UNITED NATIONS **E**

Economic and Social Council

Distr.
GENERAL

EB.AIR/GE.1/2001/6/Add.1
2 July 2001

ORIGINAL : ENGLISH

ECONOMIC COMMISSION FOR EUROPE

EXECUTIVE BODY FOR THE CONVENTION ON
LONG-RANGE TRANSBOUNDARY AIR POLLUTION

Steering Body to the Cooperative Programme for Monitoring and Evaluation
of the Long-range Transmission of Air Pollutants in Europe (EMEP)
(Twenty-fifth session, Geneva, 3-5 September 2001)

(Item 4 (h) on the provisional agenda)

DRAFT GUIDELINES FOR ESTIMATING AND REPORTING EMISSION DATA

Prepared by Task Force on Emission Inventories and Projections in cooperation with the secretariat

Addendum

Below are annex IV and annex V to the Guidelines for Estimating and Reporting Emission Data, for consideration by the Steering Body. Annex IV contains seven tables prepared with an orientation toward the Selected Nomenclature for Air Pollution (SNAP). In accordance with the decision of the editorial committee, established by the Task Force, reporting tables following the system of the Intergovernmental Panel on Climate Change (IPCC) system are contained in an informal document, which the Steering Body also may wish to consider. Annex V contains the technical description of the EMEP 50x50 km^2 grid.

GE.01-31507

Annex IV

REPORTING FORMATS

This annex contains a new format description for electronic reporting of emission data and related information under the Convention.

A. Introduction

1. This format specification describes how the data structure should be expressed in the data files submitted to UNECE/EMEP. To simplify the task of preparing such files, the Parties will be provided with ready-made template files, and software to check the syntax of the files. ASCII files are recommended for data submission, but another compatible format, e.g. EXCEL sheets, is also accepted.

2. Template ASCII files. These files with a structure corresponding to the Excel sheets attached, will be available for downloading from the EMEP web site. Template ASCII files for reporting gridded data will also be available. Examples of such files can be found in section G below. The table below shows the recommended names of available template files.

Description of contents	Corresponding Excel sheets	Recommended names of template ASCII files
Protocol totals for Main, PM and HMs	Table 1A	COUNTRY_Main_PM_HM_Tot_YYYY.emi
Protocol totals for POPs	Table 1B	COUNTRY_POP_Tot_YYYY.emi
NFR sector emissions for Main, PM and HMs	Table 2A	COUNTRY_ Main_PM_HM_ NFR_ YYYY.emi
NFR sector emissions for POPs	Table 2B	COUNTRY_POP_NFR_YYYY.emi
Energy consumption data	Table 3A	COUNTRY_Min_data_YYYY.act
Energy consumption data for transport sector	Table 3B	COUNTRY_Min_transportdata_YYYY.act
Agricultural activity data	Table 3C	COUNTRY_Min_agridata_YYYY.act
Gridded data (Protocol totals) for all components		COUNTRY__ALL_G50_YYYY.emi
Gridded aggregated NFR sector 1-10 data for main components		COUNTRY_ALL_GS50_YYYY.emi
Emission values for large point sources		COUNTRY_LPS_EMIS_YYYY.emi

B. Overall description of ASCII files

3. The data shall be delivered in the form of pure text files, using the ISO 8859-1 character set (ISO latin-1). This character set (an extension of the ASCII character set) includes most of the special European characters. Any textual information in the files should be in English.

4. A file is a sequence of lines, separated by single LF (line feed) characters (as produced by UNIX text editors), or by CR LF sequences (carriage return - line feed, as produced by MS-DOS/Windows text editors). Each line, except the first three, must end with a '$' (dollar) character.

5. Two types of lines shall be used:

(a) **Text**. These lines have a '#' (hash) character in the first character position to distinguish them from data lines. Text lines may contain any explanatory text that the Parties find appropriate to include. No text lines must contain '$' characters within the text. A line beginning with '##' (double hash characters) will mark the end of the explanatory lines. Some text lines, referred to as *declaration lines*, are used to give structure and identification to the files. These lines must conform to the specific formats described below. They will define the context of data lines that follows, until the end of the file. Three such lines at the beginning of each file are used to identify the overall content of the file. Lines beginning with '#' occurring after the first data line will be ignored;

(b) **Data.** These lines contain identification values and data values separated by ';' (semicolon). The values can be text values and numeric values. Any blanks (including TAB characters) before or after each value will be ignored. A field for a data value should never be left blank. Parties should use the standard indicators presented below to fill the blanks in all the tables of the inventory. This approach facilitates assessment of the completeness of emission data reports. The standard indicators are as follows (see also para. 23, completeness):

(i) "NO" (not occurring) for emissions by sources of compounds that do not occur for a particular compound or source category within a country;

(ii) "NE" (not estimated) for existing emissions by sources of compounds that have not been estimated. Where "NE" is used in an inventory the Party should indicate why emissions could not be estimated;

(iii) "NA" (not applicable) for activities in a given source category that do not result in emissions of a specific compound. If categories in the reporting format for which "NA" is applicable are shaded, they do not need to be filled in;

(iv) "IE" (included elsewhere) for emissions by sources of compounds are estimated but included elsewhere in the inventory instead of the expected source category. Where "IE" is used in an inventory, the Party should indicate where in the inventory the emissions from the displaced source category have been included and the Party should give the reasons for this inclusion deviating from the expected category;

(v) "C" (confidential) for emissions by sources of compounds which could lead to the disclosure of confidential information. Where "C" is used in an inventory, reference should be made to the Protocol provision that authorizes such practice; and

(vi) "0" for emissions by sources of compounds that are estimated to be less than one half of the unit being used to record the inventory table, and which therefore appear as zero after rounding. The amount should still be included in the national totals and any relevant subtotals.

A text value can contain any character except ';' and '$'. A numeric value must be a contiguous string composed of an optional sign (+,-), digits (0-9), an optional decimal sign (.) followed by decimal digits. No spaces or commas can be used to group the number (e.g. NOT ALLOWED: 123,456.30). For some data values there might be a need to comment on the value. This has to be done separately as no comments or notes to the data values should appear in the main data files.

C. File identification

6. The following declaration lines, which are mandatory, are used to identify the overall content of a file:

COUNTRY: <country name>
REPORTED: <date>
YEAR: <year>

These three lines must appear at the beginning of a file. For <country name>, the name of the country given in English must be substituted. For <date>, the date of the day the report was submitted must be substituted (e.g. 24.01.2002). For <year>, the year of emissions must be substituted.

D. List of codes

7. For the purpose of defining the context of all data values, a list of text codes is presented below. These text codes are grouped into the following categories:

- Text codes describing pollutants;
- Text codes describing energy consumption;
- Text codes describing emission source;
- Text codes describing unit;
- Text codes for describing point sources;
- Text codes for describing sources;
- Identification text codes.

The text codes play various roles in the data format. Some text codes may appear in more than one syntactical context. That is why the list of codes below is presented without explaining how the codes are used in the data format. This explanation will appear later as a part of the description of individual declaration lines. Each text code group is given a *syntactic notation*, which is used later in the specification to represent any member of the group.

Text codes describing pollutants Syntactic notation: <variables>	
Main components:	
SOx	Sulphur reported as SO_2
NOx	Nitrogen oxides reported as NO_2
NH3	Ammonia
NMVOC	Non-methane volatile organic compounds
CO	Carbon monoxide
Particulate matter:	
TSP	Total suspended matter
PM10	Particulate matter with diameter less than 10µm
PM2.5	Particulate matter with diameter less than 2.5µm
Heavy metals:	
As	Arsenic
Cd	Cadmium
Cr	Chromium
Cu	Copper
Hg	Mercury
Ni	Nickel
Pb	Lead
Se	Selenium
Zn	Zinc
Persistent organic pollutants:	
HCH	Hexachlorocyclohexane (CAS: 608-73-1)
PCP	Pentachlorophenol (CAS: 87-86-5)
HCB	Hexachlorobenzene (CAS: 118-74-1)
DIOX	Dioxins and Furans
PAH	Polyaromatic hydrocarbons
SCCP	Short-chained chlorinated parraffins (CAS: 85535-84-8)
PCB	Polychlorinated biphenyls
Aldrin	CAS: 309-00-2
Chlordane	CAS: 57-74-9
Chlordecone	CAS: 143-50-0
DDT	CAS: 50-29-3
Dieldrin	CAS: 60-57-1
Endrin	CAS: 72-20-8
Heptachlor	CAS: 76-44-8
Hexabromobiphenyl	CAS: 36355-01-8
Mirex	CAS: 2385-85-5
Toxaphene	CAS: 8001-35-2
Text codes describing energy consumption Syntactic notation: <variables>	
Hard coal	
Brown coal	
Natural gas	
Heavy fuel oil	
Other liquid fuels	
Biomass (fuelwood)	
Other solid fuels	

Nuclear	
Hydro	
Renewables(solar, wind)	
Electricity	
Heat	
Gasoline	
LPG	Liquefied petroleum gas
Diesel	
CNG	Compressed natural gas
head	Number of animals (used for agricultural activity data)
N	Nitrogen (used for agricultural activity data)
Text codes describing emission source (anthropogenic total or NFR codes) Syntactic notation: <source>	
PTOT	National Protocol Total (correspond to the sum of sectors 1-10)
TOT	National Total (corresponding to PTOT+NFR11+National overseas areas)
OVAR	National Overseas Areas
Sectors (NFR)	
NFR1	Combustion in energy and transformation industries
NFR1 A-D	
NFR2	Non-industrial combustion plants
NFR2 A-C	
NFR3	Combustion in manufacturing industry
NFR3 A-E	
NFR4	Production processes
NFR4 A-N	
NFR5	Extraction and distribution of fossil fuels and geothermal energy
NFR5 A-C	
NFR6	Solvent and other product use
NFR6 A-D	
NFR7	Road transport
NFR7 A-F	
NFR8	Other mobile sources and machinery
NFR8 A-H	
NFR9	Waste treatment and disposal
NFR9 A-H	
NFR10	Agriculture
NFR10 A-X	
NFR11	Other sources and sinks
NFR11 A	
Text codes describing unit Syntactic notation: <unit>	
g I-Teq	Grams of toxic equivalent
kg	Kilograms
Mg	Megagrams = metric tons
Gg	Gigagrams = kilotons = 1000 metric tons
TJ	Terajoules = 10^12 joules

Text codes for describing point sources Syntactic notation: <variables>	
LPS	Full name of the source
latitude	Latitude of source given as degrees with decimal digits (i.e. 50.5 corresponds to 50 degrees and 30 minutes)
longitude	Longitude of source given as degrees with decimal digits
NFR	Source sector (codes NFR1,…,NFR11) for the point source
height	Physical height of stack (metres)
Text codes for describing sources Syntactic notation : <variables>	
i	The I coordinate of the 50*50 km EMEP grid
j	The J coordinate of the 50*50 km EMEP grid
DESCRIPTION	Description of NFR sector
COMMENTS	General comment
SOURCE	Identification of emission source (text code for NFR sector)
Identification text codes	
YEAR	A four-digit number representing the emission/consumption/activity year. Examples: 1980, 2000, 2010
REPORTED	Date of reporting. Example: 31.12.2001
COUNTRY	Name of the reporting country

E. Declaration lines

8. The following declaration lines (collectively called *context declaration lines*) are used to describe the context of the data lines that follow. These declaration lines are at the beginning of the files and must not be changed.

VARIABLES: <var1>;<var2>;<var3>;… The <var1>, <var2> etc. are text codes (or variables) separated by semicolons (;) that describe the content of the corresponding fields in the data lines beneath the #VARIABLES line. All data lines will have this structure. One or more of the initial variables may represent identification text codes. The corresponding fields in the data lines will then contain text codes which will further define the context of the data values in the data lines.

UNIT: <unit1>;<unit2>;<unit3>:… Defines the units of the emissions of the different components

F. Excel files

Table 1A: National emissions: main pollutants, particulate matter and heavy metals

Table 1B: National emissions: persistent organic pollutants

Table 2A: National sector emissions of main pollutants, particulate matter and heavy metals

Table 2B: National sector emissions: persistent organic pollutants

Table 3A: Activity data: energy consumption

Table 3B: Activity data: energy consumption data for transport sector

Table 3C: Activity data: agriculture

G. Examples of ASCII files (to be made available on EMEP Home Page www.emep.int)

H. Checklist

Description of contents	Corresponding template ASCII file	COMPONENT	Reported for Year (s)/Not Reported (NR)	Comments
MINIMUM REPORTING / YEARLY		To be filled in by Party	To be filled in by Party	To be filled in by Party
Protocol totals for main pollutants	COUNTRY_Main_PM_HM_Tot_YYYY.emi			
Protocol totals for PM	COUNTRY_Main_PM_HM_Tot_YYYY.emi			
Protocol totals for HM	COUNTRY_Main_PM_HM_Tot_YYYY.emi			
Protocol totals for POPs	COUNTRY_POP_Tot_YYYY.emi			
NFR sector emissions for main pollutants	COUNTRY_ Main_PM_HM_ NFR_ YYYY.act			
NFR sector emissions for PM	COUNTRY_ Main_PM_HM_ NFR_ YYYY.emi			
NFR sector emissions for HM	COUNTRY_ Main_PM_HM_ NFR_ YYYY.emi			
NFR sector emissions for POPs	COUNTRY_POP_NFR_YYYY.emi			
MINIMUM REPORTING/FIVE-YEARLY				
Gridded data (Protocol totals) for all components	COUNTRY__ALL_G50_YYYY.emi			
Gridded aggregated NFR sector 1-10 data for main components	COUNTRY_ALL_GS50_YYYY.emi			
Emission values for large point sources	COUNTRY_LPS_EMIS_YYYY.emi			
Energy consumption data	COUNTRY_Min_data_YYYY.act			
Energy consumption data for transport sector	COUNTRY_Min_transportdata_YYYY.act			
Agricultural activity data	COUNTRY_Min_agridata_YYYY.act			

Description of contents	COMPONENT	Reported for Year (s)	Comments
ADDITIONAL REPORTING (REVIEW)			
VOC speciation			
Height distribution			
Land-use data			
Mercury breakdown			
% of toxic congeners of PCDD/F			
Pre 1990 emissions of PAHs, HCB, PCDD/F and PCB			
Other heavy metals			
Other POPs			

#COUNTRY:
#REPORTED:
#YEAR:
#TABLE 1A: National emissions: Main Pollutants, Particulate Matter and Heavy Metals

# Yearly minimum reporting												Additional reporting						
##	Main pollutants					Particulate matter			Priority metals			Other metals						
#Pollutant:SOURCE	SOx (as SO2)	NOx (as NO2)	NH3	NMVOC	CO	TSP	PM10	PM2.5	Pb	Cd	Hg	As	Cr	Cu	Ni	Se	Zn	$
#Units	Gg	Gg	Gg	Gg	Gg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	$
NFR1																		$
NFR2																		$
NFR3																		$
NFR4																		$
NFR5																		$
NFR6																		$
NFR7																		$
NFR8																		$
NFR9																		$
NFR10																		$
NATIONAL PROTOCOL TOTAL																		$
NFR11																		$
NATIONAL OVERSEAS AREAS																		$
NATIONAL TOTAL																		$

#Note:

#Main pollutants should cover the timespan 1980 to latest year.

#HM should cover the timespan 1990 to latest year.

#PM should cover the timespan 2000 to latest year.

#COUNTRY:

#REPORTED:

#YEAR:

#TABLE 1B: National emissions: Persistent Organic Pollutants $

#Yearly minimum reporting $																		
##	ANNEX I (1)									ANNEX II (2)			ANNEX III (3)			OTHER (4)		$
#Pollutant:SOURCE	Aldrin	Chlordane	Chlordecone	Dieldrin	Endrin	Heptachlor	Hexabromobiphenyl	Mirex	Toxaphene	HCH	DDT	PCBs	Dioxins&Furans	PAHs	HCB	PCP	SCCP	$
#Units:	kg	kg	kg	kg	kg	kg	kg	kg	Kg	kg	kg	kg	g I-Teq	Mg	kg	kg	kg	$
NFR1																		$
NFR2																		$
NFR3																		$
NFR4																		$
NFR5																		$
NFR6																		$
NFR7																		$
NFR8																		$
NFR9																		$
NFR10																		$
NATIONAL PROTOCOL TOTAL																		$
NFR11																		$
NATIONAL OVERSEAS AREAS																		$
NATIONAL TOTAL																		$

#Notes:

#POPs should cover the timespan 1990 to latest year.

#(1): The POPs listed in annex I to the Protocol on POPs are substances scheduled for elimination.

 # DDT and PCBs are also listed in annex I.

#(2): The POPs listed in annex II to the Protocol on POPs are substances scheduled for restriction use.

#(3): The POPs listed in annex III to the Protocol on POPs are substances referred to in article 3, para. 5 (a), of the Protocol.

 # Polycyclic aromatic hydrocarbons (PAHs): For the purpose of the emission inventories, the following four indicator compounds shall be used: benzo(b)pyrene,

 # benzo(b)fluoranthene, benzo(k)fluoranthene and indeno(1,2,3-cd)pyrene. HCB is also included in annex I to the Protocol as a substance for elimination.

#(4): See article 8 of the Protocol (Research, development and monitoring; reporting voluntary).

 # COUNTRY:
 # REPORTED:
 # YEAR:
 # TABLE 2A: National sector emissions: Main Pollution, Particulate Matter and Heavy Metals $

#Yearly minimum reporting												Additional reporting						$
## NFR 1: Combustion in energy and transformation industries	Main Pollutants					Particulate matter			Priority metals			Other metals						$
#Pollutant: SOURCE; DESCRIPTION	SOx (as SO2)	NOx (as NO2)	NH3	NMVOC	CO	TSP	PM10	PM2.5	Pb	Cd	Hg	As	Cr	Cu	Ni	Se	Zn	$
#Units:	Gg	Gg	Gg	Gg	Gg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	$
NFR1A; Electricity and heat production																		$
NFR1B; Petroleum refining																		$
NFR1C; Manufacture of Solid Fuels and Other Energy Industries																		$
NFR1D; Pipeline compressors																		$

## NFR 2: Non-Industrial combustion plants	Main Pollutants					Particulate matter			Priority metals			Other metals						$
#Pollutant	SOx (as SO2)	NOx (as NO2)	NH3	NMVOC	CO	TSP	PM10	PM2.5	Pb	Cd	Hg	As	Cr	Cu	Ni	Se	Zn	$
#Units:	Gg	Gg	Gg	Gg	Gg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	$
NFR2A; Other Sectors-Commercial/Institutional																		$
NFR2B; Other Sectors-Residential																		$
NFR2C; Other Sectors-Agriculture/Forestry/Aquaculture																		$

#NFR 3: Combustion in manufacturing industry	Main Pollutants					Particulate matter			Priority metals			Other metals						$
#Pollutant	SOx (as SO2)	NOx (as NO2)	NH3	NMVOC	CO	TSP	PM10	PM2.5	Pb	Cd	Hg	As	Cr	Cu	Ni	Se	Zn	$
#Units:	Gg	Gg	Gg	Gg	Gg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	$
NFR3A; Combustion in boilers, gas-turbines and stationary engines																		$
NFR3B; Industry-Iron and Steel																		$
NFR3C; Industry-Other																		$
NFR3D; Industry-Non-ferrous metals																		$
NFR3E; Industry-Pulp, Paper and Print																		$

#NFR 4: Production Processes	Main Pollutants					Particulate matter			Priority metals			Other metals						$
#Pollutant	SOx (as SO2)	NOx (as NO2)	NH3	NMVOC	CO	TSP	PM10	PM2.5	Pb	Cd	Hg	As	Cr	Cu	Ni	Se	Zn	$
#Units:	Gg	Gg	Gg	Gg	Gg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	$
NFR4A; Fugitive emissions from processes in Petroleum Industries																		$
NFR4B; Fugitive emissions from coke-ovens and solid smokeless fuels produc.																		$
NFR4C; Industrial Processes-Metal Production-Iron and steel																		$
NFR4D; Industrial Processes-Metal Production- Aluminium																		$
NFR4E; Industrial Processes-Metal Production-Ferroalloys																		$
NFR4F; Industrial Processes-Metal Production-Other																		$
NFR4G; Industrial Processes-Chemical Industry-Sulphuric acid																		$
NFR4H; Industrial Processes-Chemical Industry-Nitric Acid																		$
NFR4I; Industrial Processes-Chemical Industry-Ammonia																		$
NFR4J; Industrial processes-Other Production-Pulp and Paper																		$
NFR4K; Industrial processes-Other Production-Food and Drink																		$
NFR4L; Industrial processes-Mineral Products-Asphalt Roofing																		$
NFR4M; Industrial proc.-Mineral Products-Road Paving with Asphalt																		$
NFR4N; Industrial processes-Mineral Products-Other																		$

#Yearly minimum reporting												Additional reporting						
#NFR 5: Extraction and distribution of fossil fuels and geothermal energy	Main Pollutants					Particulate matter			Priority metals			Other metals						
#Pollutant	SOx (as SO2)	NOx (as NO2)	NH3	NMVOC	CO	TSP	PM10	PM2.5	Pb	Cd	Hg	As	Cr	Cu	Ni	Se	Zn	$
#Units:	Gg	Gg	Gg	Gg	Gg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	$
NFR5A; Fugitive emissions from fuels-Oil																		$
NFR5B; Fugitive emissions from fuels-Natural gas																		$
NFR5C; Geothermal energy and Other																		$

#NFR 6: Solvent and other product use	Main Pollutants					Particulate matter			Priority metals			Other metals						
#Pollutant	SOx (as SO2)	NOx (as NO2)	NH3	NMVOC	CO	TSP	PM10	PM2.5	Pb	Cd	Hg	As	Cr	Cu	Ni	Se	Zn	$
#Units:	Gg	Gg	Gg	Gg	Gg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	$
NFR6A; Solvent and other product use-Paint application																		$
NFR6B; Solvent and other product use-Degreasing and dry cleaning																		$
NFR6C; Solvent and other product use-Chemical products																		$
NFR6D; Solvent and other product use-Other																		$

#NFR 7: Road transport	Main Pollutants					Particulate matter			Priority metals			Other metals						
#SPollutant	SOx (as SO2)	NOx (as NO2)	NH3	NMVOC	CO	TSP	PM10	PM2.5	Pb	Cd	Hg	As	Cr	Cu	Ni	Se	Zn	$
#Units:	Gg	Gg	Gg	Gg	Gg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	$
NFR7A; Transport-Road (1-Cars)																		$
NFR7B; Transport-Road (2-Light-duty trucks)																		$
NFR7C; Transport-Road (3-Heavy-duty trucks and buses)																		$
NFR7D; Transport-Road (4-Motorcycles)																		$
NFR7E; Petrol evaporation																		$
NFR7F; Automobile tyre and brake wear																		$

#NFR 8: Other mobile sources and machinery	Main Pollutants					Particulate matter			Priority metals			Other metals						
#Pollutant	SOx (as SO2)	NOx (as NO2)	NH3	NMVOC	CO	TSP	PM10	PM2.5	Pb	Cd	Hg	As	Cr	Cu	Ni	Se	Zn	$
#Units:	Gg	Gg	Gg	Gg	Gg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	$
NFR8A; Military																		$
NFR8B; Transport-Railways																		$
NFR8C; Transport-Navigation / 2-National navigation																		$
NFR8D; Fishing																		$
NFR8E; Transport- Civil aviation (2-Domestic)																		$
NFR8F; Transport- Agriculture/Forestry																		$
NFR8G; Transport- Industry																		$
NFR8H; Transport- Other																		$

#NFR 9: Waste treatment and disposal	Main Pollutants					Particulate matter			Priority metals			Other metals						
#Pollutant	SOx (as SO2)	NOx (as NO2)	NH3	NMVOC	CO	TSP	PM10	PM2.5	Pb	Cd	Hg	As	Cr	Cu	Ni	Se	Zn	$
#Units:	Gg	Gg	Gg	Gg	Gg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	$
NFR9A; Waste-Incineration																		$
NFR9B; Fugitive emissions from fuels-Oil and natural gas/Flaring																		$
NFR9C; Waste-Solid waste disposal on land-Managed Disposal																		$
NFR9D; Waste-Solid waste disposal on land-Unmanaged Sites																		$
NFR9E; Waste-Solid waste disposal on land-Other																		$
NFR9F; Waste-Waste-water treatment/Industrial																		$
NFR9G; Waste-Waste-water treatment/Domestic and commercial																		$
NFR9H; Waste-Other																		$

#Yearly minimum reporting												Additional reporting						$
# NFR 10: Agriculture	Main Pollution					Particulate matter			Priority metals			Other metals						$
#Pollutant	SOx (as SO2)	NOx (as NO2)	NH3	NMVOC	CO	TSP	PM10	PM2.5	Pb	Cd	Hg	As	Cr	Cu	Ni	Se	Zn	$
#Units:	Gg	Gg	Gg	Gg	Gg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	$
NFR10A; Agriculture-Agricultural soils																		$
NFR10B; Agriculture-Rice cultivation																		$
NFR10C; Agriculture-Field burning of agricultural wastes-Cereals																		$
NFR10D; Agriculture-Field burning of agricultural wastes-Pulse																		$
NFR10E; Agriculture-Field burning of agric. wastes-Tuber and Root																		$
NFR10F; Agriculture-Field burning of agric. wastes-Sugar Cane																		$
NFR10G; Agriculture-Field burning of agricultural wastes-Other																		$
NFR10H; Agriculture-Manure management/Cattle/Dairy																		$
NFR10I; Agriculture-Manure management/Cattle/Non-dairy																		$
NFR10J; Agriculture-Manure management/Swine																		$
NFR10K; Agriculture-Manure management/Sheep																		$
NFR10L; Agriculture-Manure management/Horses																		$
NFR10M; Agriculture-Manure management/Poultry																		$
NFR10N; Agriculture-Manure management/Other																		$
NFR10O; Agriculture-Manure management/Goats																		$
NFR10P; Agriculture-Manure management/Mules and asses																		$
NFR10Q; Agriculture-Manure management/Camels and llamas																		$
NFR10R; Agriculture-Manure management/Buffalo																		$
NFR10S; Pesticides Emissions and removals from soil																		$
NFR10T; Agriculture-Manure management-Anaerobic																		$
NFR10U; Agriculture-Manure management-Liquid Systems																		$
NFR10V; Agriculture-Manure management-Solid Storage																		$
NFR10X; Agriculture-Manure management-Other																		$

#NFR 11: Other sources and sinks	Main Pollution					Particulate matter			Priority metals			Other metals						$
#Pollutant	SOx (as SO2)	NOx (as NO2)	NH3	NMVOC	CO	TSP	PM10	PM2.5	Pb	Cd	Hg	As	Cr	Cu	Ni	Se	Zn	$
#Units:	Gg	Gg	Gg	Gg	Gg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	Mg	$
NFR11A; Managed forests																		$

#Note:
#Main Pollutants should cover the timespan 1980 to latest year.
#HM should cover the timespan 1990 to latest year.
#PM should cover the timespan 2000 to latest year.

COUNTRY:
REPORTED:
YEAR:
TABLE 2B: National sector emissions: Persistent Organic Pollutants $

#Yearly minimum reporting

## NFR 1: Combustion in energy and transformation industries	Annex 1 (1)									Annex II (2)			Annex III (3)s			OTHER (4)		$
#Pollutant: SOURCE; DESCRIPTION	Aldrin	Chlordane	Chlordecone	Dieldrin	Endrin	Heptachlor	Hexabromobiphenyl	Mirex	Toxaphene	HCH	DDT	PCBs	Dioxins&Furans	PAHs	HCB	PCP	SCCP	$
#Units:	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	g I-Teq	Mg	kg	kg	kg	$
NFR1A; Electricity and heat production																		$
NFR1B; Petroleum refining																		$
NFR1C; Manufacture of Solid Fuels and Other Energy Industries																		$
NFR1D; Pipeline compressors																		$

#NFR 2: Non-industrial combustion plants	Annex 1 (1)									Annex II (2)			Annex III (3)s			OTHER (4)		$
#Pollutant:	Aldrin	Chlordane	Chlordecone	Dieldrin	Endrin	Heptachlor	Hexabromobiphenyl	Mirex	Toxaphene	HCH	DDT	PCBs	Dioxins&Furans	PAHs	HCB	PCP	SCCP	$
#Units:	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	g I-Teq	Mg	kg	kg	kg	$
NFR2A; Other Sectors-Commercial/Institutional																		$
NFR2B; Other Sectors-Residential																		$
NFR2C; Other Sectors-Agriculture/Forestry/Aquaculture																		$

#NFR 3: Combustion in manufacturing industry	Annex 1 (1)									Annex II (2)			Annex III (3)s			OTHER (4)		$
#Pollutant:	Aldrin	Chlordane	Chlordecone	Dieldrin	Endrin	Heptachlor	Hexabromobiphenyl	Mirex	Toxaphene	HCH	DDT	PCBs	Dioxins&Furans	PAHs	HCB	PCP	SCCP	$
#Units:	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	g I-Teq	Mg	kg	kg	kg	$
NFR3A; Combustion in boilers, gas-turbines and stationary engines																		$
NFR3B; Industry-Iron and Steel																		$
NFR3C; Industry-Other																		$
NFR3D; Industry-Non-ferrous metals																		$
NFR3E; Industry-Pulp, Paper and Print																		$

#NFR 4: Production processes	Annex 1 (1)									Annex II (2)			Annex III (3)s			OTHER (4)		$
#Pollutant	Aldrin	Chlordane	Chlordecone	Dieldrin	Endrin	Heptachlor	Hexabromobiphenyl	Mirex	Toxaphene	HCH	DDT	PCBs	Dioxins&Furans	PAHs	HCB	PCP	SCCP	$
#Units:	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	g I-Teq	Mg	kg	kg	kg	$
NFR4A; Fugitive emissions from processes in Petroleum Industries																		$
NFR4B; Emissions from coke-ovens and smokeless fuels production																		$
NFR4C; Industrial Processes-Metal Production-Iron and steel																		$
NFR4D; Industrial Processes-Metal Production-Aluminium																		$
NFR4E; Industrial Processes-Metal Production-Ferroalloys																		$
NFR4F; Industrial Processes-Metal Production-Other																		$
NFR4G; Industrial Processes-Chemical Industry-Sulphuric acid																		$
NFR4H; Industrial Processes-Chemical Industry-Nitric Acid																		$
NFR4I; Industrial Processes-Chemical Industry-Ammonia																		$
NFR4J; Industrial processes-Other Production-Pulp and Paper																		$
NFR4K; Industrial processes-Other Production-Food and Drink																		$
NFR4L; Industrial processes-Mineral Products-Asphalt Roofing																		$
NFR4M; Industrial proc.-Mineral Products-Road Paving with Asphalt																		$
NFR4N; Industrial processes-Mineral Products-Other																		$

#Yearly minimum reporting

#NFR 5: Extraction and distrib. of fossil fuels and geothermal energy	Annex I (1)									Annex II (2)			Annex III (3)s			OTHER (4)		$
#Pollutant	Aldrin	Chlordane	Chlordecone	Dieldrin	Endrin	Heptachlor	Hexabromobiphenyl	Mirex	Toxaphene	HCH	DDT	PCBs	Dioxins&Furans	PAHs	HCB	PCP	SCCP	$
#Units:	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	g I-Teq	Mg	kg	kg	kg	$
NFR5A; Fugitive emissions from fuels-Oil																		$
NFR5B; Fugitive emissions from fuels-Natural gas																		$
NFR5C; Geothermal energy and Other																		$

#NFR 6: Solvent and other product use	Annex I (1)									Annex II (2)			Annex III (3)s			OTHER (4)		$
#Pollutant	Aldrin	Chlordane	Chlordecone	Dieldrin	Endrin	Heptachlor	Hexabromobiphenyl	Mirex	Toxaphene	HCH	DDT	PCBs	Dioxins&Furans	PAHs	HCB	PCP	SCCP	$
#Units:	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	g I-Teq	Mg	kg	kg	kg	$
NFR6A; Solvent and other product use-Paint application																		$
NFR6B; Solvent and other product use-Degreasing and dry cleaning																		$
NFR6C; Solvent and other product use-Chemical products																		$
NFR6D; Solvent and other product use-Other																		$

#NFR 7: Road transport	Annex I (1)									Annex II (2)			Annex III (3)s			OTHER (4)		$
#Pollutant	Aldrin	Chlordane	Chlordecone	Dieldrin	Endrin	Heptachlor	Hexabromobiphenyl	Mirex	Toxaphene	HCH	DDT	PCBs	Dioxins&Furans	PAHs	HCB	PCP	SCCP	$
#Units:	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	g I-Teq	Mg	kg	kg	kg	$
NFR7A; Transport-Road (1-Cars)																		$
NFR7B; Transport-Road (2-Light-duty trucks)																		$
NFR7C; Transport-Road (3-Heavy-duty trucks and buses)																		$
NFR7D; Transport-Road (4-Motorcycles)																		$
NFR7E; Petrol evaporation																		$
NFR7F; Automobile tyre and brake wear																		$

#NFR 8: Other mobile sources and machinery	Annex I (1)									Annex II (2)			Annex III (3)s			OTHER (4)		$
#Pollutant	Aldrin	Chlordane	Chlordecone	Dieldrin	Endrin	Heptachlor	Hexabromobiphenyl	Mirex	Toxaphene	HCH	DDT	PCBs	Dioxins&Furans	PAHs	HCB	PCP	SCCP	$
#Units:	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	g I-Teq	Mg	kg	kg	kg	$
NFR8A; Military																		$
NFR8B; Transport-Railways																		$
NFR8C; Transport-Navigation / 2-National navigation																		$
NFR8D; Fishing																		$
NFR8E; Transport- Civil aviation (2-Domestic)																		$
NFR8F; Transport- Agriculture/Forestry																		$
NFR8G; Transport- Industry																		$
NFR8H; Transport- Other																		$

#NFR 9: Waste treatment and disposal	Annex I (1)									Annex II (2)			Annex III (3)s			OTHER (4)		$
#Pollutant	Aldrin	Chlordane	Chlordecone	Dieldrin	Endrin	Heptachlor	Hexabromobiphenyl	Mirex	Toxaphene	HCH	DDT	PCBs	Dioxins&Furans	PAHs	HCB	PCP	SCCP	$
#Units:	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	I-Teq	Mg	kg	kg	kg	$
NFR9A; Waste-Incineration																		$
NFR9B; Fugitive emissions from fuels-Oil and natural gas/Flaring																		$
NFR9C; Waste-Solid waste disposal on land-Managed Disposal																		$
NFR9D; Waste-Solid waste disposal on land-Unmanaged Sites																		$
NFR9E; Waste-Solid waste disposal on land-Other																		$
NFR9F; Waste-Wastewater treatment/Industrial																		$
NFR9G; Waste-Wastewater treatment/Domestic and commercial																		$
NFR9H; Waste-Other																		$

#Yearly minimum reporting																		
#NFR 10: Agriculture	Annex I (1)									Annex II (2)			Annex III (3)s			OTHER (4)		$
#Pollutant	Aldrin	Chlordane	Chlordecone	Dieldrin	Endrin	Heptachlor	Hexabromobiphenyl	Mirex	Toxaphene	HCH	DDT	PCBs	Dioxins&Furans	PAHs	HCB	PCP	SCCP	$
#Units:	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	g I-Teq	Mg	kg	kg	kg	$
NFR10A; Agriculture-Agricultural soils																		$
NFR10B; Agriculture-Rice cultivation																		$
NFR10C; Agriculture-Field burning of agricultural wastes-Cereals																		$
NFR10D; Agriculture-Field burning of agricultural wastes-Pulse																		$
NFR10E; Agriculture-Field burning of agric. wastes-Tuber and Root																		$
NFR10F; Agriculture-Field burning of agric. wastes-Sugar Cane																		$
NFR10G; Agriculture-Field burning of agricultural wastes-Other																		$
NFR10H; Agriculture-Manure management/Cattle/Dairy																		$
NFR10I; Agriculture-Manure management/Cattle/Non-dairy																		$
NFR10J; Agriculture-Manure management/Swine																		$
NFR10K; Agriculture-Manure management/Sheep																		$
NFR10L; Agriculture-Manure management/Horses																		$
NFR10M; Agriculture-Manure management/Poultry																		$
NFR10N; Agriculture-Manure management/Other																		$
NFR10O; Agriculture-Manure management/Goats																		$
NFR10P; Agriculture-Manure management/Mules and asses																		$
NFR10Q; Agriculture-Manure management/Camels and llamas																		$
NFR10R; Agriculture-Manure management/Buffalo																		$
NFR10S; Pesticides Emissions and removals from soil																		$
NFR10T; Agriculture-Manure management-Anaerobic																		$
NFR10U; Agriculture-Manure management-Liquid Systems																		$
NFR10V; Agriculture-Manure management-Solid Storage																		$
NFR10X; Agriculture-Manure management-Other																		$

#NFR 11: Other sources and sinks	Annex I (1)									Annex II (2)			Annex III (3)s			OTHER (4)		$
#Pollutant	Aldrin	Chlordane	Chlordecone	Dieldrin		Heptachlor	Hexabromobiphenyl	Mirex	Toxaphene	HCH	DDT	PCBs	Dioxins&Furans	PAHs	HCB	PCP	SCCP	$
#Units:	kg	kg	kg	kg		kg	kg	kg	kg	kg	kg	kg	g I-Teq	Mg	kg	kg	kg	$
NFR11A; Managed forests																		$

#Notes:
#POPs should cover the timespan 1990 to latest year
#(1): The POPs listed in annex I to the Protocol on POPs are substances scheduled for elimination
DDT and PCBs are also listed in annex I.
#(2): The POPs listed in annex II to the Protocol on POPs are substances scheduled for restriction use.
#(3): The POPs listed in annex III to the Protocol on POPs are substances referred to in article 3, para. 5 (a), of the Protocol
Polycyclic aromatic hydrocarbons (PAHs): For the purpose of the emission inventories, the following four indicator compounds shall be used: benzo(b)pyrene,
benzo(b)fluoranthene, benzo(k)fluoranthene and indeno(1,2,3-cd)pyrene. HCB is also included in annex I to the Protocol as a substance for elimination.

COUNTRY:
REPORTED:
YEAR:

TABLE 3A: Five yearly, Minimum reporting of Energy consumption data

Fuel:SOURCE;	Hard coal	Brown coal	Natural gas	Heavy fuel oil	Other liquid fuels	Biomass	Other solid fuels	Nuclear	Hydro	Renewable	Electricity	Heat
UNIT:	TJ	TJ	TJ	TJ	TJ	TJ	TJ	TJ	TJ	TJ	TJ	TJ
NFR 1a												
NFR 1bc												
NFR 2a-c												
NFR 3a												
NFR 3b-e + NFR 4a-n												
NFR 7a-d + NFR 8a-h												

Notes:

Other liquid fuels*:* For transport split into petrol, liquefied petroleum gas (LPG), diesel, compressed natural gas (CNG) and kerosene.

Nuclear, Hydro, Renewable: Primary energy equivalent for non-fossil fuels should be reported according to the total primary energy supply (TPES) convention of converting electricity into primary energy, i.e. electricity generated in nuclear power plants with 33% efficiency, hydro, solar and wind with 100% efficiency and geothermal with 10% efficiency.

Energy consumption should be reported both for historical (1990, 1995 and 2000) and projection years (2010 and 2020) as in the table above. If data for this sectoral resolution are not available, please aggregate accordingly (provide documentation on aggregation used).

COUNTRY:
REPORTED:
YEAR:

TABLE 3B: Five yearly, Minimum reporting of Energy consumption data for transport sector

Fuel: SOURCE	Petrol	LPG	Diesel	CNG	Heavy fuel oil
UNIT:	TJ	TJ	TJ	TJ	TJ
NFR 7a					
NFR 7b					
NFR 7c					
NFR 7d					
NFR 8b					
NFR 8a + NFR 8f-h					
NFR 8e					
NFR 8cd					
Aggregated categories					
NFR 7a-d					
NFR 8ab + NFR 8e-h					
NFR 8cd					

Notes:

Data on energy consumption in transport for 1990, 1995 and 2000 (historical years) should be provided on a sectoral resolution as in the table above. If possible, projected energy consumption for years 2000 and 2010 should also be reported following the same format. However, recognizing the fact that the projections might often be prepared at a higher sectoral resolution, aggregated categories can also be used to report historical data if detailed information cannot be obtained.

LPG - liquefied petroleum gas
CNG - compressed natural gas

COUNTRY:
REPORTED:
YEAR:

TABLE 3C: Five-yearly, Minimum reporting of Agricultural activity data

VARIABLES: SOURCE	Comments	head	N
UNIT:		1000	Gg
NFR 10h	Slurry-based system		
NFR 10h	Straw-based system		
NFR 10i	Slurry based system		
NFR 10i	Straw-based system		
NFR 10j	Slurry-based system		
NFR 10j	Straw-based system		
NFR 10m	Laying hens		
NFR 10m	Broilers		
NFR 10m	Turkeys		
NFR 10m	Other poultry		
NFR 10k			
NFR 10o			
NFR 10l + NFR 10p			
NFR 10n			
NFR 10a	N-fertilizer use – Urea		
NFR 10a	N-fertilizer use - other N-fertilizers		
Aggregated categories			
NFR 10h			
NFR 10i			
NFR 10j			
NFR 10m			
NFR 10k + NFR 10o			
NFR 10nl + NFR 10p			
NFR 10a			

Note:

If possible both historical (1990, 1995 and 2000) and projection data (2010 and 2020) should be reported in this format. Whenever disaggregated data are not available, the aggregated format can be used for both historical and projection data. For example, if it is not possible to provide split into slurry and straw systems report total number of animals only. Similarly for poultry or nitrogen (N) fertilizer use, aggregates should be reported if data on lower resolution could not be found.

Annex V

THE EMEP 50x50 km^2 GRID

According to the definition given in the Protocol on Long-term Financing of the Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe (EMEP): *"The geographical scope of EMEP means the area within which, coordinated by the international centres of EMEP, monitoring is carried out."* This definition has been referred to in all following protocols to the Convention. Since its adoption in 1984, as Parties have ratified or acceded to the EMEP Protocol, the geographical scope of EMEP has broadened.

The present EMEP grid domain is depicted in the figure at 50x50 km^2 resolution. The technical description of the grid can be found below. In addition, the following files with relevant information are available on the EMEP web site: http://www.emep.int/

Trans.f : Fortran code to convert from EMEP grid coordinates to geographical (longitude-latitude) coordinates.

EMEPgrid.data : ASCII file which defines the geographical coordinates and area of each EMEP grid point.

Technical description of the EMEP grid

The EMEP grid system is based on a polar-stereographic projection with real area at latitude 60^o N. The y-axis is oriented parallel to 32^o W defined as a negative longitude if west of Greenwich. The EMEP 50x50 km^2 domain includes 132x111 points (with x varying from 1 to 132 and y varying from 1 to 111).

For the **50x50 km^2 grid**, the latitude, ϕ, and longitude, λ, of any point (x, y) on the grid may be calculated as follows:

$$f = 90 - \frac{360}{p}\arctan\left[\frac{r}{M}\right]$$

$$l = l_0 + \frac{180}{p}\arctan\left[\frac{x - xpol}{ypol - y}\right]$$

in which:	xpol	= 8	(x coordinate of the North Pole)
	ypol	= 110	(y coordinate of the North Pole)
	d	= 50 km	(grid length at 60^o N)
	ϕ_0	= 60^o N = π/3	(defining latitude)
	R	= 6370 km	(radius of earth)

M = R/d[1 + sin (ϕ_0)] = 237.73 (Number of grid distances between the North Pole and the equator)

r = $\sqrt{(x - xpol)^2 + (y - ypol)^2}$

λ_0 = -32 (32 ° W) (rotation angle, i.e. the longitude parallel to the y-axis)

The x and y coordinate in the EMEP grid of any given latitude and longitude can be found from:

$$x = xpol + M \tan\left[\frac{p}{4} - \frac{f}{2}\right]\sin(l - l_0)$$

$$y = ypol - M \tan\left[\frac{p}{4} - \frac{f}{2}\right]\cos(l - l_0)$$

It should be pointed out that x and y coordinates calculated with the equations above coincide with the grid-square centre. Thus, if a grid-square has its centre coordinates (x,y), the coordinates of its lower left and right corners are (x-0.5, y-0.5) and (x+0.5, y-0.5) respectively, and the coordinates (x,y) of its upper left and right corners are (x-0.5, y+0.5) and (x+0.5, y+0.5) respectively.

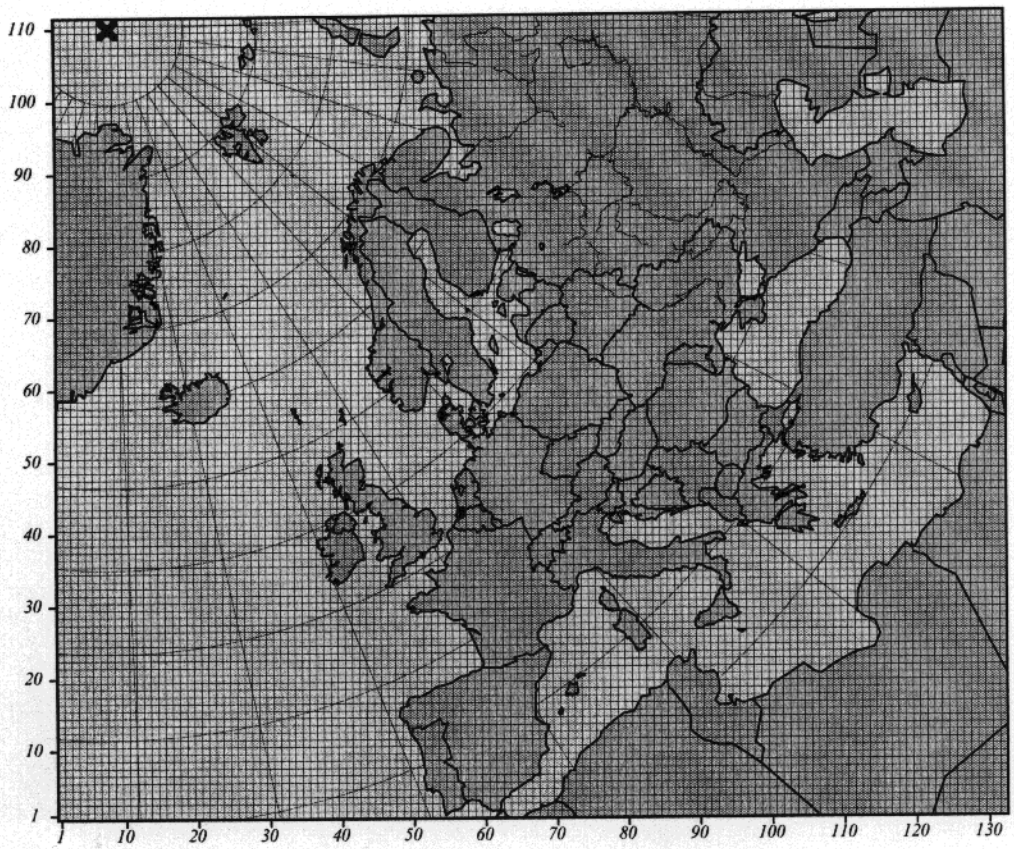

Figure. Present extent of the EMEP 50x50km^{2}grid

The boundaries shown on this map do not imply official endorsement or acceptance by the United Nations.