

PROGRESS IN EMEP ACTIVITIES IN 2022-2023 AND FUTURE WORK: MEASUREMENTS AND MODELLING

A. Colette & L. Labrador, TFMM co-chairs

Joint EMEP SB & WGE, Geneva, Sept 12, 2023

2023 ANNUAL MEETING

- 24th TFMM Meeting, hosted by Poland, 10-12 May 2023
 - Hybrid format, 60 online / 60 onsite, from 25 State Parties + MSC-West and CCC
 - All presentations are available on the TFMM website : <https://projects.nilu.no/ccc/tfmm/>
- Main items of the 2022-2023 workplan
 - O3/VOC Field campaign
 - Heavy Metals & POP
 - Review of Gothenburg Protocol
 - Air Quality / Climate / Biodiversity

23rd Task Force on Measurement and Modelling Meeting 10-12 May 2023 in Warsaw, Poland

- [Agenda](#)

Welcome, update from the convention and EMEP centers and International Organisation

- [Progress in EMEP activities, Measurements and modelling](#)
Augustin Colette and Lorenzo Labrador, TFMM Chairs: INERIS, France / WMO
- [News from the Convention](#)
Laurence Rouil, INERIS, France
- [Air quality modelling activities in Poland](#)
Joanna Struzewska, IEP-NRI, Poland
- [Air pollution management in a world under pressure](#)
Viktor Klemetz, IVL, Sweden
- [EMEP CCC update](#)
Kjetil Torseth and Wenche Aas, CCC/NILU
- [MSC-W Progress in 2022/2023](#)
Hilde Fagerli, Bruce Denby, Peter Wind and rest of the EMEP/MS-CW team, MSC-West/MET
- [Updates from the WMO/GAW Programme](#)
Lorenzo Labrador, WMO
- [Using EMEP model in CAMS analysis of pollution episodes in European cities](#)
Svetlana Tsyro, MSC-West/MET, Norway

Thematic session: General country updates

- Combining EMEP4NL & SHERPA for reduced nitrogen studies over the Netherlands
Eric van der Swaluw, RIVM, The Netherlands
- [An application of the EMEP4VRF model in South Asia](#)
Massimo Vieno, E. Nemitz, C. Di Marco, J. Scheffler, Y. Wang, T. Liska, S. Ghude, P. Pawar, M. Sutton, P. Wind, Y. Ge, M. Heal, S. Tomlinson, E. Carnell and U. Dragosits, CEH, United Kingdom
- [Update on air quality activities in ENEA](#)
Mihaela Mircea, ENEA, Italy
- [SCIENTIFIC BASIS FOR A SPANISH OZONE ABATEMENT PLAN](#)
X. Querol, A. Alastuey, J. Massague, A. Canals, N. Perez, C. Reche, M. in't Veld, M. Guevara, H. Petetin, R. Garatachea, K. Oliveira, F. Lopez, O. Jorba, C. Perez Garcia-Pando, G. Gangoiti, E. de la Torre, E. Mantilla, J.J. Dieguez, A. Munoz, E. Borrás, T. Vera, M. Millán, M. Escudero, E. Monfort, I. Celades, V. Sanfelix, A. Lopez-Lilao, J. de la Rosa, A. Sanchez de la Campa, C. Alve, S. Monge, M. Munoz, M.J. Alonso and I. Miron, CSIC, Spain
- [Assessing ozone abatement scenarios in the framework of the Spanish Ozone Mitigation Plan](#)
Oriol Jorba, Herve Petetin, Marc Guevara, Roger Garatachea, Franco Lopez, Kevin Oliveira, Santiago Enciso, Xavier Querol, Jordi Massague, Andres Alastuey and Carlos Perez Garcia-Pando, BSC, Spain
- [On the challenges of assessing the effects of emissions reductions on air quality: a modelling and an observational analysis for the COVID-19 case study](#)
Marta G. Vivanco, Mark R. Theobald, Coralina Hernandez, Juan Luis Garrido, Victoria Gil, Alejandro Rodriguez, Fernando Martin, Carlos Ordóñez, Jose Manuel Garrido, Marc Guevara and Herve Petetin, CIEMAT, Spain

Thematic session: EMEP intensive measurement period of 2022

- [Status and first results from the O3/VOC/SOA EMEP Intensive Measurement Period of 2022](#)
Wenche Aas, Sverre Solberg et al., CCC/NILU

O3/VOC 2022 INTENSIVE MEASUREMENT PERIOD

Goal:

- Knowledge of processes driving high O3 episodes in Europe (e.g. bio/anth VOC) [1.1.1.3]
- Strengthen the use of in-situ observations for models development and emission verification [1.1.1.4]

The design of the campaign was unique, unprecedented and very ambitious

- Distributed sampling at 27 sites (5 urban) in 13 State Parties
- Centralised distribution of sampling devices and analysis at 4 laboratories: IMT (FR), IGE (FR), FZJ (DE), FMI (FI)
- Forecasting with CAMS/MetNO to trigger the 1-week campaign
- Financial support from ESIG

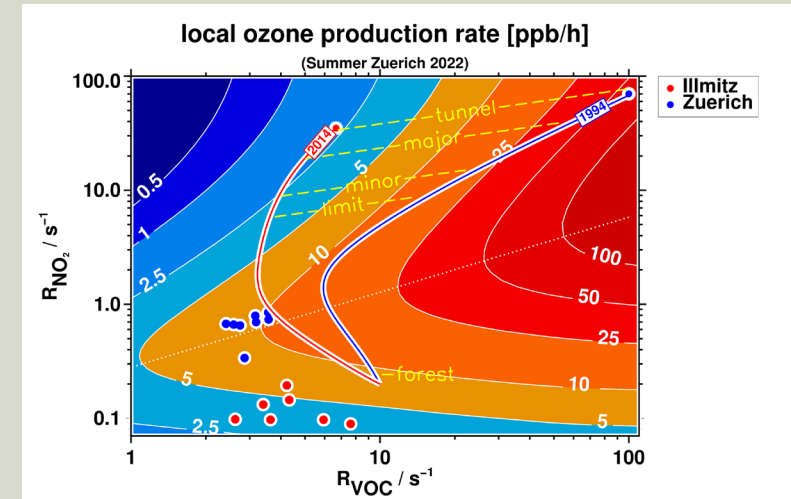
Status

- The campaign was held July 2022, the selection of the event was relevant,
- Since last SB, the analysis/reporting of the collected data demonstrated that we collected a dataset of unprecedented value
- Decision not to replicate in the EIMP 2023 and focus on the data analysis

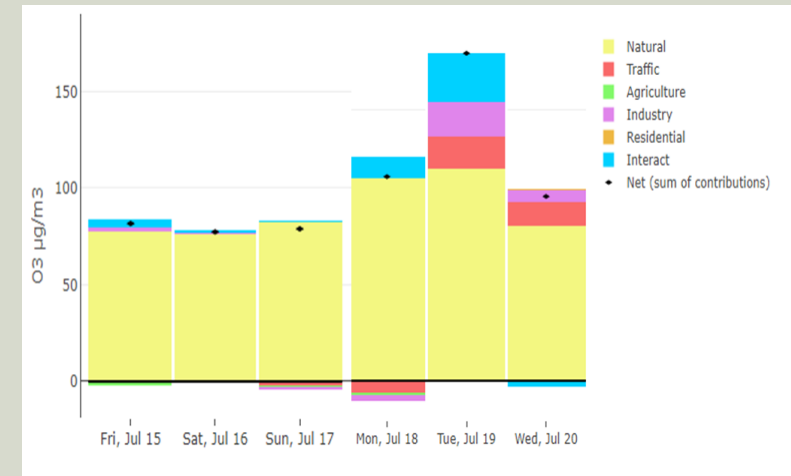


O₃/VOC 2022 INTENSIVE MEASUREMENT PERIOD

- Strengthen the VOC monitoring capacities within EMEP
 - The centralised analysis strategy is only relevant for the IMP, but it allowed developing VOC monitoring at 27 sites
 - No major problem was encountered, despite significant risks in the campaign design
 - A unique benchmark dataset for intercomparison of several VOC monitoring methods
 - Develop the reporting for a complex series of chemical species: 146 compounds!
- Related collected samples and variability to emissions sources
 - Biogenics: total flux, but also specific vegetation sources (conifers, deciduous, citrus, ...), spores, wildfires, marine,
 - Anthropogenics: aromatic hydrocarbons, alkanes, solvents, PAHs, benzene, volatile chemical products
 - Machine learning decomposition of sources
 - Mostly oxidized species, most fast-reacting A-VOC remain close to the sources
- Understanding of ozone formation processes
 - Evolution of ozone formation chemical regimes (Figure)
 - Relative importance of anthropogenic/biogenic to peak/background ozone (Figure)
 - Day-to-day variability and relation with heat wave dynamics
- Comparison with models
 - Add new VOC species in the chemical mechanisms (see MSC-W)



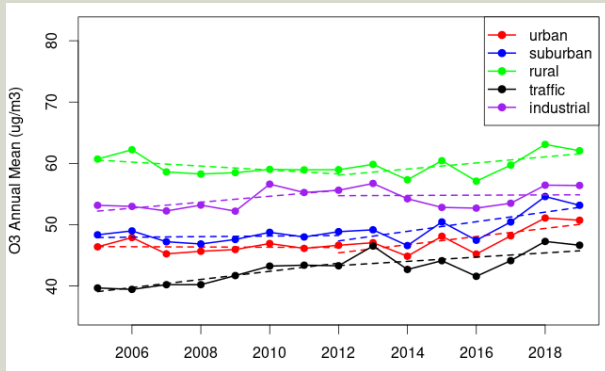
Wegener, TFMM, 2023



CAMS Policy Service

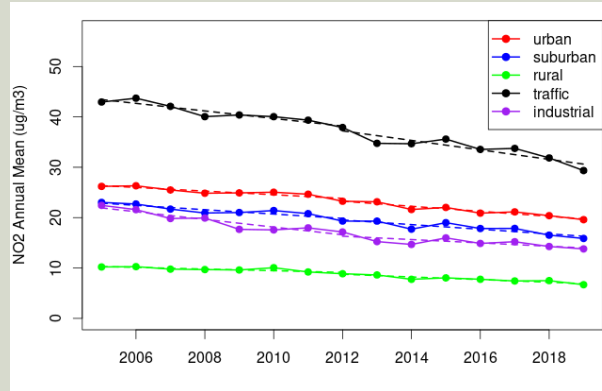
GP REVIEW

- Relative evolution between O₃ and NO₂ patterns: geographical distribution and temporal trends



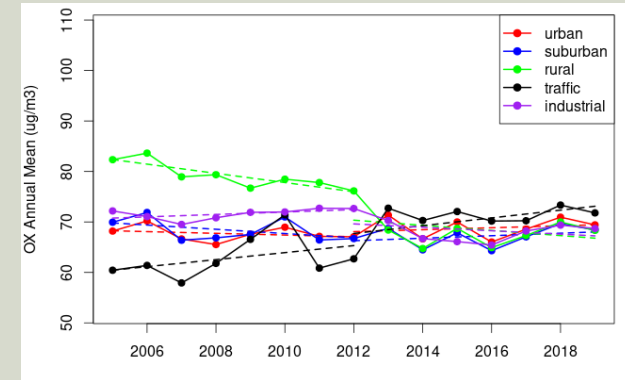
O₃

+

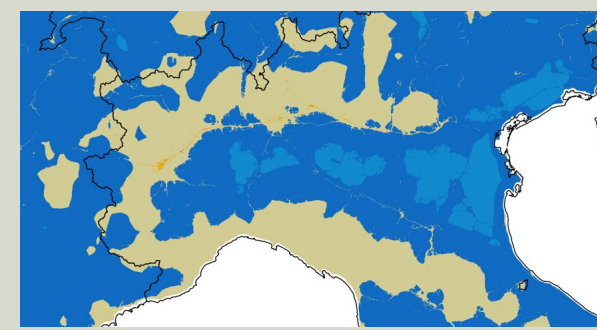
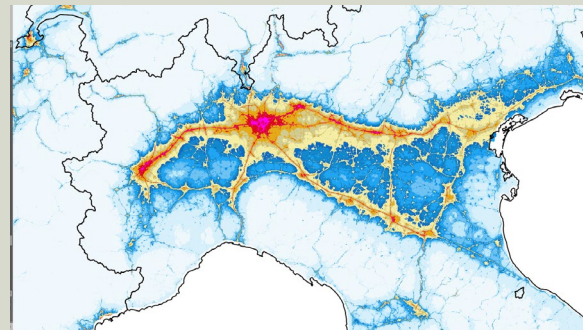
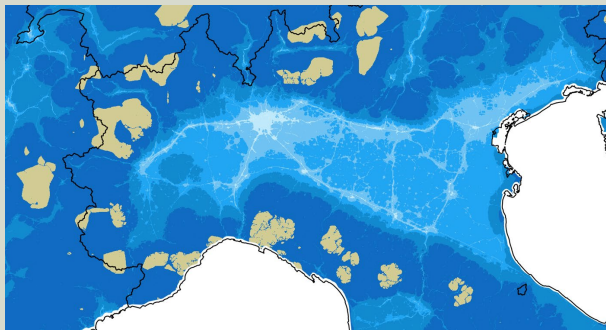


NO₂

=



O_x



uEMEP (MSC-W)

GP REVIEW

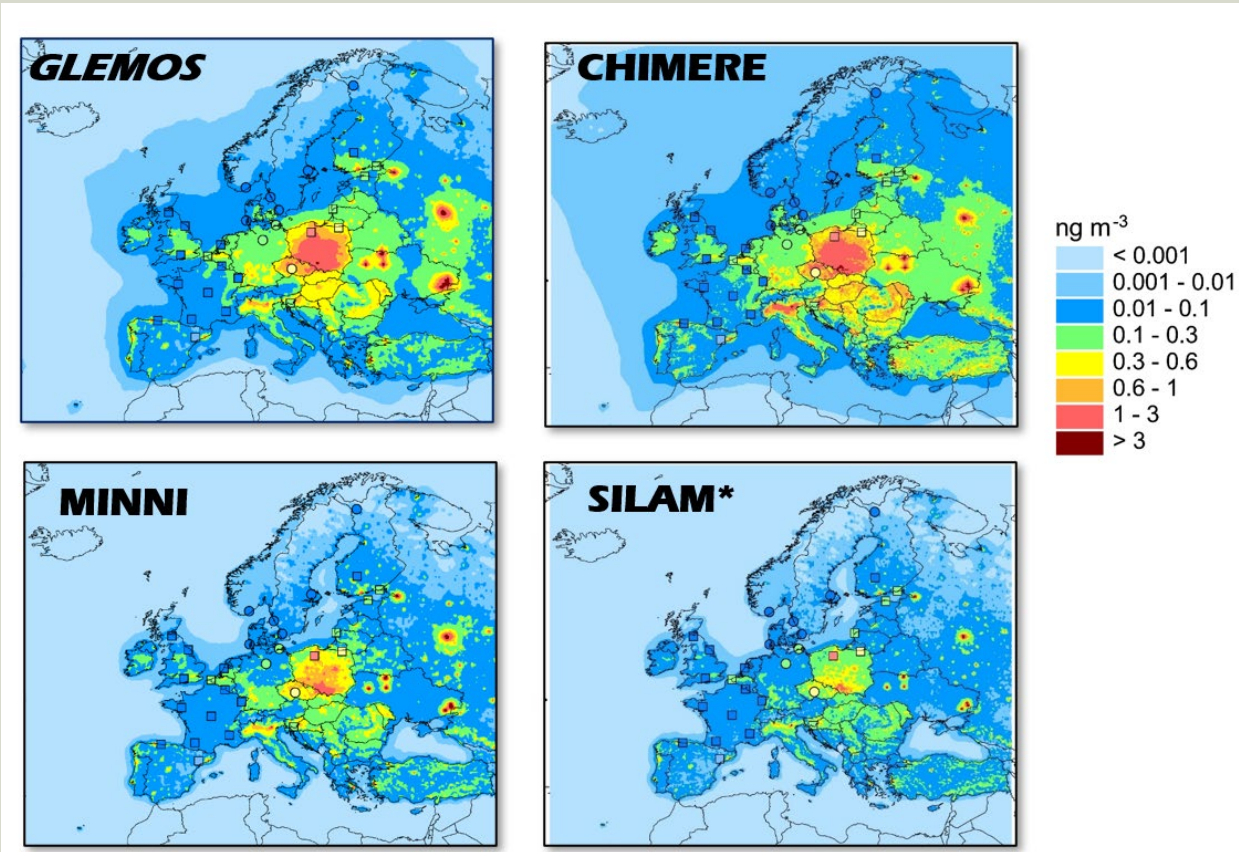
- Ozone trends
 - Methane (see discussion Wed 13/09/2023)
 - Focus on individual sources (see EIMP) and the maritime sector (Spain)
 - Same order of magnitude between past (17yrs trends), « climate penalty », and future projections, except for the most ambitious scenarios (MFR) => need to work on all scales

	Concentrations		Emissions		
	O ₃ avg	MDA8 JJA	NO _x	VOC	CH ₄ (conc)
Observations 2005-2021	+3%	-8%	-55%	-33%	+5%
Climate 2005/2050		+3%	0%	0%	0
CLE 2015/2050	+2%	-7%	-18%	-2%	+20%
MFR+CH₄ 2015/2050	-15%	-25%	-64%	-38%	-15%
CH₄ 2015/2050	-6%	-5%	0%	0%	-30%

HEAVY METALS & POPS

Eurodelta-BaP

- Modelling Experiment design
 - https://wiki.met.no/emep/emep-experts/tfmmeurodeltacarb_bap
- Coordination & Analysis
 - CIEMAT (MSC-East/EMEP)
- Modellers:
 - MSC-E/EMEP
 - France: INERIS/CHIMERE
 - Spain: CIEMAT/CHIMERE
 - Finland: FMI/SILAM:
 - Italy: ENEA/MINNI
- Status
 - The progress has slowed down in relation with the collaboration with MSC-East being on-hold.
 - CIEMAT remains committed to lead the activities, with several other contributing teams
 - New scientific topics were covered this year (e.g. BaP deposition, gas/particulate partitioning)



MISC. ITEMS

- Ambient Air Quality Directive,
 - The recast proposed by the European Commission Oct 2022 includes a specific link with EMEP through the development of supersites (both rural and urban)
 - CCC contribution to the public consultation, in coll. With TFMM Chair
 - General discussion at the TFMM Meeting
 - Biateral contribution of relevant SPs through the Council discussions
 - Webinar jointly organised with ACTRIS/Ri-Urbans/EMEP in June 2023
- Workshop on the monitoring of Chemicals of Emerging Concern
 - Oslo, Norway 8-10 November 2023
- Condensables
 - Develop model/observation evaluation on the basis of aethalometer data (CAMS/ACTRIS/RI-Urbans), follow-up of Eurodelta-Carb
- Low Cost Sensors
 - WMO launches an update of the 2021 report, EMEP will be consulted in the review process



The screenshot shows the European Commission website interface. At the top, there is the European Commission logo and navigation links for 'Log in' and 'English'. A search bar is also visible. Below the navigation, the page is categorized under 'Law'. The main heading of the page is 'Feedback from: EMEP Chemical Coordinating Centre'. Below this, there is a breadcrumb trail: 'Have your say > Published initiatives > Air quality - revision of EU rules > Feedback from:'. The main content area displays a table of feedback details:

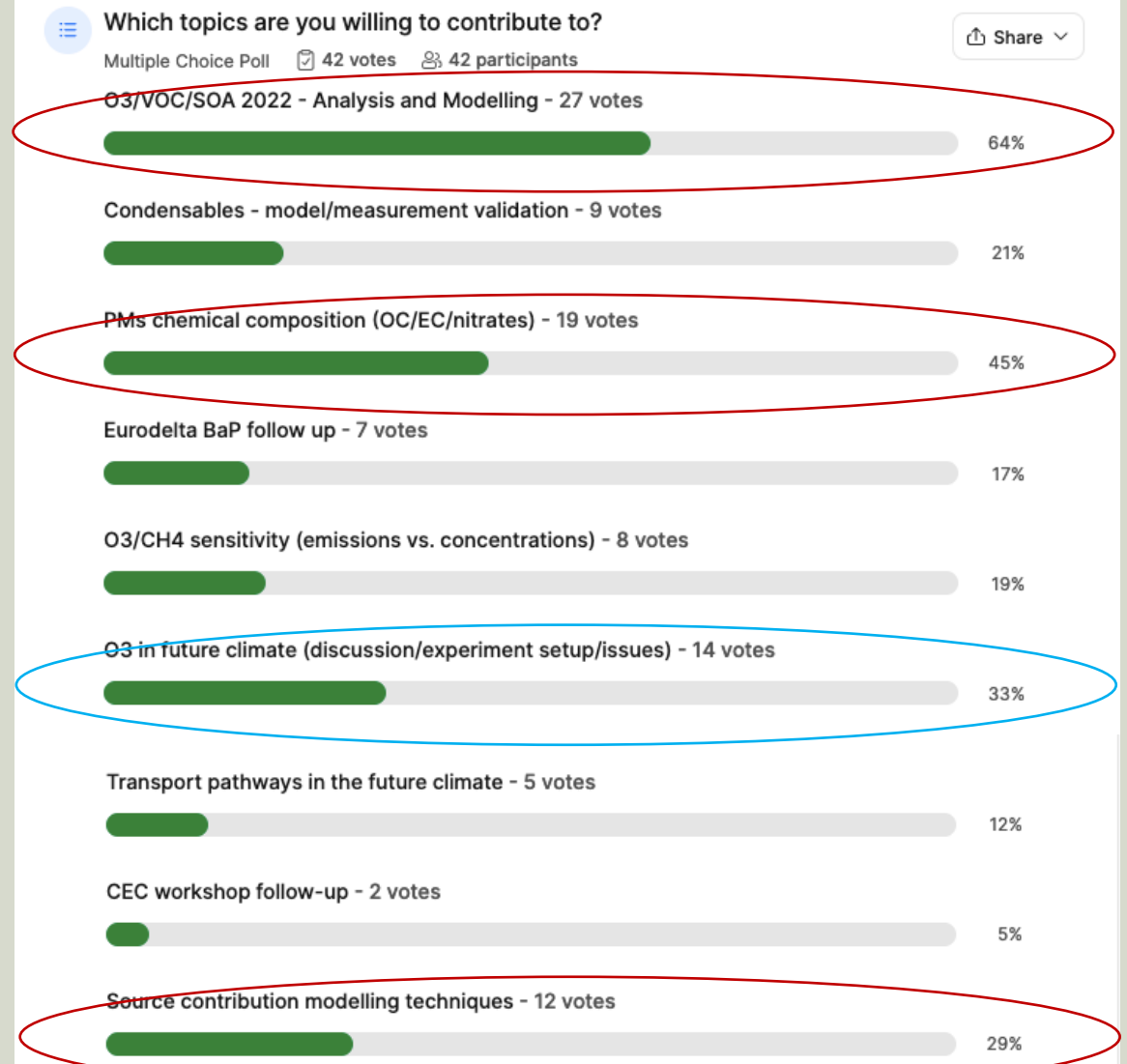
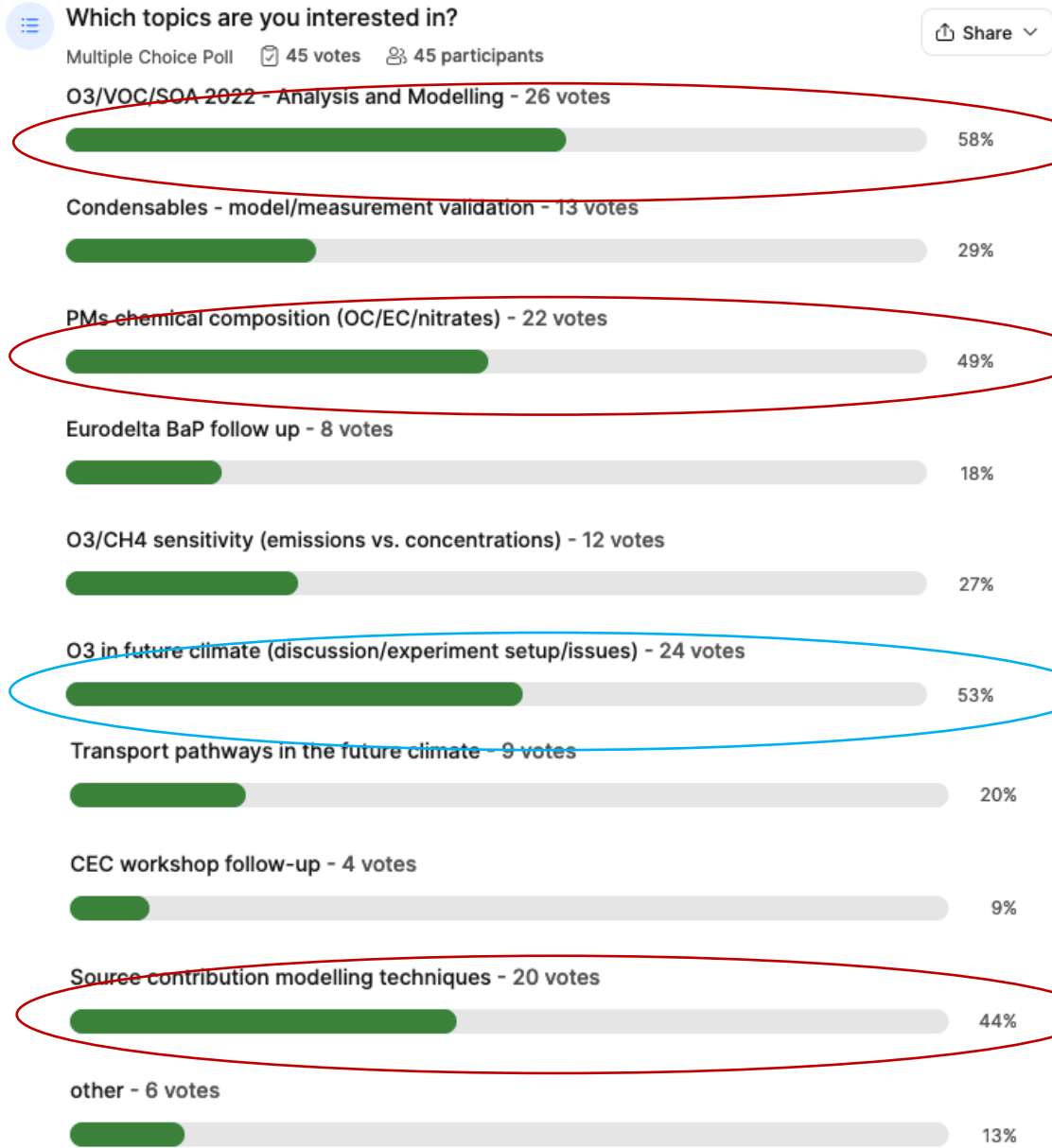
Feedback reference	F3388503
Submitted on	14 March 2023
Submitted by	Kjetil TORSETH
User type	Environmental organisation
Organisation	EMEP Chemical Coordinating Centre
Organisation size	Small (10 to 49 employees)
Country of origin	Norway
Initiative	Air quality - revision of EU rules

Below the table, there is a paragraph of text: 'This comment was prepared by the EMEP-CCC, with input from the Chair of EMEP TFMM. The EMEP monitoring strategy specifies the requirements for the monitoring activities of the Parties to EMEP: https://unece.org/sites/default/files/2021-01/ECE_EB_AIR_144_Add.1-2001542%20%28E%29_0.pdf (valid for 2020-2029). The EMEP Chemical Coordinating Centre (EMEP-CCC) is responsible for developing the EMEP monitoring strategy in cooperation with the EMEP Task Force on Measurements and Modeling (TFMM). Chapter III of the EMEP Monitoring

2024-2025 WORKPLAN

Joanna Strużewska, Lorenzo Labrador

Augustin Colette



1.1 IMPROVING TOOLS TO ASSESS AIR POLLUTION / 1.1.1 MONITORING AND MODELLING TOOLS

OZONE / VOC / CH₄

1.1.1.1 VOCs and high ozone pollution

- Follow up analysis of IOP summer 2022 + EMEP network
- NEW: model intercomparison exercise for the IOP including VOC evaluation (CCC, MSC-W)
- Outcome: modelling exercise design 2024 / modelling exercise 2025
- Preparatory stage (2024):
 - Revision of model output --> VOC species available; how to compare with measurements
 - Revision of model input --> how TotVOC are disaggregated for GNFR
 - VOC profile anthropogenic sources (emission group); what is available explicitly in the inventories
 - What is the representation of biogenic VOC and soil NO_x
 - J-values
- Modelling exercise for June 2022 (2025)
 - a) do we reproduce O₃ variability and maximum values
 - b) how well model results compare with precursor
 - c) sensitivity scenarios (at least no anthropogenic / no biogenic)
 - d) chemical regime - common approach

Messages for policy → high episodes, mitigation of VOC

1.1 IMPROVING TOOLS TO ASSESS AIR POLLUTION / 1.1.1 MONITORING AND MODELLING TOOLS

OZONE / VOC / CH₄ → Thematic session on methane – Wednesday

HTAP will lead the topic:

1.1.1.7 Long-term ozone trends and uncertainty in future projections in relation to methane mitigation (HTAP, MSC-W, TFMM)

Overlaps with 1.1.4.2 (HTAP)

1.1 IMPROVING TOOLS TO ASSESS AIR POLLUTION / 1.1.1 MONITORING AND MODELLING TOOLS

PM compositions

1.1.18 Finalise the Eurodelta-BaP model intercomparison. Assessment of the BaP related health effects

- Outcome: peer reviewed publication

→ Possible interactions with TFHealth

1.1.1.2 Chemicals of emerging concern

- Follow up conclusions and guidelines from workshop in fall 2023 (CCC)
- 8-10 November, Kjeller, Norway

1.1 IMPROVING TOOLS TO ASSESS AIR POLLUTION / 1.1.1 MONITORING AND MODELLING TOOLS

PM compositions

1.1.1.3 Aerosol chemical speciation in different models; how it can be matched with measurement (CCC) to assess the importance of different sources (1.1.1.5)

- Outcome: overview (2024)

1.1.1.4 How to apply profiles for condensables → Representation of intermediate and semi-volatile condensable emissions (TFEIP, CEIP) in models and the validation against existing observations of PM composition (CCC).

- Outcome: Overview / survey

Preparatory stage (2024):

- Answers to the questions
 - a) why PM10/PM2.5 is underestimated/overestimated
 - b) is PM10/PM2.5 correct for the wrong reason
- Revision of model input
 - a) how PMs are disaggregated;
 - b) which emission are available explicitly
 - c) How condensables are treated in the models (input)
- How mineral dust is treated in the models (soil, resuspension, desert dust)

Modelling exercise 1y (start in 2025 → ...):

- scope – to be agreed at TFMM meeting)

CONTRIBUTION TO OTHER WORK PLAN ITEMS

1.1 Improving tools to assess air pollution

1.1.5 Review of source-receptor methodologies: brute force & sensibilities (local fractions) and their applicability (EMEP report chapter, TFIAM)

- Cooperation with FAIRMODE

1.3 Cooperation with other projects and bodies

1.3.5 Low-Cost Sensor review of WMO (2024) → Lorenzo Labrador

1.3.8 Cooperation with Climate and Clean Air Coalition

COLLABORATION ACCORDING TO THE WORK PLAN

- MSC-W, CCC
- HTAP (1.1.4.2), TFEIP (1.1.2.3, 1.1.2.4), CEIP (1.1.2.6), , TFHeath (1.1.1.33)
- TFIAM (1.1.1.5, 1.1.1.33),
- Contribute to the Gothenburg Protocol Revision as mandated by the Executive Body (1.1.3.1)
- HTAP/EPCAC (scale interactions)
- FAIRMODE (source receptor)

25TH ANNUAL TFMM MEETING

(NO HOST COUNTRY YET)

6-7 MAY 2024 (TBC)