National Institute for Public Health
and the Environment
Ministry of Health, Welfare and Sport

Spatial Representativeness Intercomparison

Results of RIVM (NL)

Lan Nguyen
Ronald Hoogerbrugge

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Method

Combination of 2 techniques

- PCA (principal component analysis)
- Micro/macro observations

Used data & information
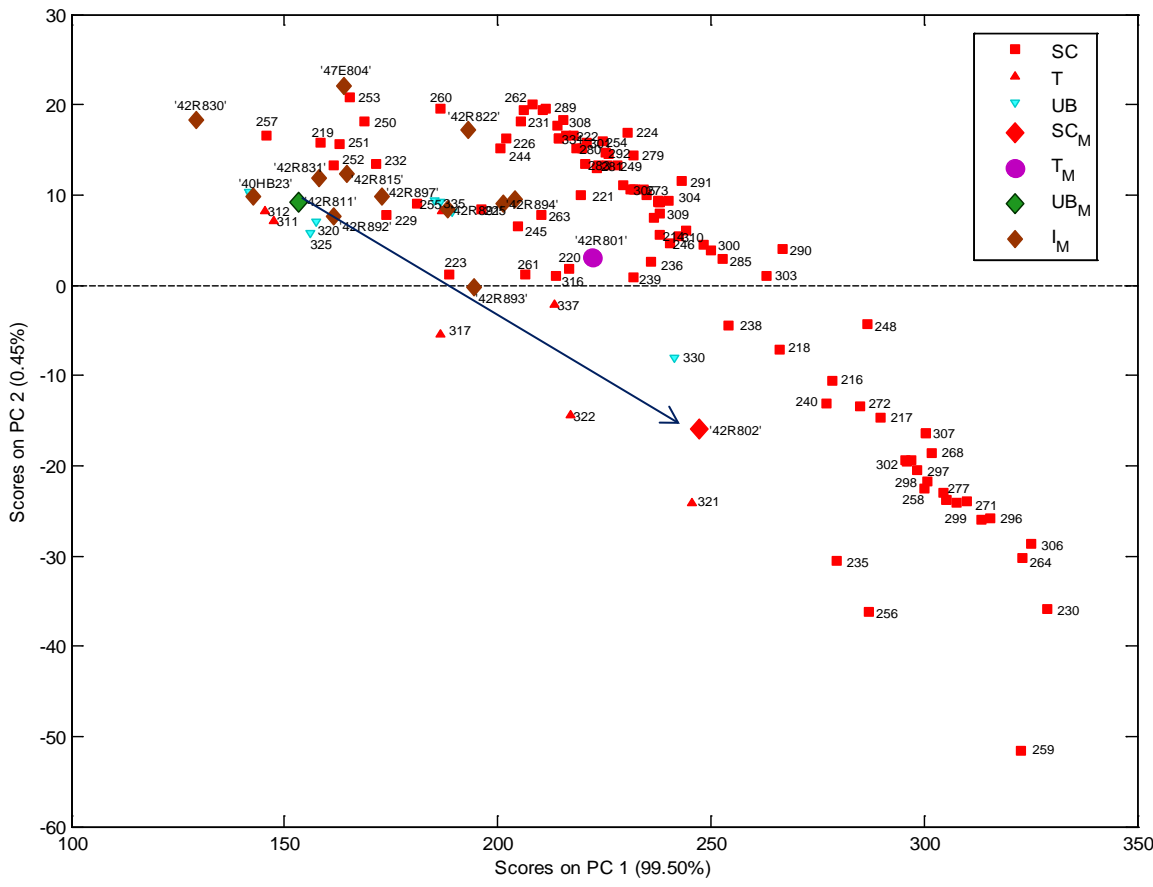
- Concentrations

  - Monitoring stations (hourly)
  - (Part of) virtual monitoring stations
    (only modelled data with a clear classification were used)

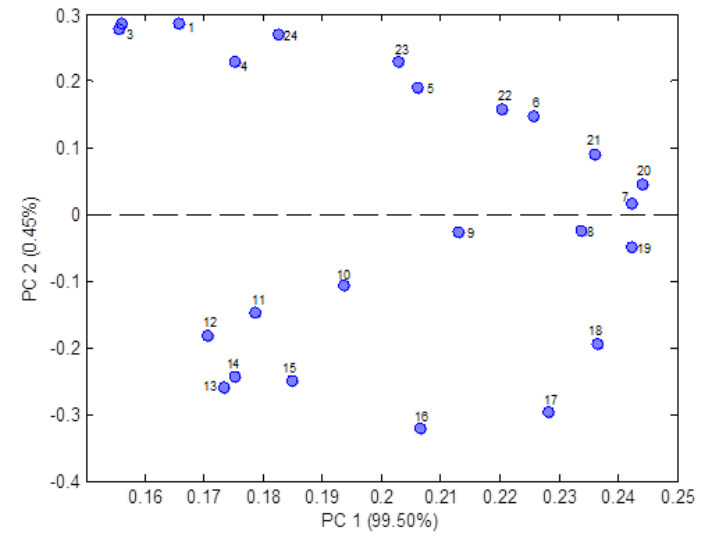   Hourly data -> diurnal variation (input of PCA)

- Google Street View

Results NO2: Primary stations

- UB stations are on the left hand side
- Modelled SC stations are on the right hand side
- Shift from UB->SC (high PC1 &low PC2 scores)

Results NO2: primary stations (cont.)

- Schoten (station 42R811) : representative UB station
- Borgerhout (station 42R802): consistent with traffic stations
  - ➢ Not possible to determine character of a station (Traffic resp. Street Canyon) by PCA
  - ➢ Google Street View used to evaluate macro/micro situation:
    - High building at one side of the street, opposite side only few blocks of high buildings
    - Buildings are not joined together

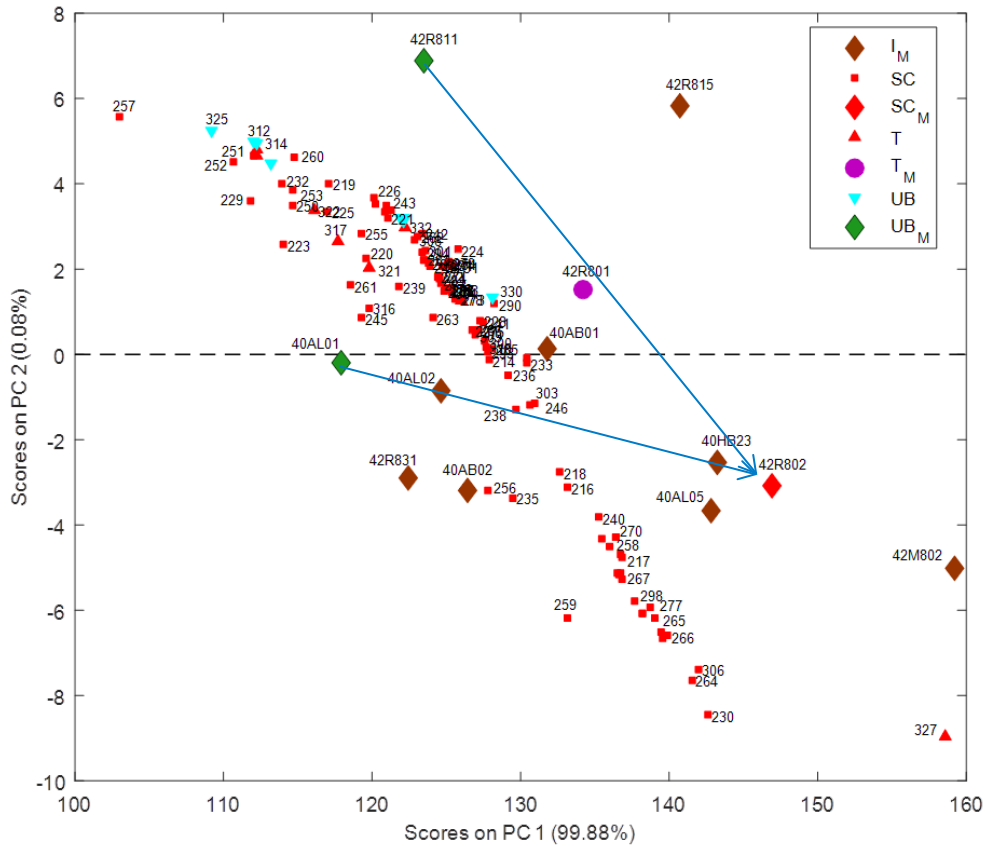   -> Borgerhout is a traffic station , but not a SC
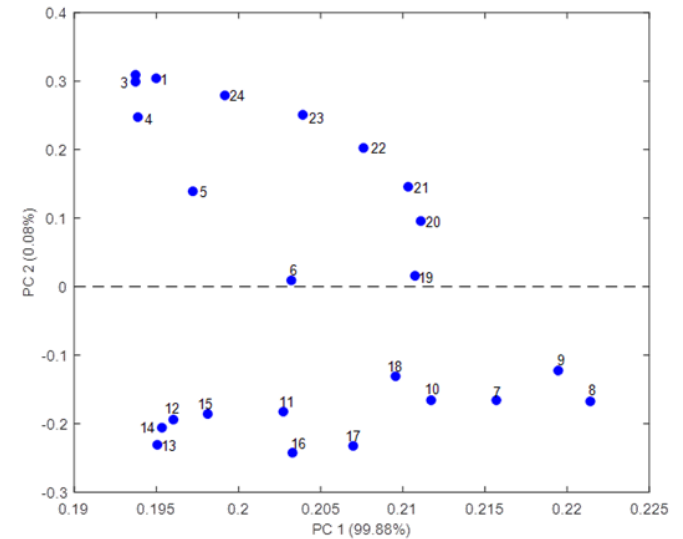
Results NO2: additional stations (blue dots)
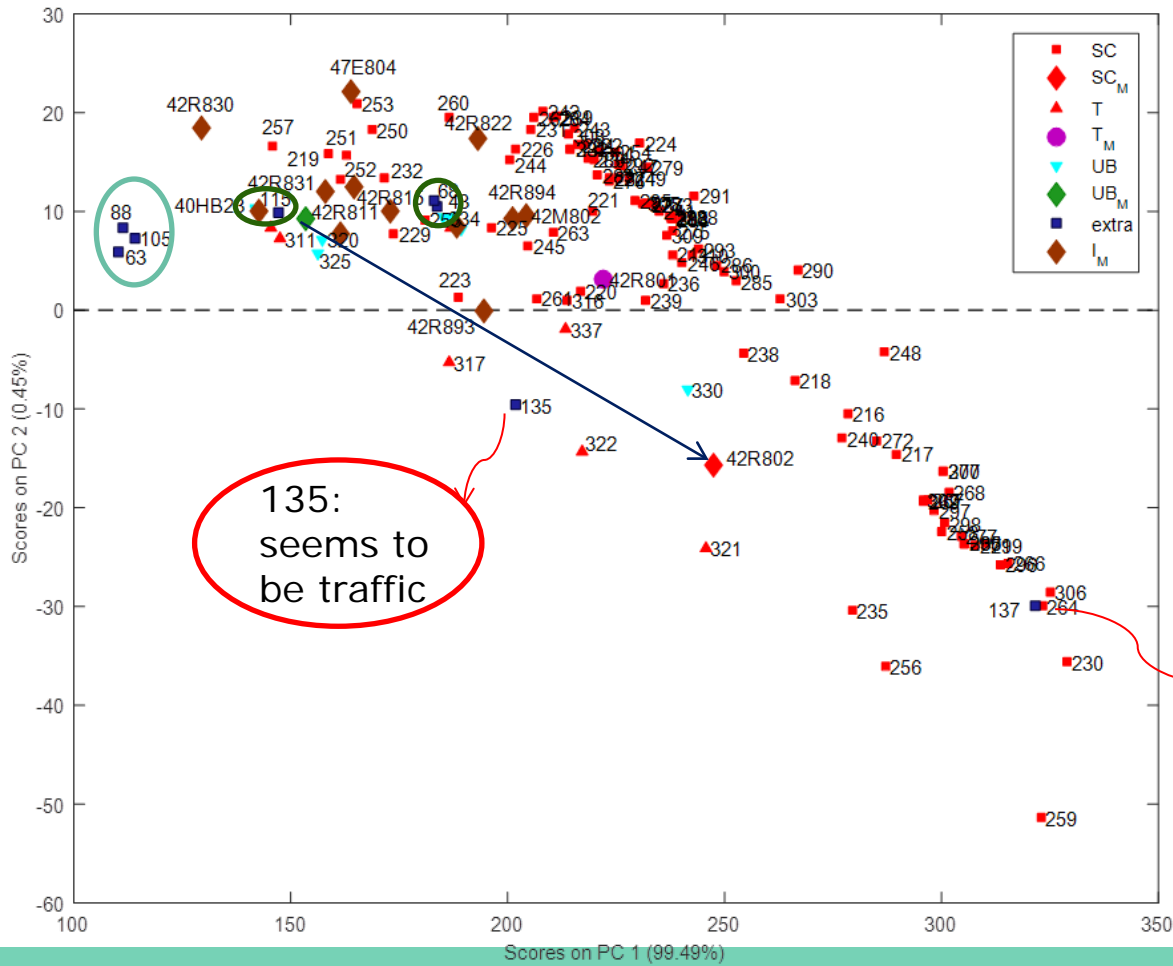
- 63,88,105,115: UB
- 68,43: UB with high concentration
- 135: seems to be traffic
- 137: clearly traffic

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Results PM10: Primary stations

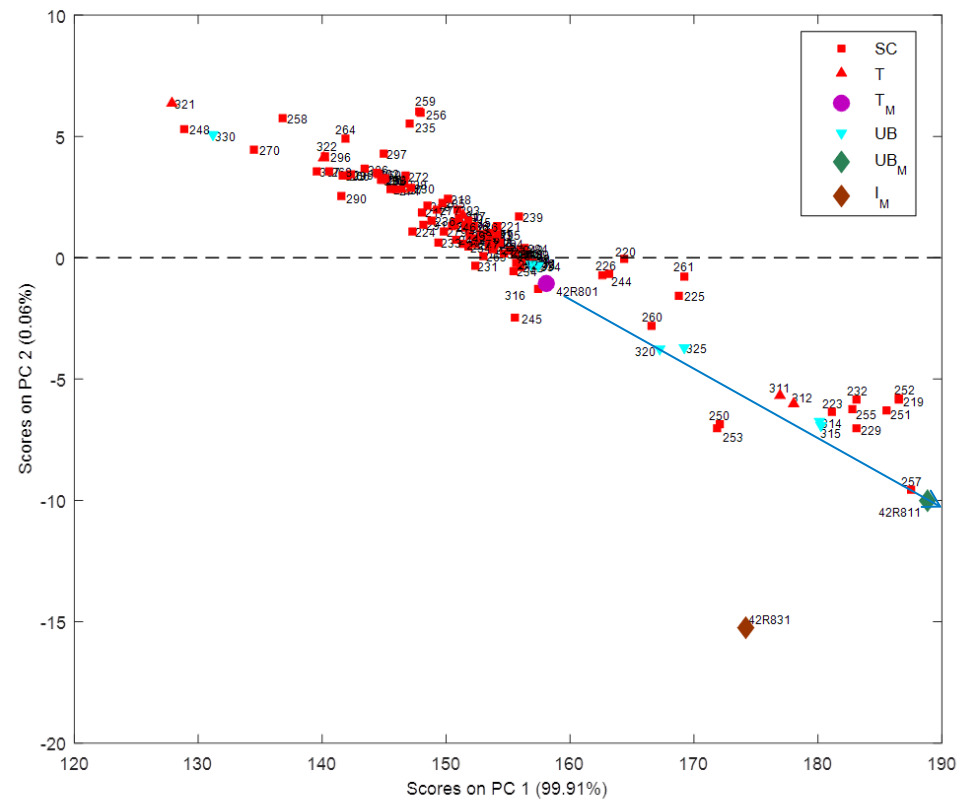

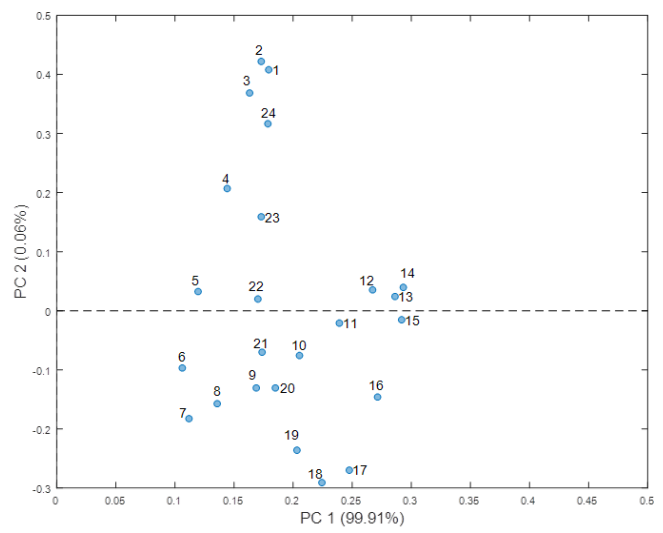- Schoten (42R811)& Likeroever (40AL01): UB
- Borgerhout (42R811): Traffic

Results O3: Primary stations

Schoten (42R811) : shift to higher PC1 & lower PC2 scores
->higher yearly conc and higher conc during rush hours (6-8 hrs and 16-18 hrs)
-> representative UB station

Conclusions

Primary stations

- Schoten (42R811): is representative UB station
- Linkeroever (40AL01): UB station with influence from NW direction
- Borgerhout (42R802): Traffic
        Google Street View: Borgerhout is not a SC station

Additional stations (virtual)

- 63,88,105,115: UB
- 43,68: UB with influence of more continues sources
- 135: possibly traffic
- 137: clearly traffic

Obligatory slide : objectives and typical use

- Objectives of the RIVM-SR method (PCA analysis) : to investigate if the current classification of a measurement station corresponds to the character of that station

- Typical use: this method was used (twice) to assess the representativeness of the Dutch National Air Quality Monitoring network

Obligatory slide: maturity and fitness to purpose

- Maturity: The PCA analysis was applied successfully twice and the method was also used once to assess monitoring stations in London

- PCA analysis is a well-known technique. The analysis tool used in this study is the PLS Toolbox of Eigenvector Research Incorporated for use with MATLAB. The PCA analysis can be applied by any other institute

Obligatory slide: similarity of SR

The PCA analysis shows e.g. that a station is a representative urban background station. It does not mean that the measured concentration of this station is representative for the whole area. If this area has a road and there are houses along this road, these inhibitants will be exposed to the influence of traffic on this road and consequently to a higher concentration.

Consequently the analysis can not guarantee a spatial representativeness for the whole area.

In The Netherlands important policy decissions, e.g. on spacial planning, are not directly based on measurements but on model calculations. Therefore the assessment on respresentativeness of measurement stations is more focussed on the representativeness for model calbration than on a precise determination of an area of representativity.

Obligatory slide: input data

- Hourly measurements data are needed for the PCA analysis.
- Measurements data were too limited -> modelled data with a clear classification were also used
- Google Street View was also used (to investigate if a street station is a street canyon)
- A large measurements dataset (e.g. measuremenst data of whole Begium) is more suitable than hundred virtual stations on a small area