Spatial Representativeness Intercomparsion: Irish feedback

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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?

Scope – Identification and quantification of an area within the vicinity of a reference monitoring station which are exposed to similar concentrations

Objective:

- Learn from other groups about work completed in their areas
- Assist in the set up of new monitoring stations as part of the Ambient Air Monitoring Programme in Ireland 2017 - 2022

2) In which **context** do you typically use this method?

The method used to assess the Antwerp dataset was a first attempt in this area. The method and assessment was completed by TCD Dublin through a small scale research study. We anticipated that a defined methodology in this area could be useful for the siting of new stations and the review of older, existing stations.

3) Are there **other SR methods** that you would typically use in your work on SR assessments?

No

4) How does the use of your method(s) relate to local / regional / national / EU-wide **regulatory and /or legal obligations**?

- As per the CAFÉ Directive requirement to document and review site selection although SR is not specifically cited
- Information to be provided to the public under article 23 (Air quality plans) in the event of an exceedance

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?

   This is a new research method developed for the intercomparison from an Irish perspective.

2) How many **years of experience** do you have with evaluating SR in general (including experience with other methods?

   Previously expert opinion coupled with limited indicative data when available have been used. This is the first time to assess SR in more depth using additional datasets.

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.)

   From an Irish perspective, the use of the method applied is rather experimental. However, the method is based on the well-established spatial interpolation techniques and can be considered as 'reasonable' with regards to available monitoring information in Ireland.

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?)

   The software tools are available to others. There is no copyright concern as the spatial interpolation method is an open-source algorithm. The modeller should have good understanding of GIS tools to be able to apply this method.

   It is important to note that this is a first attempt from an Irish perspective, where datasets to date have been limited. With more availability of spatial data it can be expected that the future attempts will incorporate more infrastructural and traffic related information.

Similarity criteria & definition of Spatial Representativenes (1)

1) Please summarize the underlying **definition of SR** you have used in the exercise.

   definition of SR - Similarity of concentration within a defined area

2) Please summarize the underlying **similarity criteria & threshold parameters** you have used.

   Bounded assessments areas for traffic (500m2) and background(3000m2)

   Acceptance criteria for all parameters – within 20% of measured concentration

3) Are there **other SR definitions** and / or **similarity criteria** you would typically use in your work on SR?

   No

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

1) Are the boundaries of your spatial SR areas constrained **exactly**, or did you add some additional **buffers or safety factors**?

   Constrained exactly

2) Can SR areas of different stations **overlap** or are they considered to be **exclusive** by principal?

   No they can overlap

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?)

   Two sided

4) 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?)

   SR areas are estimated for location of all station types (urban background stations & urban traffic station)

Input data

1) Please summarize which part of the **input dataset** you have used in the exercise.

   Monitoring station hourly and annual data, virtual monitoring station datasets, population density map

2) Did you use **additional data**, not contained in our dataset?

   (e.g., Street View pictures, maps from other sources, etc.)

   Antwerp road network information (http://www.mapcruzin.com/free-belgium-arcgis-maps-shapefiles.htm), Antwerp SRTM-DEM data

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?

   The dataset was complete for the method applied.

4) Did you **miss** any type of data / information in this dataset?

   This dataset was adequate for the current methodology. However, a more detailed microscopic model more accurate traffic, concentration & meteorological information (time-series) specially near traffic station would be required.

5) How does the dataset of the exercise compare to the **data you would more typically use** for you work on SR?

   Typically, such an extensive dataset from an Irish context, does not exist. The methodology applied, reflects what would most likely be available to air quality decisions makers in the medium term. For a microscopic model abovementioned time-series datasets would be necessary.