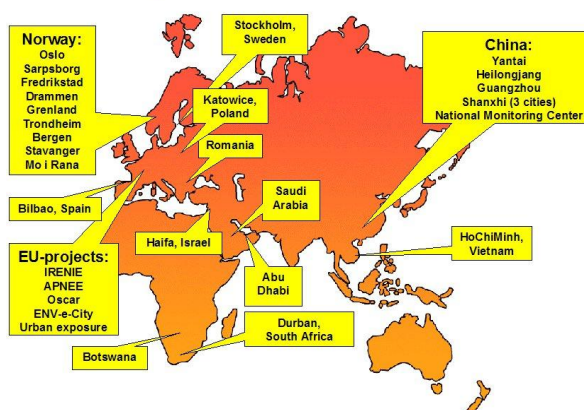


NILU: F 8/2008
REFERENCE: E-106057
DATE: APRIL 2008

NILU international assignments and the AirQUIS system

AirQUIS Installations



Presented at a meeting with Vaisala OY,
Finland Kjeller 9. April 2008

Bjarne Sivertsen

The Air Quality Management System

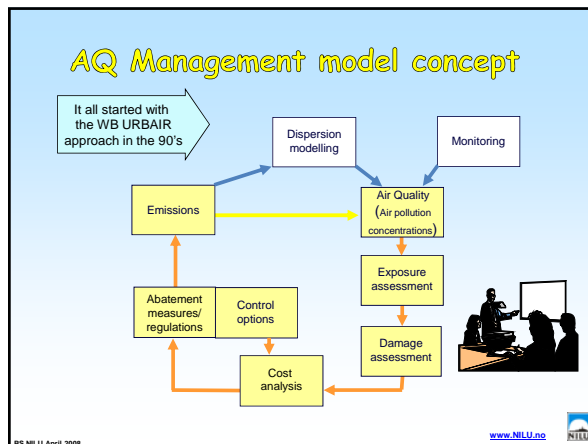
AirQUIS



Developed by the Norwegian Institute for Air Research




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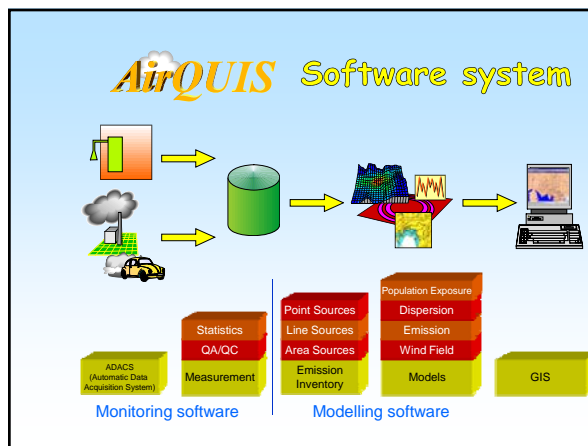
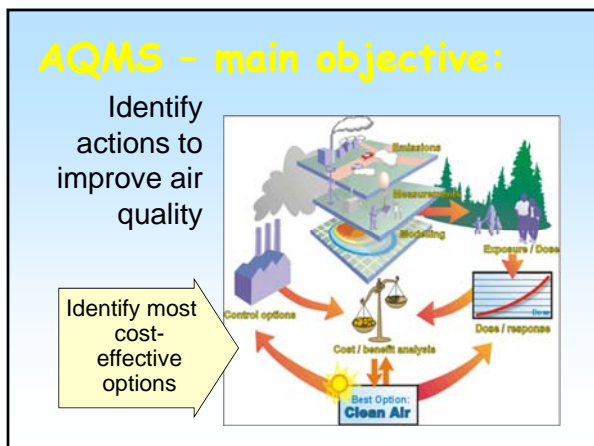
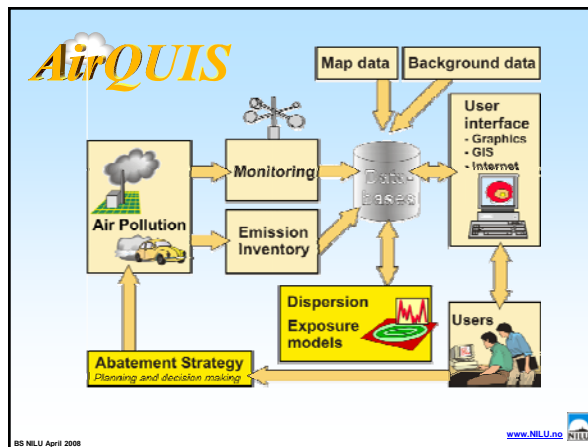


A complete Air Quality Management System

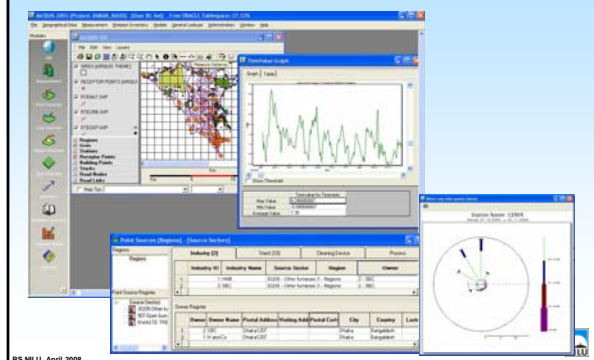
- Monitoring (Air Qual.)
- Meteorological data !
- Data retrieval
- QA/QC
- Databases (GIS based)
- Dispersion Models
- Assessment tools
- Planning tools
- Forecasts (met+AQ)



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AirQUIS application

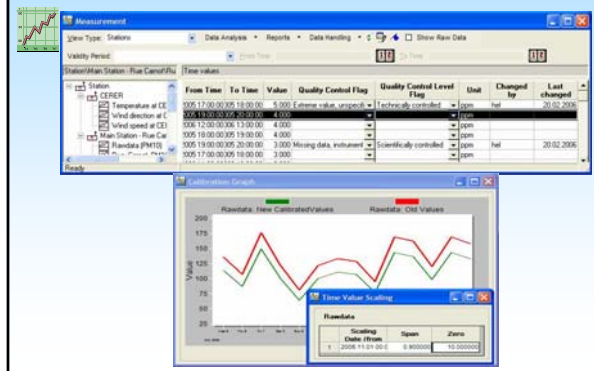


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Measurement database

- Database: Retrieve, organise and store data
- Quality control
- Data presentation
- Graphics and statistics
- Data as input for model calculations

Measurement data - quality control



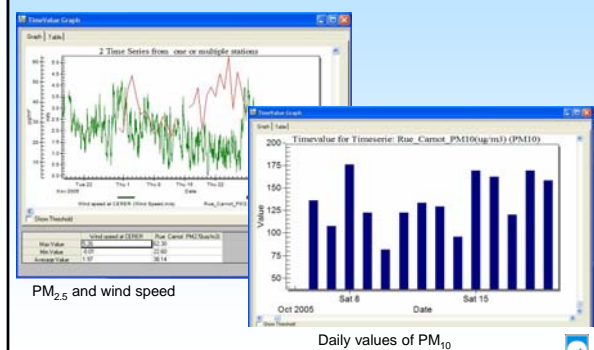
Measurement database

- Stations
- Components
- Time series

The screenshot shows the 'Measurement' window with a table of station data. The table has columns for ID, Code, Name, East Co-ordinate, North Co-ordinate, Altitude, Description, and Station Type.

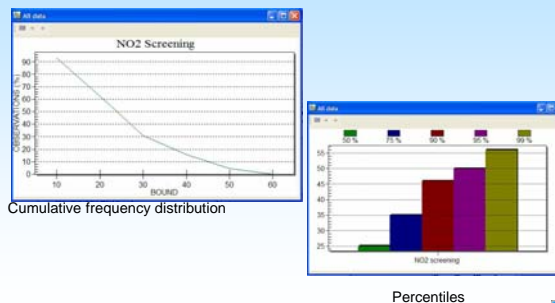
ID	Code	Name	East Co-ordinate	North Co-ordinate	Altitude	Description	Station Type
1		Met. Inland model	250764.7	103729.9	0.0		
2		CEPER	23740.6	142020.0	0.0		
3		Screening_Performance	236722.3	142409.3			
4		Screening_Cafe de Flore	237055.9	142264.5	0.0		
5		Screening_CE TUD	237406.2	1420010.0			
6		Screening_University	234895.8	1429693.7			
7		Screening_Evaluated Cent	237962.9	1426397.7			
8		Met. Station - Rue Canal	227533.9	1422520.0	7.0	Main station in Dallas score	

Measurements - time series



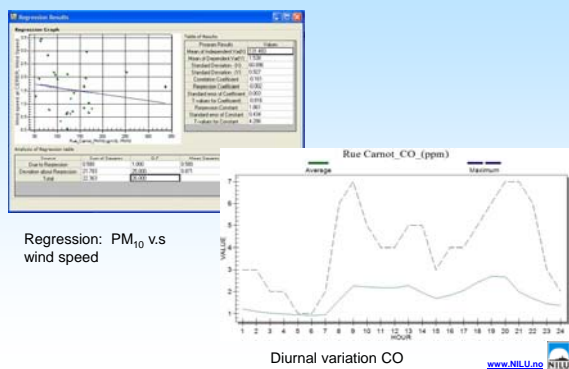
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Measurement - statistics



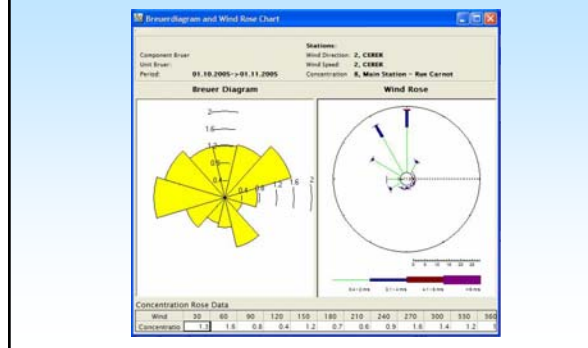
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Measurement - statistics

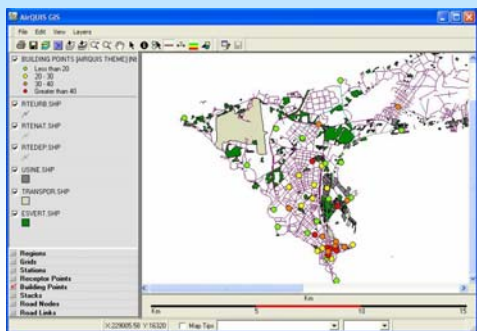


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Measurements - air quality statistics



Measurement data presentations

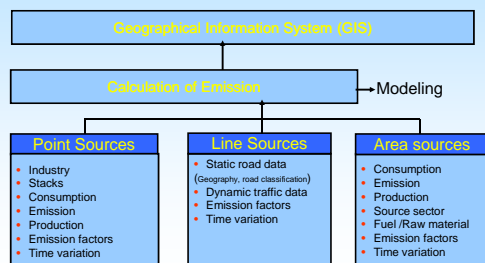


The emission inventory

The atmospheric emissions inventory is a compilation of all sources of air pollution within an area



The emission inventory database



Emission inventory templates

Stack data												
Stack ID	Stack name	X Co-ordinate	Y Co-ordinate	Stack height (m)	Stack Diameter (m)	Gas Temperature (C)	Gas Velocity (m/s)	Gas Flow Rate (m³/s)	Building Height	Building Width	Industrial Plant Name	
30100501	Pipe 301005-1	600669	6645282	10	0.5	130	16.27	3.19	5	10	Industry nr 301005	
30100601	Pipe 301006-1	598856	6646044	20	0.5	178	10	2.00	5	10	Industry nr 301006	
30101201	Pipe 301012-1	604096	6646518	46	0.6	250	20	6.67	18	28	Industry nr 301012	
30101301	Pipe 301013-1	600071	6644366	14	0.4	190	12.61	10.00	6	10	Industry nr 301005	
30101502	Pipe 301015-2	598835	6644487	40	3	225	5	35.34	18	40	Industry nr 301006	
30101901	Pipe 301019-1	604474	6646890	30	0.8	110	20	10.00	12	18	Industry nr 301012	

A number of Excel based templates for collecting of input data

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Traffic data

The screenshot shows a software interface with two main data tables. The top table is titled 'Static Line [187]' and lists road classes with columns for ADT, ADT, Speed (km/h), and Validity Period. The bottom table is titled 'Dynamic Data [451]' and lists road classes with columns for Validity, Registered Vehicles, Percentage (%), and Time Variation.

Static Line	ADT	ADT	Speed (km/h)	Validity Period
1. HANS N. HAUG	8452.00	80.00	80.00	1998
2. HANS N. HAUG	8028.00	80.00	80.00	1998
3. HANS N. HAUG	8452.00	80.00	80.00	1998
4. HANS N. HAUG	8028.00	80.00	80.00	1998
5. HANS N. HAUG	8028.00	80.00	80.00	1998
6. HANS N. HAUG	8028.00	80.00	80.00	1998
7. HANS N. HAUG	8028.00	80.00	80.00	1998
8. HANS N. HAUG	8028.00	80.00	80.00	1998
9. HANS N. HAUG	8028.00	80.00	80.00	1998
10. HANS N. HAUG	8028.00	80.00	80.00	1998
11. HANS N. HAUG	8028.00	80.00	80.00	1998
12. HANS N. HAUG	8028.00	80.00	80.00	1998
13. HANS N. HAUG	8028.00	80.00	80.00	1998
14. HANS N. HAUG	8028.00	80.00	80.00	1998
15. HANS N. HAUG	8028.00	80.00	80.00	1998
16. HANS N. HAUG	8028.00	80.00	80.00	1998
17. HANS N. HAUG	8028.00	80.00	80.00	1998
18. HANS N. HAUG	8028.00	80.00	80.00	1998
19. HANS N. HAUG	8028.00	80.00	80.00	1998
20. HANS N. HAUG	8028.00	80.00	80.00	1998

Industrial data

The screenshot shows a software interface with a table of industrial sources. The table has columns for Stack ID, Stack Name, EW-Co., NS-Co., Height(m), Chem., Gas Temp., and Gas Velocity.

Stack ID	Stack Name	EW-Co.	NS-Co.	Height(m)	Chem.	Gas Temp.	Gas Velocity
1.	2818201 FONG1042	1 open	48928.00	28681.00	20.00	1.20	20.00
2.	2818204 FONG1042	4 open	48928.00	28681.00	12.00	1.40	20.00
3.	2818301 FONG1043	1 open	60482.00	28728.00	20.00	0.40	200.00
4.	2818401 FONG1044	1 open	48724.00	28216.00	18.00	0.30	180.00
5.	2818402 FONG1044	2 open	48724.00	28216.00	18.00	0.30	180.00
6.	2818501 FONG1048	1 open	60008.00	28821.00	12.00	0.48	20.00
7.	2818502 FONG1048	2 open	49998.00	28664.00	12.00	1.80	20.00
8.	2818504 FONG1048	4 open	60772.00	28849.00	13.00	0.83	20.00
9.	2818603 FONG1049	3 open	48948.00	28801.00	12.00	0.40	20.00
10.	2817003 FONG1073	3 open	60008.00	28674.00	12.00	1.86	28.00
11.	2817001 FONG1071	1 open	60048.00	28661.00	12.00	0.30	20.00
12.	2817102 FONG1071	2 open	60048.00	28661.00	12.00	0.40	20.00
13.	2817101 FONG1071	10 open	60048.00	28661.00	40.00	2.00	27.00
14.	2817101 FONG1071	12 open	60048.00	28661.00	40.00	2.00	20.00

Area source data

The screenshot shows a software interface with a table of grid emission sources. The table has columns for Source Sector, Component, Time Variation, and Validity Period.

Source Sector	Component	Time Variation	Validity Period
1. Road Transport	PM10	2. [DPP201-C90-2000]	
2. OTHER MOBILE SOURCES	PM10	2. [DPP201-C90-2000]	
3. WASTE TREATMENT AND TRANSF	PM10	2. [DPP201-C90-2000]	
4. AGRICULTURE	PM10	2. [DPP201-C90-2000]	
5. OTHER SOURCES	PM10	2. [DPP201-C90-2000]	
6. 12. Low municipality sources	PM10	1012. traffic time var.2000	
7. Road Transport	PM2.5	2. [DPP201-C90-2000]	
8. OTHER MOBILE SOURCE	PM2.5	2. [DPP201-C90-2000]	

AirQUIS models

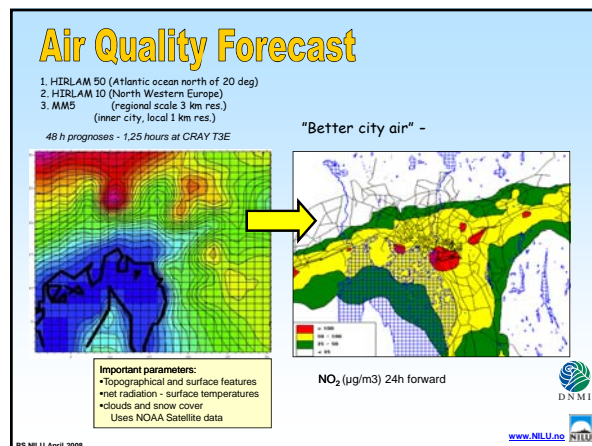
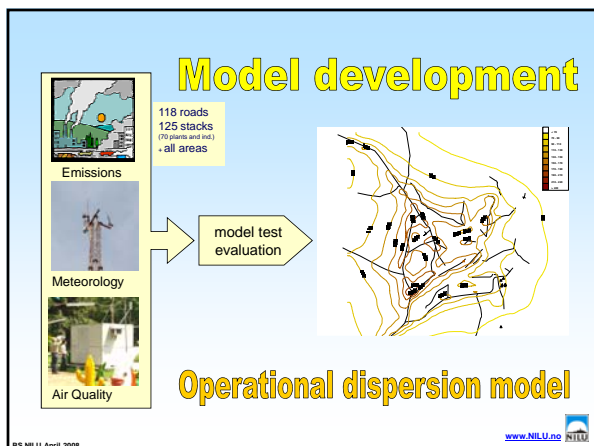
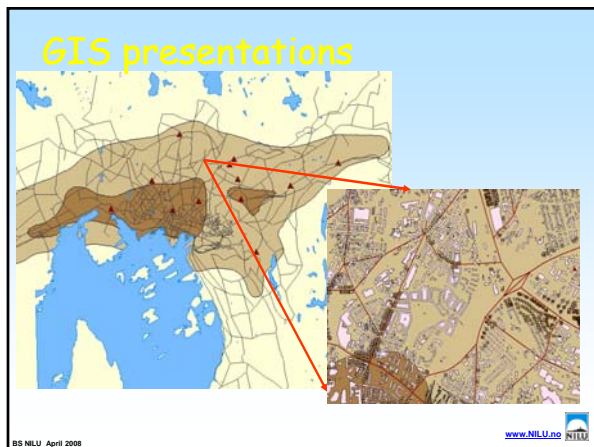
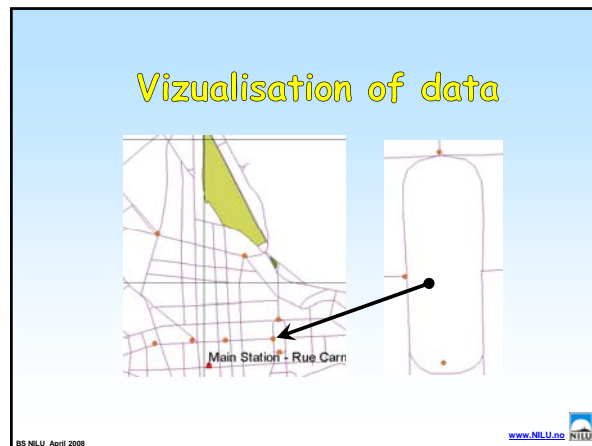
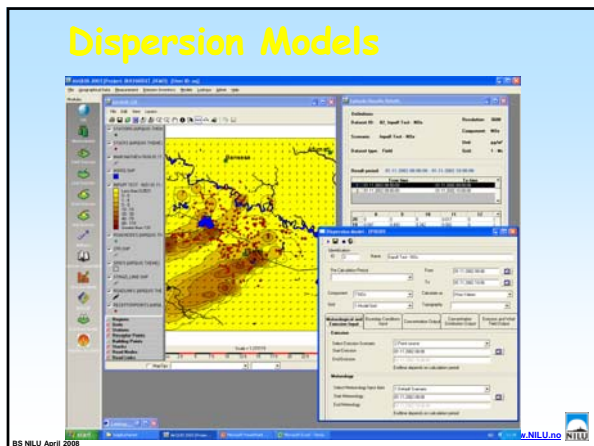
- Emission model
- Wind field model (MATHEW)
- Dispersion model (EPISODE)
- Exposure model

AirQUIS modelling

- Spatial distribution of pollutant concentrations
- Source contribution quantification
- Effects of suggested measures
- Exposure Estimates
- Forecasting

GIS applications

- Visualize information
 - e.g. sources, measurement stations
- Show relationships
 - sources/stations/concentration distribution
- Create and update data
- Present results
 - Reports/internet



Model applications

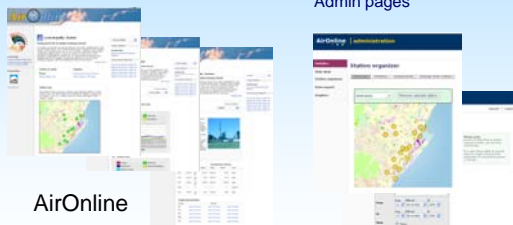
- Environment impact assessment
- Surveillance and management
- A.Q. forecasting and early warning
- Optimal abatement strategies
- A.Q. information systems



Web solutions AQ data information

Public pages

Admin pages



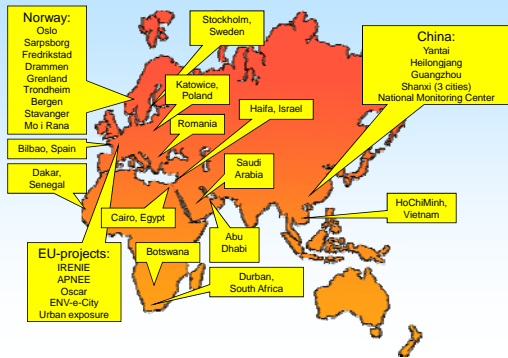
AirOnline

www.luftkvalitet.info

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AirQUIS Installations



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International

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International assignments



Some NILU clients:

- UN ECE, Europe
- European Environmental Agency
- European Commission
- World Bank
- World Meteorological Organisation
- World Health Organization (WHO)
- UNEP
- The European Bank for Reconstruction and Development

Development projects:


- NORAD
- DANIDA
- Guangzhou Science and Technology Commission (China)
- Egypt Environmental Affairs Agency
- ERWDA, Abu Dhabi, UAE
- Department of Mines, Botswana
- DOSTE, HCMC Vietnam
- SEC, Saudi Arabia

Coordination


- EMEP-CCC
- OSPARCOM
- WMO-GAW
- EUROTRAC
- NDSC
- CEC – EEA, DG ENV
- AMAP
- CEC – DG RES
- HELCOM

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NILU as international data centre




- EMEP-database
- OSPARCOM-database
- The World Data Centre for Surface Ozone
- HELCOM database
- European Emission database on POPs
- AMAP-database
- Third European Stratospheric Experiment on Ozone -database

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Local scale :
Air Quality monitoring and EIA

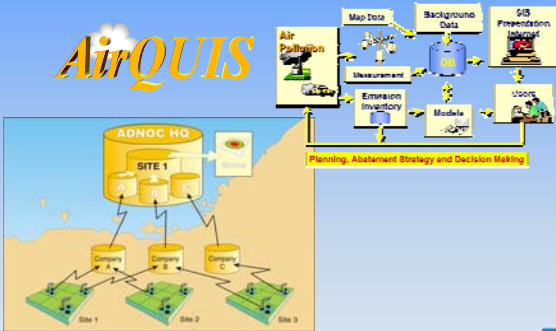



- ✓ Design monitoring programmes
- ✓ Undertake measurements
- ✓ Siting studies
- ✓ Background studies
- ✓ Model estimate consequences
- ✓ Optimise mitigation plans
- ✓ Urban AQ assessments
- ✓ Air Quality forecasts
- ✓ Dissemination of information

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Integrated solution using

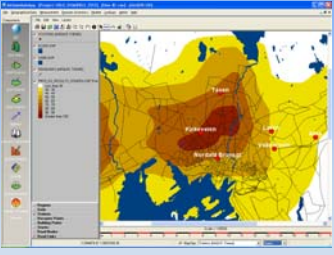
AirQUIS




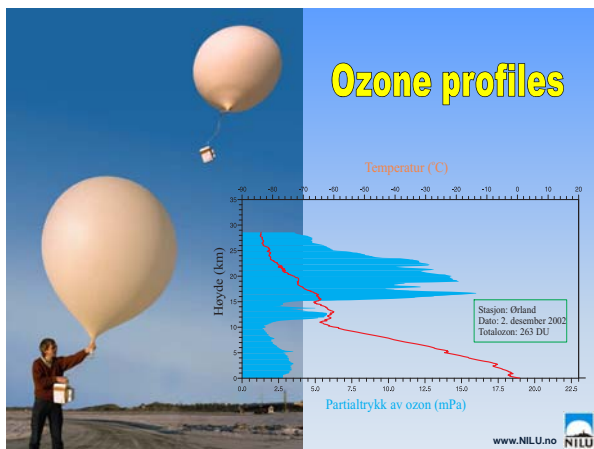
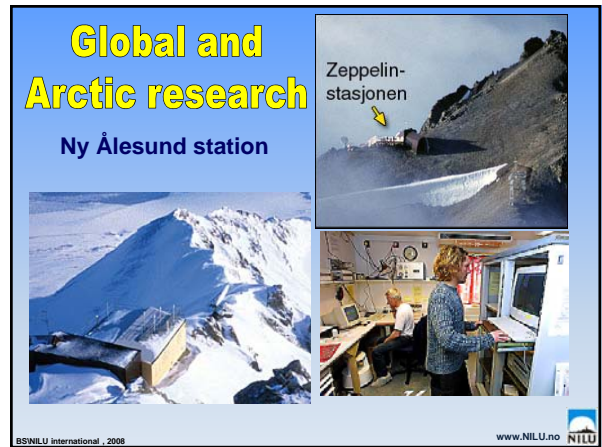
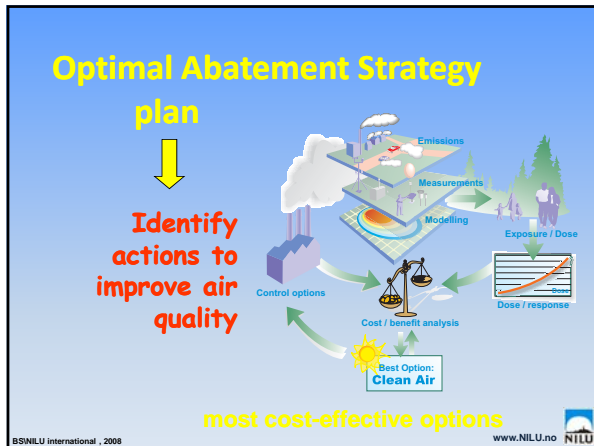
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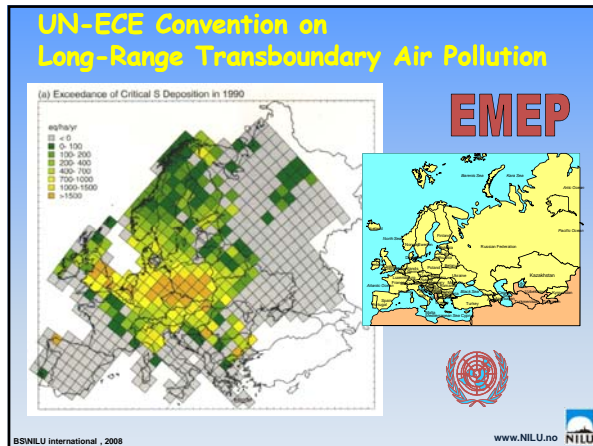
A complete AQMS

- Monitoring
- Data retrieval
- QA/QC
- The GIS database
- Models
- Input data
- EIA
- Forecasts



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Almost 100 EU projects

Last 5 years:
Co-ordinated 20 Database for 42 Presently ~50

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NILU provides Internet solutions

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On-line information for your mobile telephone

With AirQUIS as a GIS-based database on-line data can be accessed directly:

- Grenland (APNEE)
- Cities in Norway
- Industrial impact, Svanvik
- Local communities
- Haifa, Israel
- Romania
- Abu Dhabi
- Durban (RSA)

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