Agenda for this morning

Thursday 16th May

9:00 - 9:45 User Engagement (Jeroen Kuenen)

9:45 - 10:20 Satellite date

9:45 - 10:05 SEEDS (Sentinel EO-based Emission and Deposition Service) project (Leonor Tarrason, NILU)

10:05 - 10:20 Discussion (lead by Jeroen Kuenen)

10:20 - 11:30 New Science

10:20 - 10:40 HTAPv3 Global Emissions Mosaic (Monica Crippa, JRC)

10:40 - 11:10 Coffee break

11:10 - 11:30 The use of inverse modelling for emission reporting verification (EEA)

11:30 - 11:50 Emissions from Commercial Cooking (Tim Murrells, Ricardo)

TFEIP

TFEIP User Engagement

Jeroen Kuenen (TNO)

Start presentation

Outline

- Summary of what was done before and work plan

- Available additional profiles and factors - examples
  - Temporal emission distribution
  - Pollutant speciation (NOX, SOX, PM, NMVOC)

- Our work plan and the Guidebook

Recap (1)

- Emissions are key input for modelling
- Inventories need several “add-ons” to be used in models
- Reported data not always most suitable
- One-way exchange of information, no interaction

- Interaction on emissions & modelled results
  - Modelled results can be compared to measured data (in-situ & satellite) which may trigger feedback to emission community
  - Valuable alternative approach / type of validation to emission inventories

Recap (2)

- Emission inventories focus primarily on national totals by sector for each pollutant & year (what matters for compliance)
- But users (modellers) need more than just that, in particular:
  - Gridded emissions (annually)
  - Temporal disaggregation
  - Speciation for lumped pollutants (particularly PM and NMVOC but also NOx & SOx)
- Can we – from TFEIP – help:
  - Facilitate the dialogue between emission inventory compilers and users
  - Provide our user community with relevant additional information related to emissions

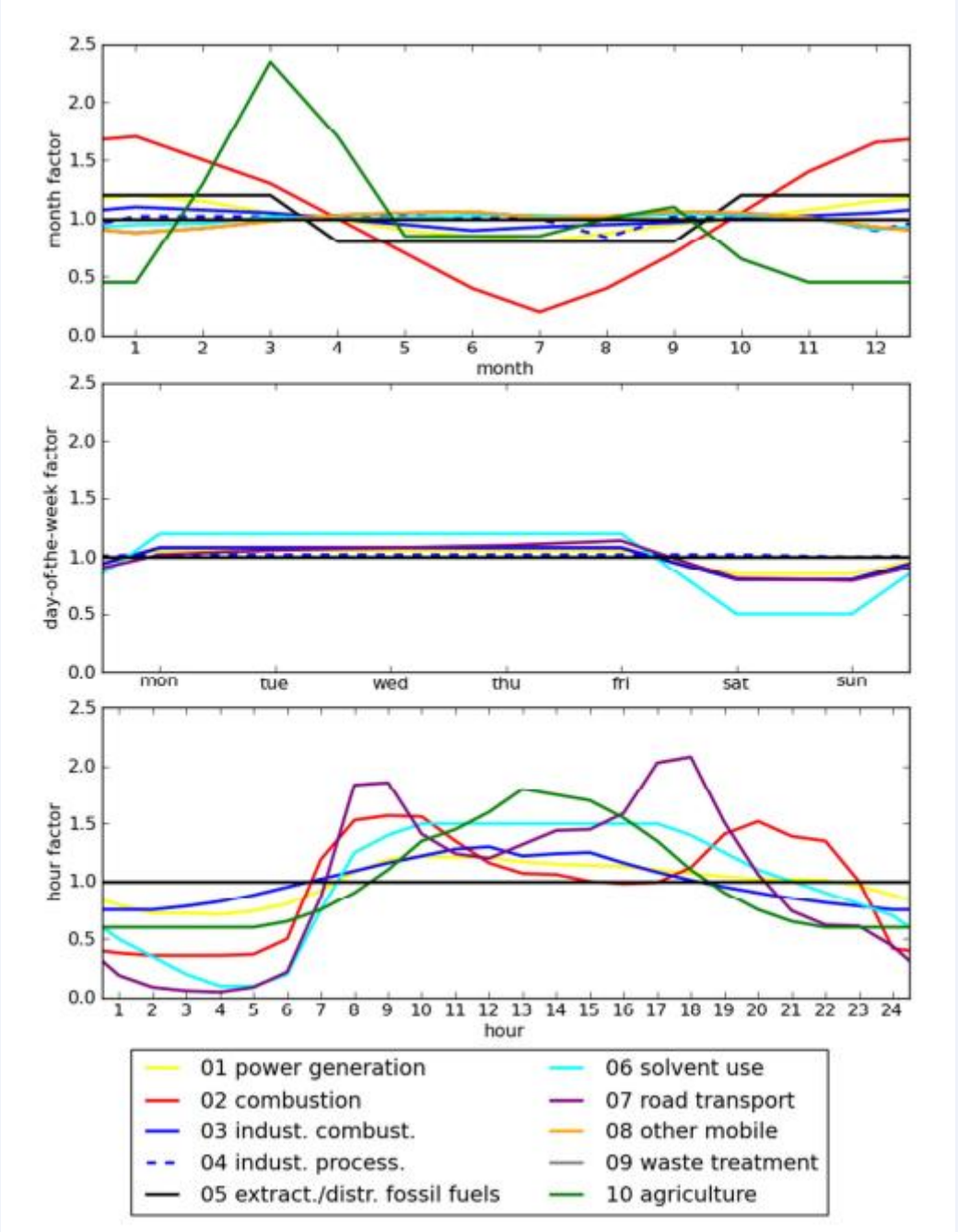
Work planned in recent years

- Update the EMEP/EEA Guidebook 2023 on spatial emissions mapping
  - Done
- Make a document of information not related to the spatial distribution
  - Recommendations for users for what they can use
  - Not done due to lack of resources – on work plan for next year

Temporal emission profiles

- For many years modellers used static profiles per main activity sector
  - Seasonal variation (distribution over months)
  - Weekly variation (weekdays vs. weekends)
  - Diurnal variation (within 24 hours of each day)

- For many years users have used standard profiles



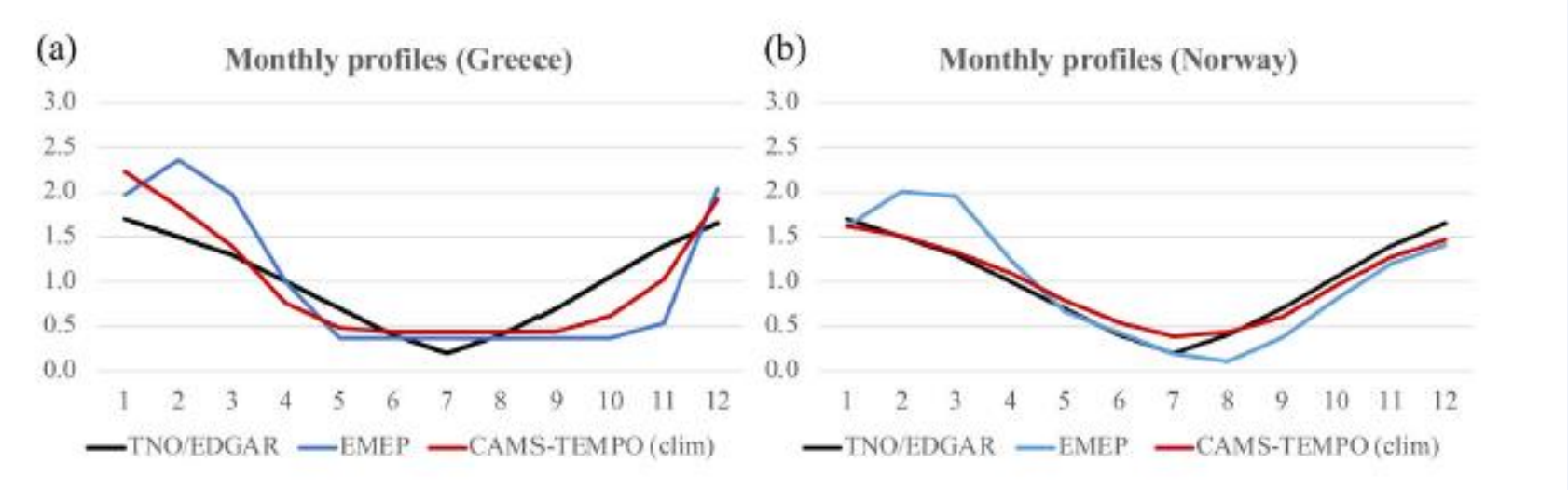
Improving temporal emission profiles

- With improving inventories and model capabilities, timing of emissions becomes relatively more important
- Several ways to improve temporal profiles
  - Profiles per day (365) and hour (24) instead of combination of 3 factors
  - Profiles for more detailed sectors
  - Regional (or country) specific profiles
  - Pollutant specific profiles
  - Gridded emission profiles

- A detailed construction of new emission temporal profiles taking into a combination of the factors above was constructed in the framework of CAMS and is described in detail in Guevara et al. (2021)

Examples of new approaches

- ENTSO-E Transparency Platform publishes electricity production statistics for most EU Member States **per fuel type** at **hourly resolution** for power plants
- A heating degree function is used for small combustion, modelling the fuel demand based on outdoor temperature on an hourly basis

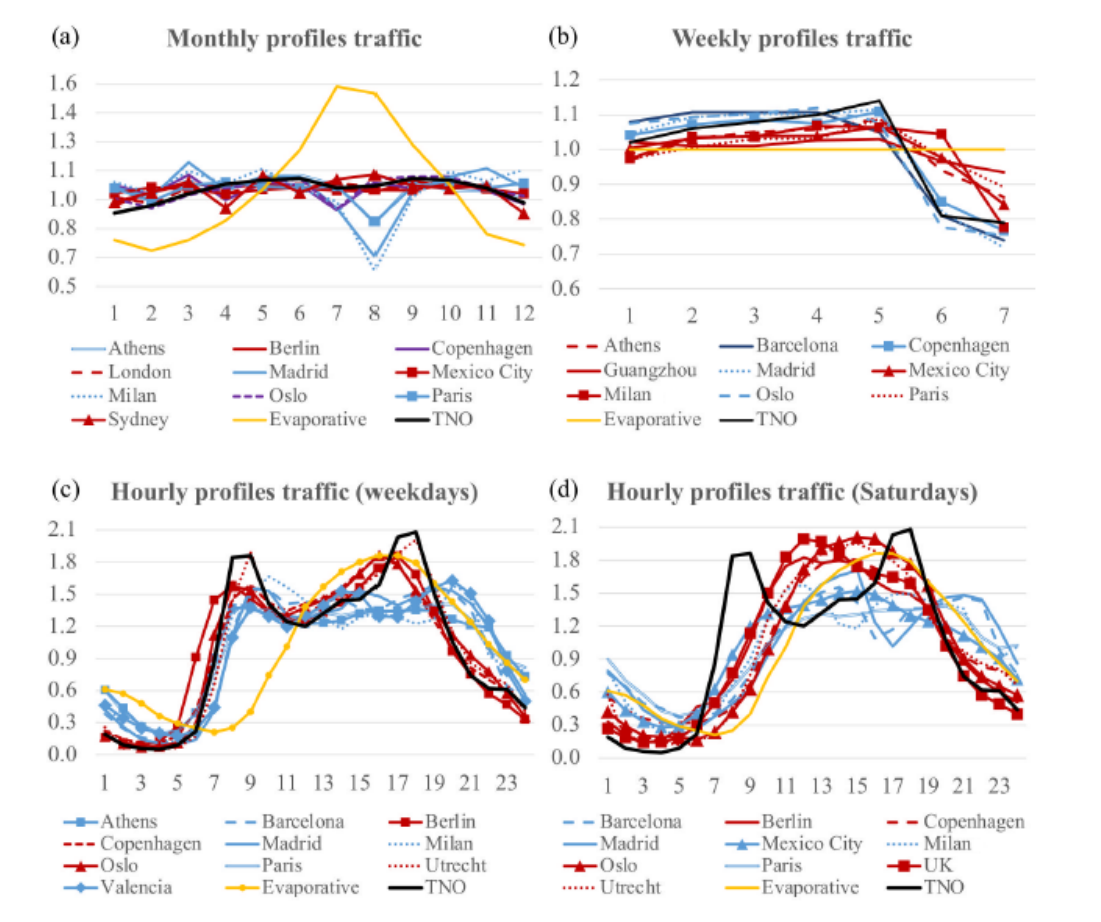


(using climatology, averaged HDD-based profiles for 2010-2017)

*Based on CAMS-TEMPO dataset, see **Guevara et al. (2021)***

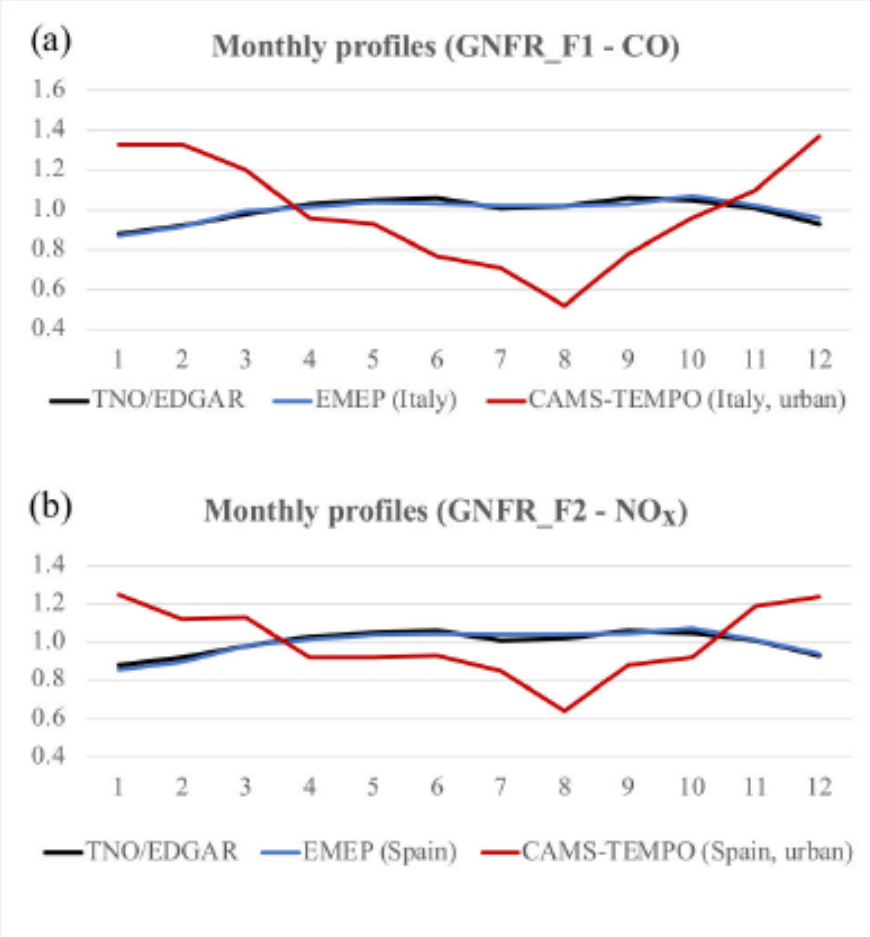
Examples of new approaches – road transport

Profiles derived based on traffic counts in major cities



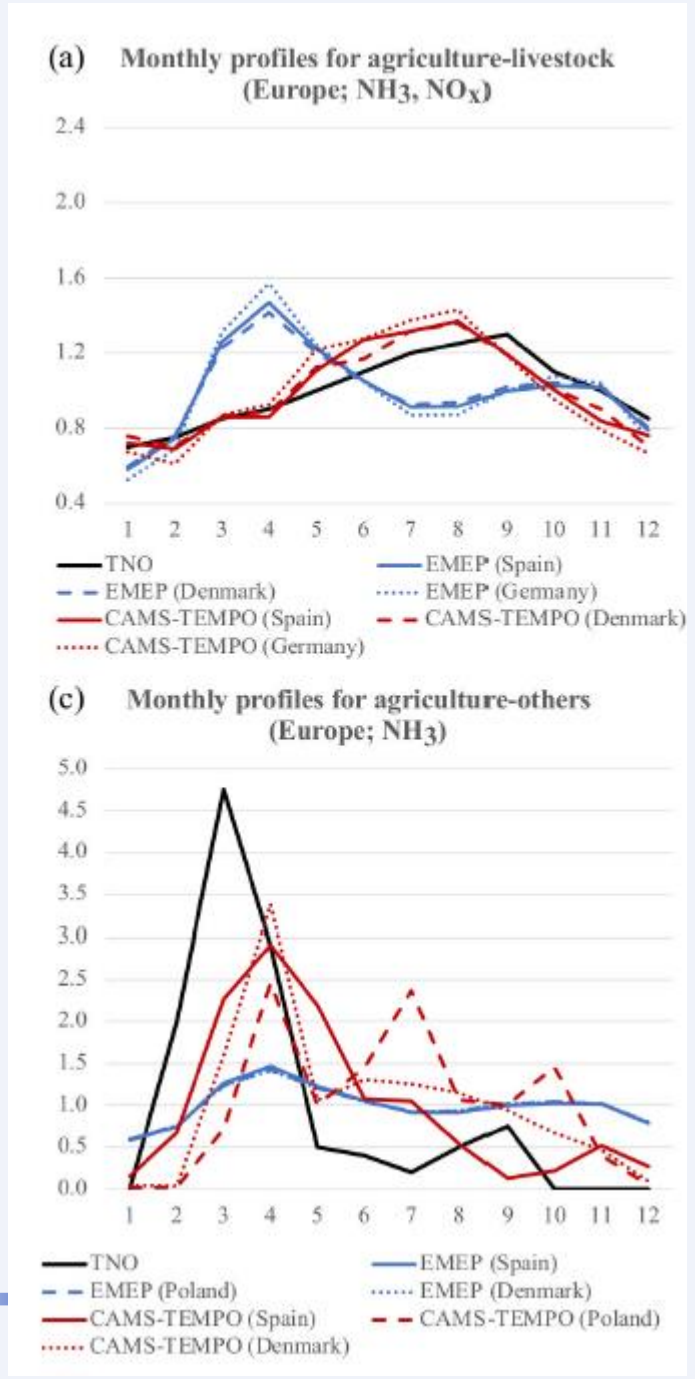
Based on CAMS-TEMPO dataset, see ***Guevara et al. (2021)***

Taking into account dependency of emissions on ambient temperature



Examples of new approaches – agriculture

- Livestock N-emission variation estimated depending on temperature and ventilation rates (following approach in Skjøth et al. 2011)
- For other agriculture
  - NH3 based on fertilizer/manure application (crop calendar)
  - Other pollutants: agricultural waste burning (estimated based on GFEDv3.1)



Based on CAMS-TEMPO dataset, see ***Guevara et al. (2021)***

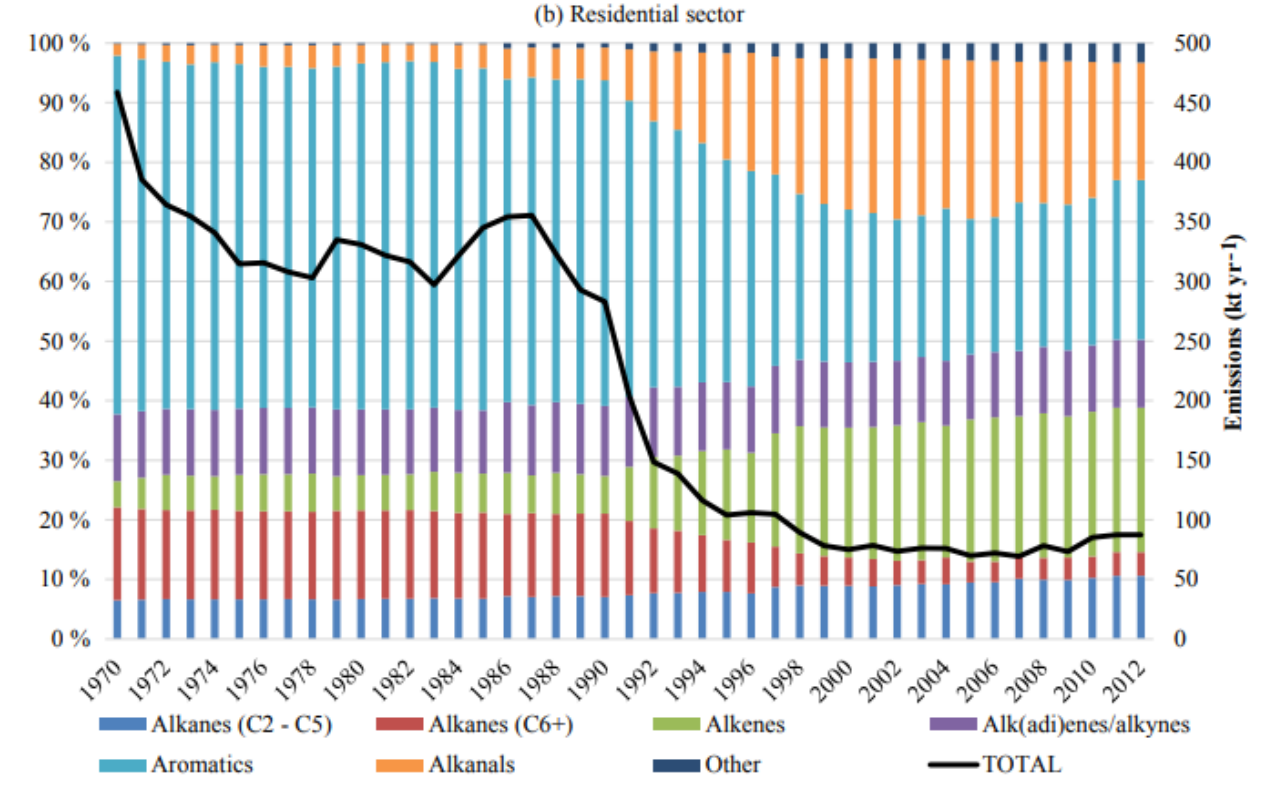
Temporal profiles - conclusions

- The Guevara et al. (2021) CAMS-TEMPO dataset provides an excellent starting point
  - Updates to the dataset have been made through CAMS contracts

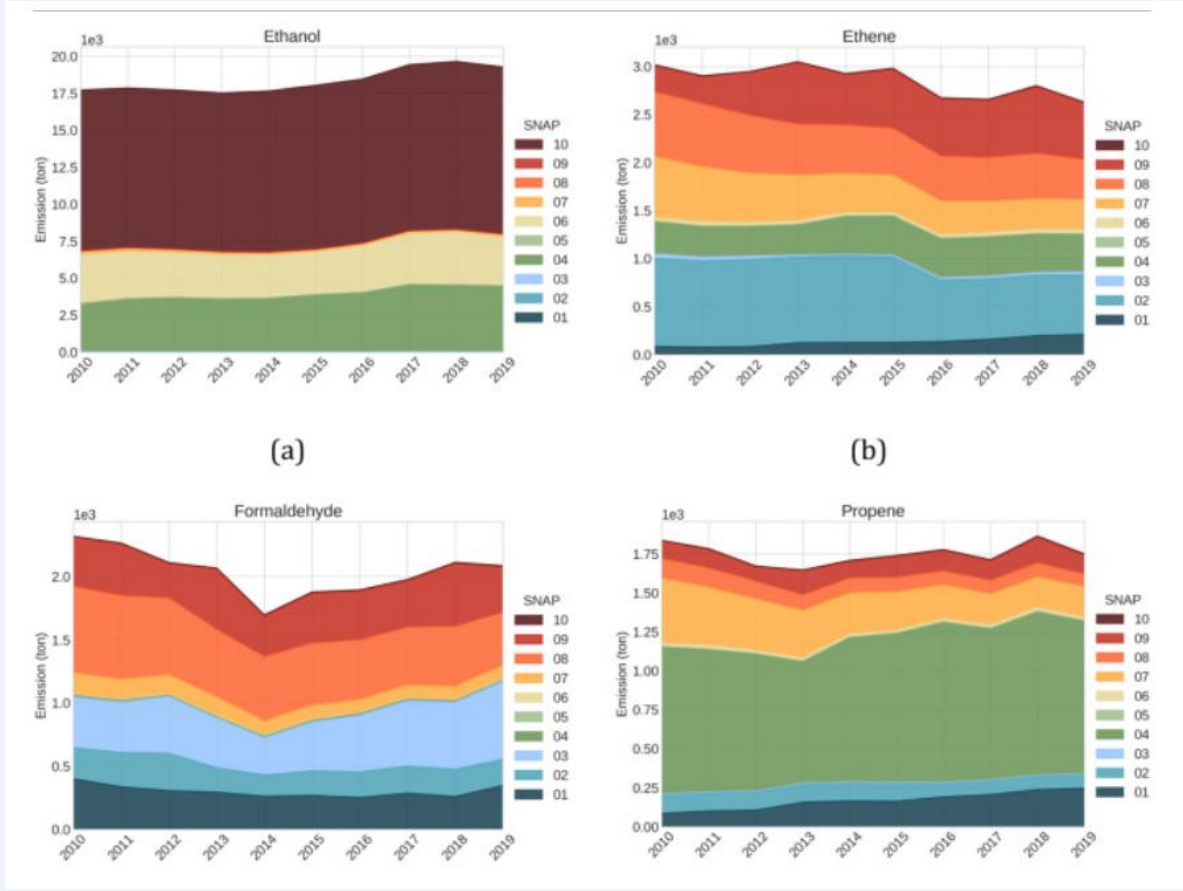
- Suggested way forward
  - Propose CAMS-TEMPO as the primary source of information for temporal emission disaggregation
  - **Question**: any nationally available information in countries- please provide the information so it can be included.

NMVOC speciation

Huang et al. (2017) EDGAR v4.3.2-VOC *(example for Germany, residential sector)*

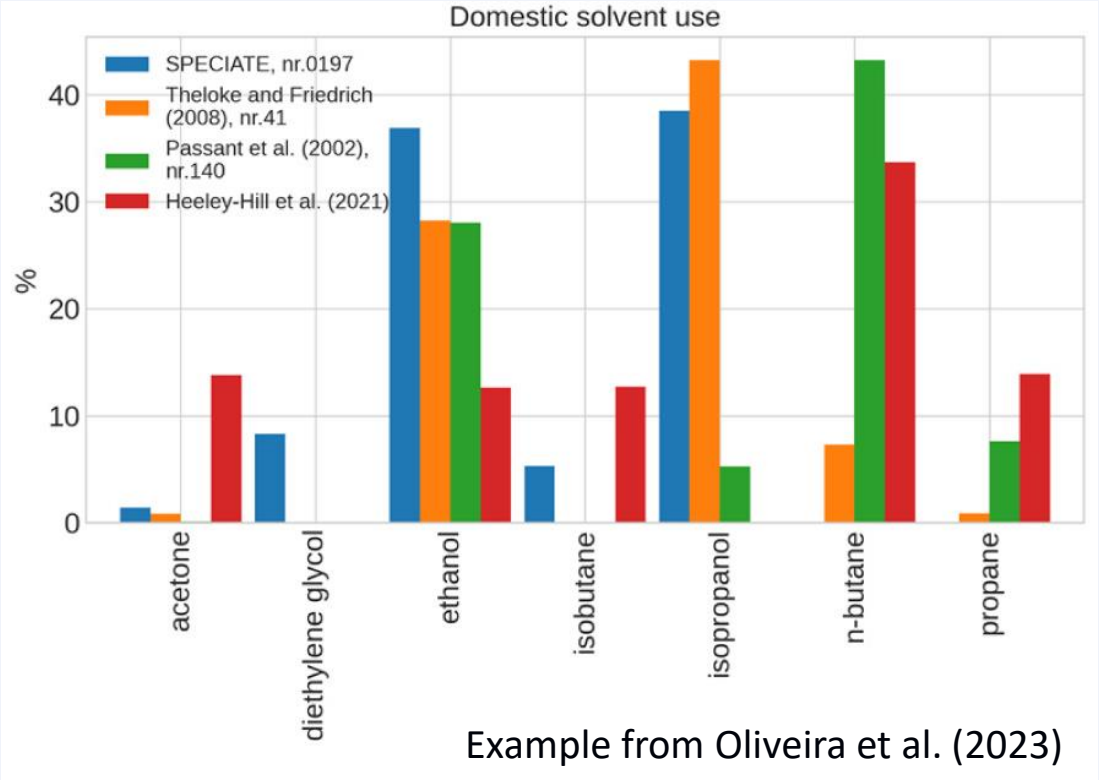


Oliveira et al. (2023) for Spain – examples for species with high ozone formation potential



NMVOC speciation

- Various NMVOC speciation profiles available, but…
  - Temporal coverage (which years)
  - Country coverage (Europe/global or just single countries/regions)
  - Species included do not always match 1-to-1 with model needs
  - Representability / Quality ?



Example from Oliveira et al. (2023)

- Proposed way forward
  - Make an overview of available datasets and corresponding descriptions or papers
  - If there is any nationally available information in countries- please send us the information so it can be considered!

EMEP/EEA Guidebook

- Next Guidebook update scheduled for **2027** but already planning ahead
  - How can we best support emission inventory compilers **and** users?

- Spatial mapping guidance
  - Needs for updating this chapter?
  - Feedback very welcome
  - Collect ideas until next TFEIP meeting (2025)

- Guidance on NMVOC speciation & temporal emission disaggregation, possibly including also other emission related information which is **not** part of our emission inventories
  - As additional Guidebook chapter or stand-alone background document

Work plan for the coming year(s)

- **NMVOC emission speciation (*TFEIP Work Plan Task 1.1.1.1*)**
  - Link to work being done in several places, can we identify best practices/approaches?
- **Improve data for modellers: updated EMEP gridded emissions (*TFEIP Work Plan Task 1.1.2.6*)**
  - Liaise with CEIP activities on gapfilling the gridding processes
- **Converting annual emissions into fine time steps (hourly scale) for modelling applications**
  - Proposed approach to recommend CAMS-TEMPO approach as “best practice”
- **Uncertainties in emission estimates**

We need your contributions!

Thank you for your attention!

An Expert Group on User Engagement was formed for previous GB update and will be used as a starting point for the upcoming work

If you can contribute (or someone else from your team who is not in this meeting) please reach out!!!

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