental Information System (SEIS) and Dissemination of Air Quality Information

Sheila Cryan, EEA

The presentation provides a brief description of the Shared Environmental Information System (SEIS) and the processes which are already underway to make it a reality. EEA has responsibility for the data centre on air within the SEIS. This data centre must provide the quality assured data at European level for air quality and emissions of air pollutants. EEA will design and implement the data centre on air through its work programme in 2007 and 2008.
In 2007, the first phase of the work to improve the dissemination of the air quality data held in AirBase was completed. Applications for downloading and for interactive queries on the tabular data are now available to the public in EEA Data service at: http://dataservice.eea.europa.eu/dataservice/metadetails.asp?id=949. The second phase of applications which will allow users to query the Airbase data geographically will be completed in Spring 2008.
It is important to appreciate that the data centre on air is wider than the data provided under the Exchange of Information Decision. It will cover all data and information under the Air Quality Framework Directive and its daughter directives, the National Emissions Ceilings Directive, the European Community's obligations as a party to the Convention on Long Range Transboundary Convention and the European PRTR.

Link to presentation: http://air-climate.eionet.europa.eu/docs/meetings/071015_12th_EIONET_AQ_WS/15_AQ_in_SEIS_Cryan.pdf

On the Air Pollution Situation and NRT Data Dissemination in Cyprus

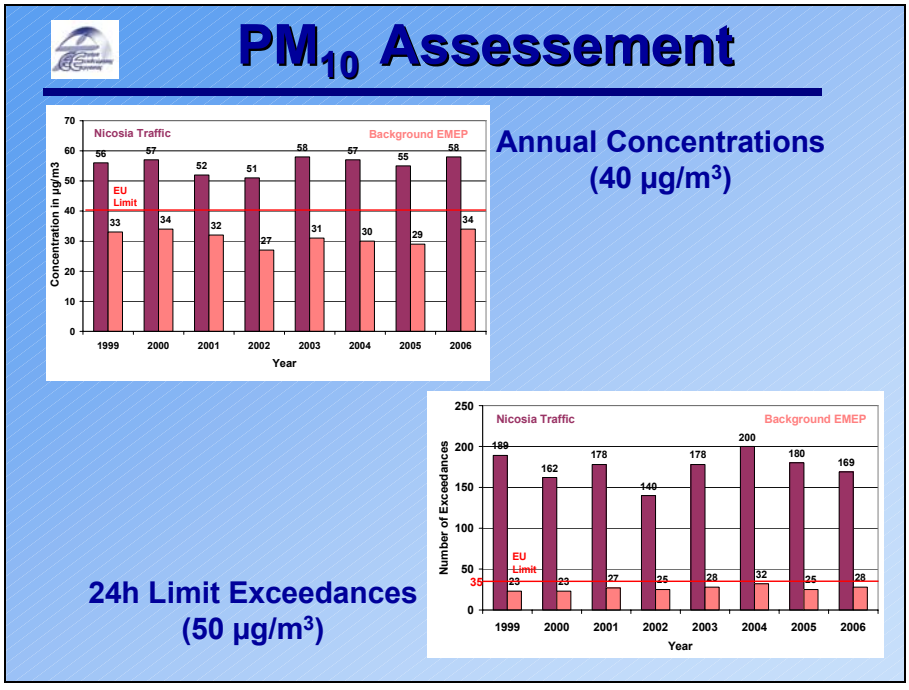
Savvas Kleanthous, Dpt. Of Labour Inspection, Cyprus

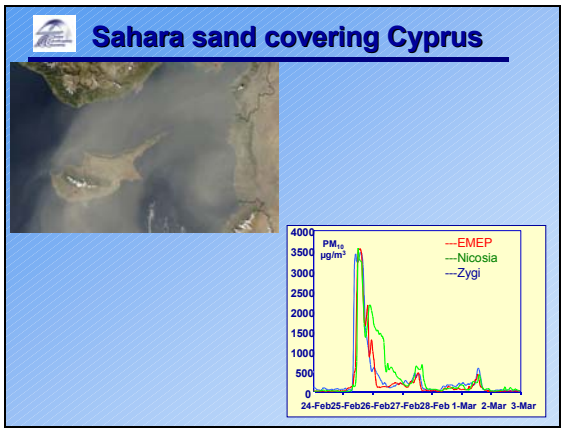
Based upon the Preliminary Assessment on air pollution that Cyprus carried out according to the requirements in the AQ Directives, Cyprus has now established a national air quality monitoring system, containing 9 stations as well as a reference laboratory to ensure good data quality. The data and information collected by the system is disseminated in near-real-time to the public through a web site and public information panels.

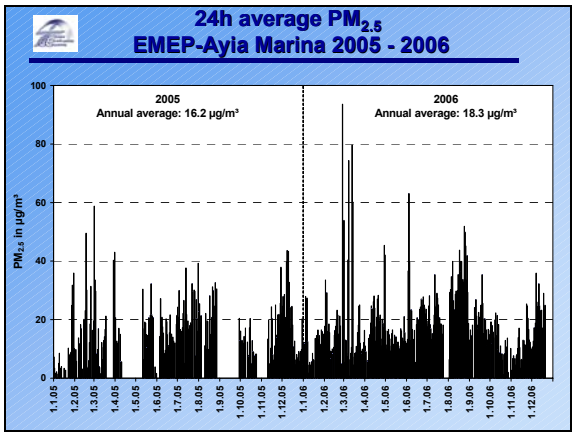
PM represents the main air pollution problem in Cyprus. Apart from the vehicle exhaust source, the most important PM10 sources in Cyprus are connected to resuspension from roads and soil surfaces. Regional PM10 sources are also sea salt as well as Sahara dust during episodes. At the EMEP station the PM10 level is slightly below the AQ Limit values, while at a traffic station in Nicosia the annual average concentration is close to 60 ug/m3, and the 24-hour limit value is exceeded on more than 150 days per year. Sahara dust episodes give very high PM10 and PM2.5 levels when they occur.

Plans and measures for reducing the air pollution levels have been developed. They cover abatement measures such as replacement and check on old vehicles, fuel quality, urban planning procedures, modern traffic management, upgrading of the bus system to increase use of public transport, promotion of renewable energy etc.


Republic of Cyprus
AIR QUALITY IN CYPRUS
English
Ελληνικά
Log in
Search
Home
Reports
FAQ
Contact
Home
National overview - Status
Go directly to a station
Updated: 12/10/2007 10:00:00
Click the circles to navigate to a city or station
Pollution level
Very high
High
Moderate
Low
No data
See explanation
NOTE! Live data. Errors may occur. Station color indicates highest current pollution level.
Airquality - Status
Air quality in Cyprus is accessed with the aid of a network of nine advanced monitoring stations. Data is recorded hourly and then presented on the website and on public indoor/outdoor panels.
The Department of Labour Inspection (DLI), Ministry of Labour and Social Insurance has the responsibility for the operation of the network, and for the implementation of abatement measures in order to reduce environmental pressures and improve air quality.
View Details
- Overview of air quality at all stations
- Compare stations last 24/72 hours
- Compare stations last months
Air Pollution
Here you can find information about air pollution and related pollutants.
More...
Health effects
Bad air quality can cause negative health effects, especially for sensitive parts of the population.
More...
Kids Corner
Here you will find lots of information that can be used by children in order to learn about the environment.
More...
Latest news
08/10/2007
Ozone: 8hours Rolling Averages for the last 24hrs 08:00 - 08:00
08/10/2007
Ozone: 8hours Rolling Averages for the last 24hrs 14:00 - 14:00
07/05/2007
Announcement regarding high dust concentrations in the atmosphere of Cyprus, due to transport from North Africa 7 May 2007
Archive
Media Center
For easier use of the site by the media, these pages provide useful information and guidance.
More...
Regulations
Information concerning the air quality legal framework of Cyprus and of the European Union
More...
Statistics
These pages give statistical overviews of the air quality situation in Cyprus.
More...


PM10 Assessment
Nicosia Traffic
Background EMEP
Concentration in µg/m3
EU Limit
Year
Annual Concentrations (40 µg/m3)
Number of Exceedances
24h Limit Exceedances (50 µg/m3)





Link to presentation: http://air-climate.eionet.europa.eu/docs/meetings/071015_12th_EIONET_AQ_WS/16_AQ_in_CY_Kleanthous.pdf

Discussion

The discussions centered around the SEIS presentation.

Arno Graff: It is clear that there needs to be work by the Member States to provide contents in SEIS. Colleagues are very reluctant to take part in SEIS, especially because there are in general no additional resources for this additional work. INSPIRE is already there, and it also has contents, and we also have the GMES initiatives.

EEA maintained that there is along history of sharing data, this will continue, and SEIS will be built step-by-step. The EEA has a strong commitment to INSPIRE as well, it is needed. EEA need to communicate with the MSs on contents. There is a need to bring INSPIRE, GMES and SEIS together.

SESSION 3
EXCHANGE OF NEAR-REAL-TIME INFORMATION ON AIR QUALITY IN EUROPE

Session chair: Steinar Larssen, NILU

Summary of session 3

The session had presentations on the 'GMES atmosphere' service and its project PROMOTE, on the ozone web, as well as on the COST ES602 action on 'chemical weather'.

GMES' objective is to provide relevant information to policy-makers, particularly in relation to environment and security, based on Earth monitoring data from space (satellites) and in situ observations. It is a joint initiative of the European Commission and ESA. The information needs are policy driven, and the information is fed from observation systems, ground based as well as satellite based.
Core services are defined to serve Pan-European, multi-purpose information needs, linked to EU information needs based upon public funding, while Downstream services are tailored for specific applications at local, regional, national, European levels (public good or private use), using core services as one of the inputs.
The program has an Implementation Group of 9 experts backed by 4 work groups. 3 main atmosphere service related projects have been defined, the GEMS (an FP6 project), PROMOTE (a GMES service element project) and MACC (an FP7 project). The presentation provides details on the various services in place and planned.
EIONET is seen by the GMES bureau as having a role in relation to in-situ and also as a key user community. It was noted that contact between national representatives to the GMES Advisory Council (GAC) and EIONET needed to be strengthened. Participants were requested to get in touch with their GAC representatives, in particular to review the outcomes of the September Council on in-situ. The Bureau also confirmed that EEA and EIONET are seen as in-charge in relation to the in-situ data requirements and that developing GMES services should not duplicate existing infrastructures for in-situ.

The near-real-time data flow activity of the EEA; the ozone web, was presented in terms of 2007 activities and 2008 plans. In 2007 most countries, except Balkan countries and Turkey, report n-r-t ozone data to the web.
The case for using near-real-time ozone data for the summer ozone reporting was presented. N-r-t data had been compared to validated data for 6 countries, with the conclusion that the n-r-t data have a high enough quality to support their use for summer ozone reporting. This feasibility exercise was seen as preparation for a pilot project to be run in 2008 with the aim to test the use of near real-time data to replace monthly and seasonal summer ozone reporting.
Plans for 2008 include also set up of a pilot data exchange for n-r-t PM data.

Participants were requested to provide feedback on the requirements document in preparation for a pilot in 2008. Participants were also requested to consider whether they would like to participate in the pilot itself.

The title of the COST ES602 is "Towards a European Network on Chemical Weather Forecasting and Information Systems".
Its 3 work packages are Exchange of AQ forecasts and input data; Multi-scale forecasting, multi-model ensemble and boundary data; Dissemination and vizualisation, as well as an activity to coordinate with other organisations, whre EEA is mentioned specifically. Participants are meteo services and environment agencies in each country, the EEA as well as project participants (e.g. GEMS, PROMOTE).
The emphasis of this action is on AQ forecasting and to effectively disseminate the forecasts. It is obvious that as far as input data are concerned, this activity needs to feed off the same data flows as the near-real-time flows used and established by the EEA. It is obvious that EEA needs to link to this COST activity to ensure coordination and avoid duplication, and also to join forces regarding data provision. Each member country should also consider to take part.

'PROMOTE-2: The GMES Service Element "Atmosphere'

Robert Höller, Federal Environment Agency, Austria

The PROMOTE project, a an ESA project to provide GMES relevant services for the atmospheric theme was presented. The project offers a number of services and actively seeks user involvement in the development and use of services. A user oriented workshop will be held be held at EEA on June 12-13 2008. Potential users are actively encouraged to visit the PROMOTE website (www.gse-promote.org) and contact the project as well as to consider participation in the workshop.
PROMOTE is addressing a well-represented segment of the European community with services related to the atmosphere.
Scientific themes: Ozone and UV, Air Quality, Support to Climate Change and Aviation Control.
User communities: Health, Local and national environmental agencies, International organizations, Science and research.
Services are freely available online and documentation of them and their utility available upon request.
PROMOTE has 60 Service Level Agreements(SLA), with public agencies in many countries, International organizations and federated user groups. In the presentation, several examples of active services were shown.
Air Quality related service examples are:

- Global and European Air Quality records
- European-scale Air Quality analyses and forecasts (daily)
- Regional/local Air Quality forecasts and assessments
- Desert dust awareness (regional)
- Pollen (regional à European)
- Satellite-based ground-level PM (regional and European)
- Regional Air Quality Scenario Tool.

PROMOTE is seeking continued cooperation with EEA and the EIONET community.

'GMES Atmosphere':
Scope, Framework and Plans for the Coming Year

Arno Kaschl, EC GMES Bureau

The purpose of the GMES initiative is to deliver Information Services on environment and security based on Earth monitoring data from space (satellites) and in situ observations. GMES Atmosphere services include the topics "Air Quality, Climate forcing, Ozone, UV and renewable energies". Output services in the form of e.g. datasets, maps, reports, targeted alerts, etc are produced, corresponding to the needs of the identified users, who include: European institutions and agencies, national and regional authorities; international bodies in support of conventions; the European citizen and NGOs and specific communities such as the research community, health services and the private sector, among others.

The services of common European value (so-called "core service") are intended to be in direct support of EU policies. A number of tailored "downstream services" for various users will be enabled through the provision of products from the core service.

The observational infrastructure is divided into space infrastructure (satellites and ground stations) and in-situ infrastructure (ground-based, water-based, airborne measuring instruments). This infrastructure needs to be developed, operated, maintained and updated according to the technological development.

The first GMES services being developed as priority ('fast track' treatment) are entering the validation phase in the framework of FP7 calls for proposals (closure June 2007): these include a Marine, Land and Emergency Response service. The preparations for a pilot service on atmosphere have similarly been started in December 2006 with a general user workshop including 100 participants from 27 countries and relevant European institutions that discussed the pertinent issues of such a service. This service will address atmosphere composition and should complement the information already provided by the meteorological services. Four themes have been identified: Air quality, climate forcing, stratospheric ozone and UV radiation (solar energy). The extension of the service would be global for ozone, radiation, greenhouse gases and aerosols, while air quality and CO2 sources/sinks would be limited to a European extent.

As GMES is a user-driven initiative, employing the following mechanism to establish the services while keeping user's interest in mind:
(1) The general **user workshop;**
(2) followed up by the work of an **implementation group** composed of experts not involved in the service delivery and which should represent the user interest;
(3) at the same time, building the services using **funding from FP6/7 and ESA**;
(4) an **operational phase** for the services.

The implementation group is tasked with providing recommendations on scope, functionality/architecture, links between core and downstream services, space and in situ observation infrastructure, governance and funding of a future service. The work of the implementation group is back up by four working group, so that altogether 45 European experts are involved in these groups. The IG's final report is expected for summer 2008. Current projects preparing the atmospheric services are GEMS (FP6, 10M€) and PROMOTE (ESA, 5M€). These will in all likelihood by followed up by the FP7-funded project MACC as of 2009.

Link to presentation: http://air-climate.eionet.europa.eu/docs/meetings/071015_12th_EIONET_AQ_WS/17_GMES_GAS_Kaschl.pdf

Near-real-time European Air Quality: Results for 2007 and Plans for 2008

Tim Haigh, EEA

The presentation outlines the main results from 2007 in relation to ozone web as well as the work planned for 2008.

The ozone web project delivered an initial result in July 2006 when a pilot was published on the EEA website (http://www.eea.europa.eu/maps/ozone/map/). In the latter part of 2006 the concept of SEIS matured and identified the ozone web project as a prototype for elements of the SEIS with the potential to be a quick win. By this, it is meant that ozone web would support improved understanding of the opportunities provided by the development of the SEIS.

The objective of SEIS is to establish a distributed and sustained environmental information system to improve accessibility and sharing of data and information within Europe for public policy makers and citizens. The systems are foreseen to support an improvement both in the quality of environmental data and information as well as in its management, use, dissemination and reporting.

Within this framework, and based on the results of the ozone web project, three objectives are foreseen for 2008 for near real-time air quality work:

1. Demonstrate that the system can be used to provide information relating to provisional ozone exceedances (current monthly summer ozone exceedance reporting).
2. Demonstrate that near real-time ozone data can be consolidated to full coverage and repeated for other priority air pollutants, for example particulate matter.
3. Assess the properties of ozone web to determine which characteristics of the system, data and data exchange mechanisms are key and suitable for extension of this approach to other areas.

Input from countries in 2008 is requested to consolidate near real-time data provision as well as to participate in an EEA pilot to test the feasibility of using near real-time data provision as a replacement for summer ozone reporting.

In 2007, work was undertaken to assess stakeholder requirements to extend the near real-time air quality system to particulate matter as well as to use ozone data for summer ozone reporting. Key findings are presented. Work was also undertaken to systemise the ozone web system within EEA procedures.

Near real-time ozone data from 2006 was compared with reported summer ozone exceedances for the same period for six countries. The results show:

- High degree of match in days with exceedance episodes registered;
- Time-lag in start of exceedance is constant and there are almost no difference in duration of exceedances;
- The max concentration during exceedances shows only some small differences (no significant difference in the two datasets);

Based on this result, it is envisaged to extend the near real-time ozone web system to pilot the use of the data for summer ozone reporting in 2008.

The performance of the system in 2007 was reviewed. Geographic coverage has been extended to almost all EEA countries. Bulgaria, Iceland, Lichtenstein, Luxembourg, and Romania still have to complete sign-up. The overall system and data provision have generally been reliable with around 85% data capture rate. When problems have occurred, recovery of data has been good, both by data providers and at EEA. Visibility of the site needs to be further improved. Links from US web sites, links from other environmental sites, translation, lag-time in search engine pick-up, map speed, and the weather are key factors.

Link to presentation: http://air-climate.eionet.europa.eu/docs/meetings/071015_12th_EIONET_AQ_WS/19_NRT_AQ_2007_08_Haigh.pdf

Q and A:

Q: Has ozoneweb the capacity to receive large amounts of corrected data, for eaxample after validation of the data. In practice this will imply the submission of data of all stations in a network covering period of one up to 6 months.
A: Some countries send corrected data, and is dealt with because there is a small amount. Large amounts of data will tend to clogg the system.

Q: Do you know why a one-two hour difference in start time for information thresholds has been observed for Austria?
A: Probably a systematic error due to a misunderstanding between the data transmitter and the data receiver about the timing of information required.

Q: Can you say a few words about the difficulties and possibilities open to modellers and similar?
A: The big drawback is ensuring understanding that data is provisional and not validated. But as long as users understand this, then this is a big resource offering a first view of current status, and offering an early view of the air quality experienced in Europe far ahead of the summer ozone reporting schedule. Being on-line makes it readily available.

Q: I noted a difference between the official UK data and the ozone web data. For compliance purposes a 100% agreement is required.
A: Ozoneweb is not meant to be used for compliance reporting, it is just giving an overview of the current situation.

COST ES 0602 'Chemical weather': Towards a European Network on Chemical Weather Forecasting and Information Systems

Presented by Tim Haigh, EEA on behalf of Jaakko Kukkonen, FMI

The title of the COST ES602 is "Towards a European Network on Chemical Weather Forecasting and Information Systems".
Its 3 work packages are Exchange of AQ forecasts and input data; Multi-scale forecasting, multi-model ensemble and boundary data; Dissemination and visualization, as well as an activity to coordinate with other organisations, where EEA is mentioned specifically. Participants are meteo services and environment agencies in each country, the EEA as well as project participants (e.g. GEMS, PROMOTE).
The emphasis of this action is on AQ forecasting and to effectively disseminate the forecasts. It is obvious that as far as input data are concerned, this activity needs to feed off the same data flows as the near-real-time flows used and established by the EEA. It is obvious that EEA needs to link to this COST activity to ensure coordination and avoid duplication, and also to join forces regarding data provision. Each member country should also consider to take part.

Link to presentation: http://air-climate.eionet.europa.eu/docs/meetings/071015_12th_EIONET_AQ_WS/18_COST_602_chem_weather_Kukkonen.pdf

Q and A:
Q: It may be worthwhile to recommend that someone from EEA or ETC/ACC act as a representative of this EIONET community to the COST action, so that the knowledge and needs of the environmental and observing community are taken on board. There is otherwise a danger that the work becomes overfocused on technical modelling aspects.
A: Yes.

PROMOTE-2: The GMES Service Element "Atmosphere"

Robert Höller, UBA Austria

Robert Höller[1], Thomas Holzer-Popp[2], Eleni Paliouras[2], and the PROMOTE-2 Team

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(2) DLR-DFD, Oberpfaffenhofen, Germany

PROMOTE is an international project within the European Space Agency's Global Monitoring for Environment and Security (GMES) Service Element (GSE) programme (www.gse-promote.org). About 20 service providers have teamed to provide targeted information related to atmospheric conditions directly to end users. The main objective of the project is to construct and deliver sustainable and reliable operational services to support informed decisions on atmospheric policy issues. The users of the services include over fifty administrations and organisations in Europe and Canada ranging from city administrations to Volcanic Ash Advisory Centres to the European citizens at large. The PROMOTE service portfolio consist of five service groups:

- Ozone Services
- UV Services
- Air Quality Services
- Climate Study Support Service
- Aviation Support Service

The User Federation (UF) of the project is composed of all users that signed a Service Level Agreement (SLA) within PROMOTE. The UF therefore is a group of active users that is closely cooperating and interacting with one or more service provider organisations, and provides feedback to improve PROMOTE services. The UF aims at ensuring that PROMOTE services are strongly user-driven and acts as an interface between the demand and supply sides of the project. Within the course of the project, PROMOTE aims at progressively expanding the volume and geographical extent of services delivered to end users, but also to enlarge its user community.

The PROMOTE Ozone Services consist of a range of products related to stratospheric ozone. Information provided includes records of total ozone column and profiles useful for monitoring the evolution of the protective ozone layer. The services also offer near-real-time ozone concentration retrievals and nine-day forecasts for improving weather prediction and the forecast of surface ultraviolet (UV) radiation.

UV radiation is closely related to atmospheric composition because the amount of stratospheric ozone directly influences UV radiation at the Earth's surface. The UV Services include an on-demand information service which provides personalized information on sunburn time available on the internet and through mobile phone technology (SMS). The information provided helps people to prevent sunburn due to excessive exposure to the sun and suggests exposure times and protective sunscreen to adopt. When an information request is made by an individual, the calculation is modified to account for forecasted stratospheric ozone levels (delivered by PROMOTE) and personal characteristics such as age and skin type. Additionally, another service offers global information on long-term surface UV radiation levels based on the atmospheric composition including stratospheric ozone levels, cloud cover, and surface elevation and albedo.

The Air Quality Services of PROMOTE offer a wide range of data and information products which act as input for forecasting, monitoring and reporting duties of environmental agencies in almost a dozen European countries. Daily updates of the pollution situation are also distributed to the public to enable individuals - especially those affected by respiratory diseases - to adjust their behaviour accordingly. These services consist of products ranging from records of air pollutants to analysis and forecasts of air quality at European, regional and local scales. The resulting maps provide information on a wide range of parameters including pollen, ground-level ozone, and particulate matter concentrations. Figure 1 shows an example of air quality forecast modelling at European scale. This service provides an ensemble forecast of air pollutant concentrations for all of Europe. Ground level concentrations of ozone, nitrogen dioxide and particulate matter derived from several well established and validated chemistry-transport models are integrated. The final product is based on an ensemble approach in order to get the best result from a combination of different models. Forecasts up to two days are provided at a resolution of ~50 km*50 km. In the near future analysed maps will be available, too. They will be issued from simulations including assimilated in-situ observations. All products are available daily using near-real-time observational data from satellite and ground.

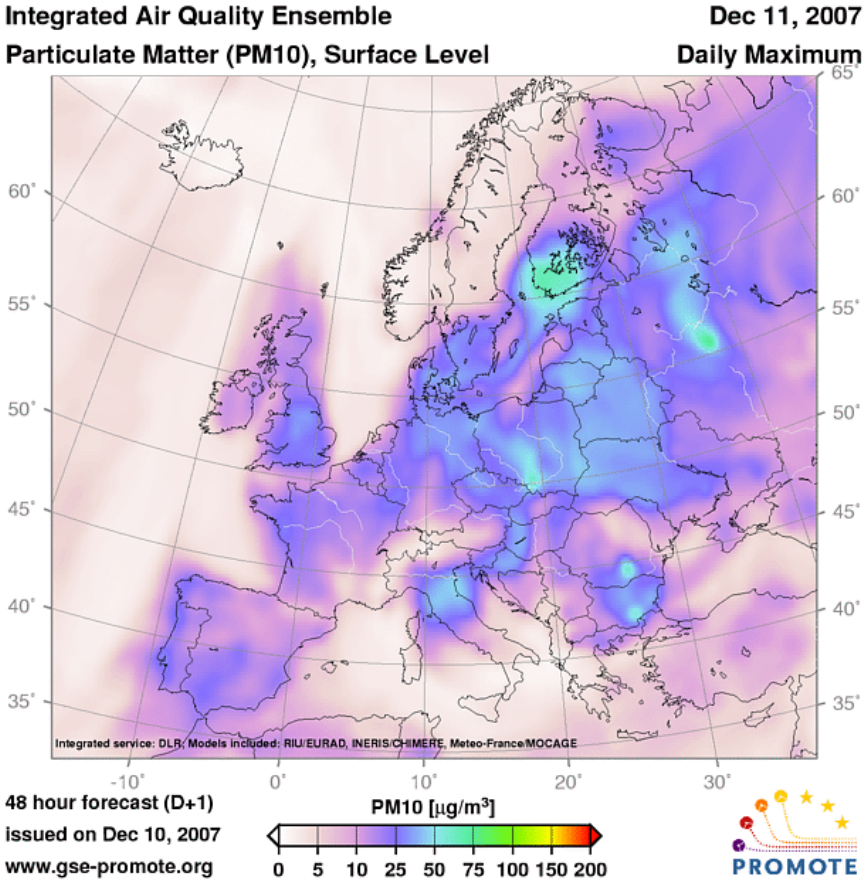

Figure 1: 48 hour forecast surface level concentration of PM10 (µg m^{-3}) for December 10th, 2007.

The Climate Study Support Service consists of records of methane and carbon dioxide distribution maps. Aerosol products form the second component of this PROMOTE service and focus on distributions of aerosols and aerosol type. Products within this service are currently in a demonstration stage, but show great promise and are raising interest among a wide range of climate researchers.

A special service provided by PROMOTE is the Aviation Support Service using near-real time satellite data to detect volcanic eruptions. Volcanic ash and sulphur dioxide endanger air traffic. Once detected, trajectories of volcanic plumes can be modelled and can provide information on plume extent and movement.

Link to presentation: http://air-climate.eionet.europa.eu/docs/meetings/071015_12th_EIONET_AQ_WS/20_PROMOTE-2_Hoeller.pdf

Q and A:
Q: Are the results of the three models in the project different in spatial coverage or in their estimates?
A: The three models estimate the same components in the same spatial coverage. The results are combined to give ensemble results. This combination gives added value. In addition, satellite data and ground-based in-situ data are assimilated into the models.

Discussion

Comment: Moussiopolous – underline the potential great benefit of developing and disseminating satellite derived data. This type of data is very useful for improving AQ assessments.

Comment: Fiala – Important to ensure that the data provided by MS and the Agency are made as widely available as possible.
Comment: Graff – Satellite data is good for basic research, for supporting modelling etc. However, there still is a long way to go before it can be used in daily practice of a community like this, for example, in compliance checking.
Comment: A question to the Commission is to ask what can we learn from NRT work so far about future reporting needs.
Comment: It is important that the Agency and EIONET community say clearly what services are needed. Delivery of data is not needed; rather it is worked-up products. The community must take responsibility in expressing what type of products it needs from the data.

SESSION 4
EIONET AIR QUALITY MODELLING NETWORK

Session chair: Anke Lűkewille

Summary of session 4

The European Environment Agency (EEA) and the European Commission Joint Research Centre (JRC) were activated in 2006 towards setting up a Modelling Network to promote synergy between the users of AQ models at a local and national level and model developers, as well as exchange of relevant information. As a result, ETC/ACC has a task to establish an EIONET modelling network, while JRC has

activated a network of modellers to improve on the scientific and quality of results of AQ models for regulatory purposes.

Nicolas Moussiopoulos, AUTH/ETC-ACC, spoke of the modelling network from the perspective of the EEA. The new Air Quality Directive will put more emphasis on the use of models in the regular AQ assessment activities under the Directive. It is recognised that there is a strong need for guidance in the use of models for such purposes. He mentioned relevant previous and on-going activities that need to form a basis for further work: the CITY- and EURO-DELTA model intercomparison projects, various COST activities, projects like EUROTRAC-2, ACCENT, Air4EU). Also, the Model Harmonization workshops (going on since 1992) and the use of modelling within the US EPA provide important basis.
The main needs to be satisfied are:

- harmonization in use of models and their results
- model improvements and validation.

The 2 initiatives that have been taken, by EEA and by JRC, will combine efforts. The EEA/ETC /EIONET side will focus on the user perspective while JRC will focus on the more scientific side of model validation and use.
Objectives of the modelling network are to

- provide guidance in use of models
- provide a common infrastructure for exchange of results, for their reporting and storage, and for dissemination of results, such as in form of maps.
- promote the combination of modelling and monitoring data in assessment (e.g. data assimilation)
- promote model validation.

The network will be established based upon nomination and invitation. In selcting participants emphasis will be put on the importance of interactions between AQ managers, model users and model developers.
Roles of NFPs and NRCs should be to:

- nominate experts and users for participation in the network activities
- establish national sub-networks as appropriate

The first assembly of the network is scheduled for Spring 2008.

Panagiota Dilara, JRC, said that the need for a network in the area of Air Quality modelling was recognised by JRC in parallel with EEA. JRC called a first meeting on this in May 2007, and agreed to build a common network with shared goals. She described in fair detail the previous model intercomparison activities run by JRC, the CITY-DELTA and EURO-DELTA projects.
JRC sees its role as to focus on

- model intercomparisons, model improvements and developing AQ/QC procedures for model applications, with emphasis on model use for compliance checking and for making projections
- promotion of relevant research.

In the discussion, Helge Olesen - Chairman of the Harmonization initiative – welcomes these initiatives to get a better grip on the quality of models. Benchmarking of models is valuable. He further suggested the use of a web based discussion forum as an integral part of the network activities; and offered the Harmonization Workshops (one per 18 months) as a platform for further discussions.

Questions related to:

- the usefulness of CITY-DELTA results, since in AQ assessments and exceedance discussions one quickly gets down to the very local scale.

- how to ensure that this network activities do not replicate work already done.
- The importance that the network should NOT constrain the use of models, rather it should ENABLE model use.
- Whether other assessment tools that dispersion models would be considered, such as mapping approaches.
- Whether the data currently in AirBase is sufficient for the model validation activities foreseen.

All these points are very important to be considered in the work to establish the objectives and work plan for the network.

The issue of network participation was discussed in view of the present participation in the EIONET workshops. It is clear that the modeling network will to a large extent address another audience than the mainly monitoring data oriented participants in the present workshops. It might be considered to bi-annually focus on monitoring and modeling assessments in the further EIONET workshops.

Towards a modeling network in support of the New Air Quality Directive

Nicolas Moussiopoulos, AUTH, Greece (ETC/ACC)

Towards QA/QC for Air Quality Models at the JRC: Setting up the network

Panagiota Dilara, JRC Ispra

The following abstract was produced in cooperation by the two speakers above:

In view of the requirement for increased modelling use in air quality assessment as put forward within the frame of the new Air Quality Directive (AQD), the European Environment Agency (EEA) and the European Commission Joint Research Centre (JRC) were activated towards setting up a Modelling Network to promote synergy between the users – at a local and national level – as well as exchange of relevant information. In response to these requirements, the EEA via the European Topic Centre on Air and Climate Change (ETC-ACC) has formulated a task having as a main aim the development of a Modelling Network. The JRC additionally proposed that a main aspect of the Modelling Network should be to focus on scientific research that will establish improved and validated modelling tools on which decision making will be based. Thus the Modelling Network will aim in promoting the use of these modelling tools for policy purposes in a harmonised manner between member states. Emphasis will be put on the new proposed AQD requirements, mainly on the promotion of good modelling practices and the interaction between authorities and the modelling community at national and European levels. Some important objectives of the Modelling Network are:

- To establish tools and mechanisms for enhancing communication between modellers and model users and provide a framework for exchange of experience at all levels of application. This will include electronic interfaces, databases (such as MDS, COST728 Metadatabase, EEA Data Centre) and tools as well as workshops, seminars and common activities.
- To provide a centralised portal for information concerning the AQD, submission of compliance data based on modelling, references and experiences of other users through case studies, and will provide QA/QC methods for users and provide information support for these services.

- To establish a common infrastructure based on best practice for reporting and storing the information, results and maps in a standardised and harmonised manner to create an archive for reference where tools, data and information will be readily available to authorities and scientists of the member states.
- To promote model validation and quality assurance of model results to identify limitations and remove error factors, which implies the organisation of and participation in model validation and intercomparison exercises at national or European level. Such exercises will be complementary to other parallel activities. The JRC will take on a leading role in the coordination of such actions, gaining from its experience in leading the "Eurodelta" and "CityDelta" intercomparison exercises.

The Modelling Network will follow a methodology that will consist of four specific work tasks. For each work task relevant activities will be assigned according to the following table.

Table 1: *Activities to be undertaken by the Modelling Network*

Work Task	Related Activities	Leader
Network establishment and maintenance, communication and collaboration	Working document Theme specific workshops, seminars and information days	EEA
Model validation and assessment	Model intercomparison exercises Benchmarking tests	JRC
Exchange of data and information	Common infrastructure and structural tools	EEA
Modelling and its application for AQD and reporting	Guidance for model use and reporting Example case studies for reporting	EEA, DG ENV

Link to Moussiopoulos' presentation:
http://air-climate.eionet.europa.eu/docs/meetings/071015_12th_EIONET_AQ_WS/21_mod_network_for_new_AQD_Moussiopoulos.pdf

Link to Dilara's presentation:
http://air-climate.eionet.europa.eu/docs/meetings/071015_12th_EIONET_AQ_WS/22_AQmodels_JRC_Dilara.pdf

Q and A, and Discussion:

Comment: Helge Olesen - Chairman of the Harmonization initiative – welcomes these initiatives to get a better grip on the quality of models. Benchmarking of models is valuable. He further suggests the use of a web based discussion forum as an integral part of the network activities; the Harmonization Workshops (one per 18 months) could also form a platform for further discussions.

Q: What is still missing after CITY-DELTA etc is clear statements as to what is needed regarding data quality objectives for modelling used for AQ modelling - compliance

checking and other regulatory modelling. This quickly leads to local scale modelling as exceedences are invariably linked to hotspots. In this respect the scale of CITY-DELTA is of unclear help.
A: One of the first activities of the coming network is to establish a working group on data objectives. Existing recommendations from prior work also needs to be included in the terms of reference of the working group, so that some kind of guidance document may result, possibly to be ready before EIONET 2008.

Q: Can we ensure that the working group doesn't replicate what has happened before, or what is happening elsewhere? Secondly, a comment to be made is that the working group outputs and the network should enable not constrain.
A: There is a need to discuss the terms of reference before the group starts to ensure no replication. Also, the intention of the network is to further communication, and thereby enable. We need to keep this in mind.

Q: Will more general approaches be included in future than simply dispersion modelling, e.g. mapping approaches?
A: The purpose of the work is to promote communication around the tools used for air quality management. The work must reflect the skills needed to do the work needed, and this can as well include mapping approaches as well as dispersion models.

Q: Is the information now found in Airbase sufficient for benchmarking work etc by the working groups, and if not, what else is needed?
A: This form of assessment may need to be the first priority as the work begins. What data is appropriate for what tasks is clearly in need of definition if we are to address the matter of data quality objectives.

Q: Which people should be a part of the network? Much of the EIONET community is from the data provider side. Who from this community, and which other communities, should be included?
A: Defining the profile of the people needed is hard. Understanding the purpose of the work, and understanding the capabilities/limitations of models would be an advantage. But also, the national stand point is vital, and it may be best to first wait until the national participations becomes clear.

Comment: In order to accommodate for the modelling network activities within the EIONET workshops, it can be considered to focus on monitoring and data exchange in some workshops and on modelling and assessment activities in others.

Comment: The matter is often raised as to when compliance checking will begin. This is, however, too simplistic as there is no one place which will undertake such work. Rather all levels, from local government, through national agencies and national government to European level government will have roles to play. It thus becomes necessary to treat the whole activity as having a user-group focus which can promote the communication across spatial and hierarchical scales.

SESSION 5
SUPPORT TO AIR QUALITY ASSESSMENT BY MONITORING, MODELLING AND COMBINATION

Session chair: Tim Haigh, EEA

Summary of session 5

The common topic of the presentations in this session was 'spatial assessment and mapping of air quality'. The session had presentations on classification of monitoring stations, and on spatial mapping of air quality to assist effects assessments.

The project 'Classification and Representativeness of Air Quality Monitoring Stations' was carried out by UBA-Wien for the Commission, with the objective to develop definitions, methods and validation procedures for
- the classification for air quality (AQ) monitoring sites for various pollutants, focusing on NO_2, PM10 and ozone, but also taking into account PM2.5, SO_2, NOx, CO and benzene;
- the assessment/delimitation of the geographical area of representativeness of air quality monitoring sites.

A classification scheme for stations was attempted using surrogate data such as for emissions and extent of activities, e.g. road traffic and domestic heating near stations. Classification of ozone stations required a special treatment. Representativeness was defined as areas having the same concentration (within uncertainty) for the same reasons (e.g. similar source mix in the area), and should be pollutant specific.

The presentation on 'Spatial mapping of air quality for European impact assessments' showed examples of development of exposure distributions (for health and ecosystem effects) as well as effects assessments, based upon spatial mapping and detailed additional data, such as population data, including its stratification (age groups).

The presentation 'A Generic approach for the spatial representativeness of air quality monitoring stations and the relevance for model validation' stated that assessment of the spatial representativeness of monitoring stations is both a requirement of the Directives (for spatial assessment of air quality in zones) as well as essential for model validation. Land cover and traffic density data was used as a means to specify representativeness of stations, as well as to down-scale modelling results (example: the belEUROS model) for comparison with measurements.

The presentation 'New web tools for mapping of air quality at different scales in Europe – illustrative examples of near-real-time applications' showed examples of mapping of urban and local concentrations based upon modelling. Emphasis was put on the need to conform with the new AQ and INSPIRE directives' requirements regarding data reporting, sharing and spatial assessments in zones.

Classification and Representativeness of Air Quality Monitoring Stations

Wolfgang Spangl, UBA Austria

The main objectives of the project „Development of the methodologies to determine representativeness and classification of air quality monitoring stations“[11] are to develop definitions, methods and validation procedures for

- the classification for air quality (AQ) monitoring sites for various pollutants, focusing on NO_2, PM10 and ozone, but also taking into account PM2.5, SO_2, NO_x, CO and benzene;
- the assessment/delimitation of the geographical area of representativeness of air quality monitoring sites.

The definitions and the methodology take into account the following principles: The methodology should be applicable throughout Europe, both classification and representativeness provide results specific to different pollutants, classification and representativeness are temporally constant over time periods of at least several years, and the classification methodology developed in this study focuses not only on existing monitoring stations, but considers any point in space in Europe.

The central motivation for developing a „new” classification approach is a desire to improve the description and classification of monitoring stations used for air quality reporting and data analyses on a European level. The classification method developed and proposed in this study can be used to improve the monitoring station description as required by EC legislation, especially in the Exchange of Information Decision (101/97/EC).

The primary advantages of the proposed classification method which could improve the EoI station descriptions are:

- **it gives quantitative criteria (though not for all emission categories),**
- **it is uniformly applicable throughout Europe,**

which should allow a more accurate description of monitoring stations with respect to emissions, and harmonise meta-information about monitoring stations throughout Europe. Unlike the EoI station descriptions, the proposed classification is pollutant-specific.

The central purpose of classification is to facilitate statistical analyses of data by grouping monitoring sites into classes with common characteristics. Emissions from different major source categories are a traditional basis for monitoring site classification, and this approach has also been pursued in this study. The classification scheme developed in this study focuses on NO_2/NO_x and PM10 and takes into account the **three most important source categories**: **Local road traffic**, **domestic heating** and **industrial and commercial sources** (including power plants, and special infrastructural facilities like airports or ship emissions in large sea ports and harbours). The impacts of each source category to a monitoring station are estimated independently from each other. The classification scheme is an extension of the „type of station” classification in the EoI meta-data (97/01/EC).

[11] This work was carried out under “Service contract to the Commission for the Development of the Methodologies to determine Representativeness and Classification of air quality monitoring stations”,Contractor to DG ENV: Umweltbundesamt Austria; Subcontracts with TNO and Central Institute for Meteorology and Geodynamics, Vienna.)

The classification parameter for **local road traffic** is an estimator for the contribution from local road traffic to the concentration at a given site. The contribution of road traffic emissions is referred to as „traffic emission parameter" and is quantified by the following approximation: Traffic emission parameter = **emissions of local road traffic divided by square root of the distance.**

The square root of the distance from the road as the denominator is the best simple mathematical approximation for the concentration distribution along a street from model results. To account for effects of street geometry, an **„exposure coefficient"** is introduced, by which the respective traffic emissions are to be multiplied. The exposure coefficient ranges from zero for the configuration of a monitoring site and a road with completely closed building blocks in between to **1.5** for situations with adverse local dispersion in street canyons.

The contribution of **domestic heating emissions** to the ambient air concentration may be assessed by modelling or by using surrogate parameters. The classification method discussed in this study can be applied if modelling is not available. It considers the domestic heating **emissions within a radius of 1 km.**
The contribution of **industrial (commercial) emissions** can either be assessed by modelling or by expert judgement. There is no simple, generally applicable way to assess the industrial contribution using surrogate information, since industrial sources cover a wide range of different configurations regarding e.g. spatial distribution and the number of sources.
The application of the classification scheme is demonstrated and tested in this study with three classes for each emission category.
As a definition of „**urban background**", locations which have been put into the lowest class related to road traffic and industry are proposed. **Rural background** shall cover locations which have been put in the lowest class regarding all categories of emissions.
Ozone is a secondary pollutant; formation and depletion processes are used for classification. Classification of ozone monitoring sites is based upon the following parameters: Local ozone depletion by NO titration is taken into account by classification of **NO_x emissions from local road traffic**; two classes are proposed.

The effect of ozone depletion at the surface and vertical mixing, leading to a distinct vertical gradient, is dealt with by a simple topographic classification based on **exposure**: from „plain" for low vertical exchange and high surface depletion to „high alpine" for locations on high mountain summits characterised by strong exchange with the free troposphere and negligible surface depletion. **Regional photochemical ozone formation** in the plumes of large agglomerations can be assessed either by expert judgement or through assessment of regional NO_x and VOC emissions within a circle of approx. 50 to 100 km in radius; two classes are proposed.

Classifying AQ monitoring sites **according to the population distribution** separates different types of urban and rural sites. The proposed classification scheme is in principle related to the „type of area" description used in the Ozone Directive (2002/3/EC) and the Exchange of Information Decision (97/101/EC),.The proposed criteria are based on population numbers within a radius of 1 km (referring to local emissions) and 10 km (covering also medium-range transport and pollutant accumulation). This scheme can be used both for exposure assessment and assessment of total emissions, since the population density is a surrogate value for spatially distributed emissions.
The assessment of the **representative area of a monitoring station** allows extending information observed at one point – the monitoring site – to the area of representativeness.

In this study, the general definition of representativeness is based on the following two criteria:

- The concentration parameter (annual mean and annual percentile) is below a certain threshold.
- The „similarity of concentrations" is caused by common external factors.

The proposed **numeric threshold values** for averages and percentiles are set at 10% of the total range of values observed in Europe. Therefore, the concentration thresholds for the annual mean values of NO_2 and PM10 are set at ± 5 µg/m³, for the annual 90.4 percentile of daily mean PM10 values at ± 8 µg/m³, and for the annual 93.2 percentile of daily maximum 8-hour mean ozone values at ± 9 µg/m³. In order to avoid „similarity by chance" in one year, but not in another year – due to e.g. inter-annual variations of meteorological conditions – the criterion has to be fulfilled over three years.

Because NO_x is of relevance only at monitoring sites where the limit value for the protection of vegetation and ecosystems applies, namely locations with quite low concentration levels, it is proposed that for **NO_x** a range of ± 5 µg/m³,should be used. The second criterion – „**similarity for common reasons**" – is included in the definition, because similar annual mean values or percentiles can be observed by chance at different locations due to a combination of quite different external factors like emissions, dispersion, long-range transport, formation or depletion. The following external parameters are used as criteria for delimitation of the area of representativeness:

- **Emissions** from different types of sources (the three categories on which the classification scheme is based are used).
- **The climatic and topographic dispersion situation,** including local **building structure**.
- A **maximum extension** of the area of representativeness, related to transport and chemical transformation in the atmosphere.

The dispersion situation in this context is related to the **climatic and topographic situation** and the local **building structure/street geometry** which trigger the dispersion/accumulation of pollutants. They cover different scales: **Local environment** (scale < 100 m – street geometry, local building structure and topographic situation, forest), **regional environment** (scale < 10 km – valleys, basins, flat terrain, coastal areas etc.), and **large-scale** (> 10 km – large-scale topographic and climatic region).

The chemical transformation – i.e. both removal and formation – of the major pollutants considered in this study (NO2, PM10, ozone) covers a temporal scale of less than one day (average atmospheric lifetime of about 12 h for NO2). The corresponding distance is considered the **maximum extension** of the area of representativeness of a monitoring station. For the extra-Alpine parts of Austria, the respective distance is about 100 km, derived from an analysis of backward trajectories.

Spatial pollutant concentration can be determined either using air quality modelling or based on surrogate data which are spatially available themselves. Input data for the parameterisation of concentrations are **emission data** (emission densities) or **surrogate data for emissions** (such as traffic information or population density) and parameters triggering **dispersion** (meteorological or climatological data, topographical/geographical information, building structure, etc.). These data also serve as input for modelling.

Different methods have been developed for the **assessment of concentrations based on surrogate data**, covering different levels of sophistication - from using

land-use information to simple modelling techniques. Such assessment methods can also be used to estimate emissions. To estimate both concentrations and emissions, a simple empirical relation between measured concentrations and geographical information (topography, CORINE landcover, TeleAtlas functional road classes, population per municipality) is used in this study.

This simple method, however, can only be applied to rural and small-town locations, with only a coarse representation of traffic influence. For urban areas, much more precise information about both emissions and concentration patterns is essential.

Link to presentation: http://air-climate.eionet.europa.eu/docs/meetings/071015_12th_EIONET_AQ_WS/23_station_classif_repr_Spangl.pdf

Q and A:
Q: Have you addressed short term exposure as well as long term?
A: No.

Q: Has the classification scheme been tested or used in other countries as well?
A: It has been tested for Dutch stations as presented. It is extremely difficult to get the necessary input data for such testing.

Spatial mapping of Air Quality for European Impact Assessments

Frank de Leeuw, MNP, the Netherlands (ETC/ACC)

Interpolation techniques for the construction of detailed air quality maps for Europe based on a combination of primarily air quality monitoring data and secondarily, modelling and other supplementary data have been described by Horalek et al (2007). The resulting interpolated air quality maps have used for assessment of exposure and impacts of air pollution in terms of population and ecosystems at risk. We calculate the number of Europeans exposed to annual mean concentrations of PM_{10} above the European limit value of 40 $\mu g.m^{-3}$ at 6 % of the total population in 2004. The estimated number of premature deaths calculated using 2004 as the reference year is estimated between 246,000 and 327,000, depending on the choice of background concentration. The high end of this range is close to the estimates used in the CAFE strategy. For ecosystems, we find that more than 30 % of all agricultural land may be exposed to ozone exceeding the target value of 18 $mg.m^{3}.h$ and more than 80 % may be exposed to levels in excess of the long-term objective of 6 $mg.m^{-3}.h$. In southern countries more than 90 % is estimated to exceed the target values, while in northern Europe the estimated ozone levels are below the target value for nearly 70% of the agricultural area. For forests, in northern Europe the EU-ozone reporting level of 20 $mg.m^{-3}.h$ is not exceeded in our calculations, but in southern Europe it is exceeded everywhere. The critical level as used under the CRLTAP-convention is exceeded in nearly the whole of Europe. The rural NO_x map shows a few regions where the NO_x limit value for the protection of vegetation is exceeded (the Benelux, the Rhone Valley and northern Italy). No significant exceedances for SO_2 were expected as the interpolated map of annual average SO_2 confirms.

Reference:

Jan Horálek, Bruce Denby, Peter de Smet, Frank de Leeuw, Pavel Kurfürst, Rob Swart, Twan van Noije (2007) Spatial mapping of air quality for European scale assessment. ETC/ACC Technical Paper 2006/6.

Link to presentation: http://air-climate.eionet.europa.eu/docs/meetings/071015_12th_EIONET_AQ_WS/24_AQmapping_imp_assessm_dLeeuw.pdf

A generic Approach for the Spatial Representativeness of Air Quality Monitoring Stations and the Relevance for Model Validation

Stijn Janssen, VITO, Belgium

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As a matter of fact the majority of the air quality monitoring stations in Belgium and elsewhere is located in urban, suburban or industrial areas since it is there that high levels of pollution and human exposure are expected. When these measurements are used for air quality assessment, the spatial representativeness of the urban and industrial monitoring sites is an essential point that needs to be addressed. This certainly holds when those urban or industrial sites are used for model validation. For those locations it is questionable if point measurements can be directly compared to volume-averaged modelled concentrations.

In this paper a statistical technique is presented which addresses this spatial representativeness of monitoring locations. The technique relies on optimized relations between the (statistical) properties of air quality concentrations and land use characteristics. For the parameterisation of the land use character the generic CORINE Land Cover data set is used in combination with traffic data. This parameterisation results in a so called β-value calculable for the entire territory. In order to assess the spatial representativeness of the monitoring locations, the variability of the land use parameter β in the vicinity of the site is examined (Figure 1). From this plot, it can be deduced how land use characteristics vary in the vicinity of four different types of monitoring sites (rural, urban background, urban and industrial). It is important to stress that in the assessment procedure only generic data such as the CORINE data set is used, which clearly is an advantage of the presented technique.

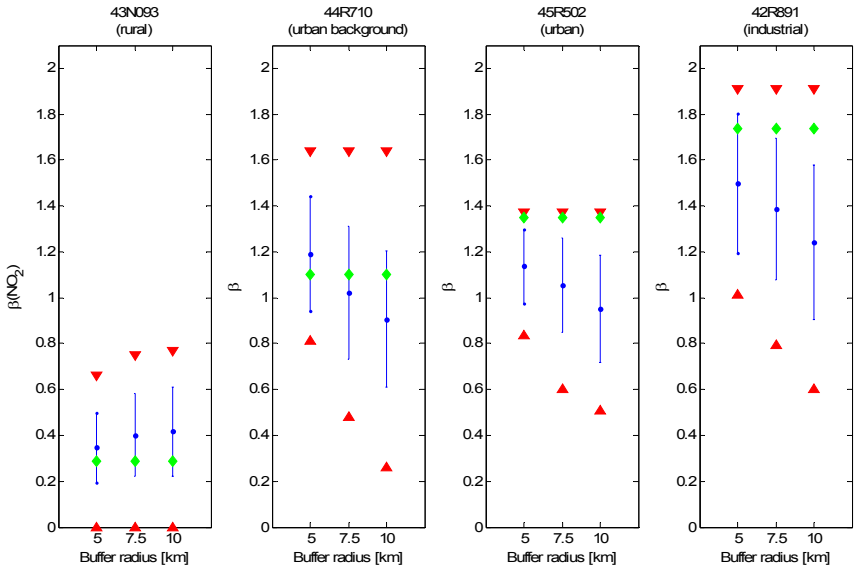

Figure 1: Variation of the NO_2 β -parameter as a function of the buffer size around four Belgian monitoring sites (43N093 – rural, 44R710 – urban background, 45R502 – urban and 42R891 – industrial). The average β -values +/- one standard deviation are given as blue dots with error bars. The maximum and minimum β -values in the buffer are given as the red triangles. The β -values of the monitoring sites are printed as green diamonds. Values are determined inside a 5, 7.5 and 10 km radius buffer around the monitoring site.

The relevance of this issue for model validations is illustrated with the BelEUROS results for NO_2 and PM_{10}. BelEUROS is an Eulerian chemistry transport model that produces concentration fields on a 15x15 km² grid. The BelEUROS-model is used as a policy supporting tool in Belgium.

In a first approach, the point measurements of the monitoring network are interpolated into a high resolution air pollution map. For the interpolation step, the statistical air quality interpolation model RIO is used, which can be categorized as a detrended Kriging model. RIO relies on the same air quality – land use relations as described above. Once the interpolated map is obtained (for NO_2 see Figure 2), an aggregation over the BelEUROS-grid can be performed. At this stage, volume-averaged model results can be compared to grid-averaged measurement values, the latter ones taking into account the spatial representativeness of the monitoring location.

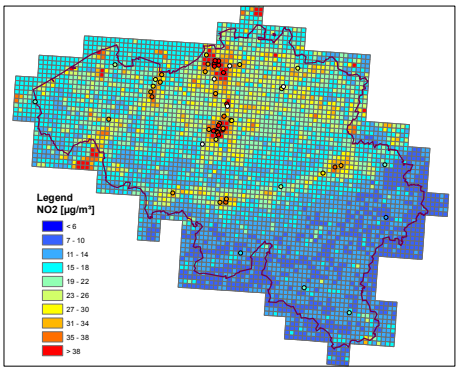

Figure 2: Map of the 2002 annual mean NO_2 concentration in Belgium obtained by interpolation of the measurements. The RIO model is used as the spatial interpolation tool.

An alternative way to improve the model validation procedure is via refining (or downscaling) of the modelled concentrations to a higher resolution. Based on the relations between air pollution levels and land use patterns, a model concentration distribution is carried out inside a model grid cell according to the observed land cover variability. Once the downscaling is performed (e.g. on a grid of 3x3 km², see Figure 3), high spatial resolution model results can be compared to the measurements at sampling locations that suffer from a limited spatial representativeness. This downscaled map can also be compared with the results of the interpolated measurements.

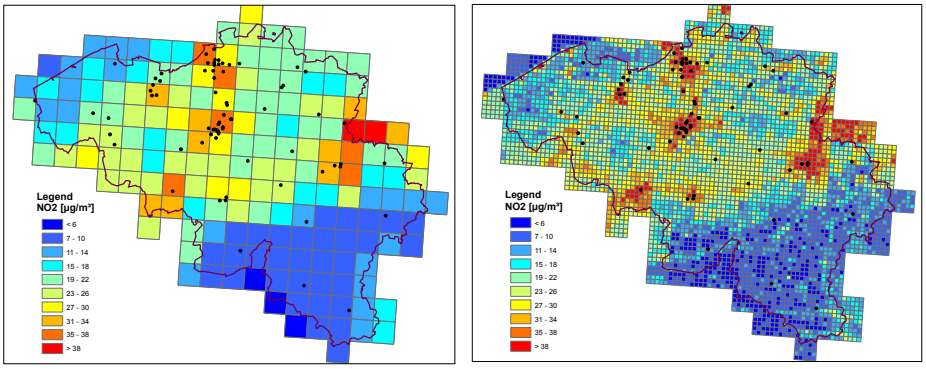

Figure 3: Map of the 2002 annual mean NO_2 concentration in Belgium as calculated by the BelEUROS model. The map on the left shows the raw model results in the 15x15km² grid. The map on the right presents the downscaled results on a 3x3km² grid obtained by using the β-variability within the parent grid cells. Monitoring station locations are indicated by the black dots.

Link to presentation: http://air-climate.eionet.europa.eu/docs/meetings/071015_12th_EIONET_AQ_WS/25_AQ_stationspat_repres_mod_valid_Janssen.pdf

New web-site tools for mapping of the Air Quality on Different Scales in Europe – Illustrative Examples of near-real-time Applications

Ana Grossinho, Bureau Veritas, UK

Link to presentation: http://air-climate.eionet.europa.eu/docs/meetings/071015_12th_EIONET_AQ_WS/26_NRT_tools_AQmapping_Grossinho.pdf

CLOSING DISCUSSION

Jaroslav Fiala welcomed the progress with the Implementation Plan 2008 for ETC/ACC work for next year, and suggested that this should be an important component of the next EIONET meeting. MS may present their own experiences. The discrepancies in data delivered under EoI and that used for the Preliminary Assessments for the 4th Daughter Directive should be addressed by each MS, to improve quality of data delivered.
The collaboration with AQUILA should continue and should be strengthened. Topics to discuss with AQUILA are among other, the use of reference methods and demonstration of equivalence; how to handle data below detection limit (and below zero) , harmonization of meta-information.
When air quality data has been revised and/or corrected it is important to re-submit the data to EEA and ETC/ACC . Only in this way agreement between the national AQ database and AirBase can be guaranteed.

Hans Guido:
Representing the WHO. There seems to be restricted use of the conclusions and recommendations of previous meetings. Also, when preparing assessments it appears that comment or input from the WHO is not taken into account.
Jaroslav Fiala:
The contributions from WHO are definitely considered valuable, and it is a matter of improving the follow-up.

Cernikovsky: http://rsc-amg.org/Pages/presentations/Prague contains comparisons of PM10 measurement methods, which may be useful.

Jaroslav Fiala: The need to ensure the right audience could suggest that one workshop be dedicated to EoI data exchange and the mechanisms, whilst the next for example may be focused on the assessment approach and use of questionnaires. There is at least a need to be clear with the agenda at an early stage.

Wolfgang Brauniger: The health effects of high PM10 concentrations may indicate that limits are too high.

Jeff Huntington: This is exactly what the Council and Parliament are now debating.

Jaroslav Fiala: It is proposed to hold the next EIONET in Belgium, and possibly earlier in the summer so that attention to questionnaires could be utilised the same year. Comments on this proposal should be sent to Anke Luekewille.

Jaroslav Fiala: We must thank Savvas for excellent preparation of the workshop, and Catherine for organisation.

Anke Lűkewille: Thanks are due to Jaroslav and Steinar, as this may well be their last EIONET workshops.

POSTER SESSION

The following poster was presented:

Jan Horalek et. al.: Spatial Air Quality Analysis and Assessment at European Level
Czech Hydrometeorological Institute, Praha

Link to poster: http://air-climate.eionet.europa.eu/docs/meetings/071015_12th_EIONET_AQ_WS/p01_AQmapping_poster_Horalek.pdf

ABBREVIATIONS

AirBase	European Air Quality Database
AQ	Air quality
AQD	Air Quality Directives
AQDD	Air Quality Daughter Directives
AQUILA	European network of Air Quality Reference Laboratories
Benelux	Belgium, Luxemburg and the Netherlands
CAFE	Clean Air for Europe
CLE	Current legislation
CLRTAP	Convention on Long Range Transboundary Air Pollution
CDR	Central Data Repository
CEN	European Committee for Standardization (Comité Européen de Normalisation)
CF	Correction factor
CITY-DELTA	European Modelling Exercise - An Inter-comparison of long-term model responses to urban-scale emission-reduction scenarios
COST	European Cooperation in the field of Scientific and Technical Research
DEG	Data Exchange Group
DEM	Data Exchange Module
DL	detection limit
EoI	Exchange of Information Decision
EEA	European Environment Agency
EEA-32	32 Members of the EEA (EU15+EU10+EFTA4+Romania, Bulgaria and Turkey)
EFTA	European Free Trade Association
EFTA4	Iceland, Liechtenstein, Norway, Switzerland
EMEP	Cooperative programme for the monitoring and evaluation of the long range transmission of air pollutants in Europe (European monitoring and evaluation programme)
EIONET	European Environment Information and Observation Network
ETC/ACC	EEA's European Topic Centre on Air and Climate Change
EU	European Union
EU-15	The 15 pre-2005 EU Member States
EU-10	The 10 new post-2005 EU Member States
EU-25	The pre-2007 EU Member States
EU2CC2	Bulgaria, Rumania and Candidate Countries (EU)
FAO	Food and Agricultural Organisation
GDP	Gross Domestic Product
GHG	Greenhouse Gases
GEMS	Global and regional Earth-system (Atmosphere) Monitoring using Satellite and in-situ data
GMES	Global Monitoring for Environment and Security
GMES-GAS	GMES-Atmosphere service
IPCC	Inter-Governmental Panel on Climate Change
INSPIRE	INfrastructure for SPatial InfoRmation in Europe
JRC	European Commission Joint Research Centre
LAU	Local Administrative Units
LCP	Large combustion plant
LPG	Liquid Petrol Gas
LRTAP	Long Range Transboundary Air Pollution (Convention)
LTO	Long term objective for for ozone concentrations in ambient air
LV	Limit value
MFR	Maximum feasible reduction

NECD	National Emission Ceiling Directive
NMVOC	Non-methane volatile organic compounds
NRC	National Reference Centre (of EIONET)
NUTS	The Nomenclature of Territorial Units for Statistics
OSPAR	Oslo and Paris Commission for Protection of NE Atlantic
PAH	Polycyclic aromatic hydrocarbons
PM	Particulate matter
PROMOTE	PROtocol MOniToring for the GMES Service Element: Atmosphere
SOMO35	For ozone, the Sum Of Means Over 35ppb (daily maximum 8-hour)
SEIS	Shared Environmental Information System
TOFP	Tropospheric ozone forming potential
TV	Target Value
TWC	3-way catalyst
UN-ECE	United Nations Economic Commission for Europe
VOC	Volatile organic compounds
WHO	World Health Organisation

ANNEX 1. WORKSHOP AGENDA

12th EIONET Workshop on Air Quality Management and Assessment

Limassol, Cyprus, 15-16 October, 2007

AGENDA

Monday 15 October

8:00-09:00	**Registration**	Catherine Brytygier
09:00-09:10	Welcome address by Cyprus Ministry of Labour and Social Insurance	Hosts
09:10-09:20	Welcome, scope and goal of the workshop Follow-up 11th AQ workshop	Jeff Huntington, Jaroslav Fiala (EEA)
Session 1: AQ Directives, and MS' reporting to EC *(Chairing: Jaroslav Fiala)*		
09:20-09:40	EU air quality legislation – update	Anna-Karin Lund (EC, DG Env)
09:40-10:00	Implementing provisions to the CAFE directive	Wolfgang Spangl (UBA, Austria)
10:00-10:20	MSs' reporting on AQ in zones using the Questionnaire: Status and results	Edward Vixseboxse (ETC/ACC, MNP)
10:20-10:40	Preliminary assessments under the 4th DD	Kevin Barrett, (ETC/ACC, NILU)
10:40-10:50	Launch of the report *Air Pollution in Europe 1990-2004*	Anke Lükewille (EEA)
10:50-11:05	Intercomparison exercise for heavy metals on PM_{10} filters (QA/QC related to monitoring requested by the 4th DD)	Michel Gerboles (JRC Ispra)
11:05 -11:20	***Coffee***	
11:20-11:35	Particulate Matter in the Netherlands; some recent results	Hans Berkhout, NL
11:35-11:50	Discussion	
Session 2: AQ data flows **(Chairing: Sheila Cryan)**		
11:50-12:30	The 2006 EoI data reporting cycle	Patrick van Hooydonk/ Wim Mol (ETC/ACC, MNP)
12:30-13:00	Discussion	
13:00-14:20	***Lunch***	
14:20-14.40	Future developments of AirBase	Wim Mol
14.40-15:00	Data exchange under the Framework Directive Questionnaire	Frank de Leeuw (ETC/ACC, MNP)
15:00-15.20	Problems of mapping zones and agglomerations	Libor Cernikovsky (ETC/ACC, CHMI)
15:20-15:40	Discussion	
15:40-16:00	***Coffee***	

16.00-16:20	Ozone Directive: reporting summer data	Libor Cernikovsky
16:20-16:40	NRT ozone data and potential use for summer ozone reporting	Hans Berkhout, NL
16:40-17:00	Future developments: Air quality in the Shared Environmental Information System (SEIS), dissemination of air quality information	Sheila Cryan (EEA)
17:00-17:20	On the air pollution situation in Cyprus AQ data dissemination	Savvas Kleanthous (DLI, Cyprus)
17:20-18:10	Discussion on technical issues	
20:00	***Dinner***	

Tuesday 16 October

Session 3: Exchange of up-to-date information on air quality in Europe *(Chairing: Steinar Larssen)*		
08:30-08:50	'GMES atmosphere': Scope, framework and plans for the coming year	Arno Kaschl (EC, GMES bureau)
08:50-09:10	COST ES 0602 'Chemical weather': Towards a European Network on Chemical Weather Forecasting and Information Systems	
09:10-09:30	Near real time European air quality: results for 2007 and plans for 2008.	Tim Haigh (EEA)
09:30-09:50	PROMOTE-2	Robert Höller (UBA, Austria)
09:50-10:10	Discussion	
10:10-10:30	***Coffee***	

Session 4: EIONET Air Quality modelling network *(Chairing: Anke Lükewille)*		
10:30-11:10	EIONET AQ Modelling network	Nicolas Moussiopoulos, (ETC/ACC, AUTH) / Panagiota Dilara (JRC, Ispra)
11:10-11:40	Discussion e.g. On the use of data reported to AirBase for model validation	

Session 5: Support to air quality assessment by monitoring, modelling and combination *(Chairing: Tim Haigh)*		
11:40-12:00	Classification and representativeness of Air Quality monitoring stations.	Wolfgang Spangl
12:00-12:15	Spatial mapping of air quality for European impact assessments	Frank de Leeuw
12:15-12:30	A generic approach for the spatial representativeness of air quality monitoring stations and the relevance for model validation	Stijn Janssen (VITO)
12:30-12:45	New web-site tools for mapping of air quality on different scales in Europe – illustrative examples of near real time applications	Ana Grossinho (Bureau Veritas, UK)

12:45-14:00	***Lunch***	

14:00-14:45	Closing discussion, conclusions (Chairing: Jaroslav Fiala)	
14:45-15:00	***Coffee***	
15:00-	**Excursion**: Castle of Limassol and Kourion	Outside Main Entrance

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