NEWSLETTER

WHO COLLABORATING CENTRE FOR AIR QUALITY MANAGEMENT
AND AIR POLLUTION CONTROL at the FEDERAL ENVIRONMENT AGENCY, GERMANY

No. 46 - December 2010

EDITORIAL

A new face in a good tradition

The Newsletter has developed its layout, because the conditions and options to publish this bi-annual bulletin have changed, mostly due to the technical progress in printing and distribution, but also due to the expectations of our readership. Additionally, we decided to introduce an editorial replacing the cover cartoon and, if available, figures, pictures and logos in full colours as well.

Herewith we would like to express our gratitude to the cartoonist, Prof Michael Wagner, for his long-lasting motivation to connect serious themes with an humoristic eyecatcher over more than twenty years.

Thank You, Mike!

2010 - A year with exceptional air pollution by nature in Europe

In April the eruption of the volcano Eyjafjallajokull produced enormous ash clouds which rapidly affected public life, mainly in Iceland, but with regard to air traffic in Europe as whole.

Vegetation fire
© Valery Kirsanov / Fotolia.de

A few months later a period of extremely hot and dry weather and wild vegetation fires caused outstanding health concerns to the public in parts of the Russian Federation. Mid-July wildfires started in the Central and Volga region in Russia which produced a dense plume of smoke over hundreds of kilometers, a situation aggrevated by a continuing heat-wave with temperatures above 40°C. This natural disaster killed more than 50 people in a greater region east and south-east of Moscow.

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Close to the forest and peat fires, smoke influenced public life by declining the visibility and increasing health risks, because coarse and fine ash particles and hazardous gases irritated the eyes and respiratory system. Data from parts of the Moscow city air quality monitoring network indicated that e.g. particulate matter (PM_{10}) concentration had significantly exceeded health-related air quality safe levels (see article on page 9). People at risk, such as elderly, chronically sick or those with cardiopulmonary diseases, children and outdoor workers, are particularly vulnerable to the combined impacts of heat-waves and air pollution.

In both cases the WHO Regional Office for Europe has been in contact with national governments and health authorities to assist with public health advice and technical assistance.

Good to know that these natural disaster have gone, but could return sooner or later and we should be well prepared.

Hans-Guido Mücke
WHO Collaborating Centre for
Air Quality Management and Air Pollution Control

ABOUT

The NEWSLETTER is published twice a year by the
WHO COLLABORATING CENTRE FOR AIR QUALITY MANAGEMENT AND AIR POLLUTION CONTROL, located at the FEDERAL ENVIRONMENT AGENCY, GERMANY.
It is circulated in 2000 issues and distributed to readers in more than 50 countries.
Additionally, the NEWSLETTER is published on our website (see link below) to be downloaded as pdf. The NEWSLETTER does not constitute formal publications; it should not be reviewed, abstracted or quoted without prior permission. Authors alone are responsible for their articles.

NOTE

We appreciate articles and contributions concerning the subject of
Air Quality Management and Air Pollution Control.
Due to the abuse of e-mail addresses the symbol @ is replaced by [at]!

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RESEARCH ON AIR POLLUTION, CLIMATE CHANGE AND HEALTH IN EUROPE — THE ERA-ENVHEALTH PROJECT

Katja Kailer and Adrienne Pittman

Project background

Physical, chemical and biological agents can strain human health. It is estimated that around 20% of the burden of disease in industrialised countries can be attributed to environmental factors (EU Environment and Health Strategy 2004). The World Health Organization has calculated that between 13 and 27% of deaths in the European Region can be traced back to environmental pollutants, like outdoor air pollutants. 13% applies to the countries Austria, Cyprus, Germany, Israel, Italy, Monaco, Netherlands, Sweden and Switzerland. 27% applies to Tajikistan (WHO 2007).

Many citizens are concerned about the potential impact of the polluted environment on their health and expect policy-makers to act. Although there is a good progress in the evaluation of environmental related health risks still many open questions exist, for example with respect to the combination effects of different environmental influences (e.g. noise plus air pollutants). Additionally new technologies always generate new substances (e.g. nanomaterials, plasticiser like DINCH), whose effects are unknown at first. Therefore, it is still necessary to further promote research in the field of Environment and Health (E&H) and to develop methodologies, which allow the comparability of data, especially at the international level (Kailer 2010).

Research promotion for E&H differs a lot between the respective countries in Europe and up to now international cooperation is rare. As the countries' problems are very similar it is reasonable to spread the research results beyond the national scope and therefore be able to support European policy in its decision and governance processes. That's where ERA-ENVHEALTH comes in.

The strategic objectives of the project are to:

- establish a network of programme managers to share information on research activities and expertise in the area of E&H,
- define opportunities for cooperation and coordination of national and regional research activities and identify priority areas for multinational research leading to multi-disciplinary collaborations between the respective research communities,
- develop coherent joint activities at the EU level on specific E&H topics,
- implement joint multi-national calls for research proposals on identified E&H issues,
- thereby, provide policy support for the implementation of the Environment and Health Action Plan (2004-2010) and support a number of other EU policies concerned with environmental health including strategies regarding climate change, air pollution and children's health.

ERA-ENVHEALTH has received funding by the European Commission's Seventh Framework Programme (FP7). It started in September 2008 and is running until August 2012. It brings together 16 E&H programme managing organisations from 10 countries (Table 1).

Table 1: ERA-ENVHEALTH partner organisations

Partner name	Acronym
French Agency for Food, Environmental and Occupational Health Safety (France)	ANSES
French Environment and Energy Management Agency (France)	ADEME
Ministry of Ecology, Energy, Sustainable Development and the Sea (France)	MEEDDM
Belgian Federal Science Policy Office (Belgium)	BelSPO
Federal Public Service Health, Food Chain Safety and Environment (Belgium)	FPS
Federal Environment Agency (Germany)	UBA
Ministry of Health (Israel)	MOH
Superior Institute for Environmental Protection and Research (Italy)	ISPRA
National Research Council (Italy)	CNR
Ministry for Housing, Spatial Planning and Environment (Netherlands)	VROM
National Institute for Public Health and the Environment (Netherlands)	RIVM
Environmental Protection Agency (Ireland)	EPA
Public Health Authority of the Slovak Republic (Slovakia)	UVZ
Swedish Environmental Protection (Sweden)	Swedish EPA
Environment Agency (United Kingdom)	EA
Natural Environment Research Council (United Kingdom)	NERC

During its first two years ERA-ENVHEALTH managed to develop a shared vision and improve knowledge exchange and expertise in the field of E&H between countries through access to data at the European level. A project website was developed as well as an expert and research database. Also the report entitled "Overview of environment and health programmes and projects including synthesis and recommendations" (ERA-ENVHEALTH 2010, Figure 1) was written on basis of two questionnaires, a first one on "Research programmes and projects related to environment and health within the partner countries" (answered by the ERA-ENVHEALTH partners and other relevant organisations in the partner countries) and a second one on "Framework for joint activities relating to environment and health research within the partner countries" (answered by the ERA-ENVHEALTH partners only).

In the first questionnaire the organisations could select the relevant topics for each programme and project from predefined categories. The information from the first questionnaire was also entered into the research database.

The overview shows that the number of E&H programme managing organisations and programmes differs a lot from country to country. This might be due to different research and administration structures as well as federal structures in certain countries. Most of these organisations are ministries, federal agencies and other public bodies.

Research database

The database aims to facilitate information collection and presentation of E&H programmes and projects running from 2006 up to date and their organisations. It was launched online in April 2009. Subsequently it was completed with information and currently provides data on 41 organisations, 50 programmes and 498 projects.

It has open access and can serve as a tool for programme managers, scientists and policy-makers working in the field of E&H to get information, to exchange knowledge and to make new contacts.

The database allows searching for E&H programmes and projects focusing on specific topics within the following categories:

- "Activities and media related to human health effects",
- "Agents",
- "Human health effects",
- "Methodologies" and
- "Social aspects of E&H".

Under the category "Activities and media related to human health effects" for example the following topics are found:

- "Air quality outdoor",
- "Air quality indoor",
- "Climate change",
- "Food safety",
- "Green Space",
- "Local/living environment",
- "Soil contamination",
- "Transport" and
- "Water quality and supply".

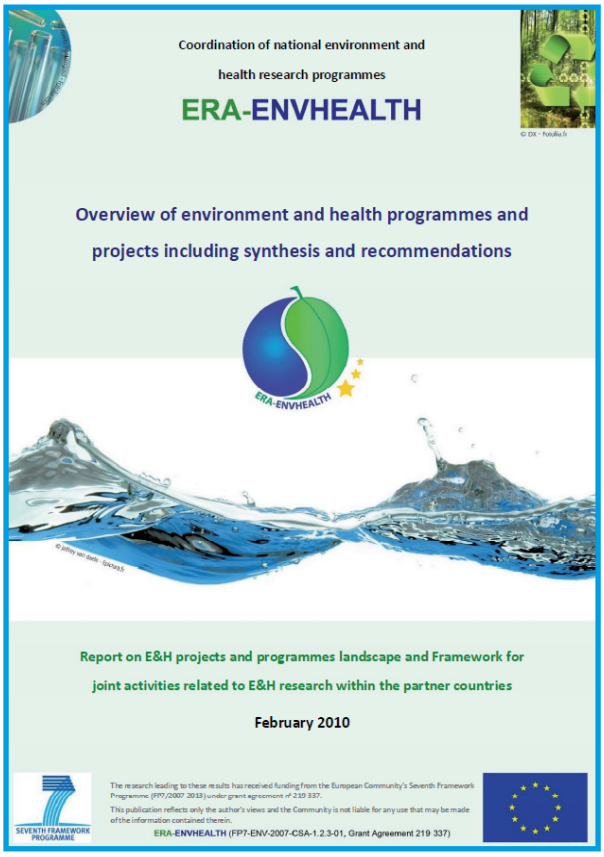

Figure 1: Frontpage of the Overview Report

Table 2 shows the total number of projects as well as the number of projects in the participating countries focusing on the topics "Air quality outdoor", "Air quality indoor", "Climate change", "Particulate matter", "Respiratory diseases", "Asthma", "Allergies", "Cancer", "Epidemiological studies" and "Children's health" (Table 2). Please note that with respect to every project more than one topic could be selected.

The database also allows searching for conjunctions between different topics from the same category and from different categories, like conjunctions between topics of the category "Activities and media related to human health aspects" and "Methodologies" or "Human health effects". In the following this has been explored particularly with respect to the topics "Air quality outdoor", "Air quality indoor" and "Climate change".

Results on air quality outdoor, air quality indoor and climate change

With respect to the methodologies there are 15 projects in the database focusing on "Air quality outdoor and epidemiological studies" (e.g. the German project "Prenatal and postnatal influence of exposure to environment contaminants (persistent organic pollutants, perfluorinated compounds, endocrine disruptors) on development of children"). 14 projects are focusing on "Air quality indoor and epidemiological studies" (e.g. the French project "Indoor moulds in homes and health: a pilot epidemiologic study in Ile-de-France") and one project is focusing on

Table 2: Number of projects on specific topics

ERA - ENVHEALTH													
	Number of Projects												
Subject	Total	BEL	DEU	FRA	GBR	IRL	ISR	ITA	NLD	POL	SVK	SWE	Multiple
Air Quality Outdoor	99	8	16	21	24	3	9	3	-	1	4	4	6
Air Quality Indoor	64	3	22	20	2	2	-	2	-	5	2	1	5
Climate Change	23	5	11	-	3	1	1	1	-	-	1	-	-
Particulate Matter	55	8	11	8	6	2	5	3	1	-	2	4	4
Respiratory Diseases	59	4	13	16	4	4	2	2	2	-	4	4	4
Asthma	45	8	9	7	1	3	1	4	-	1	2	4	5
Allergies	48	9	14	8	3	2	1	2	-	2	2	1	4
Cancer	55	-	11	26	7	-	-	8	-	-	3	-	-
Epidemiological Studies	71	1	17	7	9	1	3	7	1	4	16	4	1
Children's Health	62	3	17	9	5	1	1	5	-	3	12	3	3

"Climate change and epidemiological studies" (the Slovakian project "Influence of globalization to the import of causative agents of parasitic diseases to Slovakia, their epidemiological and molecular aspects").

With respect to human health effects there are 27 projects focusing on "Air quality outdoor and respiratory diseases" (e.g. the Irish project "Health effects associated with the atmospheric degradation of polycyclic aromatic hydrocarbon"), 26 projects focusing on "Air quality indoor and respiratory diseases" (e.g. the Belgium project "Indoor risk factors for childhood respiratory diseases: development and application of non-invasive biomarkers") and 3 projects focusing on "Climate change and respiratory diseases" (e.g. the German project "Climate change and human health surveillance systems in Germany").

25 projects deal with "Air quality outdoor and asthma" (e.g. the Israeli project "Prevalence, extent and geographical distribution of asthma and atopic diseases in young"), 20 with "Air quality indoor and asthma" (e.g. the French project "In vitro study of the effects of indoor air pollutants on the respiratory tract cells") and 7 with "Cimate change and asthma" (e.g. the Belgium project "Impact of phenology and environmental conditions on biogenic volatile organic compounds emissions from forest ecosystems").

18 projects deal with "Air quality outdoor and allergies" (e.g. the English project "Exposure-response relationships for bioaerosol emissions from waste treatment processes"), 23 with "Air quality indoor and allergies" (e.g. the multi-national project "Emissions, exposure patterns and health effects of consumer products in the EU"), and 7 with "Climate change and allergies" (e.g. the German project "Influence of climatic factors as well as their past and expected alterations concerning the increase of the sensitization by the example of ragweed pollen").

Detailed information on the E&H projects – title, acronym, URL, start date, end date, budget, related funding programme, type, orientation, objectives, methodologies, output information, scientific outputs, topics, keyword, coordinator(s) – can be found in the database (Figure 2).

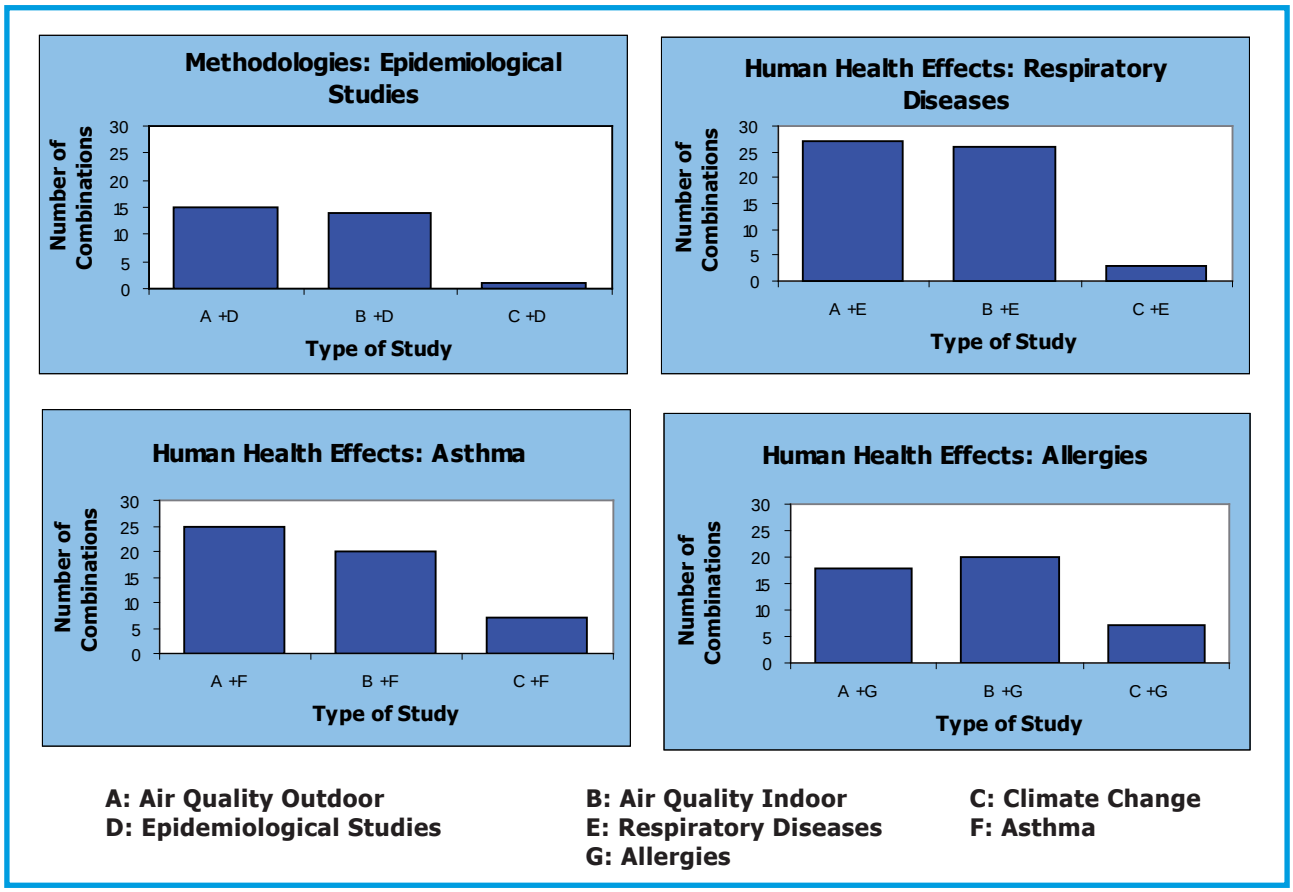

Figure 2: Overview of projects on air quality, climate change and health

Conclusion

One result of the overview report on programmes and projects is that nine out of ten partners identified "Air quality outdoor" as a current national priority of their country, eight partners identified "Climate change" and seven "Air quality indoor". These three topics were also most often identified as future priorities of the ERA-ENVHEALTH partner programmes and as planned and/or most important topics of the partner organisations. Additionally "Air quality outdoor" and "Air quality indoor" – besides "Water quality and supply" and "Local/living environment" – were identified as current programme topics in the majority of all participating E&H programmes. "Climate change" was nominated by several ERA-ENVHEALTH partner organisations as an issue not pursued at present but for which the organisations are keeping a watching brief in case it becomes more important (ERA-ENVHEALTH 2010, Table 3).

Table 3: Most frequent E&H topics regarding „Activities and media related to human health aspects"

Programme topics	Future priorities of programmes	Current national priorities	Planned and/or most important topics of partners
Air quality outdoor	Climate change	Air quality outdoor	Air quality indoor
Water quality and supply	Air quality indoor	Climate change	Climate change
Local/living environment	Air quality outdoor	Air quality indoor	Air quality outdoor
Air quality indoor			

This indicates that air hygiene topics (indoor and outdoor) are quite well established in most of the countries in Europe, but further research still is considered to be necessary in these fields. "Climate change" is considered to be an important topic as well. Taking into account that it was mentioned by several partners as a future priority and an issue not pursued at present it seems that "Climate change" is not established in every country yet even though there is a big need for further research in this field.

For more information on the ERA-ENVHEALTH project visit the website http://www.era-envhealth.eu. A monthly "newsflash" informs about the latest status of the project. It can be accessed through the project website. The research database can also be accessed via the project website or directly via http://era-envhealth.stis.fgov.be/.

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AIR QUALITY MONITORING IN MOSCOW

Moscow was the first region of the Russian Federation to set up a local ecological monitoring system. At present, Moscow has its own legislation on ecological monitoring and "The Integrated System of Ecological Monitoring" that includes the subsystems of monitoring of air quality, surface water, soil, noise and plantations.

Moscow is one of the biggest cities in Europe, with general population size of more than 10 million people and a great number of emission sources as it is also a major industrial and transport centre of the Russian Federation. At present, more than one thousand industrial enterprises are registered in Moscow. The vehicle fleet amounts to more than three million vehicles and is increased by 200-300 thousands of vehicles each year. At the same time 30% of Moscow territory is occupied by plantations, such as parks, boulevards and specially protected nature areas. Such complex urban structure with distinguishable functional zones has a considerable effect on air pollution within the city and therefore determines the structure of the Air quality monitoring system in Moscow.

The Air quality monitoring system in Moscow was founded in 1995. The setup of the air quality monitoring network was designed taking into consideration international experience, such as experience gained by European cities and Directives of the European Union concerning the selection of controlled pollutants, measurement methods, number and location of automatic stations.

Currently, the Air quality monitoring system includes 36 automatic monitoring stations situated in all administrative districts of the city and covering typical locations of the city in order to represent exposure of general population to different levels and sources of pollution (Figure 1).

Four stations adjoin major motorways, 14 stations are located in residential areas, including two stations in protected nature areas, and six stations in residential areas adjoining industrial enterprises. In addition to this, in 2007 two more monitoring stations were set up outside Moscow at a distance of around 60 km from the borders of the city, on the leeward and windward sides judging by the dominant wind direction.

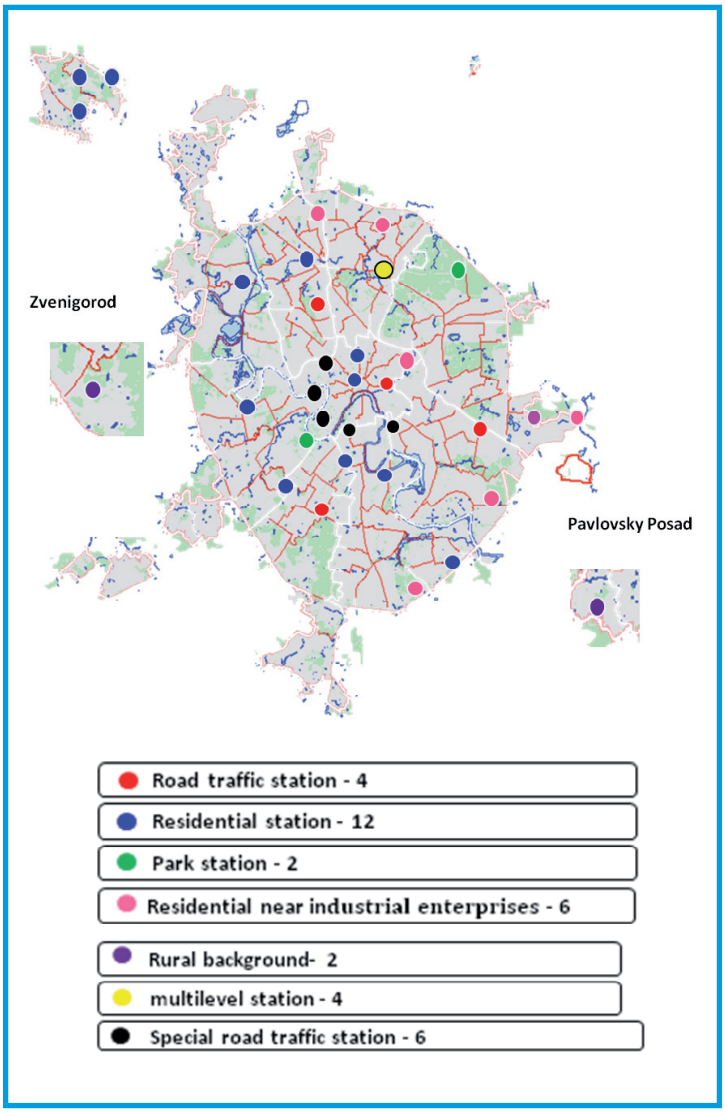

Figure 1: Location of automatic air monitoring stations in Moscow

Furthermore, a multilevel monitoring station, which supplies the system with information on air quality at different altitudes (2, 100, 200 and 300 meters above ground), was set up on Moscow TV tower in 2007.

Automatic monitoring stations operate twenty-four-hours a day. The complete list of controlled pollutants includes 22 substances, such as CO, NO_2, NO, O_3, PM_{10}, $PM_{2.5}$, SO_2, benzene, formaldehyde, H_2S, phenol, sterol etc. The list of pollutants, controlled by any particular station, is individual and depends on the type of the territory and emission sources in the area. Still, the concentrations of nitrogen oxides and carbon monoxide are measured by every station. PM_{10} concentrations are measured at nine stations, ozone concentrations at 12, and sulfur dioxide at 10 stations. Fine particulate matter ($PM_{2.5}$) concentrations have been measured since 2009 and presently are gauged at two stations.

In order to ensure the accuracy of measurements all instrumentation is certified, regularly calibrated, maintained and updated if needed, the data received from monitoring stations is controlled every day and validated every year. All works are carried out in accordance with the relevant data quality objectives. This ensures that the gathered information on air quality and assessment results are sufficiently accurate and representative.

Regarding the number and location of automatic stations, monitored parameters, monitoring techniques and assets, the air quality monitoring system in Moscow complies with the EU Directives (Directive 2008/50/EC in particular). All measurement techniques are either reference or equivalent measurement methods. This ensures that the information collected on air pollution in Moscow is sufficiently representative and comparable with data of EU cities.

The system of automatic stations is supplemented by the mobile air quality laboratory, by means of which measurements are carried out in the areas of the city where inhabitants complain about air pollution. The mobile laboratory automatically measures 20 pollutants, including carbon monoxide, nitrogen oxides, ozone, sulfur dioxide, PM_{10}, some aromatic hydrocarbons and meteorological parameters (Figure 2). Moreover, its staff takes samples of ambient air for further analysis in the chemical analysis laboratory, which extends the list of measured pollutants to more than 100 substances.

As air quality depends considerably on weather conditions, concentrations of pollutants in Moscow vary 5 to 10 times without considerable changes in emissions capacity. It is illustrated by the fact that the greatest part of citizen's complaints about air pollution is received during periods with adverse meteorological conditions. This requires that along with pollutants also meteorological parameters, which affect pollutant dispersion in the air, are monitored. Every monitoring station measures wind speed and direction, temperature, air pressure and relative humidity. Data on wind and temperature profiles in the air level up to 500 m above ground are transmitted from Moscow TV tower. A temperature profiler and two SODARs are also installed in Moscow as a part of the monitoring system.

Figure 2: More than 180 sites in Moscow are inspected by the Mobile air quality laboratory every year

In 2009/2010 the State Environmental Institution "Mosecomonitoring" has focused on the dissemination of information on air quality. In that sense, the SEI Mosecomonitoring complies with the constitutional provisions which guarantee people's access to information on environmental pollution. One of the advantages of the air quality monitoring system based on automatic monitoring stations is that it provides data on air quality to the public in real time.

Table 1: Air quality standards in the Russian Federation, EU and WHO Guidelines

Substance	Average Time	Russian Federation (μg/m³)	WHO (μg/m³)	EU (μg/m³)
CO	15 min	-	100,000	-
	20-30 min	5,000	60,000	-
	1 hour	-	30,000	-
	8 hours	-	10,000	10,000
	24 hours	3,000	-	-
NO_2	20-30 min	200	-	-
	1 hour	-	200	200 (<18 times/year)
	24 hours	40	-	-
	1 year	-	40	40
O_3	20-30 min	160	-	-
	1 hour	-	-	-
	8 hours	-	100	120 (<25 times/year)
	24 hours	30	-	-
SO_2	10 min	-	500	-
	20-30 min	500	-	-
	1 hour	-	-	350 (<24 times/year)
	24 hours	50	20	125 (<3 times/year)
	1 year	-	-	-
PM_{10}	20-30 min	300	-	-
	24 hours	60	50	50 (<35 times/year)
	1 year	40	20	40
Benzene	20-30 min	300	-	-
	24 hours	100	-	-
	1 year	-	-	5

It was especially important during the period of wild-land fires in summer 2010, when Moscow's population has been informed promptly about pollutant concentrations in the air, and advised on protection measures and how to behave in such conditions. At present, our information is disseminated via following channels: television, radio broadcasts, newspapers and internet.

Data on air quality in Moscow, including current pollutant concentrations and a forecast, are broadcasted three times a day by two TV channels, and published in three newspapers as well as on the websites of five major Russian information agencies. The real time monitoring data is available on the website of SEI Mosecomonitoring (http://www.mosecom.ru/). One of the wellknown information radio stations City-FM has hourly broadcasts on air quality in Moscow. It is also possible to obtain data on air quality in Moscow through sms-service of one of the major cellular operators in Moscow. The location of the subscriber is defined automatically and the specific data on current air quality and a forecast for this particular location is sent in sms.
In the Russian Federation specific air quality standards are adopted. There are two types of air quality standards in Russia:

- short-term maximum allowable concentration, which should guarantee that there will be no acute reactions and no impact on human health in case of short-term exposure (from 20 minutes), and
- daily maximum allowable concentration, which should guarantee that there will be no harmful effect on human health in case of long-term (lifelong) exposure.

These limit values are set up for all inhabited areas of Russia excluding working places. They are used to prevent harmful effects on human health at the stage of designing industrial enterprises, buildings, technological processes, ventilation systems and in city planning. The key difference between Russian air quality standards and European Union limit values is that Russian standards do not contain restrictions on frequency of exceedances of maximum allowable concentrations (with the exception of PM_{10} and $PM_{2.5}$, see Table 1).

In a whole, values of Russian maximum allowable concentrations correspond with WHO Air Quality Guidelines and EU limit values, except PM_{10} and benzene.

Main results of air quality measurements in Moscow

Data analysis shows that air pollution in Moscow varies considerably depending on the siting criteria type. Maximum concentrations are observed at sites along major city highways. At these sites the pollution level is 1.2 to 1.7 times higher than in residential areas situated remotely from highways and protected by the first line of buildings and two times higher than in protected nature areas.

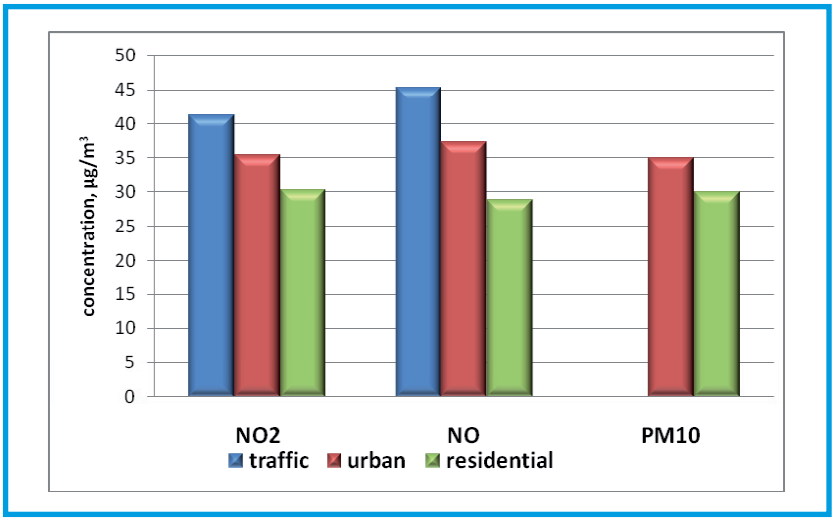

Figure 3: Annual average concentrations of PM_{10}, nitrogen dioxide and nitrogen monoxide, depending on the siting criteria type

Another station type refers to residential areas, which adjoin industrial enterprises. In these areas, carbon monoxide, nitrogen dioxide and PM_{10} concentrations increase by 15 to 18% compared with residential areas without influence of industrial emissions.

Annual average concentration of nitrogen dioxide at sites along major motorways amounts to 40 µg/m³ (at most sites up to 45 µg/m³), while the frequency of exceedances of the EU one hour limit value is more than 20 times per year. At residential sites, annual average concentration of nitrogen dioxide vary from 22 to 38 µg/m³ (average: 30 µg/m³) while one hour limit value is exceeded less than 10 times per year (Figure 3).

Annual average PM_{10} concentrations in Moscow vary from 27 to 43 µg/m³. 24-hour average concentrations exceed EU limit value more than 40 times per year in the sites along major motorways. 8 hour limit value of ozone in 2007 to 2009 was exceeded less than 20 times a year. European Union limit values and Russian maximum allowable concentrations of carbon monoxide and sulfur dioxide are not usually exceeded.

A number of measures are introduced in Moscow in order to reduce the level of ambient air pollution, as follows:

- Restriction of heavy duty vehicles entry to the central part of Moscow, based on ecological characteristics
- Use of liquefied natural gas and propane-butane as fuel for public transport
- Ensuring that only petrol and diesel fuel of EURO 3 and higher is sold in Moscow
- A programme to stimulate Moscow residents to use cars with low fuel consumption
- Use of electric vehicles for passenger and cargo transportation
- Continuous monitoring of emissions of the major industrial enterprises.

The implementation of these measures to a large extent enabled to maintain the level of ambient air pollution in Moscow over the previous years despite the constant increase in vehicle fleet. Since 2002, there has been a gradual decrease in carbon monoxide concentrations at all types of monitoring sites in Moscow (Figure 4). Compared to 2001 and 2002 air pollution by carbon monoxide in 2008 and 2009 is two times lower and concentrations do not exceed 1 mg/m^3. Since 2006 there also has been a gradual decrease in nitrogen oxides concentrations, on average 5 to 8% a year for nitrogen dioxide and 10% per year for nitrogen monoxide. The number of exceedances of EU and Russian limit values is also decreasing. Annual average concentrations of sulfur dioxide are invariably low, not higher than 5 µg/m^3. In 2009, PM_{10} concentrations in Moscow stabilized between 33 and 37 µg/m^3. Evolution of air pollution by ozone is mostly associated with meteorological conditions. Maximum annual average ozone concentrations were observed in 2002 and amounted up to 60 µg/m^3.

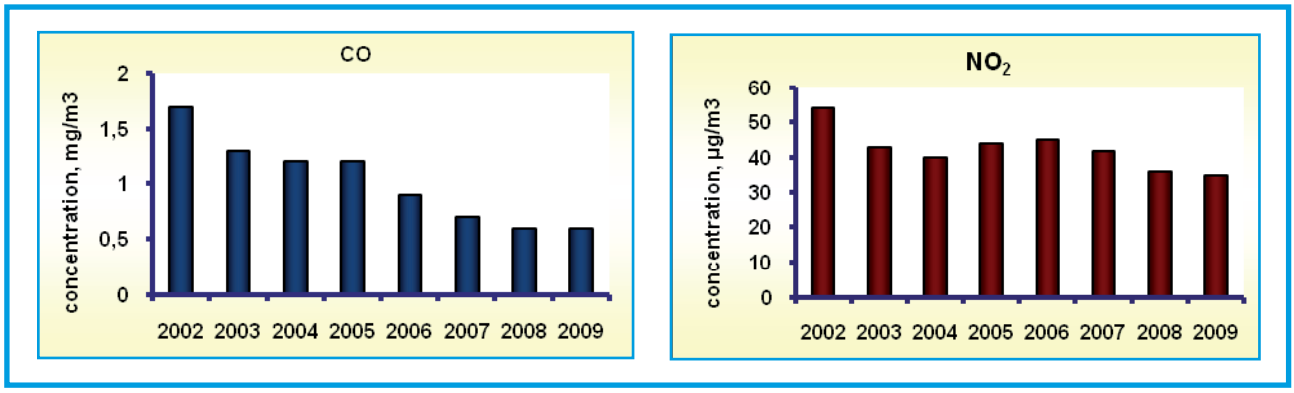

Figure 4: Trend in annual mean CO and NO_2 concentrations in the period 2002 to 2009

Air quality in Moscow during wild-land fires in Central Russia in summer 2010

Since the 21 June 2010 in the European part of Russia an abnormal hot and dry weather set in. This caused many forest and peat fires which surrounded Moscow. The severest situation was near eastern boundaries, where the fires approached Moscow territory as close as 5 km. These fires caused the extremly high concentrations of pollutants in Moscow over a one month period, from 14 July until 19 August. The situation was also aggravated by the fact that over the same period an adverse meteorological condition (a stable high pressure system with thermal inversions) was observed.

Table 2: Maximum daily PM_{10} concentrations in Moscow during the period of wild-land fires in Central Russia in 2010

Date	Daily PM_{10} Average Concentration (µg/m^3)	Exceedance Factor to Russian Federation Norm	Exceedance Factor to EU Norm	Moscow District with Maximum Exceedance
04.08.2010	602	10.0	12.0	South
05.08.2010	499	8.3	10.0	Centre
06.08.2010	541	9.0	10.8	Centre
07.08.2010	906	15.1	18.1	East
08.08.2010	511	8.5	10.2	East
09.08.2010	431	7.2	8.6	East

Highest air pollution levels were observed over a period from 4 until 9 August. This was caused by the maximum number of wild-land fires in adjoining regions. Concentrations of pollutants amounted to the following values: carbon oxide up to 30 mg/m^3, PM_{10} to more than 1,500 µg/m^3 and organic compounds up to 15 mg/m^3 (10 times higher than the average level). Even a short-term exposure to such concentrations might cause acute health effects on public. The highest PM_{10} concentrations over the period were observed on 7 August (see Table 2).

We also observed prolonged exceedances of short-term maximum allowable concentrations of carbon monoxide and PM_{10} – the duration of continuous exceedances reached up to 60 hours (an abnormal high level of pollution was observed every day, with the exception of 5 August). The daily maximum allowable concentrations of carbon monoxide and PM_{10} were exceeded during 5 days in succession. In addition to the data from automatic monitoring stations regular analytical samplings of ambient air was provided in order to assess the level of pollution by specific organic compounds. As a result, concentrations of some substances, such as formaldehyde, ethylbenzene, benzene, toluene, sterol etc., were found to exceed short-term maximum allowable concentration up to 8 times.

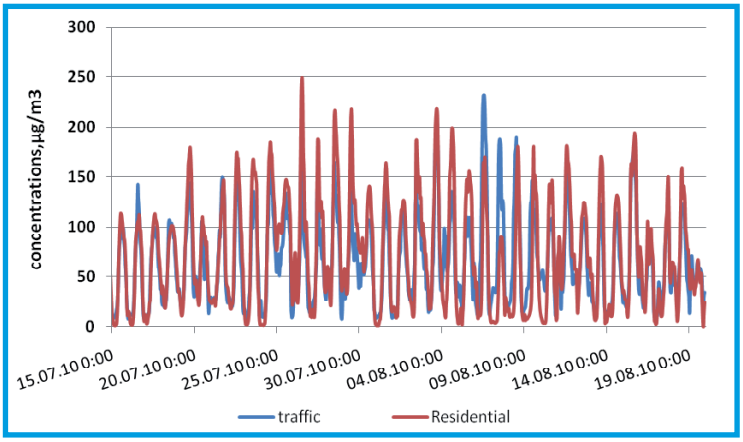

Figure 5: Ozone concentrations in Moscow during wild-land fires in summer 2010

Moreover, extreme high ozone concentrations, which were up to six times higher than maximum allowable concentrations, were observed (Figure 5). High levels of ozone pollution are normal in conditions of hot and sunny weather, however, during the period of wild-land fires ozone concentrations were five times higher than those observed during previous summers.

The data on air quality in Moscow are used by governing bodies for purposes of state environmental control (monitoring of compliance with environmental legislation), social-hygienic monitoring and assessment of risk to human health (carried out by the Ministry of Health and Social Development of the Russian Federation and by the Ministry of the Russian Federation for Civil Defence, Emergencies and Elimination of Consequences of Natural Disasters), city planning etc.

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Research and Development for future air quality monitoring

The new EU project 'Air Pollution Monitoring Technologies for Urban Areas' (AirMonTech, http://www.airmontech.eu/), co-financed by the European Commission's 7th Framework Programme, compiles information to harmonize current air pollution monitoring techniques and to advise on future monitoring technologies and strategy. AirMonTech will gather information on instrument performance, test results, equivalence demonstrations and procedures for operation, maintenance and calibration and process them into specifically designed databases. Particular emphasis will be placed on methods for real time monitoring of particles and particle-related proxy variables. A roadmap for future urban air quality monitoring including recommendations on existing and new monitoring technologies will be developed and discussed with stakeholders. Opportunities and limitations for the improvement and harmonization of monitoring activities in EU Member States will be evaluated in an interactiv dissemination process involving all relevant stakeholder groups.

A first project workshop on "Current and Future Air Quality Monitoring" took place on 14th and 15th December 2010 in London, UK, in conjunction with the annual Air Quality Conference of the Automation and Analytical Management Group of the Royal Society of Chemistry (http://www.aamg-rsc.org).

17th WaBoLu Conference on Indoor Air Quality 10 to 12 May 2010 in Berlin, Germany

This year's programme focused on "Emissions from building products and cultural heritage and other problems of current interest". As in the years before, the conference was met with keen interest from a mixed audience, with participants from local health authorities, universities, private expert offices and testing institutions. Companies developing products and procedures to prevent or remove damages in the indoor environment were also among the participants. The topics and most prominent results of the different sessions are summarized in the following article.

Session „Health aspects and exposure"

In this session, the immunomodulating and allergy inducing effects from volatile organic compounds (VOC) were discussed. The contribution of indoor air pollutants to health risks and the symptoms observed in susceptible populations (elderly, children, and people with immunodeficiency) were presented. Carbon monoxide has recently regained importance as indoor air pollutant in German homes, due to a growing tendency to use charcoal grills indoors and the use of waste heat for heating purposes. This can have fatal consequences; several CO-intoxications have already been reported to the Federal Institute for Risk Evaluation (BfR). A risk estimate for carbon monoxide in certain indoor settings was described.

Other presentations dealt with studies concerning fine and ultrafine particles in vehicles. The aim of these studies was to determine the concentration of different particles in moving vehicles at different speeds and traffic situations. A particular burden and health risk was identified for professional drivers.

Session „Building products: emissions and evaluation"

The sensory evaluation of building products was the focus of this session. New approaches to the sensory evaluation of building products and their integration in the evaluation scheme of the "Blue Angel" were presented. Other case studies dealt with peculiar reactions in PVC floorings due to increased humidity and emissions from oriented strand boards (OSB) with and without lamination.
The evaluation of emissions from a variety of building products in Germany follows the criteria laid down in the "AgBB" scheme. The limitation of VOC and SVOC emissions by so-called "LCI values" (LCI: lowest concentration of interest, in German: NIK) is a key aspect of the "AgBB" scheme. The results of a research project on the establishment of occupational exposure limits (OELs) in several European countries were presented; they represent the major basis for LCI values. The European harmonisation of the evaluation of emissions from building products is currently subject to discussions on a European level.

Session „VOC/SVOC: contamination and remediation"

The presentations in this third session dealt with emissions and decontamination of cultural assets. In recent past, the German Federal Environment Agency (UBA) received an increasing number of requests concerning indoor air pollution in museums and churches. Some risk factors related to exhibits and protection measures for items resulting in indoor air contamination were discussed. The remediation of historically precious items can be achieved with a specially developed laser procedure. This method removes residues of wood preservers quickly and gently from the material. VOC contamination is of relevance in other areas of life as well, for instance in saunas, as presented in a case study from Austria. Especially formaldehyde emissions from wood panels resulted in air contamination with VOCs.

Session „Influence of ventilation, sampling standards, printers"

The influence of ventilation, sampling standards and particle emissions from office printers were the subjects of the final session. The first presentation discussed physiological influences of low levels of relative humidity (RH) and the question, whether a "low effect limit" for low RH can be established. Improved ventilation not only decreases humidity, but in general leads to an overall improvement of indoor air quality. Furthermore, technical ventilation concepts can contribute to a reduction of energy use due to heating, when efficiently planned, as demonstrated in another contribution. Standards for sampling techniques and systematic approaches to indoor air contaminations were also discussed. Particle emissions from laser printers were already treated in depth at the 16th "WaBoLu-Conference on Indoor Air Quality" in 2009. The extent of indoor air pollution under real office conditions has not been determined until now. Results of a new study on this issue were presented and methods for measurements in "real room" were proposed. In the present study, in most cases no increase of particles under "real room" conditions could be found.

The 18th "WaBoLu- Conference on Indoor Air Quality" will take place from 30 May to 1 June 2011. Detailed information on the topics and the programme will be sent to you in due time.

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Int. Conference „Air Quality Management in European Regions – challenges and success stories", 9 September 2010 in Essen, Germany

How do other European regions deal with the ambitious EU-standards for air quality which have been set for all EU Member States? How does the German State of North Rhine-Westphalia converted the standards for air quality? How can the air quality management be improved over the next years to reduce PM_{10} and NO_2 and keep up the limits? And how do air quality management, noise reduction and climate change interact? These questions have been the focus of the International Conference „Air Quality Management in European Regions – challenges and success stories" which took place on 9 September 2010 in Essen, Germany. The conference was organized by the Ministry of the Environment of the German State of North Rhine-Westphalia in cooperation with the European Commission and the City of Essen. It has been planned in context of the EU Project "PRONET" (**P**ollution **R**eduction **O**ptions **Net**work).

The interaction between air quality management, noise reduction and climate change, which is quite evident for all traffic related approaches, has been discussed as well as the impulse of these environmental topics for an integrated urban development and mobility planning. Moreover, the aim of the conference was to discuss and to demonstrate examples of air quality management and the different approaches to meet the ambitious EU air quality standards of the similar European regions.

The welcome addresses were held by the vice-mayor of the City of Essen, the vice-mayor of the City of Stockholm and the Minister of the Environment of the German State of North Rhine-Westphalia, Mr. Johannes Remmel. The key note speech was given by Mr. Thomas Verheye of the European Commission. He lined out very clearly that the EC is not planning to lower the requirements for health based air quality targets. Notification procedures will be dealt with very restrictively. So EU Member States are highly urged to take measures.

Afterwards, speakers from various European cities and from the German Cities of Berlin and Dortmund presented their strategies to implement the requirements of the EU air quality and ambient noise directives.

The interaction between the business sector and the environmental politics were stressed as well as the important role of urban planning in the context of air quality management and noise abatement in urban agglomeration areas. A panel discussion with stakeholders from politics, business sector, NGO's and European Commission reflected the challenges, opinions and lessons learnt.

As a supplement to the conference, the presentations and lectures of the individual speakers are available for download at http://www.apug.nrw.de/inhalte/aktuelles.htm - the documents are provided in PDF format. A more detailed documentation of the results of this conference is under preparation and will follow.

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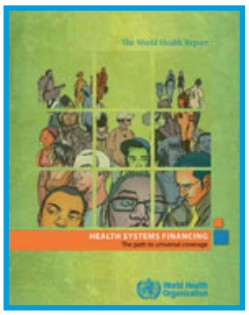
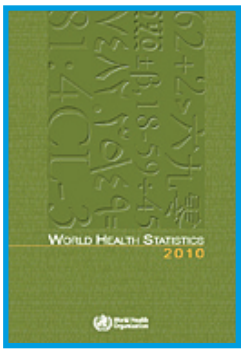
The World Health Report 2010 – Health Systems Financing: the Path to Universal Coverage



WHO Publications, Geneva, Switzerland 2010, 128 pages, ISBN 978 92 4 156402 1, Order Number 12402010, CHF 40,-, in developing countries CHF 20,-, available in six languages: Arabic, Chinese, Russian, Spanish, French and English.

The promotion and protection of health is essential to human welfare and to sustained economic and social development. People rate health as being one of their most important priorities but timely access to appropriate health services requires a well-functioning health financing system. WHO's Member States have set themselves the target of developing their health financing systems to ensure that all people can use health services, while being protected against financial hardship associated with paying for them.

In this report, the World Health Organization maps out what countries can do to modify their financing systems so they can move more quickly to universal coverage, and sustain the gains that have been achieved. The report builds on new research and lessons learnt from country experience. It provides an action agenda for countries at all stages of development and proposes ways that the international community can better support efforts in low-income countries to achieve universal coverage and improve health outcomes.



World Health Statistics 2010

WHO Publications, Geneva, Switzerland 2010, 177 pages, ISBN 978 92 4 156398 7, available online in six languages: Arabic, Chinese, Russian, Spanish, French and English: http://www.who.int/whosis/whostat/EN_WHS10_Full.pdf.

The World Health Statistics series is WHO's annual compilation of health-related data for its 193 Member States, and includes a summary of the progress made towards achieving the health-related Millennium Development Goals (MDGs) and associated targets. WHO presents World Health Statistics 2010 as an integral part of its ongoing efforts to provide enhanced access to high-quality data on core measures of population health and national health systems. Unless otherwise stated, all estimates have been cleared following consultation with Member States and are published here as official WHO figures. However, these best estimates have been derived using standard categories and methods to enhance their cross-national comparability. As a result they should not be regarded as the nationally endorsed statistics of Member States which may have been derived using alternative methodologies.

European exchange of monitoring information and state of the air quality in 2008 – ETC/ACC Technical Paper 2010/1

W. Mol, P. van Hooydonk, F. de Leeuw, European Topic Centre on Air and Climate Change, Bilthoven, The Netherlands 2010, 77 pages, available online: http://air-climate.eionet.europa.eu/reports/ETCACC_TP_2010_1_EoI_AQ_meta_info2008.

Current EU air quality legislation, Council Decision (97/101/EC), requires the European Commission to prepare yearly a technical report on the meta information and air quality data that have been exchanged among the EU Member States and the Commission. Besides, the member and collaborating countries of the European Environment Agency, which include EU (potential) candidate countries and EFTA states, have agreed to follow this reporting procedure as well. All this information is made available in the AIRBASE database, accessible at http://airbase.eionet.europa.eu. This technical report not only describes the meta information and the quality of the measurement data but also the state of the air quality for some selected pollutants in 2008, including observed trends and exceedances of limit or target values.

Air quality and health for urban influenced populations – ETC/ACC Technical Paper 2009/17

K. Barrett, S. López-Aparicio et. al., European Topic Centre on Air and Climate Change, Bilthoven, The Netherlands 2010, 79 pages, available online:
http://air-climate.eionet.europa.eu/reports/ETCACC_TP_2009_17_AQ_health_urban.

Assessments of the impacts of exposure to air pollution upon the health of European citizens are currently performed by the ETC/ACC based on 1) average air concentrations at 10 km x 10 km scale, and 2) static residential populations. This generalisation is sufficient for broad assessments; however some factors such as commuting or spatial scale may be overlooked. This report provides an overview over the major recent methodologies and tools for assessing exposure estimates. The study, based on the review and the findings from three case studies on air pollution, health and commuting, emphasizes the importance of spatial resolution and commuting in exposure assessment studies.

Traffic and air quality – Contribution of traffic to urban air quality in European Cities, ETC/ACC Technical Paper 2009/12

C. Hak, S. Larssen et. al., European Topic Centre on Air and Climate Change, Bilthoven, The Netherlands 2010, 203 pages, available online:
http://air-climate.eionet.europa.eu/reports/ETCACC_TP_2009_12_traffic_and_urban_air_quality.

The primary goal of the study is to give better information regarding the actual contribution of road traffic to the air quality problems found in large European agglomerations. A secondary goal is also to give valuable insight to the cities regarding mitigation strategies being employed by other cities around Europe to combat air quality problems attributed to traffic. An extension of the study, using further information sources, broadened the information base and the distribution of cities became more balanced, but the total number of cities providing a source apportionment is with 68 still rather limited. See the conclusions in the report summary.

Air pollution by ozone across Europe during summer 2009 – EEA Technical report No 2/2010

European Environment Agency, Copenhagen, Denmark 2009, 40 pages, ISBN 978 92 9213 090 9, available online: http://www.eea.europa.eu/publications/air-pollution-by-ozone-across-europe-during-summer-2009/at_download/file.

Ozone levels during summer 2009 were as low as during summer 2008 and according to several indicators were among the lowest since reporting of Europe-wide data commenced in 1997. In contrast to previous summers, in 2009 there were no pan-European multi-day episodes. Summer 2009 was characterised by ozone episodes of two to five days followed by spells with few exceedances. A typical episode usually contained approximately 7-13 % of the total number of exceedances of the information threshold experienced during the summer.

$PM_{2.5}$-Vergleichsmessungen der deutschen Bundesländer im Rahmen der STIMES-Arbeitsgruppe, Fachbericht 26

Landesamt für Natur, Umwelt und Verbraucherschutz Nordrhein-Westfalen, Recklinghausen, Germany 2010, 137 pages, available online in German only:
http://www.lanuv.nrw.de/veroeffentlichungen/fachberichte/fabe26/fabe26.pdf.

Under the lead of the German Reference Laboratory LANUV NRW a field measurement campaign was performed in Wiesbaden, Germany, in the years 2008/2009 over eight months in order to compare gravimetric and continuous monitoring methods for $PM_{2.5}$. The main objective was the evaluation of data quality of gravimetric methods used in German networks. In addition, information should be gathered about continuous methods based on different principles.

2011

Air Quality Modelling in Asia 2011
20-28 January, Seoul, Korea, http://asia.kosae.or.kr/.

Air Quality and Climate Conference
14-19 March, Kona, Big Island, Hawaii, USA, http://www.aqcc.buffalo.edu/.

Indoor Air 2011
5-10 June, Austin, Texas, USA, http://lifelong.engr.utexas.edu/2011/.

Urban Transport 2011 –
15th International Conference on Urban Transport and the Environment
6-8 June, Pisa, Italy, http://www.wessex.ac.uk/urban2011cfp.html.

International Medical Geography Symposium
10-15 July, Durham, United Kingdom, http://www.dur.ac.uk/geography/conferences/imgs/.

10th International Conference on Mercury as a Global Pollutant
24-29 July, Halifax, Nova Scotia, Canada, http://www.mercury2011.org/.

Environmental Health Risk 2011 –
Sixth International Conference on the Impacts of Environmental Factors on Health
25-27 July, Riga, Latvia, http://www.wessex.ac.uk/ehr2011rem1.html.

Air Pollution 2011 –
19th Conference on Modelling, Monitoring and Management of Air Pollution
19-21 September, Malta, http://www.wessex.ac.uk/11-conferences/airpollution-2011.html.

2012

Healthy Buildings 2012 –
10th International Conference on Indoor Air Quality and Climate
8-12 July, Brisbane, Queensland, Australia, http://www.hb2012.org.

Air Quality Eight
24-27 October, Arlington, Virginia, USA, http://www.undeerc.org/AQ8/.