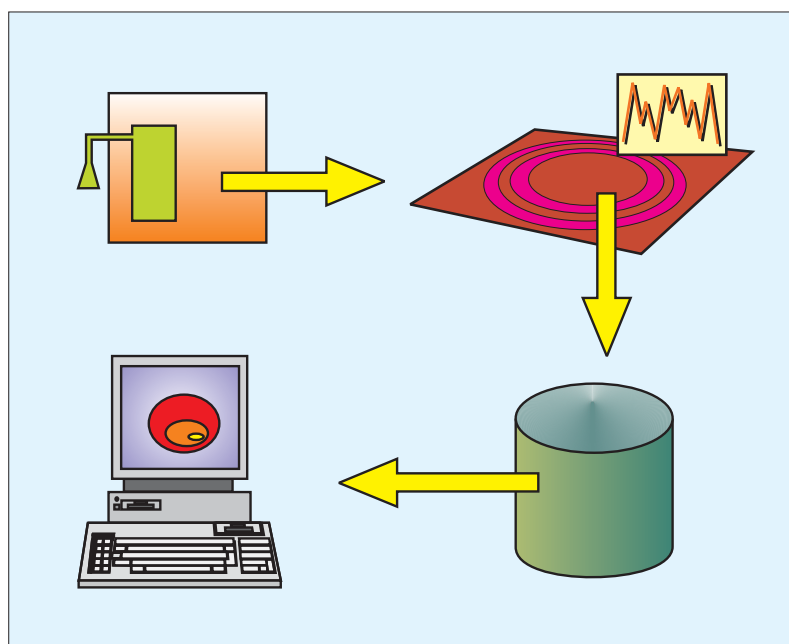# European Air Quality
Data Transfer Policy Analysis

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DISCLAIMER

This ETC/ACC Technical Paper has not been subjected to European Environment Agency (EEA) member state review. It does not represent the formal views of the EEA.

Contents

European AQ Data Transfer Policy Analysis

1. Introduction

The current report is a deliverable of the ETC/ACC Implementation Plan, task 5.3.2.2 "Presentation and Dissemination of air quality data in the Neighbourhood project", subtask 2: Data transfer policy analysis. The main objectives of the task are to (1) support the creation of an operational ozone web integrated into the EEA spatial infrastructure and (2) to ensure that the air quality part of the neighbourhood project is well accepted among the major stakeholders in Europe. Subtask 2 is mainly concerned with the second objective and a key issue is to ensure a reliable NRT data flow also in the future. For a system that is based solely on voluntary submission of data, it is crucial to focus on the data providers' part of the solution. Complementary, subtask 1 is focusing on the user end of the system.

In subtask 1, a user review workshop was arranged in early 2006 to review and comment on the current state of the ozone web portal. Recommendations for further functional developments of the web site were made and it was e.g. stated that data should not be more than 1 hour old in order to be useful to describe the current air pollution levels in Europe. Other recommendations focused on the layout of the site and how information should be presented to the public in order to make it easy to understand and appealing to use. Subtask 1 also focused on finding the European dimension of the information system to avoid competing with national providers. A similar workshop was planned for subtask 2 and the idea was to invite key data providers to review the current data transfer plans of the project and to recommend future modifications. Through the work on subtask 1, it became apparent that a data transfer policy to make sure data are being reported (in NRT) is very important. Due to time constraints it was chosen to produce the report without an expert consultation and to rather communicate with and gather information from the data providers bilaterally. A list of data providers contacted and information about this exercise is available in Annex 1 and 2.

2. Overview of existing networks and status of AQ data transfer in Europe

Official reporting of Air Quality in Europe is currently done through two main channels; to EEA for the EU and associated member states, and to UN-ECE, EMEP (United Nations – Economic Commission for Europe, European Monitoring and Evaluation Programme) for European states currently members of CLRTAP (Convention for Long-Range Transport of Air Pollution). The latter is mainly concerned with regional levels of air pollution to monitor the trans-boundary transport processes and adherence to legislations on national emissions. Data are being collected by the EMEP-CCC (Chemical Coordination Centre) and automatically and manually quality controlled/assured before being reported to UN-ECE. Data reported to EEA are stored in AIRBASE and are more focused on monitoring of urban and sub-urban air quality, although also extensive sets of regional data are being registered. A key objective is to register exceedences of limit and target values of air pollution. Data to both AIRBASE and EMEP are being reported to the central database by national contact points by 1st of October the year after a year of measurements was completed. Data for January to December 2004 was e.g. reported by 1st of October 2005. The EMEP data for 2004 were furthermore checked and validated for nearly another year before being reported to the EMEP steering body in September 2006. Data being measured in January are therefore being published nearly three years after acquisition. In the current document, the data reporting procedures of the EEA/AIRBASE and EMEP databases are referred to as the "off-line" data flow in Europe.

The EEA ozone web (previously part of the In Your Neighbourhood project) is based on an alternative data flow that has been set up ad-hoc to the off-line systems in order to get access to surface ozone in Near Real Time (NRT). Data are being gathered, not by direct data acquisition from each monitoring station, but by links to national or regional data collection systems. Implementation of the system was initiated several years ago and has evolved to a mapping system that collects, interprets and disseminates data within minutes after hourly means are being measured throughout Europe. Special data reporting routines (computer-programs and scripts) were developed and offered to the various national data providers to help them generate their data in a required format. Later on in the project, it has been allowed to report data in alternative formats to increase the data reporting rate. A list of the current data providers and their web sites are given in table 1 below. Some networks are regional and contains data from a district or a larger urban area (like the AIRPARIF site) while other networks are nationwide and contains data from a whole country. The latter may sometimes include data collected through a series of regional sub-networks (e.g. the German UBA site). Only networks that actually report data to the ozone web are listed in the table.

The EEA ozone web is the only trans-European network that collects air quality data in near real time, but a number of additional services are collecting non-AQ related atmospheric parameters in NRT. One example is the ozone-sonde service currently being operated by NILU to provide ECMWF (European Centre for Medium range Weather Forecast) with NRT access to European soundings of ozone levels in the troposphere and stratosphere. These data are not publicly available and is only being used by the centre for off-line validation of their model fields (i.e. for observing the accuracy of parts of the weather forecast). Another service, currently being operated in all regions of the world, is the WMO-GTS (World Meteorological Organization - Global Telecommunication System) that has been built to globally collect and distribute ground based meteorological measurements. The system uses dedicated communication lines (not just the internet) and satellite links to achieve access to data all over the globe within minutes after a

measurement. Due to the sensitivity of these data and the danger associated with insertion of erroneous data (commercial aircrafts obtain their weather data from this network), the GTS has implemented strict quality control of all incoming data and only special agencies (typically national weather services) have access to upload data. The users of both the ozone-sonde service and the WMO-GTS system are typically international weather services or users of special weather products (e.g. the commercial aircrafts). The public are the users of the EEA ozone web, but weather organisations such as ECMWF has expressed a clear interest in the data product.

Table 1: Overview of data providers participating in the EEA ozone-web effort

Location	URL	Organisation
Veneto (Venice)	http://www.arpa.veneto.it/	ARPAV
Paris	http://www.airparif.asso.fr/	AIRPARIF
Stockholm	http://www.slb.mf.stockholm.se/	SLB-Analys/Miljøforvaltningen
Madrid	http://www.mambiente.munimadrid.es/	Munimadrid
Helsinki	http://www.ytv.fi/FIN/	Helsinki Metropolitan Area Council (YTV)
NW-Italy	http://www.sinanet.apat.it	SINANET
Ispra (Milano)	http://airispra.jrc.it/	JRC
Katalonia, Spain	http://mediambient.gencat.net/eng//el_medi/atmosfera/inici.jsp	GENCAT
Andalucia, Spain	http://www.juntadeandalucia.es/medioambiente/site/aplica/ozono/superaciones.jsp	Junta de Andalucia
Sweden	http://www.ivl.se/miljo/projekt/ozon/	IVL
France	http://www.prevair.org/en/index.php	PREVAIR/INERIS/ADEME
Norway	http://www.luftkvalitet.info	NILU/SFT
Germany	http://www.env-it.de/luftdaten/start.fwd	UBA
Ireland	http://www.epa.ie/OurEnvironment/Air/	EPA
Austria	http://www.umweltbundesamt.at/en/umweltschutz/luft/luftguete_aktuell/	AT-UBA
France	http://www.atmonet.org/baster/form_bastermap.php (same data as PREVAIR)	ADEME
Belgium	http://www.irceline.be/~celinair/english/homeen_java.html	IRCEL-CELINE
Nederland	http://www.lml.rivm.nl/data/smog/index.html	RIVM
Hungary	http://www.kvvm.hu/olm/	OLM
Slovenia	http://www.arso.gov.si/	ARSO
Czech Rep.	http://www.chmi.cz/	CHMI
Warszawa	http://www.warszawa.airinfo.pl	VIEP
Lithuania	http://aaa.am.lt/	AAA
Estonia	http://www.klab.ee	EERC
Finland	http://www.fmi.fi/	FMI
Slovakia	http://www.shmu.sk/	SHMU
Denmark	http://www2.dmu.dk/atmosphericenvironment/byer/forside.htm	DMU
Portugal	http://www.qualar.org/	Instituto do Ambiente
U.K	http://www.airquality.co.uk	NETCEN

3. Overview of existing and planned work to improve AQ data transfer in Europe

Most existing national, regional (e.g. European) and international AQ monitoring networks are currently being improved and plans exist for further modifications in the future. Each monitoring system has their own motivations for improvements and organisations are normally focused on obtaining long-term sustainability for their measurement network. There are, however, some common intra-network key interests that are driving the developments forward, especially on the regional and international level. These include a need to achieve:

- Improved environmental management and response to crisis
- Better use of resources
- More visible use of resources
- Information to and teaching of public.

The recent developments of a large space infrastructure and availability of large quantities of Earth Observation data that are not being fully exploited is also an important motivation. Operational weather centres are soon able to provide European and global scale chemical weather forecasting by assimilating groundbased and satellite borne measurements. Access to AQ data on all scales, acquired through a variety of methods is increasing and ongoing initiatives are in place to make best use of the large information quantities. International and European project to improve access to AQ data is mentioned whenever this is of relevance to the ongoing work and future operation the EEA ozone-web.

3.1. International initiatives to improve AQ monitoring and reporting

The combination of new demands for timely information and new capabilities for providing these data have led to a series of European and international initiatives to improve the current situation. Some of these international activities are described in the following.

3.1.1. GMES

Global Monitoring for Environment and Security (GMES) is a joint initiative between the European Union and the European Space Agency and was in practice initiated in 2002 when the first GMES projects were announced. Several European organisations (Some being members of the EEA ETC/ACC) participated in these initial projects that were trying to define what GMES should contain, how it should be implemented, by whom it should be provided and when. EU (DG-Research) funded thematic projects on topics like environmental stress, land cover in Europe and atmospheric composition monitoring (all in all 32 projects). Furthermore, there were also funded a number of crosscutting projects that tried to link together and synthesise the output from the different thematic projects. These initial GMES projects were completed in 2004 or 2005

GEMS
Currently, there is only one large EU-funded GMES project in progress; the Integrated Project on "Global and regional Earth-system Monitoring using Satellite and in-situ

data", GEMS. DG Enterprise, the EU directorate currently in charge of the programme, handles the project. The main objective of the project is to "create a new European operational system for operational global monitoring of atmospheric chemistry and dynamics and an operational system to produce improved medium-range & short-range air-chemistry forecasts, through much improved exploitation of satellite data". Data assimilation is a key method and the goal is to collect all available data sources at the coordinator's site (ECMWF) and to integrate data from satellites, aircrafts and groundbased stations, both "off-line" and in NRT. Separate activities focus on greenhouse gases, reactive gases (e.g. ozone) and aerosols on a global scale. In addition, an activity focuses on "off-line" modelling and forecast of European Air Quality with the purpose of using the global data to improve model boundary conditions (e.g. to be able to include contributions from intercontinental transport). The project has direct access to satellite observations through well-established links with the space agencies, but there is a clear lack of groundbased data for NRT assimilation and/or model validation. For Air Quality, this is especially important since satellite measurements currently are not able to provide sufficient temporal or spatial of the boundary layer conditions. Networks like that of EEA or EMEP are the only sources to AQ data on a European scale and the EEA ozone web is the only source to data in NRT. The GEMS project is therefore an important potential "customer" of the EEA service.

GSE-PROMOTE
The European Space Agency has also funded a series of projects since 2002 and with their GMES Service Element (GSE) they have tried to define and provide data services to designated users. PROMOTE (Protocol Monitoring) was the atmospheric component of GSE and focused on delivering data and information products related to UV radiation, climate and air quality. The project was finished in the spring of 2006, but a PROMOTE stage II started up later in the year. The project makes an important contribution to making data and information more available, and the project works on bringing data/service providers and users closer together. Several potential users of Earth Observation data have for the first time been invited to and included in the definition of data products. Air Quality is central in PROMOTE Stage II and EEA is seen as the single most important user or "customer" for these services. The EEA "ozone web" is, among the PROMOTE partners, seen as an important contribution to information on European-level Air Quality data. There is furthermore a clear interest for direct access the data products in order to include them regional forecasting and information services (i.e. to use the EEA surface ozone data for validation of or assimilation into regional-scale air quality models).

FP7 Space programme of atmospheric monitoring
Several operational large-scale and long-term GMES projects are to be implemented through the EU seventh framework programme (FP7) on Space and Security, starting in 2007. This covers Land Monitoring, Marine Core Services and Emergency Response. In addition to these, two projects will be funded to stimulate the development of further GMES core services on (I) Atmospheric composition and dynamics monitoring and (II) Information services for security and related activities. The atmospheric project will be targeted towards European Air Quality, greenhouse gases and renewable energy sources. The GMES Atmospheric Service (GAS) will probably be built on the efforts and include partners from the PROMOTE Stage II and GEMS consortia.

3.1.2. IGACO

IGACO (Integrated Global Atmospheric Chemistry Observations) is a component of the IGOS (Integrated Global Observing Strategy) partnership and is an initiative by WMO and ESA, which should be implemented through the global Atmosphere Watch (GAW) of WMO. Within the IGACO a strategy is defined on how to combine ground-based, aircraft

and satellite observations with data archives and global models with a purpose to provide information about key atmospheric chemical species. Recommendations related to the implementation of IGACO regarding Data transfer and archiving include:

- Distribution of data: universally recognised distribution protocols for exchange of data on atmospheric chemical constituents should be established (General Recommendation 8, section 5.2.2, IGACO, 2004).

Data distribution protocols are needed for fast, easy and effective use of the data and quality assurance information, e.g. for assimilation into forecast models.

- Multi-stake holder World Integrated Data Archive Centres (WIDAC) should be established for the targeted chemical variables (General Recommendation 9, section 5.2.2, IGACO, 2004).

- Storage for raw data should be established so that they can be re-interpreted as models and understanding improve (General Recommendation 10, section 5.2.2, IGACO, 2004).

The recommendation is that observations of key components should be made available through World Integrated Data Archive Centres, which may be centralized or distributed. A WIDAC should have periodic updates of observations and reanalysis in order to be up to date with the improvement in e.g. satellite retrieval algorithms. Access to data should be easy and free of charge. The IGACO strategy is of relevance for AQ monitoring, but main focus is on long-term observations and typically "off-line" systems. The main interest for NRT data (and the current document) arise from the needs to set up a comprehensive data modelling system capable of combining data for chemical species, aerosols and ancillary parameters. By using, yet not operational, assimilation techniques, data from groundbased, airborne and satellite sensors are to be integrated into a unified global picture. Data will need to be made available in NRT, but the IGACO strategy is not clear on how it should be accomplished.

3.1.3. GEOSS

Global Earth Observation System of Systems (GEOSS) is the most general and high-level one of the three programmes and strategies mentioned here. GEOSS is multidisciplinary and international and GMES is thought to be the European component in the system of systems. GEOSS is still in an early phase and a slow start was initiated in 2006. A 10-year implementation plan has been produced (GEO, 2005) that describes the first details on how the architecture could be developed, but goes quite far in suggesting how data access and interoperability should be handled. If successful, GEOSS is likely to shape how most data centres, data providers and data users are to operate in the future and the programme has a very high level of support from politicians. Especially the acceptance of the programme in the U.S. by most of their major agencies and departments is seen as a sign of strength and sustainability.

Even though GEOSS is general in its approach, the 10-year implementation plan is specific in its goals for system architecture, interoperability and data sharing. As described in the plan, as developed by the ad hoc Group on Earth Observations (GEO) and adopted by the Third Earth Observation Summit held in Brussels Belgium, on February 16, 2005:

> *The success of GEOSS will depend on data and information providers accepting and implementing a set of interoperability arrangements, including technical specifications for collecting, processing, storing, and disseminating shared data, metadata and products. GEOSS*

interoperability will be based on non-proprietary standards, with preference given to formal international standards. Interoperability will be focused on interfaces, defining only how system components interface with each other and thereby minimizing any impact on affected systems other than where such systems have interfaces to the shared architecture.

The focus on standardising interfaces rather than trying to create a system that uses only one common standard is a central principle in GEOSS. This allows current systems and networks to continue using their specialised reporting routines, formats and metadata definitions. Attention is drawn to the participation of international standards organisations and institutes in the definition of interoperability procedures, and the use of "open-source" software is encouraged. The societal benefits of Earth Observation cannot be achieved without data sharing and the following GEOSS principles are to be used in the implementation:

- *There will be full and open exchange of data, metadata and products shared within GEOSS, recognizing relevant international instruments and national policies and legislation.*
- *All shared data, metadata and products will be made available with minimum time delay and at minimum cost.*
- *All shared data, metadata and products being free of charge or no more than cost of reproduction will be encouraged for research and education.*

The data sharing principles may cause a problem with implementing some European data archives into the system of systems since access to data is sometimes highly restricted. How to handle Intellectual Property Rights (IPR) and at the same time maximise the use of data is therefore an important problem yet to be solved in the GEOSS implementation. For the NRT data product provided through the ozone web, the main concern is not IPR on a personal level, but rather making sure that the responsible organisation does not loose visibility. Misuse or misinterpretation of these preliminary data is an additional concern, and it will be discussed in more detail later.

An integrated, EU-funded project called GEOMon (Global Earth Observations and Monitoring) is starting up in February 2007 and is aiming at providing the European component of GEOSS on atmospheric chemistry. The implementation of IGACO is therefore also of main interest for the project. A separate activity on data management is aiming at setting up a central data centre, and the data centre will aim at harmonising data monitoring and data flow on a European level. Providing access to NRT data (not only AQ relevant data) is also a major issue in this activity and the GEMS projects is included as a core user of the data products.

3.1.4. INSPIRE

INSPIRE is a Proposal by the European Commission for a directive of the European Parliament and of the Council for establishing an infrastructure for spatial information in Europe. INSPIRE is currently not yet implemented, but the content of a new directive was agreed upon by the Council and the Parliament in November 2006 and was approved by the European Council on the 29th of January 2007. Entry into force of the new directive may be expected later in 2007.

INSPIRE is relevant to the EEA ozone-web and it is necessary to assess what elements that are needed in order to keep it aligned with INSPIRE. The proposed directive contains 34 articles and some of them describe rules for implementation that are of interest to the ozone-web. Chapter III (in the INSPIRE proposal) deals with Interoperability of spatial

data sets and services. Hereunder, Article 11 and 12 says that the Commission shall implement rules specifying how spatial data are to be harmonised and provide arrangements for exchange of such data. The rules shall be designed to allow spatial data sets to be combined or for services to interact. This should be done *in such a way that the result is a coherent combination of spatial data sets or services that represent added value, without requiring specific efforts on the part of a human operator or a machine.* This is in support of the work being undertaken with the EEA ozone-web. Implementation of Article 11 (and 12) shall be within 5 years after the entry into force of the INSPIRE directive. Chapter V deals with Data-sharing and re-use and describes important principles that may dictate how the EEA ozone-web, its underlying data and data flow are going to operate in the future. Article 23, paragraph 1 & 2 states:

> *1. Member States shall adopt measures for the sharing of spatial data sets and services between public authorities. Those measures shall enable the public authorities of Member States, and the institutions and bodies of the Community, to gain access to spatial data sets and services, and to exchange and use those sets and services, for the purposes of public tasks that may have a direct or indirect impact on the environment.*

> *The measures provided for in the first subparagraph shall preclude, at the point of use, any restrictions, in particular of a transactional, procedural, legal, institutional or financial nature.*

> *2. The possibility of sharing spatial data, as provided for in paragraph 1, shall be open to bodies established by international agreement to which the Community or Member States are party, for the performance of tasks that may have a direct or indirect impact on the environment.*

Article 24 furthermore adds that the Commission shall adopt implementing plans to increase the potential of re-use of spatial data sets and services by third parties. As will be discussed later, the INSPIRE initiative is therefore of high relevance for any data policy to be implemented for the ozone-web.

3.2. Projects to improve European Infrastructure and data transfer capabilities

In addition to the large and overarching programmes like GMES and GEOSS and the project hereunder, a series of European projects to improve monitoring infrastructure and data transfer capabilities are underway. These projects are commonly more topic-specific and are connected to already existing infrastructure that is to be improved, harmonised or connected in a network. Those of relevance to NRT data acquisition or AQ data policy are mentioned in the following.

3.2.1. EUSAAR

EUropean Supersites for Atmospheric Aerosol Research (EUSAAR) is an EU funded I3 (Integrated Infrastructure Initiative) project aiming to harmonise measurement and reporting routines for monitoring of advanced aerosol parameters. Advanced, in this context, means aerosol parameters beside PM or total suspended matter and EUSAAR has a number of networking activities focusing on measurements of carbonaceous aerosols and optical and physical properties. Another networking activity is focusing on developing the EMEP monitoring database further to cope with the new types of measurements in order to allow operational reporting as part of the EMEP programme when the project finishes. The EMEP database interface will be upgraded through this

process and the system will be directly accessible for external users through a new web portal and a dedicated data interface. In addition to the database developments, a research activity is dedicated towards provision of NRT access to EUSAAR data for both internal and external users. This will include developments of a system for collection of data at a central location (at NILU). A collaboration between EUSAAR and the EEA NRT service may be interesting, especially in 2007 and the planned study on NRT PM data acquisition. It may also be useful to collaborate on data policy issues and to form a common approach to end users like GEMS.

3.2.2. IAGOS

The MOZAIC programme was funded through a series of EU research projects in the nineties and was providing "Measurements of OZone and water vapour by in-service AIrbus aircraft". These data were essential to establish reliable records of ozone levels in the free troposphere and lower stratosphere. MOZAIC data are available from the MOZAIC database web portal at http://www.aero.obs-mip.fr/mozaic/. The programme is currently being continued through the IAGOS project and data are in the future to be found through http://www.fz-juelich.de/icg/icg-ii/iagos. IAGOS is working towards becoming an operational monitoring programme with long-term secure funding through e.g. ESFRI (European Strategy Forum on Research Infrastructures) and work is ongoing to make the data products available in NRT. The project aims to be an integrated part of a future monitoring programme and may provide essential NRT information on background AQ levels. The project sees the GEMS project as an important "customer" of their data.

3.2.3. WMO-WIS

The WMO Information System (WIS) is an overarching approach and a single coordinated global infrastructure for the collection, distribution, retrieval of, and access to data and information of all WMO and related programmes. The system includes the previously described WMO-GTS system for collection of NRT data, but WIS also has focus on dissemination of information to different user groups, not just weather centres. The system may, in the future, provide the necessary infrastructure for operational NRT distribution of AQ data throughout the world since it is able to handle also non-meteorological measurements.

3.2.4. IMECC

IMECC is a pan-European project under the 6th Framework Programme. IMECC aims to build the infrastructure for a coordinated, calibrated, integrated and accessible dataset for characterizing the carbon balance of Europe. The project federates 29 partners from 15 European countries, and is an I3 project containing two research activities on NRT provision of CO_2 and Ecosystem data respectively. Much like the EUSAAR project, the aim is to establish the necessary infrastructure at monitoring sites and to establish a central location for a NRT database. Automatic data screening procedures are to be established and data will be used to provide on-line validation of satellite data from upcoming sensors such as GOSAT (Greenhouse gases Observing SATellite, JAXA, JAPAN) and OCO (Orbiting Carbon Observatory, NASA, USA). The project will start up in 2007, and even though the scientific theme is not directly of relevance to the EEA AQ NRT service, it might be beneficial to collaborate on data policy issues and to form a common approach to end users like GEMS. This could be coordinated with the EUSAAR project through the previously presented GEOMON project.

3.2.5. Cost-81

The EU sponsored Cost-action 81, Towards a European Network on Chemical Weather Forecasting and Information Systems, is planning to start up in 2007. The activity has three main workpackages; (I) Exchange of AQ forecasts and input data, (II) Multi-scale

forecasting, multi-model ensemble, boundary data and (III) Dissemination and visualization of AQ information to users. The last WP is very related to the current EEA-ETC/ACC task 5.3.2.2 "Presentation and Dissemination of air quality data in the Neighbourhood project", subtask 1. The first WP is very relevant to the current report (subtask 2) and looks towards combining NRT AQ data with models to improve forecasting capabilities in Europe. The WP has identified EEA and its current NRT service as a key collaborator, but it is also seeing the WMO-WIS as important in this context.

4. Towards a European policy for dissemination of NRT AQ data

The previous chapter describes ongoing activities and projects that are of relevance to the EEA ozone-web in the future. Collaboration with external activities such as sharing of data is, however, only interesting as long as the ozone-web stays operational and the data flow from the member-states to the central server is reliable. Since data flow is currently based on voluntary submission of data it is not certain that data will be submitted also in the future, and it is therefore first necessary to make sure continued data submission guaranteed. It is furthermore necessary to assess whether or not forwarding of data to a third party is acceptable for the countries. I.e. it is necessary to establish a data policy for the ozone-web and its associated data flow.

The main goal for EEA, with relation to their ozone-web, is therefore to establish a reliable continuing data flow. With this in mind, five National Contact Points (NCP) for data submission were contacted in order to obtain their opinion on the ozone-web and how EEA could achieve their goals. The organisations contacted were either governmental or, in the case of Spain, an organisation working as contact-point towards 17 regional Spanish departments (there is currently no coordinated Spanish data provider and no defined common owner of Spanish data). For all countries it was chosen to discuss with the owners of the data and not an organisation performing data collection/dissemination on behalf of the data owner. Use of data and data policy of the information service was discussed with data owners from Germany, Italy, England, Austria and "Spain". Annex 1 describes how this exercise was done and lists all the questions that were raised to the national delegates. The outcome of the exercise and opinions of the ones who have responded should be seen as preliminary results and is not necessarily representative for the whole Europe.

4.1. Use of data

As described in Chapter 3, the data being collected through the ozone-web may be of interest for external projects and/or organisations. It was therefore important to assess to what extent the different countries, i.e. the owners of the data, accept reuse of their data and on what conditions data sharing should occur.

Data displayed on the ozone-web is clearly marked as preliminary. This is very important for the data providers in order to avoid misinterpretation of their data displayed on the EEA portal. The same principle must be applied to further use of the data – data being collected through the ozone-web service must always be considered preliminary. The data provider must under no circumstances be held responsible for use of erroneous measurements. Only validated data being reported to AIRBASE should be used for monitoring of air pollution exceedences. With this prerequisite, all five NCPs contacted in the current exercise clearly states that access to the NRT data should be open to everyone and that there is no need to restrict data access in any way. Two of the data providers point to legislation on environmental information (and Aarhus convention) claiming that there should be no restrictions to AQ data that are already available on www. Data made freely available from a national website should be made equally available from any other system it is made available to. The INSPIRE proposal described in the chapter 3 is also in line with the concept of open access to data that have an impact on health or environment. In order to avoid misuse of data, the English NCP suggested providing a short clear explanation on how the data can be used (e.g. stating that the

current data represent kerbside conditions and should not be used for comparison/validation of remote rural sites or regional models).

There does not seem to be a main concern on use of data by competing information services. An example of such a case could be an English organisation/company retrieving data from the ozone-web (either through the current web-interface or through a future data-sharing portal) and using the data in a service competing with any of the data providers. While this may be of concern to organisations performing data acquisition and information services on behalf of their government (like e.g. NILU), it does not seem be a problem for the owners of the data. One NCP states that services should not be allowed to charge for the data without providing an additional "added value".

4.2. Content of a European data policy

A key issue for ensuring continuity of the ozone-web is if NRT data reporting (from NCP to EEA) should be based on goodwill and voluntary submission like it is today or if this should become mandatory/enforced through a new directive. Reference is given to the Data Exchange Group (DEG) on Air Pollution who proposes to extend the existing submission of provisional data on ozone in near real time to other pollutants. They are discussing to include NRT data exchange in the Implementing Provisions for reporting under Directive on ambient air quality and cleaner air for Europe. The draft implementation plan of the revised Air Quality Directive (AQD) comprise NRT data transmission as part of the AQ reporting to EC and it is suggested to replace monthly ozone data reporting. The development of the ozone-web facilities for NRT data transmission to EC is discussed in this context. One NCP suggest that a new data policy is drafted by EEA, potentially based on existing O_3 NRT guidelines. After being agreed with EC and member states, it should be implemented by EEA. Another data provider points to the fact that data transmission benefits from good cooperation between the countries and EEA, and that future data policy should aim at maintaining the goodwill many countries have for the EEA service.

All, but one, of the NCPs confirm that they are aware of differences in philosophies on data access and data policy across Europe. This was as expected, but none of them provide any further details on what the differences are. The representative for the 17 Spanish regions claimed that differences not only existed between countries, but also between different regions within one country. All NCPs state that there should be no differences in data policy for NRT data for the different countries, but one NCP believes that member states that can only provide data on different timescales, etc., to the all the others should not be enforced to change due to new regulations. The same NCP suggests that a member state is unlikely to want to sign up the system unless the philosophy is roughly in line with it's own. Legal requirements should give clear information on what is to be reported (parameters), how it should be provided (formats, transfer protocols, time-definitions, etc.), where (recipient) and when (timing of submission). The current reporting guidelines for the EEA ozone-web could be a starting point for such guidelines.

As mentioned in section 4.1, it is an absolute requirement that NRT is not to be used for monitoring of exceedences of Air Quality levels with legal consequences. Only finally validated data should be used. This needs to be clearly stated in any agreement/policy on provision of NRT data.

The German NCP furthermore provided concepts for technical principles that should be part of the data policy. Based on their own national system (as mentioned in chapter 2), data flow should be based on simple and established technology (PC, Web), simple data

format (text/ASCII as Comma Separated Values, CSV) and an automatically working system to reduce costs and need for person-power. The English NCP independently provided a similar statement for keeping things as simple as possible, including using simple data formats such as text/ASCII and CSV files transferred through automatic systems to reduce staff-time and funding requirements. The final question to be discussed with the NCPs (question 14 in Annex 1) was only answered by one of them, claiming that the biggest concern that needs to be overcome in order to establish a reliable information service is: "Reliability of data upload – need to keep this as simple as possible to allow all to use it".

4.3. Implementation of a European data policy

It is recognised that a phased/stepwise approach may be necessary in order to successfully implement a new policy for transmission of NRT data on European level. It was difficult to get a lot of details from the NCPs about what steps or phases that are needed, but the German representative suggests a three-phase approach based on the principle steps of INSPIRE: 1) Preparatory phase: Discussion with the member-states, e.g. through the DEG on Air Pollution, EIONET Air Pollution or a new working group specifically established for the purpose. Development of a data exchange concept should be done together with the member-states. 2) Transition period. 3) Implementation phase.

The need for a forum for data providers was discussed in more detail with the representative for the Spanish data. It is suggested to arrange a dedicated workshop for the data providers of the ozone-web in order to discuss issues concerning data policy. There could be an internal section in the ozone-web for the data providers where info on latest news and any relevant information is available. Existing forums need to be extended to new data providers, and for Spain a forum needs to be in place for interaction between regional data providers and EEA. The English NCP think there are sufficient forums, but that ENIONET could be expanded with new data providers.

Regarding how EEA could best maintain the good relationship with the member-states, the one NCP states: "Keep talking to everyone! Keep consulting us and showing us projects in progress. Involve us in any pilot projects".

4.4. Other developments of the EEA ozone-web

In addition to views on European data policy for NRT data, other relevant information and suggestions came out of the discussions with NCPs and representatives from EEA. Many of the problems related to getting reliable and operational data flow may be associated with technical solutions, but it was stated by the representative for the Spanish data that support is needed for manual supervision of data flow. This is needed both from data transmission from national providers to EEA, but even more importantly for data flow from regional data providers (like those in Spain) and EEA. There is a need to follow up on the data flow from each individual station to EEA and the data providers need to be notified of gaps in data. This could be implemented with an automatic alert system in the EEA system, providing a warning when data is missing for a minimum (e.g. two days) period of time. The manual follow-up of data flow by EEA has so far been very valuable and such an activity should be considered also in the future. It has made sure data submission from Norway has been restarted on at least two occasions after unexpected breakdown of the data exchange routines.

The Spanish representative suggested a better link between AIRBASE and the NRT data of the ozone-web. This would make it possible to access historical and/or statistical information on Air Quality at a certain location and see this in relation to current levels.

The Spanish representative furthermore stated that the regional data providers were generally happy with the work EEA does with their data as they feel it increases their visibility. It makes their contribution to work on improving Air Quality seen throughout Europe. The provision of a national map by an EEA web-service, based on the data submitted to the ozone-web, would be very welcome.

4.5. Conclusions

The present exercise is probably not detailed enough to suggest absolute content for a data policy for the NRT data of the EEA. However, the findings presented in chapter 4 give an indication of how the service could develop in the future. Collaboration on data policy and data flow of NRT data may be sought through the international projects and programmes described in chapter 3. Surveys suggest that the data being collected should be made freely available. This would also keep the service in line with the INSPIRE initiative/directive, but it is not clear what the new directive will require in terms of technical solutions (e.g. implementation of machine to machine interfaces such as a web service or just making plots available through a web-browser). Surveys suggest that NRT data reporting to EEA should become mandatory and that it should be implemented through a revised Air Quality Directive and its Implementation Plan. Entry into force of such a directive will probably ensure reliable and continued data input to the European-level information services on Air Quality hosted by EEA.

5. References

GEO (2005) Global Earth Observation System of Systems GEOSS. 10 year implementation plan reference document. Noordwijk, Group on earth observations (ESA SP-1284) (GEO 1000R).
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IGACO (2004) The changing atmosphere. An integrated global atmospheric chemistry observation theme for the IGOS partnership. Report of the Integrated Global Atmospheric Chemistry Observation Theme Team. Noordwijk, European Space Agency (ESA SP-1282; GAW No. 159; WMO TD No. 1235). URL: http://ioc.unesco.org/igospartners/docs/theme_reports/IGACO-ThemeReport-Sep2004.pdf

ANNEX 1 – Discussion on data policy for NRT data with National Data Providers

The main goal for EEA, with relation to their ozone-web, is to establish a reliable constant data flow. With this in mind, five National Contact Points (NCP) for data submission were contacted in order to obtain their opinion on the ozone-web and how EEA could achieve this goal. The organisations contacted were either governmental or in the case of SPAIN, an organisation working as contact-point towards 17 regional Spanish departments (there is currently no coordinated Spanish data provider and no defined common owner of Spanish data). For all countries it was chosen to discuss with the owners of the data and not an organisation performing data collection/dissemination on behalf of the data owner. The latter was only partly possible for the Spanish data. The five persons were contacted and sent a list of questions (see below) and asked to contact NILU to arrange for a telephone conversation were the various questions could be discussed. Most persons did, however, choose to answer by email and only the Spanish data situation was discussed on the phone. All answers received by email is copied into Annex 2 while all information received on the Spanish data is written out in full text in chapter 4. The persons contacted were:

Name	Organisation	Country	Comment
Ute Dauert	UBA	Germany	
Jürgen Schneider	UBA-Wien	Austria	Reply by Wolfgang Spangl
Janet Dixon	DEFRA	England	
Claudio Maricchiolo	APAT	Italy	Reply by Anna Maria Caricchia
Jaume Targa	AEAT	"Spain"	Feedback provided on behalf of 17 Spanish regional data providers

The questions sent to the five national contact points were the following:

1. Overall question: The goal for EEA is to establish a reliable constant data flow – how do you feel this can be accomplished?

Use of data
2. Is it ok to distribute your NRT data (from your country) to other interested parties, e.g. to ECMWF for use in chemical weather forecast?

3. Should access to NRT data be open to everyone?

4. If not, how should use of data be restricted?

5. What uses of data should not be allowed? E.g. competing information services.

Content of a European Data policy for distribution of NRT data
6. What principles should be used for a European data policy on NRT AQ data?

7. Should it be decided upon and implemented by EEA or someone else?

8. Are you aware of differences in philosophies on data access and data policy across Europe and are they important?

9. Should the data policy allow for different treatment of data from different countries?

10. Should the data policy enforce provision of NRT data to EEA (in order to enable national funding of such activities)? Should this be specified through a new directive?

Implementation of a new data policy
11. How can EEA maintain their good relations with the member-states, enabling them to put resources into provision of data?

12. Is a stepwise approach for implementation of the data policy needed? If so, what phases or steps are necessary?

13. Are there sufficient forums for data providers to interact with EEA (e.g. Eionet) or do they need to be created?

14. What is the biggest concern that needs to be overcome in order to establish a reliable information service?

ANNEX 2 – Details on feedback from the National Contact Points

Answers are highlighted with blue colour, but no text is modified compared to the documents that were received at NILU from the NCPs. All feedback concerning the Spanish data is written out in full text in chapter 4 and no summary is given here.

Reply from The Austrian NCP:

Questions

Overall question: The goal for EEA is to establish a reliable constant data flow – how do you feel this can be accomplished?

General question: **How is this approach related to the revision of the AQD and its IP and coordinated with DG ENV**?
The draft IP comprise NRT data transmission as part of the AQ reporting to EC (replacing monthly ozone data reporting); the development of the OzoneWeb facilities for NRT data transmission to EC is discussed.

Use of data
Is it ok to distribute your NRT data (from your country) to other interested parties, e.g. to ECMWF for use in chemical weather forecast?

This should be no problem. The preliminary status of the NRT data has to be considered.

Should access to NRT data be open to everyone?

This should be no problem. The preliminary status of the NRT data has to be considered.

If not, how should use of data be restricted?

What uses of data should not be allowed? E.g. competing information services.

According to legislation on environmental information (and Aarhus convention?), restrictions to access of AQ data which are available on www may be difficult ……

Content of a European Data policy for distribution of NRT data
What principles should be used for a European data policy on NRT AQ data?

Clear restrictions regarding exceedance/attainment of LVs/TVs with legal consequences – which have to based on finally validated data only.

Should it be decided upon and implemented by EEA or someone else?

Close coordination with EC - regarding data flow under the new AQD – is essential.

Are you aware of differences in philosophies on data access and data policy across Europe and are they important?

Should the data policy allow for different treatment of data from different countries?

No.

Should the data policy enforce provision of NRT data to EEA (in order to enable national funding of such activities)? Should this be specified through a new directive?

Should be discussed in relation to the IP of the new AQD.

Implementation of a new data policy
How can EEA maintain their good relations with the member-states, enabling them to put resources into provision of data?

Is a stepwise approach for implementation of the data policy needed? If so, what phases or steps are necessary?

Are there sufficient forums for data providers to interact with EEA (e.g. Eionet) or do they need to be created?

To my opinion Eionet is sufficient.

What is the biggest concern that needs to be overcome in order to establish a reliable information service?

Reply from The German NCP:

Questions

Overall question: The goal for EEA is to establish a reliable constant data flow – how do you feel this can be accomplished?

The existing submission of provisional data on ozone in near real time should extend to other pollutants (EEA ozone web).
Improvement of the presentation of the data (maps, tables, graphs..)

Use of data
Is it ok to distribute your NRT data (from your country) to other interested parties, e.g. to ECMWF for use in chemical weather forecast?

Yes, with reference to the data supplier and the information concerning the status of the data sets – provisional data

Should access to NRT data be open to everyone?

Yes, with reference to the data supplier and the information concerning the status of the data sets – provisional data

If not, how should use of data be restricted?

What uses of data should not be allowed? E.g. competing information services.

I don't know competing information services.

Content of a European Data policy for distribution of NRT data
What principles should be used for a European data policy on NRT AQ data?

Open access for everyone, simple to use/access (for data suppliers and users), adequate cost-value ratio

Here our experiences referring near-real time data exchange:

In 1995 the 16 German Länder and UBA started to design and establish the real-time data exchange (at first ozone, since 2001 also PM10, NO2, CO, SO2).

Our basic concept was:
* simple and established technology (PC, Web)
* simple data format (text/ASCII as 'CSV')
* automatically working system (low manpower)
* low budget

http://www.env-it.de/luftdaten/start.fwd?setLanguage=en

Should it be decided upon and implemented by EEA or someone else?

I have no preference! The system should work successful!!!

Are you aware of differences in philosophies on data access and data policy across Europe and are they important?

I think differences in philosophies on data access and data policy exist.

Should the data policy allow for different treatment of data from different countries?

No.

Should the data policy enforce provision of NRT data to EEA (in order to enable national funding of such activities)? Should this be specified through a new directive?

Currently the Data Exchange Group (DEG) on Air Pollution proposes to extend the existing submission of provisional data on ozone in near real time to other pollutants. We discus to include the near-real time data exchange in the Implementing Provisions for reporting under Directive on ambient air quality and cleaner air for Europe (contact: Andrej Kobe, DG ENV C3, Sheila Cryan is also member of the DEG).

Implementation of a new data policy
How can EEA maintain their good relations with the member-states, enabling them to put resources into provision of data?

See below

Is a stepwise approach for implementation of the data policy needed? If so, what phases or steps are necessary?

Yes! (like INSPIRE)
1. Preparatory phase: discussion with the MS, eg. DEG on Air Pollution, EIONET Air Pollution, new working group? Development of a conception **with** the MS!!!
2. Transition period
3. Implementing phase

Are there sufficient forums for data providers to interact with EEA (e.g. Eionet) or do they need to be created?

See above

What is the biggest concern that needs to be overcome in order to establish a reliable information service?

Reply from The English NCP:

Questions

Overall question: The goal for EEA is to establish a reliable constant data flow – how do you feel this can be accomplished?

Use of data
Is it ok to distribute your NRT data (from your country) to other interested parties, e.g. to ECMWF for use in chemical weather forecast?
Yes – our data is freely available from our own national website (www.airquality.co.uk) and should be from any other that it is made available to

Should access to NRT data be open to everyone?
Yes – as long as short clear explanations are given as to how the data can be used. In the UK we have had some issues where comparisons have been made between data where they should not have been made (e.g. between kerbside and remote rural sites)

If not, how should use of data be restricted?

What uses of data should not be allowed? E.g. competing information services.
Services which charge for the data with no additional 'added value'.

Content of a European Data policy for distribution of NRT data
What principles should be used for a European data policy on NRT AQ data?
Keep things as simple as possible – PC, Web based; text/ASCII files, CSV files; automatic to reduce staff-time and funding required

Should it be decided upon and implemented by EEA or someone else?
Should be drafted by EEA potentially based on existing O3 NRT guidelines, agreed with EC and MSs and implemented by EEA

Are you aware of differences in philosophies on data access and data policy across Europe and are they important?
Not generally aware of any differences in philosophies, but if there are any differences they are important. A MS is unlikely to want to sign up to the system unless the philosophy is roughly in line with it's own.

Should the data policy allow for different treatment of data from different countries?
Yes. This is almost inevitable where MS can only provide data on different timescales, etc, to all the others.

Should the data policy enforce provision of NRT data to EEA (in order to enable national funding of such activities)? Should this be specified through a new directive?
Potentially this would be helpful (for ozone data certainly for the summer reporting). It may be possible to do this through the Implementing Provisions for the new AQ Directive.

Implementation of a new data policy
How can EEA maintain their good relations with the member-states, enabling them to put resources into provision of data?
Keep talking to everyone! Keep consulting us and showing us projects in progress. Involve us in any pilot projects

Is a stepwise approach for implementation of the data policy needed? If so, what phases or steps are necessary?

Are there sufficient forums for data providers to interact with EEA (e.g. Eionet) or do they need to be created?
Think there are sufficient forums – though could expand EIONET

What is the biggest concern that needs to be overcome in order to establish a reliable information service?
Reliability of data upload onto the system – need to keep this as simple as possible to allow all to use it.

Reply from The Italian NCP:

In general , there is a wide need to provide environmental information for public use. It is also important that data are fresh as Near Real Time (NRT) data on air pollution: also in the framework on the implementation of the new AQD, in particular in the Data Exchange Group (DEG), the availability of NRT data (not only summer ozone) is a point of discussion.

Now NRT data on air pollution are available at local level for a prompt public information, but also at national and European level could be useful for a fresh and wide overview. A specific legislative instrument (directive or anything else) could be useful of course. Considering that NRT data cannot be completely validated, caution must be used in the management of NRT data on air pollution for any kind of public dissemination, and this must be taken into account in the setting up of the legislative tool.