



FAIRMODE plenary, 12th February 2014, Baveno



AQUILA –

Network of Air Quality Reference Laboratories

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Including contributions from the following JRC colleagues: Fritz Lagler, Maurizio Barbieri, Michel Gerboles, Claudio Belis and Pascual Ballesta.

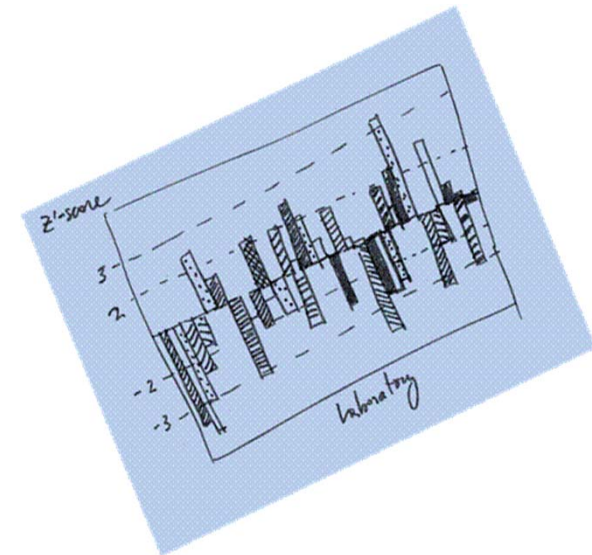
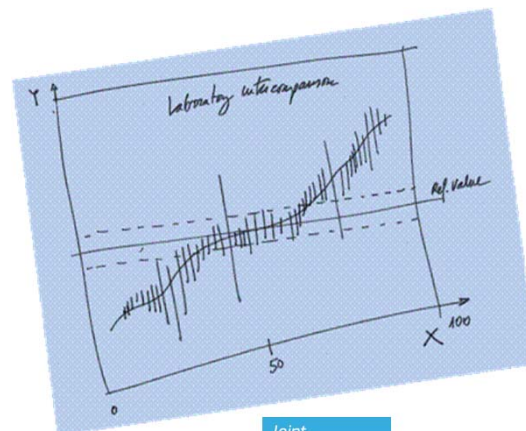
Structure of presentation

Short history

Organisation of AQUILA

Work plan/activities

Potential links with FAIRMODE



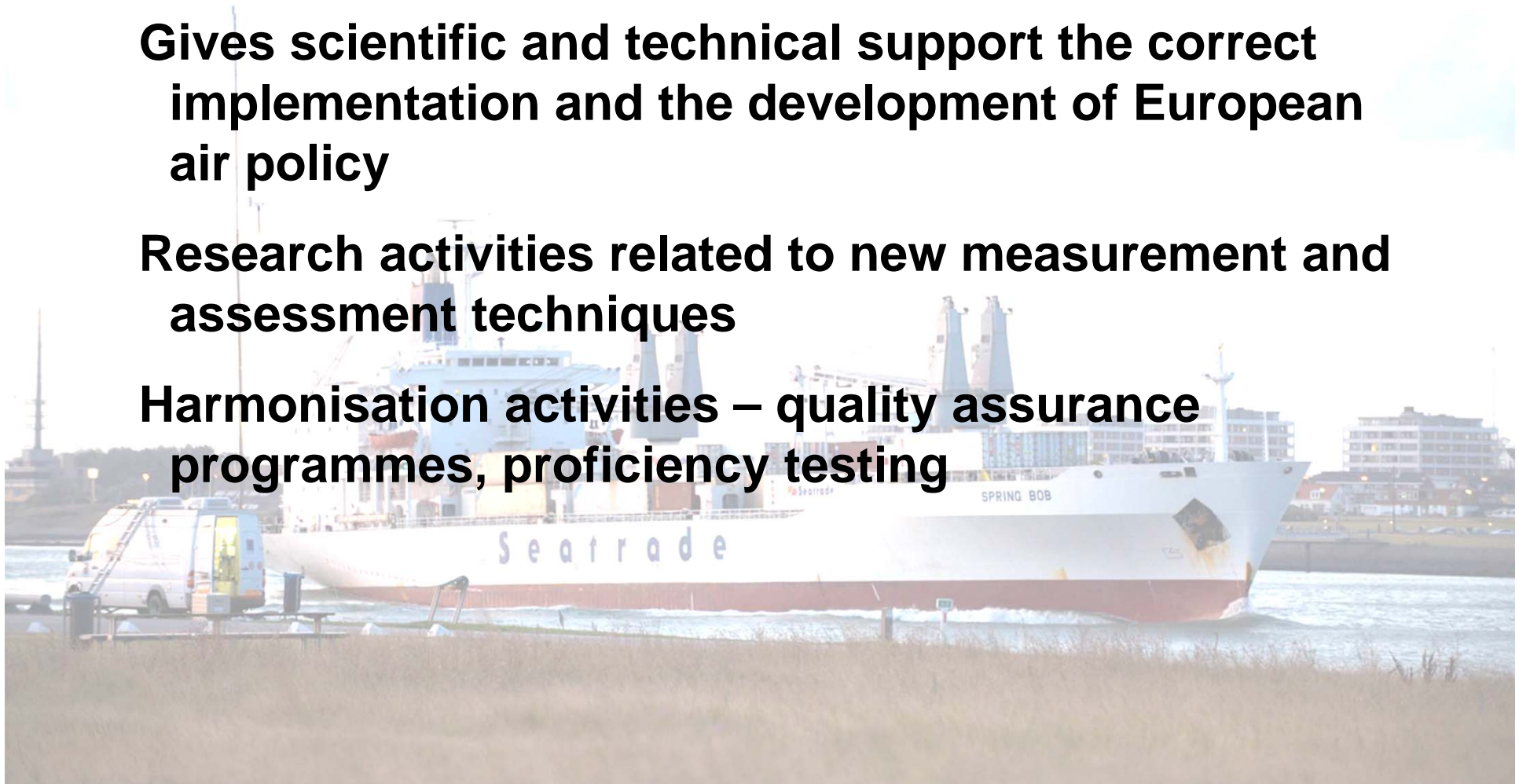


JRC's European Reference Laboratory for Air Pollution

Gives scientific and technical support the correct implementation and the development of European air policy

Research activities related to new measurement and assessment techniques

Harmonisation activities – quality assurance programmes, proficiency testing



AQUILA: background



Article 3 (2008/50/EC): Responsibilities

For the implementation of this Directive, the Member States shall designate at the appropriate levels the competent authorities and bodies responsible for:

- **Assessment of ambient air quality,**
- **Approval of measurement systems (methods, equipment, networks, laboratories),**
- **Ensuring accuracy of measurements,**
- **Analysis of assessment methods,**
- **Coordination on their territory of Community-wide quality assurance programmes organized by the Commission,**
- **Cooperation with other MS and the EC.**

Where relevant competent bodies shall comply with Section C of Annex I: QA/QC at national and EU level, traceability, accreditation according to EN/ ISO 17025



Network creation in 2001



Network Members: 37 National Reference Laboratories from the 28 Member States & EFTA

Observers: Turkey, Former Yugoslav Republic of Macedonia, Serbia

<http://ies.jrc.ec.europa.eu/aquila-homepage.html>

Secretariat: annette.borowiak@jrc.ec.europa.eu

AQUILA: Members



<http://ies.jrc.ec.europa.eu/aquila-project/members.html>

AQUILA Members - EU-27 & EFTA

Country	Institute	Contact	Website	Country	Institute	Contact	Website
Austria	Umweltbundesamt	Marina Froehlich	http://www.umweltbundesamt.at	Luxembourg	Adm. de l'Environnement	Serge Solagna	http://www.amenveloppementpublic.lu/
	Obsteternische Landesregierung	Marko Gabrysh	http://www.lands-obsteternische.gabrysh.at/	Malta	Malta Environment & Planning Authority	Michael Nolle	http://www.meps.org.mt/
Belgium	IRCEUCELNE	Philippe Maetz	http://www.ircelne.be	Poland	Chief Inspectorate for Environmental Protection		http://www.oiop.gov.pl/
Bulgaria	Executive Environmental Agency	Milena Panayova	http://inf-bjg.wonk.eu/inf/index.asp?index.html	Portugal	Instituto do Ambiente	Joao Matos	http://www.ambiente.pt/
Czech Republic	Czech Hydrometeorological Institute	Jiri Novak	http://www.chmi.cz	Romania	National R & D Institute for Environmental Protection		http://www.iirn.ro
Cyprus	Ministry of Labour and Social Insurance	Sawas Kleantous	http://www.airquality.cil.mil.gov.cy/	Slovakia	Slovak Hydrometeorological Institute	Ladislav Ronchelli	http://www.shmi.sk/
Denmark	NERI	Claus Nordstrom	http://www.dnu.dk/fordele_en.asp	Slovenia	Environmental Agency of the Republic of Slovenia	Tanja Botic	http://www.azpa.gov.si/
Estonia	Estonian Environmental Research Centre	Toivo Trautis	http://www.kit.ee	Spain	ISCIII	Saul Garcia Dos Santos	http://www.isciii.es/isciii/en/
Finland	FMI	Jari Walden	http://www.fmi.fi	Sweden	MIL	Eva Bronstrom-Lunden	http://www.mil.se/
France	LCSQA-EMD	Francois Mathe	http://www.airparif.org/fr/		ITM	Hans Aneklaug	http://www.itm.se/inf/infindex.html
	LCSQA-LNE	Tatjana Macek	http://www.lne.fr/	The Netherlands	RIVM	Theo Hafrenscheld	http://www.rivm.nl/
Germany	LARUV NRW	Ulrich Pfeiffer	http://www.laruv.nrw.de/	United Kingdom	AEAT	Brian Stacey	http://www.aeat.co.uk/
	Umweltbundesamt	Klaus Wirtz	http://www.umweltbundesamt.de/		NPL	Paul Guiney	http://www.npl.co.uk/environment
Greece	Ministry of Environment		http://www.mh.gov.gr/	Norway	NEU	Kjenti Karlsen Tomteleit	http://www.neu.no/
Hungary	Hungarian Meteorological Service	Viktor Danyi	http://www.kvvm.hu/kvvm	Switzerland	EMPA	Robert Gehrig	http://www.empa.ch
Ireland	EPA	Barbara O'Leary	http://www.epa.ie		BAFU		http://www.umwelt-schweiz.ch
Italy	CNR	Rosanna Mabilia	http://www.iaa.cnr.it	European Commission	CG Joint Research Centre	Annette Soroclek	http://ies.jrc.ec.europa.eu/
	ISPRA	Marta Belli	http://www.isprambiente.it		CG Environment	Andrej Kobe	http://ec.europa.eu/environment/air
Latvia	Latvian Hydrometeorological Agency		http://www.mata.gov.lv				
Lithuania	Environment Protection Agency	Jouzas Moles	http://www.epa.lt/				

further: associated members & observers

AQUILA: role of NRL's



Role and tasks of National Reference Laboratories

Verifying and supporting the correct implementation of AQDs, by:

- Implementing a quality system in the laboratory
- Approving measurement systems (instruments, laboratories, networks)
- Ensuring the traceability of the measurements at national level, by providing/certifying reference materials to networks
- Organizing intercomparisons/round robin tests at national level
- Participating in EC QA/QC programmes
- Exchanging information through the organisation of training sessions, workshops, conferences and guidance documents

“AQUILA's role and the tasks of a NRL” has been approved by DG ENV's "Air Quality Committee" in 2009 (download of document '*roles & requirements*' from ENV or AQUILA website).

“AQUILA Roles & Tasks”: Role and responsibilities of National Reference Laboratories (NRLs) with relevance to scientific and technical issues on the development and implementation of AQ Legislation

Chapter 1: AQUILA and NRLs: Intro, objectives, responsibilities

Chapter 2: Measurement traceability, calibration standards and CRMs

Chapter 3: Design and implementation of quality systems (accreditation of NRLs)

Chapter 4: Type approval

Chapter 5: QA/QC at national level (dissemination of QA/QC among networks)

Chapter 6: EC inter-comparisons

Chapter 7: Exchange of technical and scientific information

(77 pages)

AQUILA: structure



Steering committee: chair, vice-chair and co-chairs

Election of chair and vice-chair (4 years)

Co-chair: DG ENV, JRC-IES (4 years)

Secretariat: JRC-IES

Chair

**F. Mathe
EMD, FR**

Vice - chair

**J. Walden
FMI, FI**

Senior advisor

**P. Woods,
NPL, UK**

Co - chair

**D. Buzica
DG ENV**

Co - chair

**A. Borowiak
JRC**

AQUILA: meetings



1st meeting: December 2001



22nd meeting: June 2014



focussing on, e.g.:

- Accreditation of NRL's
- Common PM equivalence tests
- Development of CRM (DD4)
- Training on measurement uncertainty
- PM_{2.5} measurement uncertainties
- Review of EU policy



Contribution to review of TSAP: “17 AQUILA items for the review”

- **Roles and responsibilities of NRLs**
- **Intercomparison exercises**
- **Type approval of instruments**
- **Terms and definitions**
- **EC/OC, Ions & EMEP**
- **Ozone precursors**
- **Mercury and other metals**
- **Average Exposure Indicator**
- **Deposition**
- **EN standards**
- **PAHs**



Typical agenda:

DRAFT AGENDA (version 25.10.2013)
21st Meeting of National Air Quality Reference Laboratories
AQUILA
20th November 2013 @ JRC Ispra

Item	Topic	Who?	Time (min)
	Welcome & approval of agenda	Mathe, Borowiak	
	Adoption of minutes of the 20 th meeting	Mathe	
	Update on Review of Air Policy: the “air quality package”	Buzica	
	Possible modifications of AQD: AQUILA recommendations & first feedback from AAQEG	Buzica/Borowiak/Ross-Jones	
	Application of more recent EN standards for monitoring AQD – how to handle?	Pfeffer/Buzica/all (NRLs are asked to provide their position)	
	Uncertainty of measurements: hourly, daily, yearly?	Mathe/Hafkenscheid/Woods/Buzica/all	
	Equivalence Claims: information sheet/check list	Woods/Borowiak	
	PM10 equivalence tests in Sweden	Ross-Jones	
	AQUILA “Rules of Procedure”, MoU	Borowiak/Woods	
	JRC-WHO-AQUILA intercomparison exercises: organic/inorganic	Ballesta/Lagler	
	Conversion ppb-nmol/mol	Lagler/Hafkenscheid	
	Future Workshops/ Conferences- Woodburning workshop: Ghent- Closure of the “year of air” Strassbourg	Borowiak/all	
	Update CEN TC 264	Hafkenscheid	
	Date of next meeting/AOB	all	



Examples of AQUILA success stories:

- **PM QA/QC campaign (2006 - 2009)**
- **VOC round robin test (2009)**
- **Co-organisation of conferences and workshops (measurement uncertainty, equivalence, ...)**
- **JRC Intercomparison exercises in collaboration with WHO and AQUILA**
- **Production of documents/papers to topics of interest (guidance on equivalence, uncertainty AEI)**
- **AQUILA items for the review of TSAP (2011-2013)**



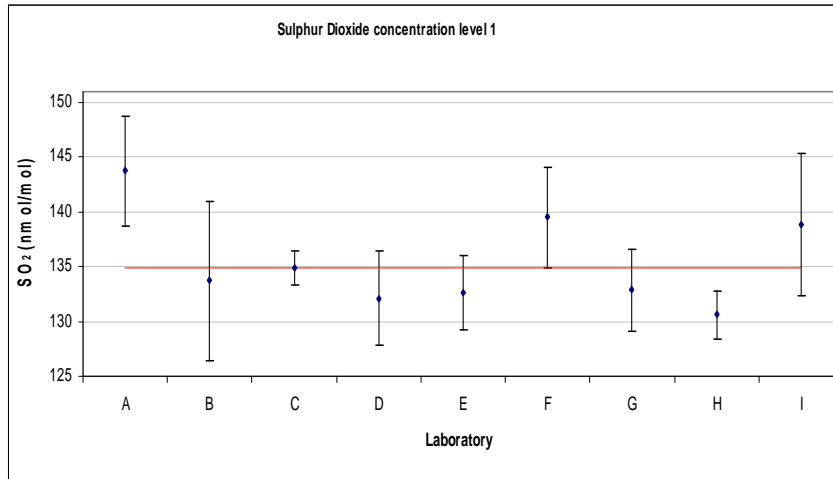
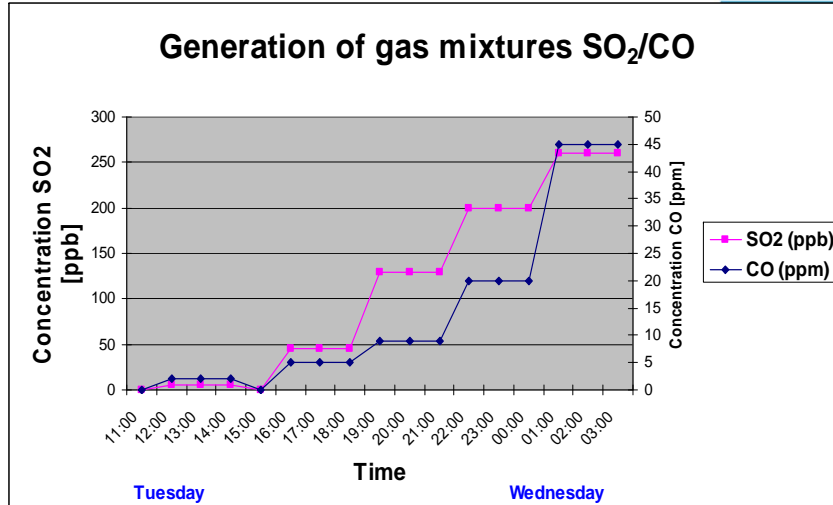
JRC - AQUILA harmonisation activities

- Intercomparison exercises for NO₂ since early 90s
- Regular intercomparison exercises for NO_x, O₃, SO₂, CO
- VOC round robin tests (gas cylinder)
- BTX intercomparisons
- AQUILA EC/OC intercomparison
- 1st metal intercomparison
- 1st PAH intercomparison
- Unique PM₁₀ & PM_{2.5} QA/QC programme

Intercomparison inorganic gaseous compounds



E.g. SO₂

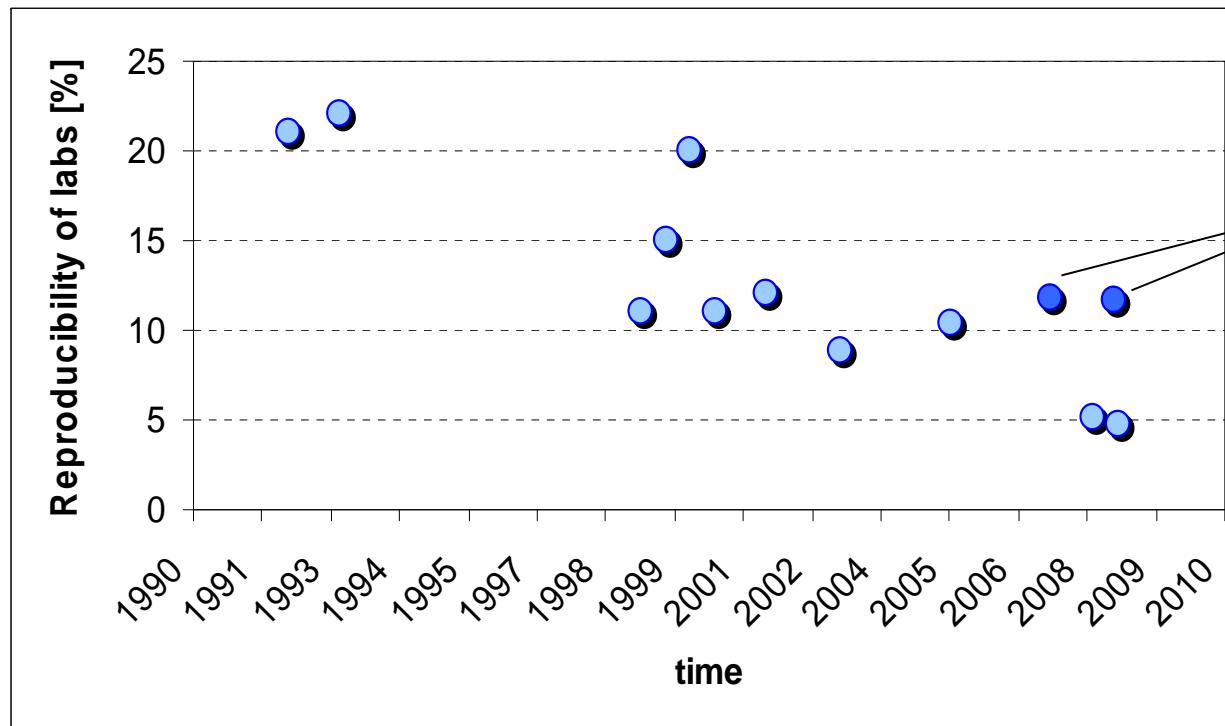


In collaboration with WHO CC at UBA (D)

Joint
Research
Centre



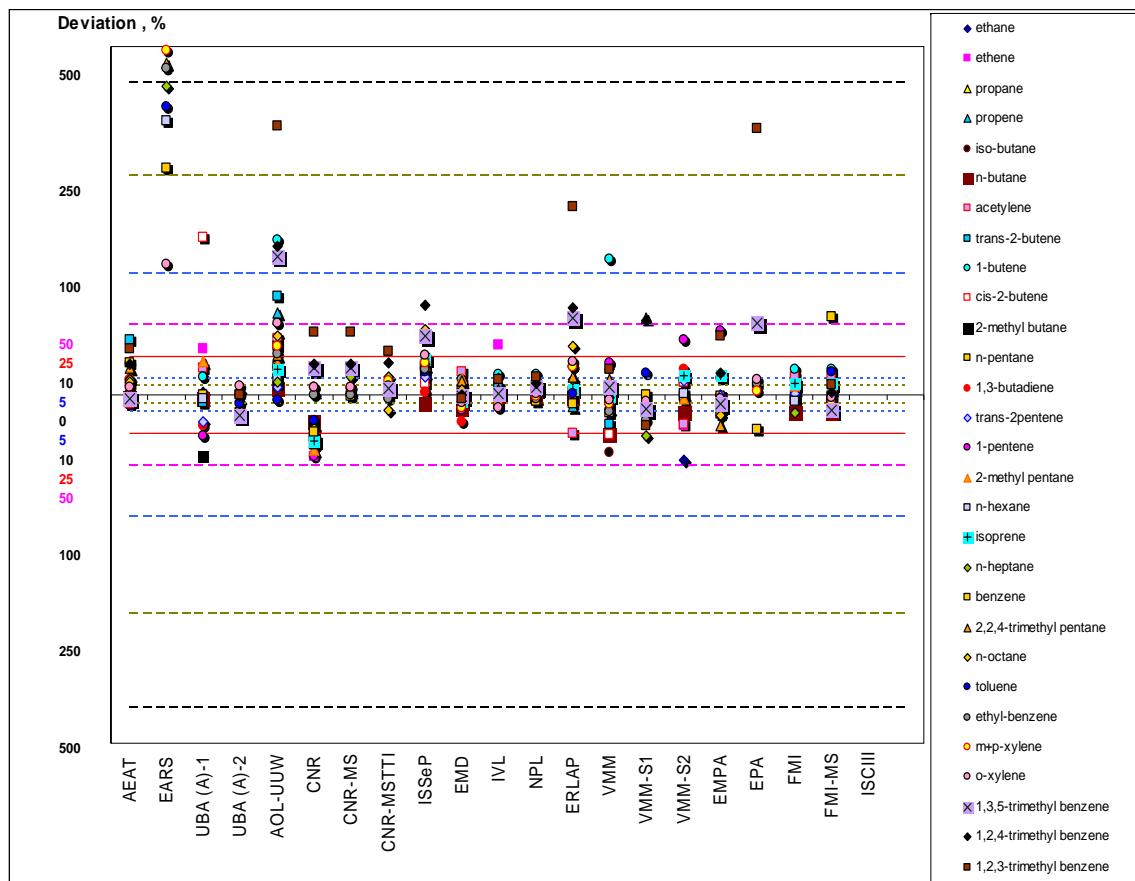
Example NO₂



High proportion of
New Members and
Accession Countries

Average reproducibility of participating national reference laboratories for NO₂ measurements

Intercomparison organic gaseous compounds



Example VOC round robin test – circulating gas cylinders

Metals intercomparison: Cd, As, Ni, Pb



S4/S5/S6 PM10 filters

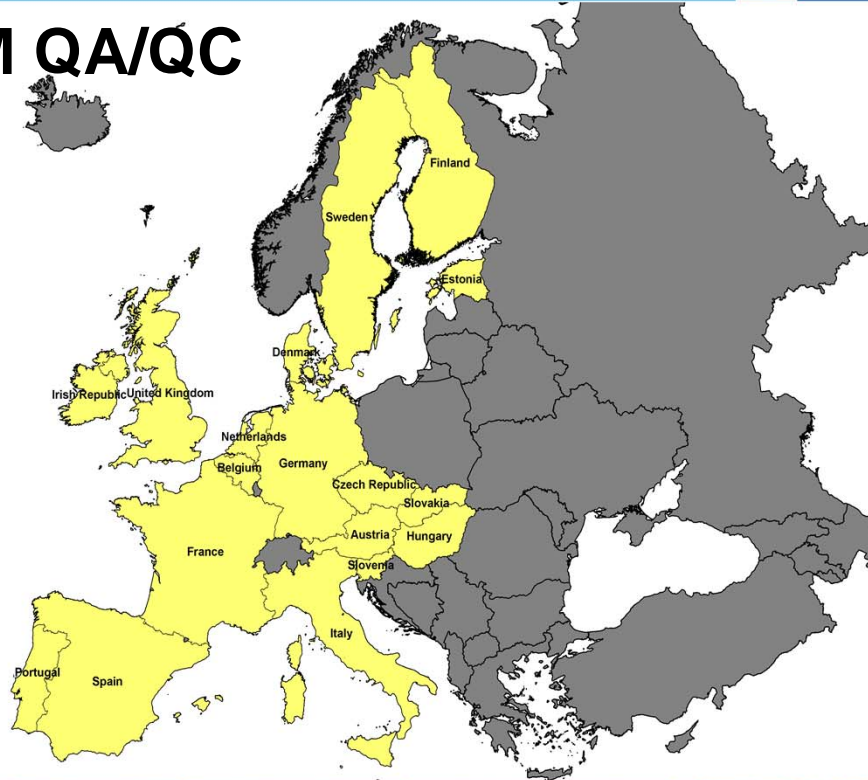
Metals intercomparison

Repeatability, Reproducibility for S_5

	All results		Outliers discarded	
	r	R	r	R
As	31%	183%	19%	46%
Cd	15%	181%	9%	54%
Ni	66%	620%	7%	68%
Pb	7%	98%	6%	41%



PM QA/QC



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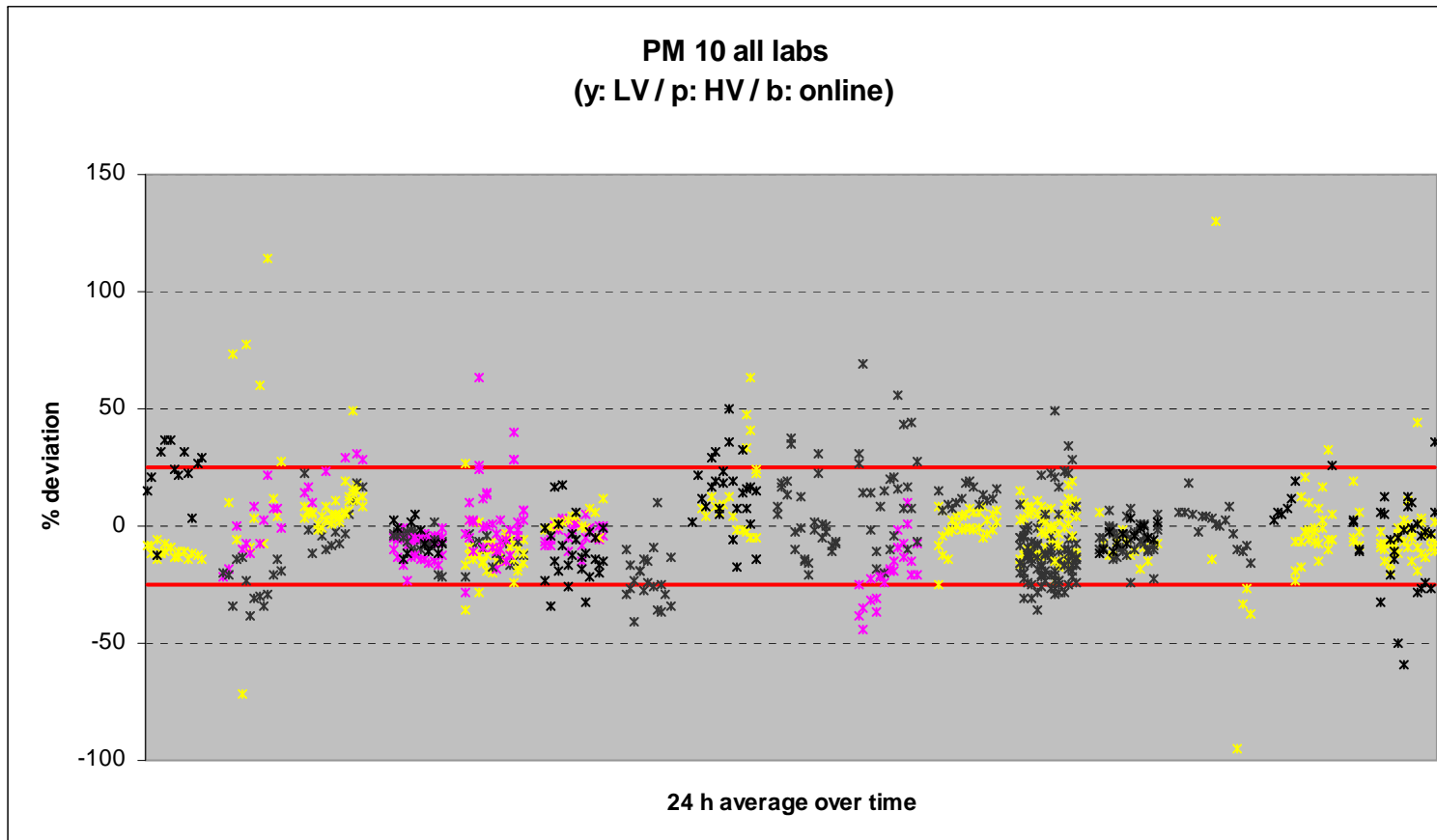
2006 – 2009: JRC mobile PM laboratory equipped with EN reference instrumentation carried out 17 parallel measurement campaigns



PM QA/QC



- Provide information on comparability of PM measurements (MS, reference, equivalent)
- Check performance of NRL & routine monitoring network
- Implementation and validity of correction factors
- Performance low vol, high vol, automatic instruments, info filter material and filter blanks, ...



Future work items:

-Collect ideas during each meeting-

- **Woodburning**
- **Type approval of instruments**
- **Equivalence demonstration**
- **Mutual recognition**
- **Update AIRMONTECH database on AQ monitoring**
- **Investigate/collaborate into future of monitoring**
- **H2020/EURAMET/...**
- **Prepare for 2018 air policy review**



AQUILA web – information platforms

<http://ies.jrc.ec.europa.eu/aquila-homepage.html>

contains members, contacts, minutes, recommendations, position paper on inter-comparisons

<ftp://s-jrciprvm-ftp-ext.jrc.it/ERLAPDownload.htm>

contains EUR report evaluations of inter-comparison exercises (metals, BTEX, VOC, SO₂, NO_x, O₃, CO) and scientific publications on development and validation of measurement techniques

http://circa.europa.eu/Public/irc/jrc/jrc_aquila/home

Member's display place with all AQUILA related information



Potential links with FAIRMODE

- Comparing model results with monitoring results: which stations?
- “SCREAM” siting/classification/representativeness of monitoring stations
- Which monitoring data input is needed by modeling?
- Set up collaborative projects? (eg vertical dimension)
- DQO/MQO – Quality Objectives
- CEN standardisation: from “new work item” to EN standards

Thank you!