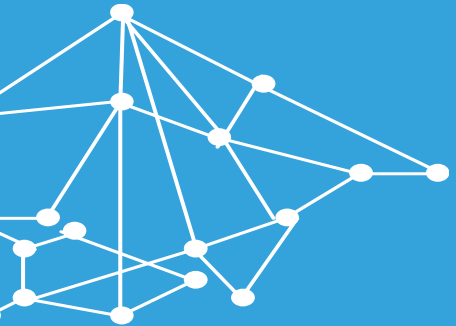


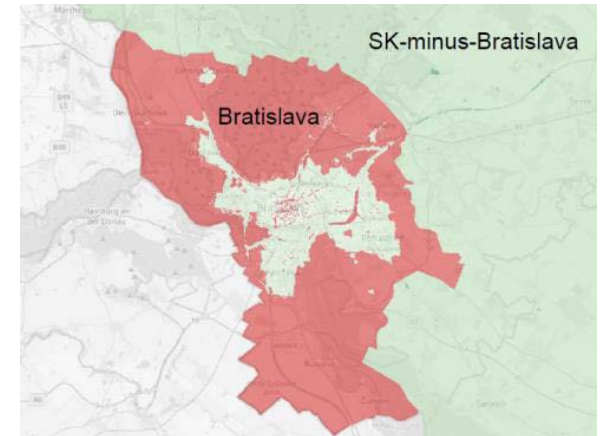
**WG8 update**  
**Spatial Representativeness,**  
**Exceedance Situation Indicators &**  
**Monitoring Network Design**



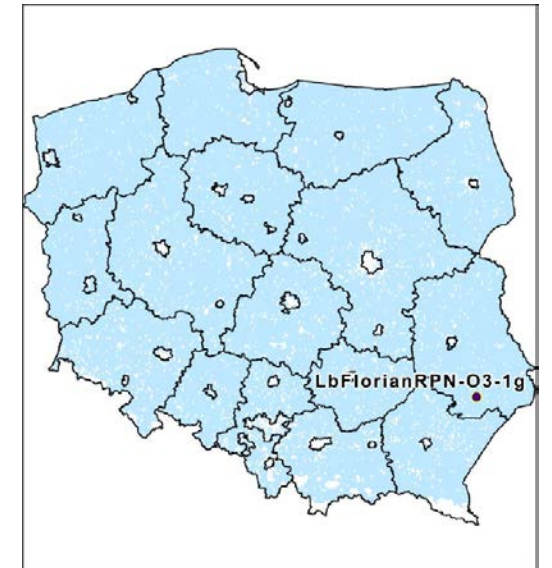
FAIRMODE Plenary Meeting  
5<sup>th</sup> March 2025

### *Activities since the 2024 plenary meeting*

- Focus on key remaining open issues, in particular:
  - » Criteria for limiting SRAs of rural / regional background stations
  - » Use of source-related criteria
- In-depth discussion at the technical meeting Oct 2024
- Two WG8 webinars 24<sup>th</sup> Jan & 11<sup>th</sup> Feb
  - » Contributions from DE, PL, AT, TECNALIA (ES), VITO (BE)



Examples of the rural background "challenge"



# WG8 UPDATE - SPATIAL REPRESENTATIVENESS

## Activities since the 2024 plenary meeting

- Written contributions from testing received from IT, WG4, SE, AT, DE, VITO (IE, BE, HR, SK)
- Updated WG8 guidance document on spatial representativeness:

The screenshot shows the FAIRMODE website interface. At the top, there is the European Commission logo and the text 'Joint Research Centre'. Below this, the 'FAIRMODE' logo is displayed with a navigation menu including 'Home', 'Activities', 'Meetings', 'About', 'Guidance', 'Tools', and a 'Join FAIRMODE' button. The main content area is titled 'WG8 – Monitoring design, spatial representativeness and associated exceedance situation indicators'. It features a 'Leaders' section with names like M. Ross-Jones and L. Tarrason, and a 'Guidances and proposals' section. Two document thumbnails are shown: 'Version 4 - Mar 2025' and 'Version 3 - Feb 2021'. A red arrow points to the 'Version 4' document. A sidebar on the right contains a 'About FAIRMODE' section with various links like 'Terms of Reference', 'Steering committee', 'National Experts', 'Roadmap', 'Strategy', 'Forum', 'Guidance', 'Assessment', 'Planning', and 'Tools'.

The cover page of the 'FAIRMODE WG8 – Guidance Document on the estimation of spatial representativeness'. It lists the authors: Matthew Ross-Jones, Leonor Tarrason, and Stijn Janssen. It also lists contributors from various countries and organizations. The document is dated 'Version 4, 03/03/2025'. The text describes the document's purpose: to summarize work on spatial representativeness, replace a previous document, and provide recommendations for sampling points. It also mentions the revised EU Ambient Air Quality Directive (EU) 2024/2881 (AAQD) and the Implementing Provisions on Reporting (IPR).

The 'List of appendices' section, which includes:

- Appendix 1: FAIRMODE WG8 – RECOMMENDATIONS ON SPATIAL REPRESENTATIVENESS ESTIMATION – ITALY
- Appendix A: Examples of good practices by ARPAE
- Appendix B: Examples of good practices by ARPA LOMBARDIA
- Appendix C: Examples of good practices by LaMMA-ARPAT
- Appendix D: Examples of good practices by ARPA FVG
- Appendix 2: Feedback and results from FAIRMODE WG4-Microscal Modelling based on the FAIRMODE WG8 checklist for further testing of spatial representativeness of measurement stations
- Appendix 3: Testing Spatial Representativeness of Monitoring Stations in Four Cities within the East Sweden Air Quality Management Association
- Appendix 4: Feedback and results from Environment Agency Austria (Umweltbundesamt GmbH) based on the FAIRMODE WG8 checklist for further testing of spatial representativeness of measurement stations
- Appendix 5: Feedback from Environment Agency Austria (Umweltbundesamt GmbH) on additional criteria for spatial representativeness of air quality monitoring stations
- Appendix 6: Testing Spatial Representativeness of Monitoring Stations in Germany
- Appendix 7: Spatial Representativeness study for Belgium, Croatia, Ireland and Slovakia.

### *Activities since the 2024 plenary meeting*

- **Guidance document on how to use MoNET for monitoring network**
  - » Evaluation of the representativity of the air quality network to assess:
    - Pollution regimes
    - Flagging of potential outliers and redundancies
    - Identification of inconsistencies in sampling point classification
    - Assessing spatial gaps
    - Evaluation of Air Quality Zones
  - » Eight contributions from the AQUILA- FAIRMODE workshop were revised
  - » The description of how to interpret the tool's output has been improved
- **MoNET has undergone significant improvements, enhancing its capabilities and performance**



### *Priorities for 2025 and finalising this work period (2023 - 2025)*

- Finalise guidebook on the use of MoNET (August)
- Finalise summary document on CAMS – FAIRMODE Natural dust exercise 2023-24
- Continue testing SR methodology and remaining open issues? E.g.
  - » Further testing on use of source-related criteria
  - » Use of other metrics than annual means, e.g. percentiles
  - » Sensitivity tests on interannual variability of SRAs
  - » Template for documentation & reporting of SRAs
- Develop priorities & potential activities for the next roadmap (2026 - 2028)
  - » E.g. Strengthen link between network design, SR and AQ zones?

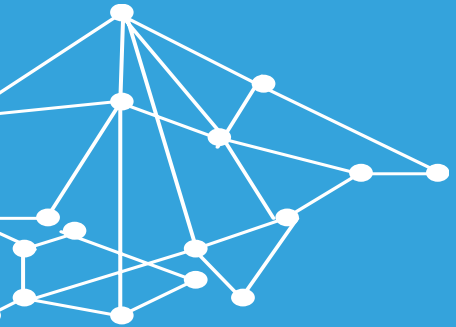


### *How did the Working Group contribute to better modelling for assessment and/or planning?*

- SR methodology developed by WG8 has provided a sound basis for:
  - Strengthened assessment provisions in the revised AAQD
  - Technical support document on modelling
    - Improved harmonisation of SRA assessment across Europe
    - Also provides a pragmatic approach for a first estimation of ESIs
- MoNET evaluation of monitoring network & optimisation
  - Valuable tool to aid the revision and optimisation of MS monitoring network under the revised AAQD
  - Useful for the evaluation of air quality zones
- Natural Dust Exercise illustrated strengths and limitations of use of CAMS for assessment of natural dust contributions
  - Important input in efforts to include CAMS modelling in the revision of the guidance to discount natural source contributions to exceedances
  - A viewer for natural dust contributions now included in the work plan of CAMS for the next phase (2025-2028) to make these data better available for use by Member States



# Thank you!



Leonor Tarrason [lta@nilu.no](mailto:lta@nilu.no)

Matt Ross-Jones

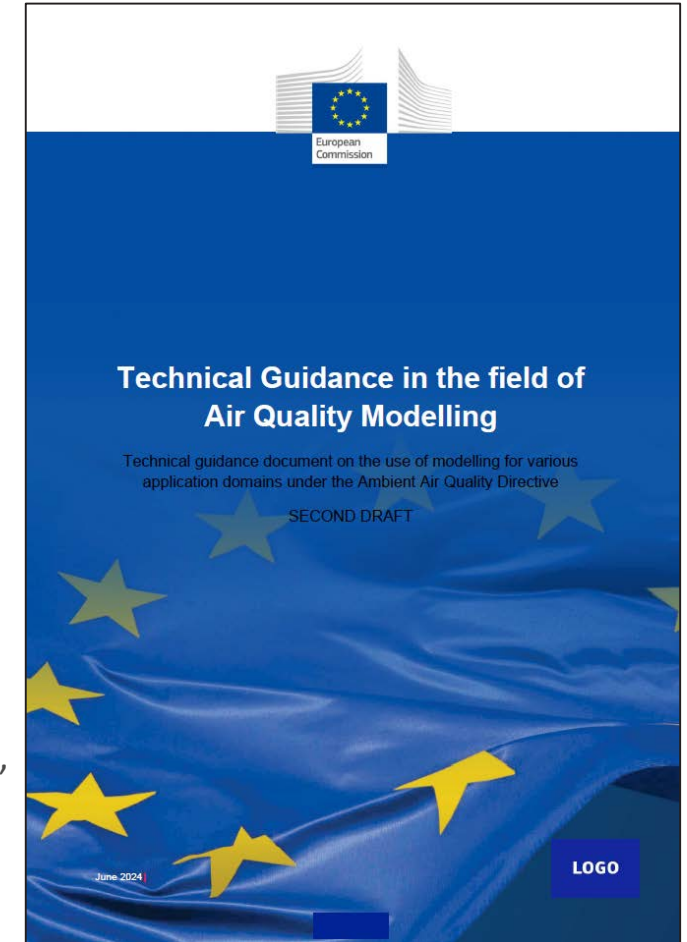
[matthew.ross-jones@naturvardsverket.se](mailto:matthew.ross-jones@naturvardsverket.se)

## Structure of the chapter/sub-chapter on monitoring network design

- Relevant AAQD requirements
- Methodology for using modelling to aid network design:
  - » Identification of hotspot locations
  - » Identification of background locations
  - » Supplementary methods for reducing min number of fixed measurements
- Regular review of monitoring network design
- QA/QC process and fitness for purpose

## Feedback received and planned changes

- **Clear request for a separate guidance on siting criteria and monitoring design (joint work with the AQUILA community)**
- Planned changes / additions:
  - » Make clear that this current guidance only covers how to use models to support network design
  - » Link to **MoNET guidance** once published
  - » **Hot spots** – defined by high concentrations in areas with high impact on exposure
  - » “Redundancies” a term to be carefully explained and considered in terms of “completeness” of networks – Identification of possible monitoring network **gaps** more relevant





## FAIRMODE MoNET GUIDANCE

- To be completed by the next plenary 2025

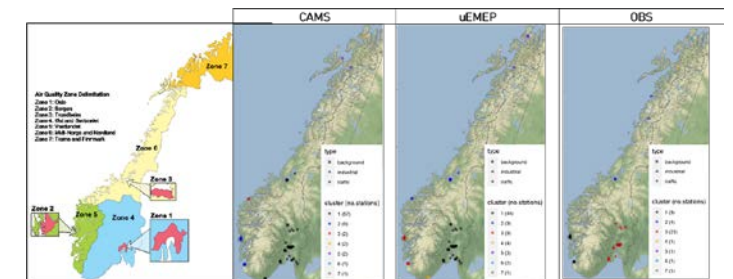
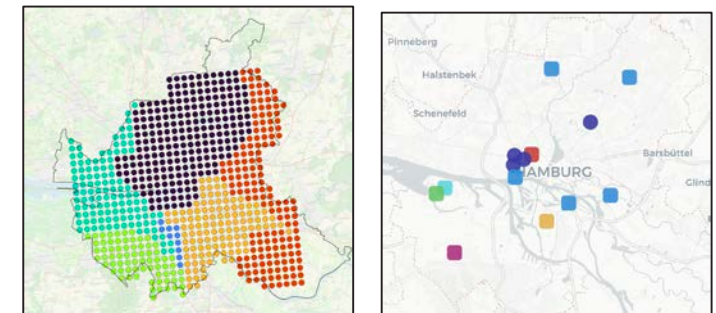
### Planned next exercises

- 1) Can clustering of model data support the SRA in a city ?

Comparison of AQ Mon+ AQ model + SRA calculations in a city

- 2) Can clustering of model data serve to define the AQ zones?

Comparison of AQ Mon+ AQ model + the countries AQ zone definition



## *Structure of the chapter/sub-chapter on exceedance situation indicators*

- Relevant AAQD requirements
- Overview of the ESI's
- Step-by-step methodology for estimating ESIs
- Population exposure modelling
- Recommendations for natural source contribution estimation

## *Feedback received and planned changes*

- » **Spatial extent of exceedances:**
  - » Use of SRAs for the ESI - calculated with a fit-for-purpose models (even if in the specific situation the model does not catch the exceedance)
- **Exposed population:**
  - » Keep it simple / pragmatic! - population data resolution and model resolution must be balanced (constrained by their fitness for purpose and MQO)
  - » Suggestion to change the recommended minimum resolution for urban population data (<0.5 km)
- **Road length in exceedance:**
  - » Keep it simple ! Keep to one road length independently of the lanes.
  - » Relevance of this indicator still in question (link to review of IPR)

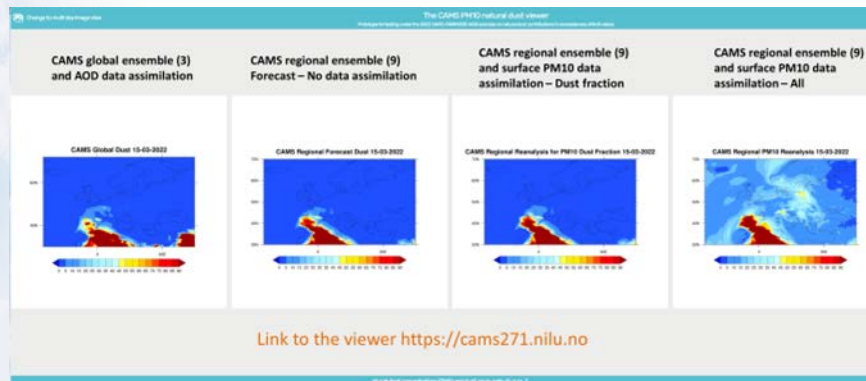





# CAMS - FAIRMODE Natural dust exercise - Document 2

- Austria** (Wolfgang Spangl, UBA-Viena)
- Cyprus** (Jonilda Kusta, CYI)
- Bulgaria** (Emilia Georgieva and Hristina Kirova, National Institute of Meteorology and Hydrology- Bulgaria)
- France** (Laure Malherbe and Laurent Latenois, INERIS)
- Hungary** (Anita Tóth, Hungarian Meteorological Service)
- Italy - Tuscany** (Guglielmo Tanganelli and Francesca Guarneri, ARPAT)
- Italy - Diapason** (Francesca Barnaba, Cnr-isac, Andrea Bolignano, Enea, and Giorgio Cattani, Ispra).
- Malta** (Ariana Schembri and Ruth Borg, ERA)
- Poland** (Joanna Strużewska, IOS, Poland)
- Portugal** (Carla Gama, University of Aveiro)
- Portugal** (Joana Monjardino, FCT NOVA, Portugal)
- Spain** (Noemi Perez, CSIC)

- Measured exceedance at sampling point
- Evidence of dust intrusion - CAMS + additional measurement data**
- Check CAMS service for occurrence of dust intrusion episode (IRA maps)
- Check CAMS modelled values for the episode at sampling point
- Review additional sampling evidence in nearby sampling points
- Evaluation of contribution of natural dust to the exceedance (possible method)**
- Apply bias correction to measured data from CAMS modelling



- **FAIRMODE Summary document (april 25)**
- **Peer review publication ?** 
- **Link to on-going revision of the guidance to discount natural source contributions to exceedances**

### *3 documents in the making*

- FAIRMODE technical guidance on evaluation of SRA
- Use of models in natural dust exceedance situation
- Guidance on the use of models for Monitoring Design – MONET guidance

*Further tests to link monitoring design testing to SRA analysis with focus on air quality zones / geographical area*

