

EMEP MONITORING STRATEGY AND MEASUREMENT PROGRAMME 2010 and onwards

First draft of a revised strategy prepared for consideration by the EMEP Steering Body at its 32nd session

Prepared by CCC in consultation with the EMEP Bureau

Introduction

1. The Convention identifies a number of issues where close collaboration of its Parties is important to achieve its goals. These include requirements with respect to instrumentation and other techniques for monitoring ambient concentrations of air pollutants, the need to exchange meteorological and physico-chemical data relating to the processes during transmission, the need to use comparable or standardized procedures for monitoring whenever possible and the establishment of monitoring stations. Monitoring of atmospheric concentrations and deposition is one of the basic elements to achieve the objectives of EMEP.
2. The EMEP Steering Body amended and adopted at its twenty-eight session in 2004 a monitoring strategy for the period 2004-2009. The Executive Body further approved the monitoring strategy at its twenty-second session and made a decision concerning its implementation (ECE/EB.AIR/83/Add.1, Decision 2004/1). The decision urges Parties to make resources available for the full implementation of the strategy at national level within the geographic scope of EMEP without undue delay, it requests the Chemical Coordinating Centre to provide technical support to Parties and it requests the EMEP Steering Body to follow the implementation of the strategy closely, to review it and to keep the Executive Body informed on the progress.
3. The EMEP Monitoring Strategy has a time horizon corresponding with the overall EMEP strategy with the next strategic period starting in 2010. The monitoring strategy also corresponds to the information needs outlined by the overall EMEP strategy.
4. EMEP is requested to provide Parties to the Convention with information on emissions, deposition and concentrations of air pollutants, with quantified source attribution of the concentrations, depositions and transboundary fluxes related to combat air pollution including long-range transport of air pollutants. This information is an important basis for developing further emission control strategies and implementing the Convention and its Protocols, as well establishing additional measures and new Protocols.
5. The EMEP observations and model calculations are important elements in establishing the air pollution situation in Europe and provide links both to the global and to the urban scales. Air pollution is also considered by other conventions, bodies and institutions. The overall EMEP strategy for 2010 and onwards discusses the links between EMEP observations and the information requirements of those other bodies.

I. OBJECTIVES AND GENERAL REQUIREMENTS OF EMEP MONITORING

6. The main objectives of EMEP are to:

(a) Provide observational and modeling data on pollutant concentrations, deposition, emissions and transboundary fluxes on the regional scale and identify their trends in time;

(b) Identify the sources of the pollution concentrations and depositions and to assess the effects of changes in emissions;

(c) Improve our understanding of chemical and physical processes relevant to assessing the effects of air pollutants on ecosystems and human health in order to support the development of cost-effective abatement strategies; and

(d) Explore the environmental concentrations of new chemical substances that might require the attention of the Convention in the future.

7. EMEP monitoring should be designed to fulfill its purpose. In the previous monitoring strategy (2004-2009) the need for information related to linkages of geographical scales (local versus regional, intercontinental transport, global change) was adopted and further measures are suggested to strengthen this in the current strategic period. It also highlighted the need to address the interaction of global change (including climate change) with air quality issues. The EMEP monitoring beyond 2010 defines monitoring requirements to achieve these goals.

8. EMEP monitoring should form the core infrastructure for monitoring atmospheric composition change throughout its domain by ensuring adequate geographical coverage by efforts of Parties and further ensure that data can be combined with data from monitoring efforts outside the region. A particular concern is the role of intercontinental transport of pollutants of short-lived species as well as long-lived species affecting the topics addressed by EMEP. EMEP observations should contribute to the Global Earth Observation System of Systems (GEOSS). EMEP observations and monitoring sites are particularly well suited to serve as complementary sources of data to air- and space borne remote sensing instrumentation, and it is expected that satellite data will towards the end of the coming strategic period provide essential information related to address the air pollution situation across the EMEP domain. The capabilities of remote sensing capacities will still strongly rely on reliable data for calibration and validation which EMEP observations partly will offer.

9. EMEP monitoring should due to the coupling between atmospheric composition and deposition with climate variability/change support information needs associated with these issues in an integrated way. This includes radiative forcing agents with significant regional gradient (e.g. aerosols and ozone) where transboundary fluxes of radiative forcing and its source-receptor relationships can be assessed. Also the monitoring of long-lived greenhouse gases should be closely integrated with the traditional EMEP parameters since they constitute a valuable addition to the monitoring programme defined in the 2004-2009 strategy. Also the coupling between the carbon cycle and reactive nitrogen cycle should be supported by EMEP observation efforts.

10. EMEP monitoring shall form the core capacity for observing atmospheric composition as an input to evaluate the regional contribution to local air pollution. This requires a close harmonization with efforts made in support of the Air Quality Framework Directive and its Daughter Directives. There is a particular need for additional sites which provide a comprehensive list of parameters in order to adequately describe the physical and chemical processes occurring during transport, a theme so far mainly being addressed by EMEP while the AQFD has a stronger focus of target species with respect to Air Quality limit values. As EMEP modeling will during the coming strategic period also improve its spatial resolution, there is a potential for the use of urban back-ground sites also in the EMEP work, and a supporting monitoring capacity should be developed jointly between EMEP and the organizations addressing local pollution issues.

11. In view of these considerations, the EMEP monitoring programme should ensure:

(a) sufficient ongoing *long-term* monitoring of concentrations and deposition to test the effectiveness of the Convention's protocols as well as other European policies;

(b) *adequate spatial coverage* in new EMEP areas as well as in areas that have been insufficiently covered up to now;

(c) *sufficient temporal resolution* that will allow investigation of atmospheric processes and model improvements as well as analysis of individual pollution events important for human health and ecosystem impacts;

(d) *Co-located and concurrent* monitoring of *all relevant components* and adoption of standard methodologies and adequate *quality assurance* procedures;

(e) the conduct of monitoring in an *affordable* way for all Parties, particularly those with economies in transition, but at the same time take advantages of the scientific development and emerging capabilities at the national level.

12. Taking into account the complexity and costs of atmospheric composition monitoring, EMEP will, as far as possible, harmonize and make use of relevant data compiled under other networks. The monitoring requirements provide important data for the assessment of environmental issues considered by other conventions including local air quality, climate change, water quality and biodiversity. There is also significant overlap in the technical infrastructures on the national level, and most EMEP supersites (see below) are also core infrastructures for measurements of parameters needed to assess such topics. As there is significant interactions between the suite of chemical constituents and the associated physical properties of air pollutants, as well as the synergies in abatement measures, this call for a close harmonization of monitoring efforts. Such an approach will ensure a sound observational basis for EMEP by combining resources and

avoiding duplication of effort. For example, these are covered by European Union (EU) legislation such as EU Air Quality Directives. Relevant monitoring is also carried out by the Working Group on Effects and its International Cooperative Programmes (e.g. ICP Forest, ICP Integrated Monitoring and ICP Vegetation) as well as various national and international programmes (e.g. the Arctic Monitoring and Assessment Programme (AMAP), the Commission of the Convention on the Protection of the Marine Environment of the Baltic Sea Area (HELCOM), the Commission for the Protection of the Marine Environment of the North-East Atlantic (OSPARCOM), the World Meteorological Organization Global Atmosphere Watch (WMO/GAW), the United Nations Framework Convention on Climate Change), The Stockholm Convention under UNEP addressing Persistent Organic Pollutants and others.

13. The strategy of EMEP is to use progress in scientific understanding represented by new methods for the conduct of monitoring, new technologies and techniques to integrate observations from measurement platforms (in situ, profiles, remote sensing etc) and methods for integrating observational data with modeling efforts through data assimilation etc. EMEP will introduce monitoring of parameters at a timeliness allowing for their application for such purposes. This will allow its users more rapid access to data on the air pollution situation across the EMEP domain.

II. GENERAL STRUCTURE OF THE EMEP MONITORING PROGRAMME

14. The monitoring programme is organized to allow for monitoring stations to operate at three different levels of scope and complexity, targeting EMEP objectives in different ways.

15. The main objective of monitoring at level-1 sites is to provide long-term basic chemical and physical measurements of the traditional EMEP parameters. Level-1 activities is the first priority when extending the network to areas not covered by measurements up to now (Eastern Europe, Eastern Mediterranean and Central Asia). By undertaking a more demanding monitoring programme, a sub-set of the level-1 stations should gradually be upgraded to level-2 sites.

16. Level-2 sites provide additional physical/chemical speciation of relevant components needed to assess the air pollution including long-range transport of air pollutants. They represent an essential supplement to the level-1 sites. The aim is to operate in the order of 20-30 level-2 sites throughout the EMEP domain. Level-2 sites are defined according to topic and do not have to cover all topics. A level-1 site extending its programme to include the level-2 activities for any of the specific topics will be identified as a “supersite” for this topic. Level-1 and level-2 sites will typically be operated by institutions nominated by the respective Parties for implementing their monitoring obligations.

Level-1 and level-2 sites are mandatory requirements, but with relaxations given in paragraphs 20 and 21.

17. Level-3 activities are research-oriented, and the main objective of level-3 sites is to improve the scientific understanding of the relevant physico-chemical processes in relation to regional air pollution and its control. Level-3 activities will typically be undertaken by research groups and

may also include campaign data. Level-3 sites are a voluntary component of the monitoring network.

18. Level-2 and level-3 sites are nominated as “EMEP supersites”; this is intended to be an important motivation factor and to provide appropriate recognition of the data providers. Efforts at level 2 sites will typically include long-term monitoring efforts while campaign type data are considered as level 3 efforts.

19. The specification of the different levels of monitoring is as follows:

(a) Level 1: measurements at level 1 include parameters required to describe basic aspects of components involved in tropospheric chemistry and deposition including substances involved in the atmospheric cycling of particulate matter, photochemical oxidants, acidifying and eutrophying compounds and heavy metals, as well as their trends over time. Requirements also include meteorological parameters, but these may be taken from an adjacent meteorological site if representative.

The financial requirements for level-1 stations are lower than for level 2. Low-cost methods can be applied for determining the partitioning between gas and particle phases of nitrogen compounds. Persistent Organic Pollutants (POPs) are not required at level 1.

(b) Level 2: measurements at level-2 sites include all parameters required at level-1 sites plus a series of additional ones. Such additional parameters include fine time resolution (daily or by continuous methods) reliable gas/particle distribution information for semi-volatile nitrogen compounds, speciated precursors to photochemical oxidants (NO_y and VOC compounds), physical and optical characterization of aerosols (size number distribution, aerosol optical depth, light scattering and absorption measurements), extended chemical speciation of particles (elemental and organic carbon, mineral dust), tracers to address air mass origin and the role of anthropogenic vs natural influence (CO, CH₄, halocarbons). For heavy metals, the level-2 programme includes air concentrations of Cd and Pb (with Cu, Zn, As, Cr, Ni as a secondary priority) and Hg in air and precipitation. POPs monitoring is mandatory in level 2 and should include measurements both in air and in precipitation. Not all parameters listed above are however required to be in compliance with the level 2 supersite requirements. Many of these observations are available from research efforts undertaken at EMEP sites, and is normally funded from other sources than national EMEP monitoring budgets.

(c) Level 3: level-3 measurements are research-driven and may partly be available at locations other than level-1 and level-2 sites. The research measurements at level 3 need to respond to the EMEP monitoring objectives and challenges. Interesting parameters for EMEP include: (i) dry deposition flux measurements (sulphur, nitrogen, ozone, VOCs, Hg, others), (ii) vertical profiles of ozone and aerosols (soundings or lidar), (iii) Hg speciation (total gaseous mercury (TGM), reactive gaseous mercury (RGM), total particulate mercury (TPM)), (iv) congener specific POPs (PCBs, PAHs, PCDDs, and PCDFs), (v) EMEP is also in need of observations of POPs and Hg in other compartments than in the atmosphere and should acquire such information through the collaboration with relevant groups, (vi) chemical speciation of organic carbon (OC) in aerosols, even CO₂ and N₂O measurements made at EMEP sites in association with other monitoring

frameworks should be made available for EMEP, vii) isotope information on OC and VOCs. Other parameters may be added to this list as they become relevant for EMEP.

20. Table 1 summarize the parameters to be monitored at the three respective levels, as well as the minimum time resolution for measurement, the reference methodologies to be applied, and acceptable options.

21. Since the different compounds studied under EMEP are intrinsically linked, it is important that the mandatory EMEP monitoring network consists of co-located and concurrent measurements in both precipitation and air. It is recognized, however, that POPs measurements may not always be co-located with level-1 sites, since many of the POP sites are operated in support of other programmes, such as OSPARCOM, HELCOM and AMAP, EC-AQFD and others. It is recommended that Parties co-locate their POPs measurements with EMEP level-1/level-2 stations wherever possible.

22. The temporal resolution for the EMEP mandatory monitoring programme should be sufficient to support analysis of chemical and physical characteristics of synoptic scale transport. Thus, the temporal resolution should generally not exceed 24 hours. Finer temporal resolution is recommended where appropriate methods exist. An exception is made when the measurement activity requires significant financial resources making a continuous time integrated sampling at 24 hour resolution unrealistic. In such cases it is recommended to continue current practice of limiting the sampling to a few short time integrated samples per week (2 hours, 24 or 48 hours per week, e.g. VOCs, carbonyls, POPs, EC/OC) or alternatively to integrate over a full week (inorganics in PM_{2.5} and Hg).

Sampling frequencies need continuous revision through the Task Force on Measurements and Modelling to address the requirements for the evolving needs of the Convention.

23. It is proposed that the site density should be defined through target densities for each level, whilst providing for some flexibility. In general, the site density should depend on the residence time of the pollutants in the atmosphere and should be highest in areas with strong gradients in air concentrations and deposition. For the compounds of interest for EMEP, the target site density varies typically between one and two sites per 100,000 km². All Parties with an area larger than 10,000 km² are requested to operate at least one level-1 site.

24. Level-2 activities represent the core requirement of the EMEP monitoring network and all Parties with an area larger than 50,000 km² are expected to operate at least one site. Possibilities for regional collaboration on the operation of sites should be explored.

25. Level-3 measurements are voluntary in EMEP, but at the same time important for further progress. Most Parties already operate sites addressing these components, and efforts should be made to include the responsible groups to the EMEP work as well as to make the data available. The level-3 sites can to some extent be expected to reflect the priority pollution issues relevant for different regions, the provision of data might be dependent on availability of research funds. EMEP should contribute to securing long-term provision of essential parameters currently not

covered through any monitoring obligations (e.g. aerosol and ozone lidar measurements, climate gases and others).

26. EMEP will maintain and further improve its quality assurance programme to make sure that observation data are of known quality and adequate for their intended use. Field inter-comparisons and laboratory ring tests are important, as well as the maintenance of good links between national data providers and the EMEP centres. These activities can be strengthened through collaboration with the central quality assurance facilities in the EU and in the WMO-GAW system. Measurements should also satisfy the requirements in terms of quality assurance and quality control (www.nilu.no/projects/ccc/qa/index.htm). The EMEP Manual for Sampling and Chemical Analysis gives the criteria that need to be satisfied for instrumentation and analytical methods. Other methods such as automatic monitors can replace manual methods when the data quality can be proven to be equivalent or better.

IV. COMPLIANCE, IMPLEMENTATION AND FURTHER EVOLUTION OF THE STRATEGY

27. All Parties are requested to ensure the full implementation of the monitoring strategy.

28. It is essential to extend the programme over Mediterranean regions, Eastern Europe and Central Asia, starting with level 1.

29. Due to the large number of parameters to be measured, and the proposed site density, some Parties might for various reasons have different priorities or have difficulties in conducting all activities defined at mandatory level 1 and level 2. EMEP will thus, on a provisional basis, acknowledge information not fully satisfying the requirements given for level 1. Such a relaxation of the mandatory requirements would, for example, be acceptable in cases where it was necessary to allow for extension into level 2 or for higher spatial resolution of measurements made in areas of large regional gradients, even if that implied a relaxation in the temporal resolution. Any major change in the monitoring programme of a Party should be made in consultation with CCC.

30. Parties with economies in transition that have not been able to operate an adequate EMEP monitoring site in the past are encouraged to enter the programme as soon as possible, but if necessary at a lower level of ambition, e.g. by implementing only parts of the programme at the beginning. The EMEP Chemical Coordinating Centre (CCC) is committed to providing guidance to the Parties on which parameters to monitor pending their abilities, location, etc.

31. There is a need for regional cooperation to provide a sufficient number of level-2 sites. Parties are urged to coordinate their efforts in order to share and reduce costs. At present, only very few sites fulfill the requirements of level 2, although in some areas a number of sites are currently being upgraded. The Parties, in close consultation with the EMEP centers, should do the selection of level-2 sites. Full advantage should be taken of other monitoring frameworks in Europe, such as GAW, the national monitoring networks reporting to the European Commission under the European Union's Air Quality Directives and the Exchange of Information Decision and national and local monitoring efforts.

32. As EMEP monitoring should involve all Parties, there is a need for an ongoing operational activity linking all Parties and EMEP centers. It is the responsibility of both the Parties and the EMEP centers to develop and maintain these connections. Level-3 activities are research-driven and CCC should, in collaboration with the scientific community, facilitate the access of such data for EMEP use. These activities are not mandatory and are dependent on research funding priorities.

33. The EMEP monitoring network must be dynamic and ready to adapt to new needs and requirements identified by EMEP and the Convention. At the same time, consistent long-term time series should be maintained to monitor emission reductions. This requires the strategy and its implementation to be regularly reviewed and, as appropriate, revised. The Task Force on Measurements and Modeling will coordinate reviews and facilitate the involvement of the EMEP centers and experts from the Parties in this process. The results of reviews and recommendations for revisions will be presented to the EMEP Steering Body.

Table 1 Monitoring requirements for the various levels specified by the EMEP monitoring strategy. (Mandatory level 1 and level 2, with compliance according to para. 20 and 21)

Level-1 sites				
Programme	Parameters	Minimum time resolution	Reference methodology¹	Notes
Inorganic compounds in precipitation	SO ₄ ²⁻ , NO ₃ ⁻ , NH ₄ ⁺ , H ⁺ (pH), Na ⁺ , K ⁺ , Ca ²⁺ , Mg ²⁺ , Cl ⁻ (cond)	Daily	Wet-only/bulk IC/AES/AAS	
Heavy metals in precipitation	Cd, Pb (1st priority), Cu, Zn, As, Cr, Ni (2nd priority)	Daily/weekly	Wet-only/bulk ICP MS or GF-AAS	
Inorganic compounds in air	SO ₂ , SO ₄ ²⁻ , NO ₃ ⁻ , HNO ₃ , NH ₄ ⁺ , NH ₃ , (sNO ₃ , sNH ₄), HCl, Na ⁺ , K ⁺ , Ca ²⁺ , Mg ²⁺	Daily	FP-filter pack IC/AES/AAS	Needs to be complemented with low cost denuders
NO ₂ in air	NO ₂	Hourly/Daily	NaI method	Continuous NO _x monitors with photolytic converter may be used
Ozone in air	O ₃	Hourly	UV-abs	
PM mass in air	PM _{2.5} , PM ₁₀	Hourly/Daily	LVS-PM ₁₀ , HVS-PM ₁₀ or equivalent	Grav. methods preferred, but monitors can be used where equivalence can be demonstrated.
Gas particle ratios	NH ₃ , NH ₄ ⁺ , HCl, HNO ₃ , NO ₃ ⁻ (in combination with filter pack sampling)	Monthly	Low cost denuder or passive samplers	Low cost alternative to basic PM speciation that provides necessary gas-particle ratios for Level 1 sites.
Meteorology	Precipitation amount (RR), temperature (T), wind direction (dd), wind speed (ff), relative humidity (rh), atmospheric pressure (pr)	Hourly	Automatic Weather Station	Can be taken from a representative met. site

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Level-2 sites				
<i>Level-2 sites should also measure a majority of parameters required at Level-1</i>				
Acidification and eutrophication				
Gas particle ratio	NH ₃ /NH ₄ ⁺ , HNO ₃ /NO ₃ ⁻ (artifact-free methods)	Hourly/Daily	Manual denuders	Continuous denuders/steam-jet may also be used. Replace low cost denuders from Level 1. See also PM speciation.
Ammonia in emission areas (optional)	NH ₃	Monthly	Low cost denuders	Optional low cost alternative to provide high spatial resolution information in emission areas, where desired.
Photochemical oxidants				
NO _x	NO, NO ₂	Hourly	Monitor	NO _x monitors with photolytic converter
Light hydrocarbons	C ₂ -C ₇	Hourly	Monitor or canister/GC	Monitoring 10-15 minutes twice a week may also be used
Carbonyls	Aldehydes and ketones	8hourly twice a week	2,4 DNPH silica cartridges/HPLC-MS	
CH ₄	Methane	hourly	GC	
Heavy metals				
Mercury in precipitation	Hg	Weekly	Wet-only/bulk CV-AFS	sampling of borosilicate or halocarbon
Mercury in air	Hg (Total Gaseous Mercury),	Hourly/Daily	Monitor or gold traps CV-AFS	Sampling 1 day per week (or weekly)
Heavy metals in air	Cd, Pb (1st priority.), Cu, Zn, As, Cr, Ni (2nd priority)	Daily/Weekly	HVS or LVS/ICP MS or GF-AAS	Analytical method is determined by the concentration level
Persistent organic pollutants				
POPs in precipitation	PAHs, PCBs, HCB, chlordane, HCHs, DDT/DDE	Weekly	Wet-only/bulk GC-MS/HPLC	
POPs in air	PAHs, PCBs, HCB, chlordane, HCHs, DDT/DDE	Daily/Weekly	HVS, PUR foam GC-MS/HPLC	Sampling 1 day per week (or weekly)
Particulate matter				
Mineral dust in PM ₁₀	Si, Al, Fe	Daily/Weekly	XRF, INAA, PIXE	
EC/OC	Elemental and Organic Carbon	Daily	Termo-optical methods	Protocol developed by EUSAAR
Aerosol absorption	Light absorption coefficient	Hourly/Daily	Aethalometer / PSAP / MAAP	Protocol developed by EUSAAR
Aerosol size/number distribution	dN/dlogDp	Hourly/Daily	DMPS / SMPS / OPC	Protocol developed by EUSAAR
Aerosol scattering	Light scattering coefficient	Hourly/Daily	Integrating Nephelometer	Protocol developed by EUSAAR
Aerosol Optical Depth	AOD at 550 nm	Hourly		
Tracers				
Carbon Monoxide	CO	Hourly	Laser	
Halocarbons	CFCs, HCFCs, HFCs, PFCs, SF ₆	Hourly	GC-MS	

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Level-3 sites Research based and voluntary -monitoring at these sites do not require all level-1 and level-2 parameters. Level 3 sites also include campaign type data.				
Programme	Parameters	Minimum time resolution	Reference methodology ¹	Notes
Dry deposition flux	SO ₂ , NH ₃ , HNO ₃ (SO ₄ ²⁻ , NH ₄ ⁺ , NO ₃ ⁻)	Hourly	-	Contributes to Acidification and eutrophication EMEP program
Dry deposition flux of O ₃	O ₃	Hourly	-	Contributes to Photo-oxidant EMEP program
Hydrocarbons	C ₆ -C ₁₂	Hourly/Daily	-	Contributes to Photo-oxidant EMEP program
Dry deposition flux of VOCs	OVOCs and terpenes	Hourly	-	Contributes to Photo-oxidant EMEP program
NO _y chemistry	PAN, organic nitrates	Hourly/Daily	-	Contributes to Photo-oxidant and Particulate matter EMEP programs
OC speciation	Both water soluble and water insoluble OC (WSOC/WINSOC)	Hourly/Daily	-	Contributes to EMEP program for PM
Vertical profiles	O ₃ soundings, aerosol Lidar,	Hourly/Daily	-	Contributes to EMEP program for PM and to modeling activities in HTAP
Organic tracers	Levoglucosan, others	Daily, weekly	GC/LC-MS	Contributes to EMEP program for PM
Isotopic information	OC, VOCs	Hourly/Daily/Weekly		Contributes to EMEP program for PM and photo-oxidants
Greenhouse gases	CO ₂ , N ₂ O	Hourly	NDIR or Laser/GC	Contributes to EMEP program for analysis of synergies with global change
Hydrogen	Hydrogen (H ₂)	Hourly	GC	Contributes to EMEP program for analysis of synergies with global change
Major inorganics in both PM _{2.5} and PM ₁₀	SO ₄ ²⁻ , NO ₃ ⁻ , NH ₄ ⁺ , Na ⁺ , K ⁺ , Ca ²⁺ , Mg ⁺ (Cl)	Hourly/Daily	Manual denuders or continuous monitors	Continuous denuder/steam-jet and other instruments may also be used
Mercury speciation	TGM, RGM and TPM	Daily/Weekly	-	Contributes to EMEP program on Heavy Metals
Congener-specific	POPs PCBs, PAHs, PCDDs and PCDFs	Daily/Weekly	-	Contributes to EMEP program on Persistent organic Pollutants

1) Reference methods can change in time as new methods become available. Methods; AAS: Atomic Absorption Spectroscopy; CV-AFS: Cold Vapor Atomic Fluorescence Spectroscopy, GF-AAS: Graphite Furnace Atomic Absorption Spectroscopy; DNPH: Dinitrophenylhydrazin; FP: Filter Pack; PUR: Polyurethane, GC: Gas Chromatography; HPLC: High Performance Liquid Chromatography; HVS: High Volume Sampler; LVS: Low Volume Sampler; ICP-MS: Inductively Coupled Plasma Mass Spectrometry; PIXE: Proton Induced X-ray Emission; Instrumental Neutron Activation Analysis (INAA) Activation Analysis; XRF: X-ray Fluorescence; IC: Ion Chromatography; AES: Atomic Emission Spectroscopy, GC-MS: Gas Chromatography- Mass Spectroscopy. AWS: Automatic Weather Station.