Development of technical guidance document on monitoring network design

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» **Site selection, its review and documentation (Annex IV, D)**

1. *The competent authorities responsible for air quality assessment shall for all zones <u>fully document the site-selection procedures</u> and <u>record information to support the network design and choice of location for all monitoring sites</u>. The <u>design of the monitoring network shall be supported at least by either modelling or indicative measurements</u>.*

2. *The documentation shall include the location of the sampling points through spatial coordinates, detailed maps and shall include <u>information on the spatial representativeness of all sampling points</u>.*

4. *Where <u>indicative measurements, modelling or objective estimation</u>, or a combination thereof are used within a zone, the documentation shall include <u>details of these methods</u> and <u>information on how the criteria listed in Article 9(3) are met</u>.*

9. *At least <u>every 5 years</u> the <u>selection criteria, network design and monitoring site locations</u>, defined by the competent authorities in view of the requirements of this Annex, <u>shall be reviewed</u> to ensure they remain valid and optimal overtime. The review shall be <u>supported at least by either modelling or indicative measurements</u>.*

10. *The <u>documentation shall be updated</u> following every review and other relevant changes to the monitoring network, and shall be made public through appropriate communication channels.*

» **Range of other relevant (mostly unchanged) provisions, incl. Annex III (minimum number of stations) and Annex IV (siting criteria)**

What further guidance is needed regarding network design?

- » How can the monitoring data be used for this purpose?
- » How can the modelling data used?
- » Use of tools such as MoNET to guide the network design

• FAIRMODE & AQUILA cooperation 45 participants from 10 countries: **15 presentations sharing experience in two sessions:**

- Austria (1), Germany (1), Ireland (1), Italy (4), the Netherlands (1), Norway (1), Portugal (1), Slovakia (1), Spain (2), Sweden (2)
  - Focused on two domains: country, region/AQ zone
  - Used for PM10 and/or NO2 (some in PM2.5 and O3 in addition)
  - Mostly hourly data, few daily (PM10)

- Useful exercise to
  - ✓ Identify inconsistencies in the monitoring sites classification
  - ✓ Revise the validity of the current air quality zone definition
  - ✓ Evaluate the optimisation of the monitoring network

- Coordinated by Norway(NILU) using the MoNet clustering tool

Results PM$_{10}$

Large clusters:
- Northern/north-eastern extra-alpine
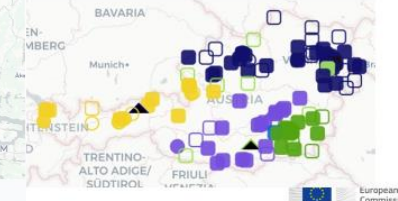
Results Region 1: Uppsala & Stockholm

Depends on metric, EuD; background stations are in same cluster
--> magnitude similar, but temporal variations influenced by local conditions
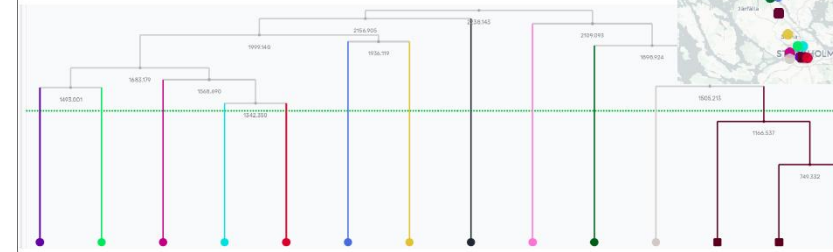
Hourly values 2021. Dissimilarity cutoff 30,000

Daily values 2021. Dissimilarity cutoff 4000

Planned next steps
- Initiation of the elaboration of a Monitoring Network Design Evaluation **Guidebook**
- **Peer review article**
- **Additional exercises** in May/June 2023 to be reported at the next FAIRMODE technical meeting

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Thank you for interest!!

Thank you for your contribution!!

Further guidance regarding network design

1 Introduction

2 Monitoring Network design: the legal framework

◢ 3 Recommended methodology for evaluating the monitoring network representativity

    3.1 Hierarchical clustering analysis

    ◢ 3.2 Monitoring Network webtool (MoNET)

        3.2.1 System

        3.2.2 Input data requirements

        3.2.3 How to use the tool

    3.3 How to interpret the results

◢ 4 Evaluation of the representativity of the air quality network: country experiences

    4.1 Flagging of potential outliers and redundancies

    4.2 Identification of inconsistencies in sampling point classification

    4.3 Assessing gaps

    4.4 Evaluation of air quality zones

5 Support to monitoring design: a cookbook

6 Conclusions

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To be presented at the FAIRMODE Plenary in February 2024

Countries' contributions are to be requested soon.

First draft for revision during March

The final document is to be presented in March-April

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