



ILMATIETEEN LAITOS
METEOROLOGISKA INSTITUTET
FINNISH METEOROLOGICAL INSTITUTE

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Air Quality measurement networks in Finland, data management and reporting

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AQ monitoring networks in Finland



Background AQ monitoring network of FMI

About 22 stations



33 Local or regional networks

About 125 stations
in 54 cities
/municipalities

- gases: SO_2 , NO_x , O_3 , VOC
- particles: PM_{10} , $\text{PM}_{2.5}$, SO_4 , heavy metals
- gases+particles: HNO_3+NO_3 , NH_3+NH_4
- deposition: pH, conductivity, main ions, heavy metals

- SO_2 , NO_x , PM_{10} , $\text{PM}_{2.5}$, TSP, O_3 , CO, TRS, heavy metals, PAH, VOC



International background AQ monitoring programs

- Finnish Meteorological Institute is responsible for the national background air quality monitoring. Most of our measurements are part of the international measurement programmes:
- **GAW** (Global Atmosphere Watch): The world-wide programme of the WMO, Pallas-Sodankylä station.
- **EMEP** Co-operative programme for monitoring and evaluating the long-range transmission of air pollutants in Europe, co-ordinated by the United Nations Economic Commission for Europe (UN/ECE), five stations (Oulanka, Pallas, Virolahti, Ahtäri, Utö).
- **AMAP** Arctic Monitoring and assessment programme, co-ordinated by the Arctic Council (Pallas-Sodankylä).
- **HELCOM** Helsinki Commission co-ordinated by the Baltic Marine Environment Protection Commission
- **Integrated monitoring** (UN/ECE) simultaneous measurements of physical, chemical and biological properties of an ecosystem, Kotinen and Hietajärvi

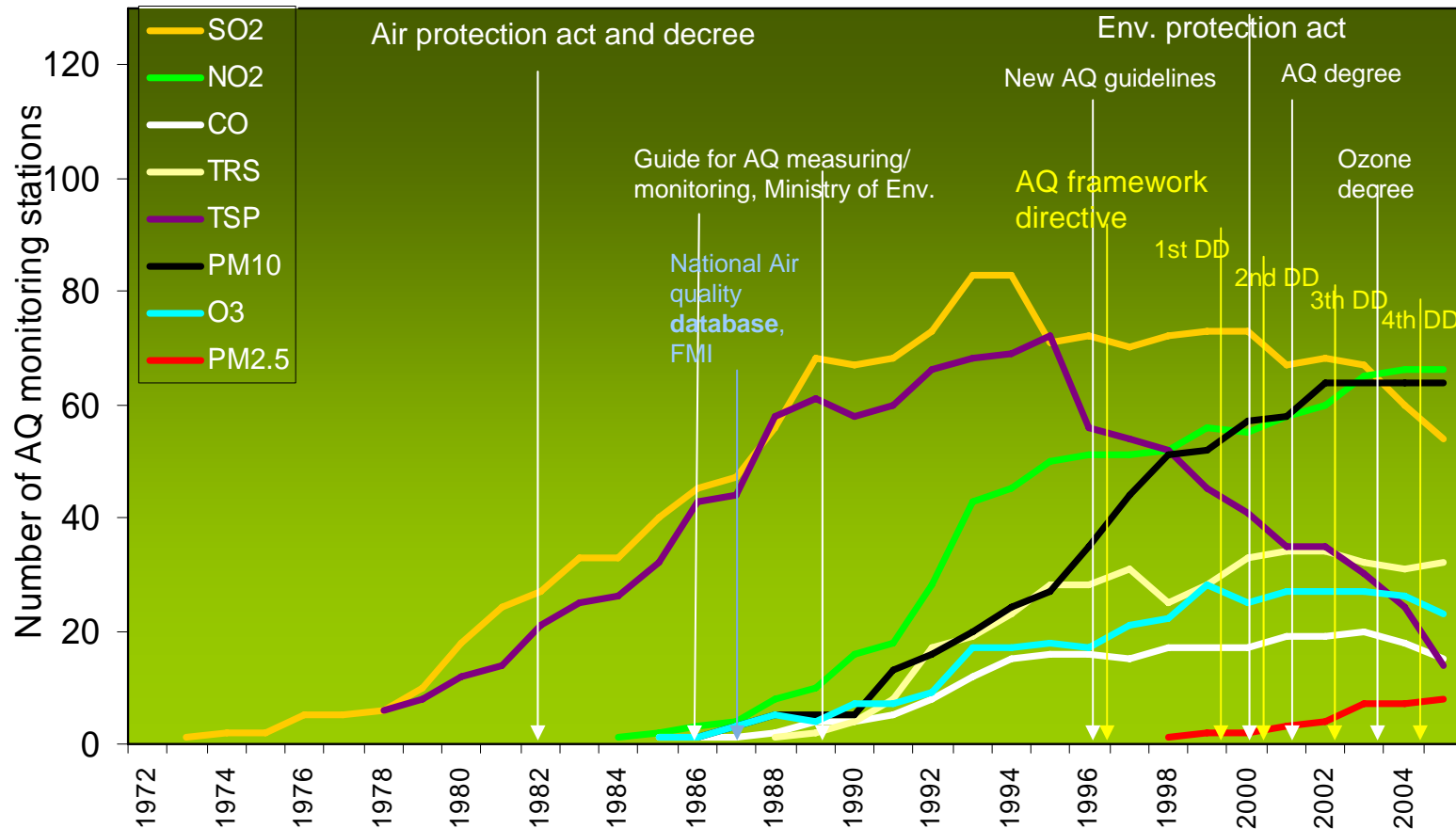


ORGANISATIONS RESPONSIBLE FOR LOCAL/REGIONAL AQ MEASUREMENTS

- Act: The municipalities shall arrange necessary air quality monitoring on their area. Also the industrial plants can be obligated to arrange necessary air quality monitoring or to sponsor the local air quality monitoring.
- Organizations responsible for local measurements are:
 - Environmental offices or centres of municipalities or co-operational organizations of municipalities
 - Environmental protection units of industrial plants
- In many cases external services are used, especially for calibration and maintenance of devices



Development of AQ legislation and number of AQ monitoring stations per pollutant in Finland



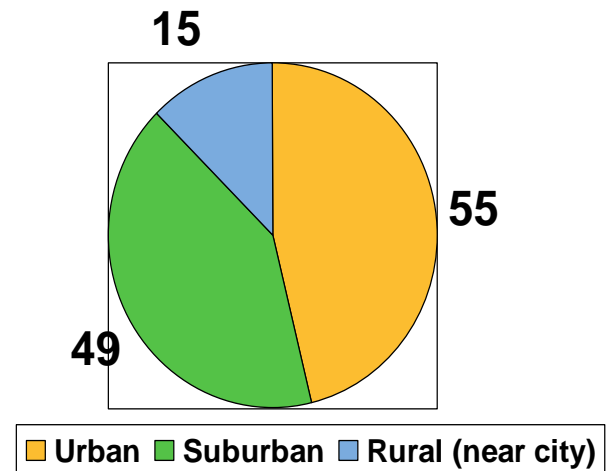
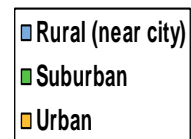
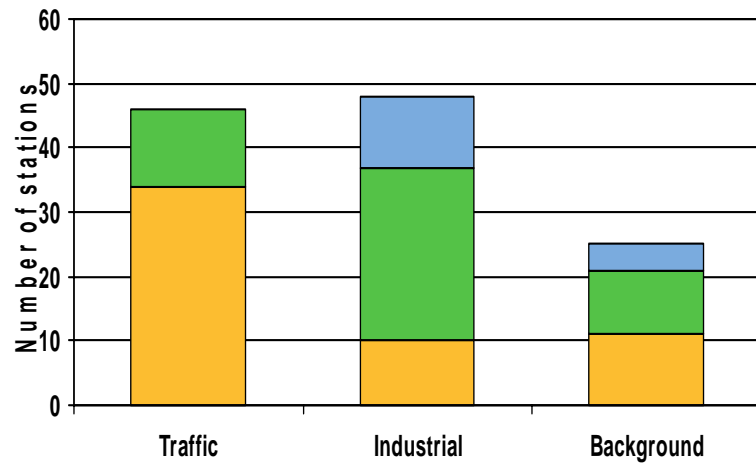


Number of AQ monitoring stations (total and per compound) in 16 major cities

	Number of Inhabitants	City	Number of Stations	NO _x	SO ₂	CO	O ₃	TRS	TSP	PM10	PM2.5
1.	559 330	HELSINKI	6	4	1	2	2		2	5	3
2.	224 231	ESPOO	3	2	1	1	1		1	2	
3.	200 966	TAMPERE	4	3	1	2	1		2	2	
4.	184 039	VANTAA	3	2		1	1		1	2	
5.	175 059	TURKU	5	2	1	2			1	2	
6.	125 928	OULU	4	2	1	1		1		2	1
7.	98 253	LAHTI	6	3		1	1		2	3	
8.	88 250	KUOPIO	5	1		1	1		2	3	1
9.	82 409	JYVÄSKYLÄ	2	2	2	2	1			2	
10.	76 189	PORI	4	2	2	2				1	
11.	58 897	LAPPEENRANTA	6	2	3			3	3	1	
12.	56 953	VAASA	2	1		1	1			1	1
13.	54 618	KOTKA	4	2	2			2	3	2	
14.	52 659	JOENSUU	1	1						1	
15.	46 909	HÄMEENLINNA	1	1		1	1			1	
16.	46 511	MIKKELI	2	1						1	



Station classification of local/regional networks (total 119 stations)





AQ data management on national level

- AQ monitoring networks (33) are responsible for AQ monitoring, data validation and local reporting
- FMI maintains national AQ database (ILPO)
- Networks sends to FMI
 - near real time data hourly (voluntary)
 - validated data and meta information of previous calendar year annually 15th April at the latest (obligatory)
- FMI store all the collected data into the database (ILPO) and publish the data in the AQ portal (www.ilmanlaatu.fi)
 - Web pages for topical AQ data were published in 9th May 2007
 - Web pages for validated data and detailed meta information will be published later 2007/2008
- FMI is responsible for data reporting and delivery for international purposes



Reporting at local and national level

- Local networks publish annual and some also monthly reports on their own data
- The last national AQ summary report is “Pia Anttila, Birgitta Alaviippola and Timo Salmi, 2003. Air quality in Finland – monitoring results in relation to the guideline and limit values and comparison with European concentration levels. Publications on Air Quality No. 33. Finnish Meteorological Institute.” (Report in Finnish, summary also in English).
- Year book on air quality measurements at background stations of FMI was published up to year 2000. Some data after 2000 are available on FMI website and data for 2004-2006 are coming.
- Some AQ data are published annually in the Statistical year book of Finland



Annual reporting for background AQ monitoring programs

- HELCOM data to CCC (Chemical Co-ordinating Centre of EMEP c/o NILU, Norwegian Institute for Air Research) annually 30th June at the latest, Nasa/Ames1001-format
- EMEP, AMAP data to CCC to 1st October, Nasa/Ames1001-format
- GAW data to WDCGG (World Data Centre for Greenhouse Gases c/o Japan Meteorological Agency), Nasa/Ames1001-format
- IM data to Finnish Environment Institute 30th November, IM-format



Reporting to DG ENV (EC) and EEA

ROD- Reporting obligations database (<http://rod.eionet.europa.eu>)

CDR- Central Data Repository (<http://cdr.eionet.europa.eu>)

- Annual report (questionnaire) on air quality assessment and management (2004/461/EC), 1st October, MSExcel
- Eol data on air quality measurement at monitoring stations, 1st October, with DEM module to AIRBASE
- EuroAirnet data (<http://air-climate.eionet.europa.eu/databases/EuroAirnet>), 1st October, with DEM module to AIRBASE
- Monthly ozone exceedances monthly between April-August, MSExcel
- Summer ozone exceedances annually 31th November, MSExcel
- Ozone today website (<http://www.eea.europa.eu/maps/ozone>) hourly, XML, FTP, from AQ portal data system



Number of stations and data per compound in the national database and in reports to DG ENV/EEA (2005 data)

	SO ₂	NO ₂	NO _x	CO	PM ₁₀	PM _{2.5}	Pb	Benzene	O ₃	TSP
NAT. DATABASE	52	64	62	14	61	8	10	5	23	14
For Directives (2004/461/EY)	1	17	9	2	27	6	0	4	15	0
Eol	10	24	24	8	28	6	1	0	15	0
EURO- AIRNET	7	16	16	3	10	4	1	0	13	7
AIRBASE TOTAL	10	28	28	9	32	6	1	0	16	7

SUMMARY: DATA FLOWS OF AIR QUALITY MONITORING IN FINLAND



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