

The European Commission's
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Joint Research Centre

Introduction & Scope of the Intercomparison Exercise

Spatial Representativeness of Air Quality Monitoring Stations

Oliver Kracht

FAIRMODE Technical Meeting, 19/21 June 2017, Athens (GR)



Wednesday 21/06 (afternoon)

Spatial Representativeness I		Guidance		Guidelines / CEN		
14:00-16:00	14:00 - 14:15: Introduction & Scope of the inter-comparison exercise (IE).	O. Kracht	The importance of evaluation of local traffic emission factors	M. Guevara	Progress of the CEN WG 44 activity	C. Belis
	14:15 - 14:30: Status of the IE	O. Kracht	Evaluation of the quality of wood-burning emissions in Norwegian cities	L. Tarrason	Use of local scale models for source apportionment	t.b.c.
	14:30 - 15:00: Team - Presentation 1	INERIS	Spatiotemporal distribution of biogenic emissions over Greece - A GIS approach	Dimitropoulou	Progress of the Guidelines	M. Mircea, G. Pirovano
	15:00 - 15:30: Team - Presentation 2	CIEMAT	On the road to improve the emission inventory over Portugal	J Ferreira or A. Monteiro	Numerical simulations and Ozone source apportionment over Attica during an episode with CAMx.	V. Asimakopoulos, K.-M. Fameli
	15:30 - 16:00: Team - Presentation 3	VITO	Recommendation for QA/QC work	All	Upcoming events and training	C. Belis
	<i>all Team-Presentations are 30 minutes: 15 min + 5 min obligatory slides + 10 min discussion</i>					
	Conclusions, way forward and closing of the meeting					
17:00-18:00	Spatial Representativeness II					
	17:00 - 17:15: Team- Present. 4 (summary on behalf of RIVM)	O. Kracht				
	17:15 - 17:30: Short Summary	O. Kracht				
	17:30 - 18:00: Discussion	All				

Thursday 22/06 (Morning)

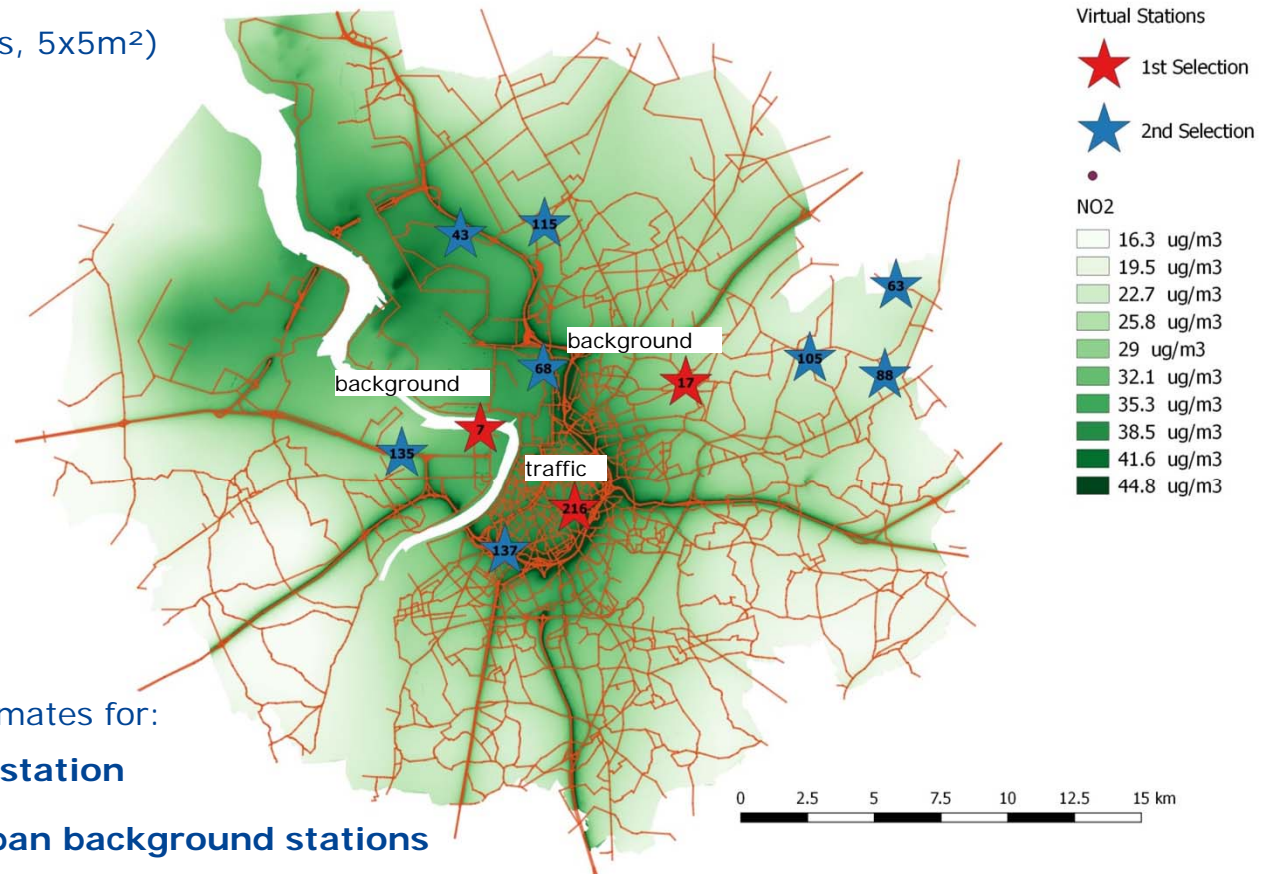
Spatial Representativeness III: Workshop		
09:00-10:45	09:00 - 09:05: Welcome & Introduction	O. Kracht
	09:05 - 09:10: Tour de table	All
	09:10 - 09:25: Introduction on modelling for the underlying dataset (+ time for Questions & Discussion)	S. Janssen
	09:25 - 09:35: Summary on "practical lessons" learned from the IE	O. Kracht
	09: 35- 10:05: Team- Presentation 5	ENEA
	10:05- 10:35: Team- Presentation 6	SLB
	10:35- 10:45: optional, if required: short summary of Team-Presentations 1-4 (for those who did not attend the first day)	O. Kracht + Teams 1-4
	<i>all Team-Presentations are 30 minutes: 15 min + 5 min obligatory slides + 10 min discussion</i>	
10:45-11:00	Coffee break	
11:00-12:30	11:00 - 11:30: Team- Presentation 7	EPAIE
	11:30 - 12:00: Team- Presentation 8	ISSEP & AWAC
	12:00 - 12:30: Presentation for opening the afternoon discussion: "Spatial Representativeness & Harmonization – Do we need a paradigm shift?" (including summary and conclusions from the IE)	O. Kracht

Thursday 22/06 (Afternoon)

Spatial Representativeness IV: Workshop		
13:30- 15:15	13:30 - 14:00: Team- Presentation 9	FEA-AT
	14:00- 14:30: Team- Presentation 10	VMM
	14:30- 15:00: Team- Presentation 11	FI
	15:00 - 15:15: Short Summary by OK & "to do List" for the IE report	O. Kracht
	<i>all Team-Presentations are 30 minutes: 15 min + 5 min obligatory slides + 10 min discussion</i>	
15:15- 15:30	Coffee break	
15:30- 17:00	15:30 - 17:00: Table Ronde & Discussion: - Spatial Representativeness & Harmonization - Are our methods fit for purpose? - Options for future work.	All

Intercomparison Exercise of Spatial Representativeness Methods

- Performed by 11 different groups, but on the same shared dataset (prepared by VITO).
- Existing stations for PM₁₀ (n=15), NO₂ (n=18) and O₃ (n=3)
- Dataset based on outputs from the **RIO-IFDM-OSPM model chain** for the region of **Antwerp** (year 2012).
- Virtual stations (n=341) from hourly model data
- Gridded model data (annual means, 5x5m²)
- Emissions
- Population density
- Building heights
- CORINE land cover



- **Spatial representativeness** estimates for:
 - PM₁₀ and NO₂ at one traffic station
 - PM₁₀, NO₂ and O₃ at two urban background stations
 - 8 additional stations (optional task)
 - classification(optional task)

Scope of the Intercomparison Exercise of Spatial Representativeness Methods

Contributed results received from:

- CIEMAT (ES)
- ENEA (IT)
- EPA (IE)
- Finnish Consortium (FMI / HSY / Kuopio / Turku)
- INERIS (FR)
- ISSeP & AwAC (Belgium)
- RIVM (NL)
- SLB (SE)
- UBA (AT)
- VITO (BE)
- VMM (BE)



Individual Presentations and Obligatory Slides



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Intercomparison Exercise of Spatial
Representativeness Methods

Scope, objectives and typical use of the selected spatial representativeness (SR) method

- 1) What is the **scope** and the detailed **objectives** of your SR method used in the exercise?
- 2) In which **context** do you typically use this method?
- 3) Are there **other SR methods** that you would typically use in your work on SR assessments?
- 4) How does the use of your method(s) relate to local / regional / national / EU-wide **regulatory and /or legal obligations**?



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Intercomparison Exercise of Spatial
Representativeness Methods

Maturity and fitness to purpose of the SR method used in the exercise

- 1) How many **years of experience** do you have with the specific SR method used in the exercise?
- 2) How many **years of experience** do you have with evaluating SR in general (including experience with other methods)?
- 3) How would you rate the **maturity of the SR method** you have used in the exercise?
(This may reach from "rather experimental" to "well established" – please also comment on the fitness to purpose of you method.)
- 4) Is it possible to **apply your method by other institutes** using the tools you have developed?
(e.g.: Are your tools available to others? Is there a copyright concern? What is the level of difficulty and necessary skills for their implementation?)



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Intercomparison Exercise of Spatial
Representativeness Methods

Similarity criteria & definition of Spatial Representativeness (1)

- 1) Please summarize the underlying **definition of SR** you have used in the exercise.
- 2) Please summarize the underlying **similarity criteria & threshold parameters** you have used.
- 3) Are there **other SR definitions** and / or **similarity criteria** you would typically use in your work on SR?

Individual Presentations and Obligatory Slides



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Intercomparison Exercise of Spatial
Representativeness Methods

Similarity criteria & definition of Spatial Representativeness (2 – some details)

- 1) Are the boundaries of your spatial SR areas constrained **exactly**, or did you add some additional **buffers or safety factors**?
- 2) Can SR areas of different stations **overlap** or are they considered to be **exclusive** by principal?
- 3) Are your similarity criteria applied **one sided** or **two sided**?
(i.e.: Are you evaluating deviations only towards higher values, or towards both higher and lower values?)
- 3) **Within your estimated SR areas: is spatial representativeness guaranteed for locations of all station types, or only for locations of station types identical to the type of the central station?**
(e.g.:
Within the SR areas estimated for the urban background stations Schoten and Antwerpen-Linkeroever: is spatial representativeness guaranteed for locations of all station types? Or for locations of background station type only?
Within the SR area estimated for the urban traffic station Borgerhout: is spatial representativeness guaranteed for locations of all station types? Or for locations of traffic station type only?)



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Intercomparison Exercise of Spatial
Representativeness Methods

Input data

- 1) Please summarize which part of the **input dataset** you have used in the exercise.
- 2) Did you use **additional data**, not contained in our dataset?
(e.g., Street View pictures, maps from other sources, etc.)
- 3) How suitable did you find the **Antwerp dataset** for your method? / How suitable would you rate your method to be for this type of dataset?
- 4) Did you **miss** any type of data / information in this dataset?
- 5) How does the dataset of the exercise compare to the **data you would more typically use** for you work on SR?

Supporting Files

<http://fairmode.jrc.ec.europa.eu/>

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Cross-cutting activities (CCA)

Ad-hoc cross-cutting activities are dealing with inter-WG specific issues like spatial representativeness, forecasting and the use of monitoring and modeling to support assessment and planning applications.

CCA1 - Spatial representativeness

Lead: JRC | Co-ordinator: O.Krachi

- 1 Review existing methodologies and current needs within the FAIRMODE community directed to the fields of spatial representativeness, station classification, and related topical areas.
- 2 Support the development of the MQO: Uncertainty estimates derived from geo-statistical methods (variography of monitoring data) can contribute towards a further level of detail in the MQO formulation in addition to monitoring uncertainty. A methodology to assess the spatial representativeness of measurement stations will be developed to this purpose. Depending on the outcomes of this research, such method can also supply information for a better design of monitoring networks.
- 3 Improvement of the model evaluation methodology: A methodology to automatically screen for anomalies within records of the AirBase database will bring a clear benefit for choosing the adequate monitoring sites for model evaluation purposes. The approach is based on spatio-temporal neighborhood statistics and is currently applicable to background type stations.
- 4 Evaluate the feasibility of methodological comparisons (example given, on shared datasets). However, the methodological diversity of the different approaches might impose significant limitations in this regard.
- 5 Assessing the representativeness of source contribution estimates derived from field data is essential for their proper interpretation. Interest has been expressed to explore the opportunities to review the progress in this subject within the FAIRMODE community.

Related Documents

- Survey on Spatial Representativeness Methods (January 2015)
- Supporting Files for the Athens SR Workshop (June 2017)

CCA2 - Monitoring & modeling

**Questions / Remarks regarding the
Organization of the Session &
Workshop Today / Tomorrow ?**