

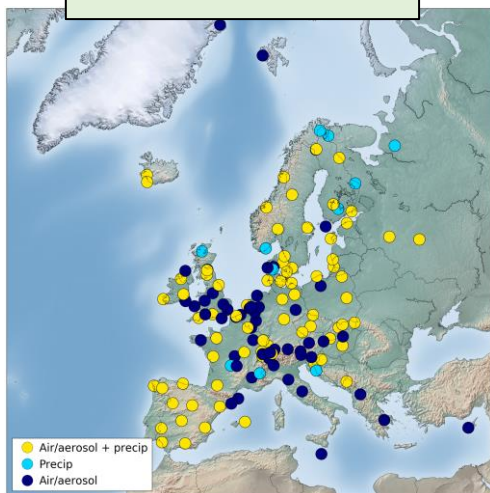
EMEP-CCC Progress of work

Wenche Aas, Anne Hjellbrekke, Helene Lunder Halvorsen, Pernilla Bohlin Nizzetto, Stephen Platt, Svetlana Tsyro (MSC-W), Sverre Solberg, Kjetil Tørseth and Karl Espen Yttri

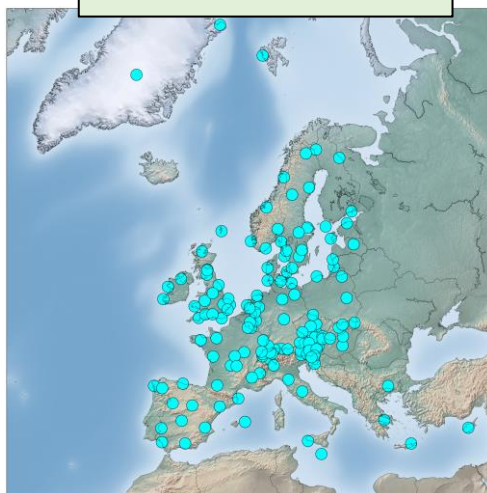
- ✓ Status 2020
- ✓ EMEP intensive measurement period
- ✓ Future plans

Measurement sites in 2020

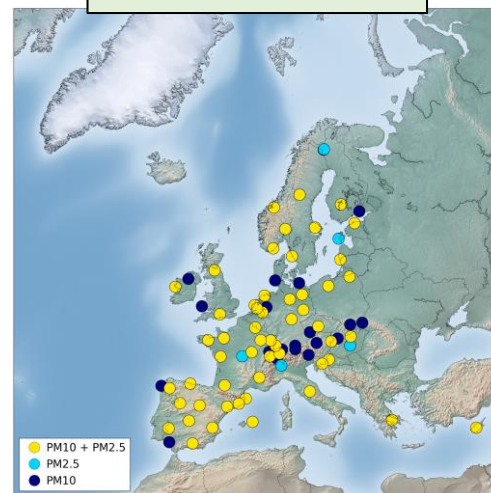
Inorg.: 140 sites
from 32 Parties



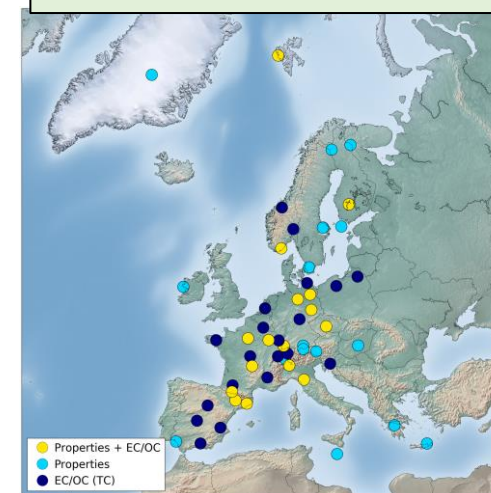
Ozone, 139 sites
from 28 Parties



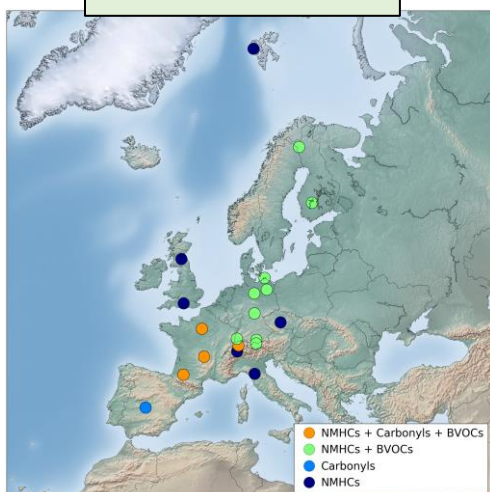
PM: 81 sites
from 22 Parties



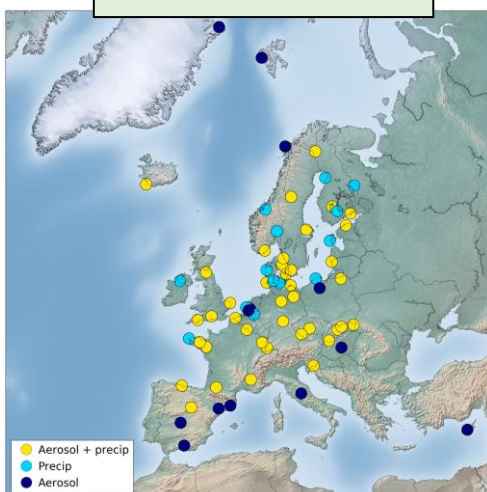
Aerosol prop: 57 sites
from 16 Parties



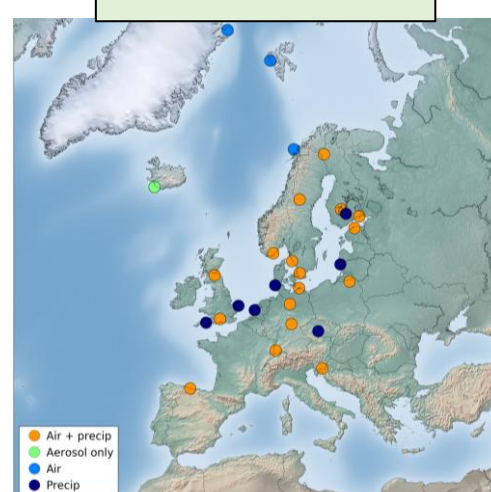
VOC: 20 sites
from 9 Parties



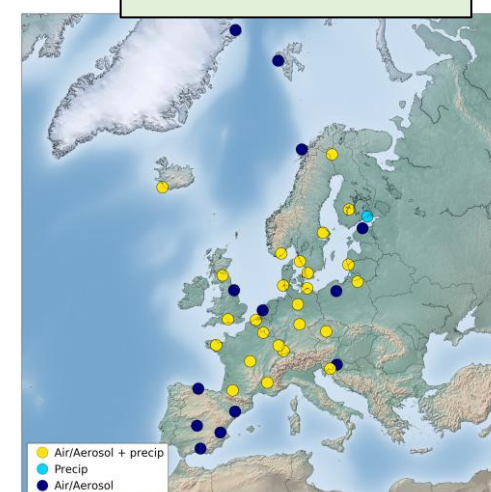
HM: 67 sites
from 21 Parties



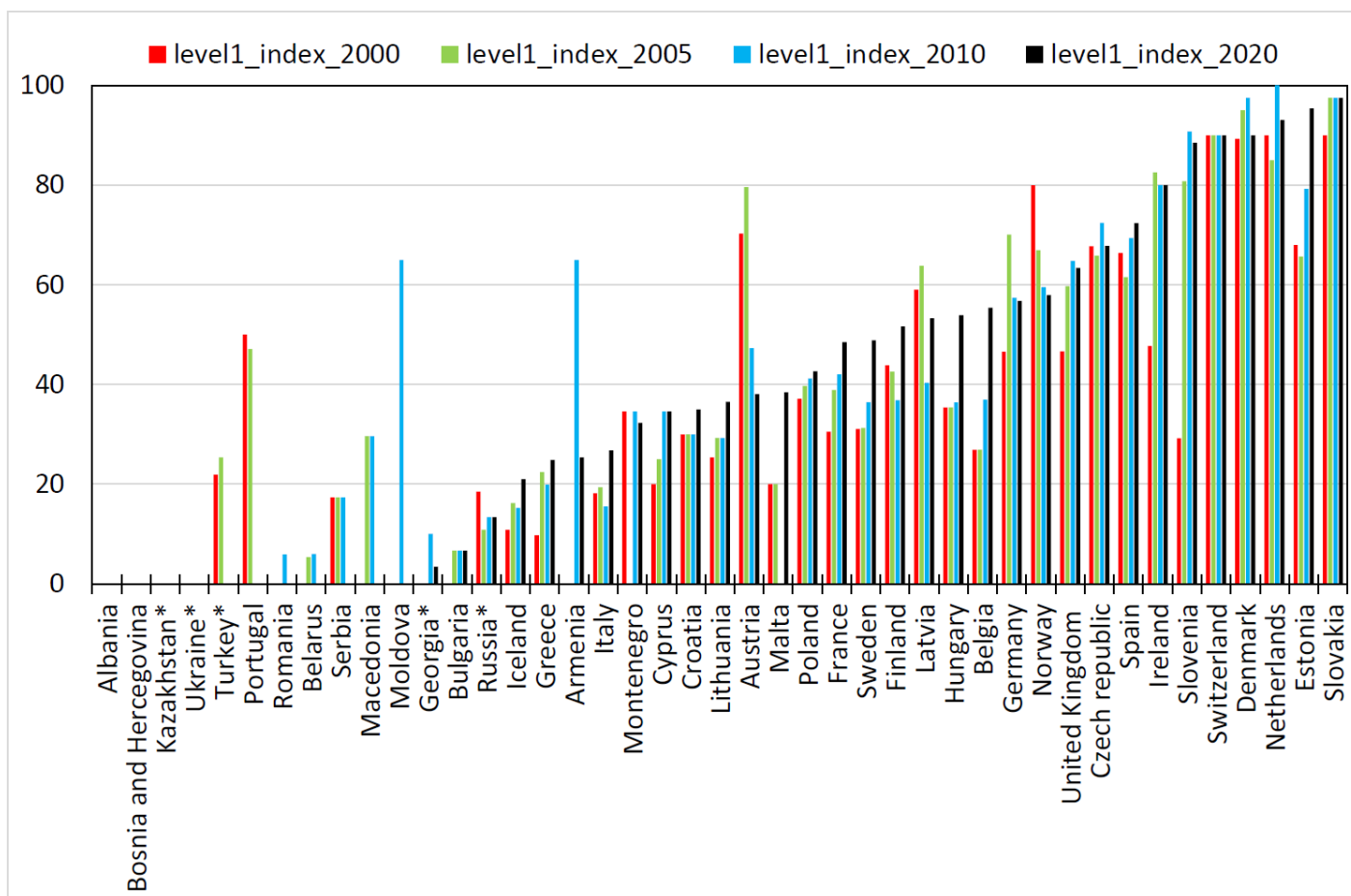
Hg: 28 sites
from 14 Parties



POPs: 39 sites
from 17 Parties



Implementation of monitoring strategy, level 1



Since 2010:

- **35%** Parties improved
- **37%** Parties reduced

Since 2000:

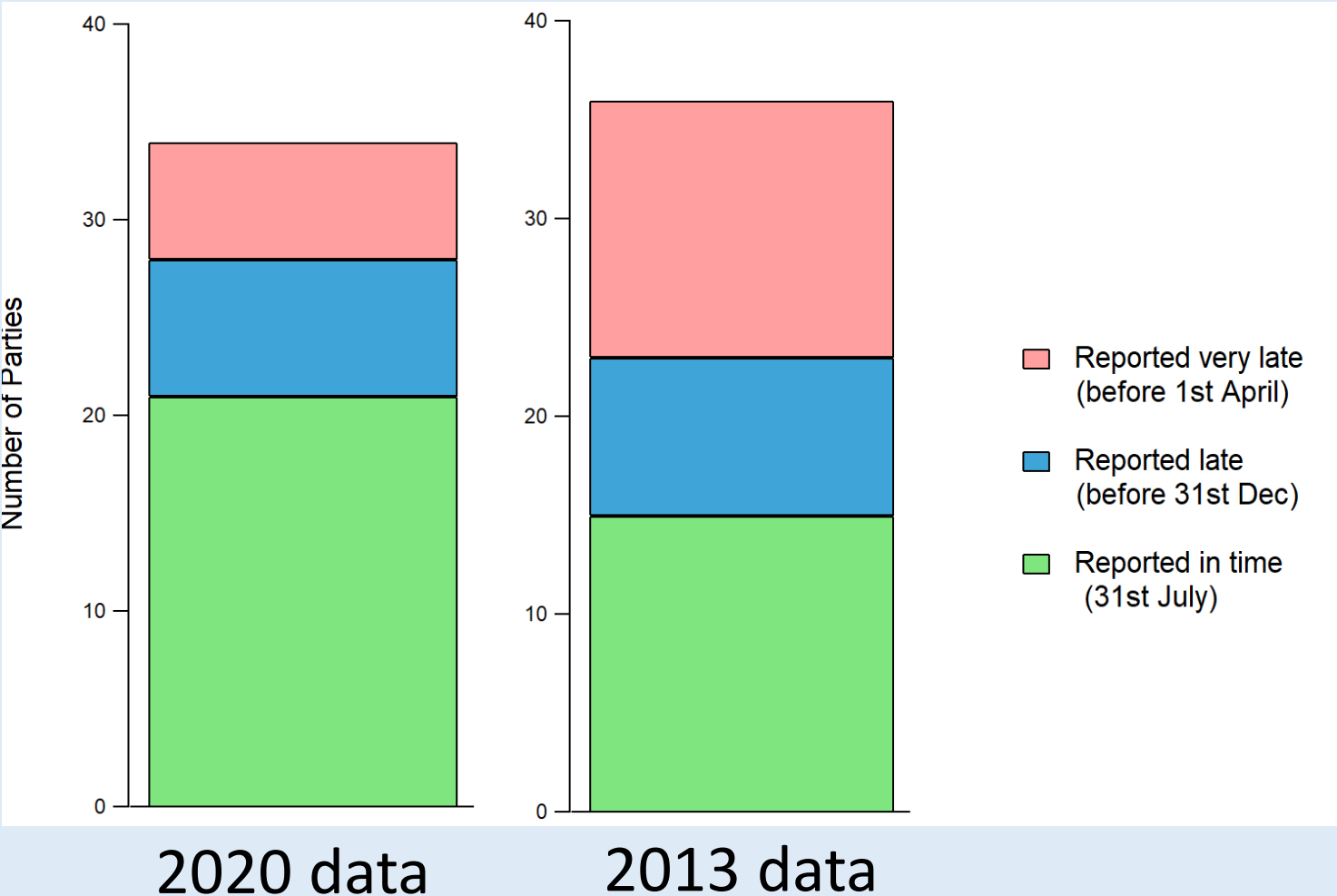
- **60%** Parties improved
- **19%** Parties reduced

Thus:

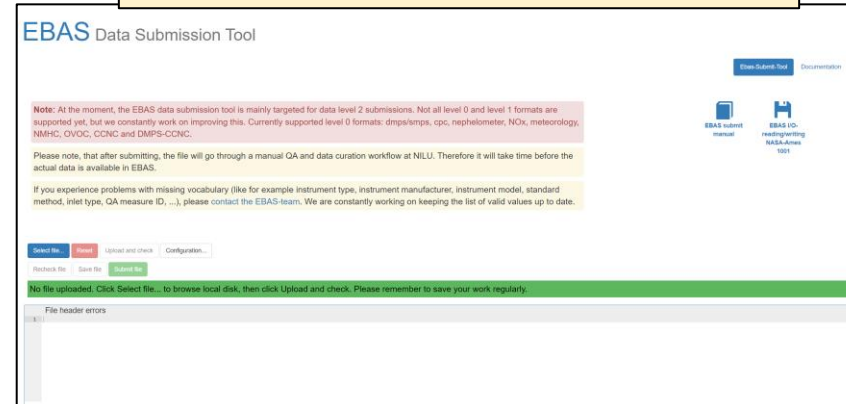
Net improvement since 2000
Status quo since 2010

Timeliness and quality in reporting has improved

Time when Parties report their data

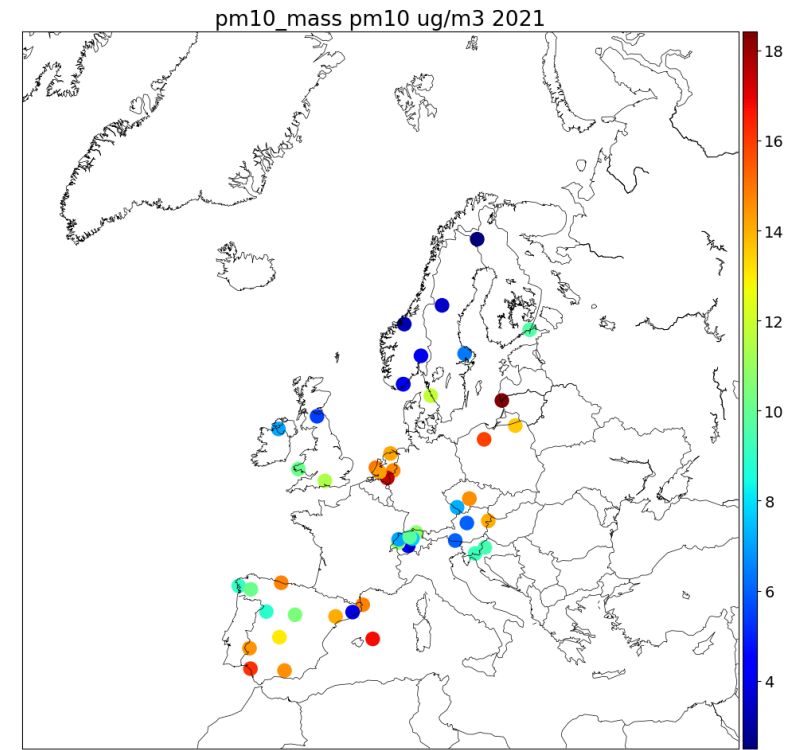
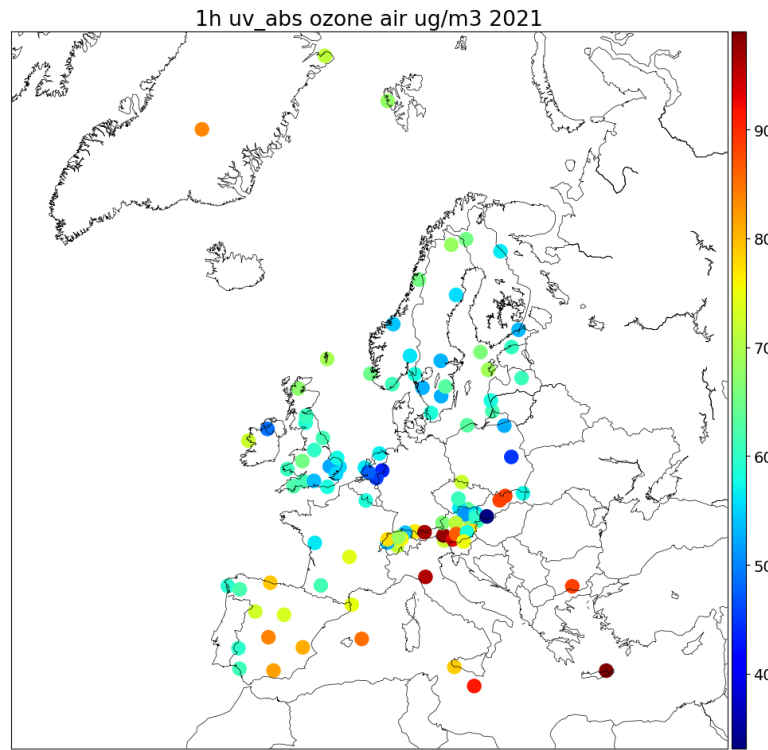
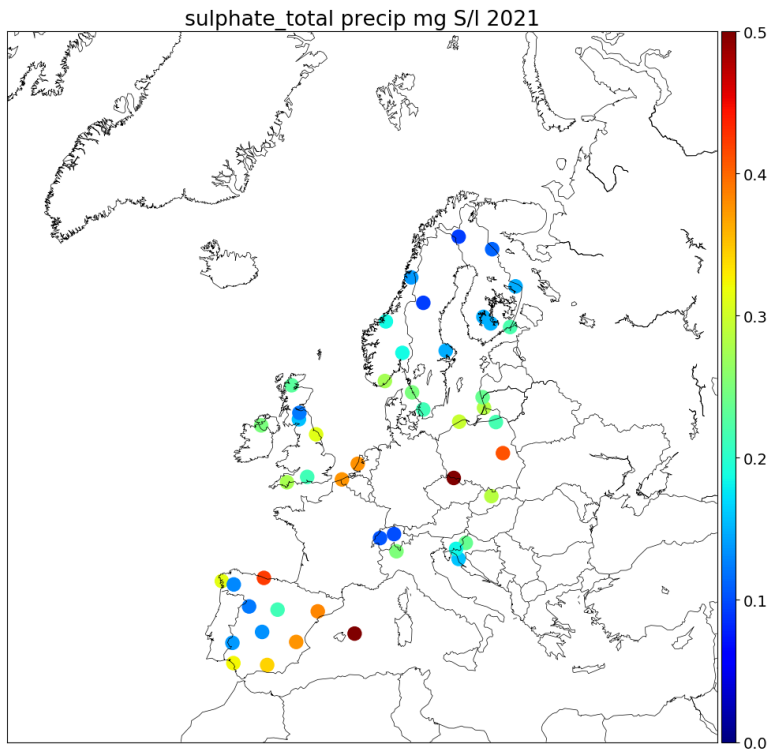


Improved tools and guidelines for reporting
<https://ebas-submit-tool.nilu.no>



Improved reporting → data available earlier ☺

-a lot of data for **2021** are already **openly** available in EBAS
(only 6 weeks after the reporting deadline)



EMEP intensive measurement periods (IMP)

The IMPs are important supplement to the regular monitoring

❖ Every 3-4 years

❖ A focus on specific areas with identified gaps:

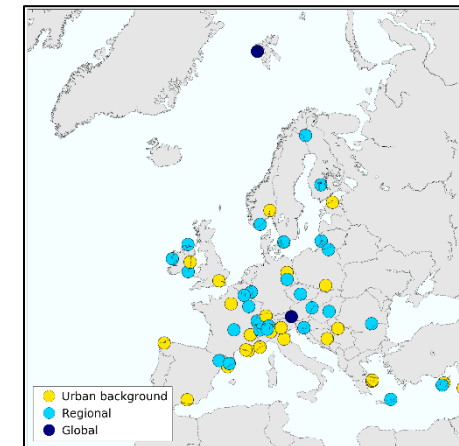
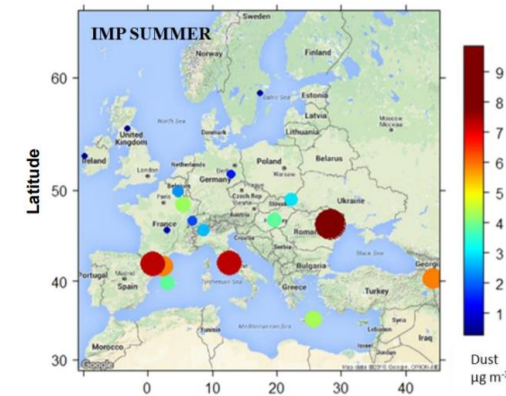
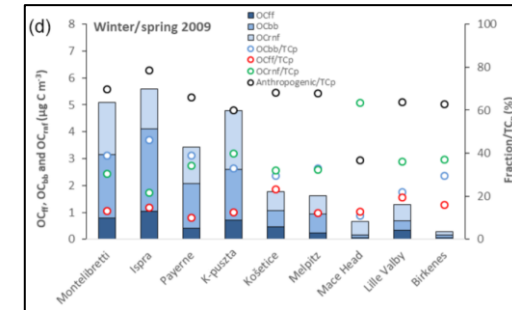
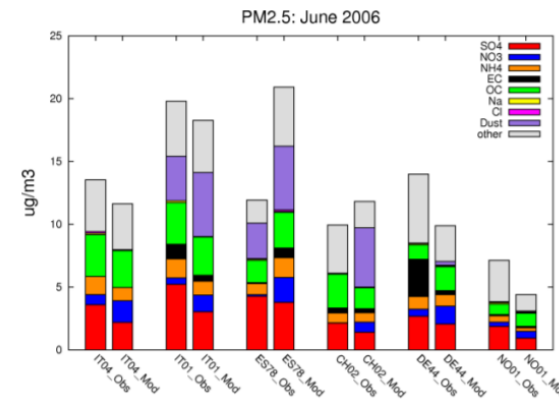
- Lack of observations
- Improve model development
- In emissions

❖ Involve Parties (via TFMM)

❖ Close cooperation with research programs and EU infrastructures

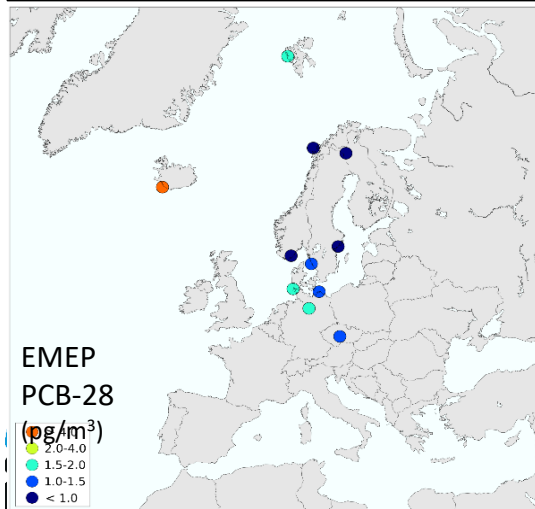
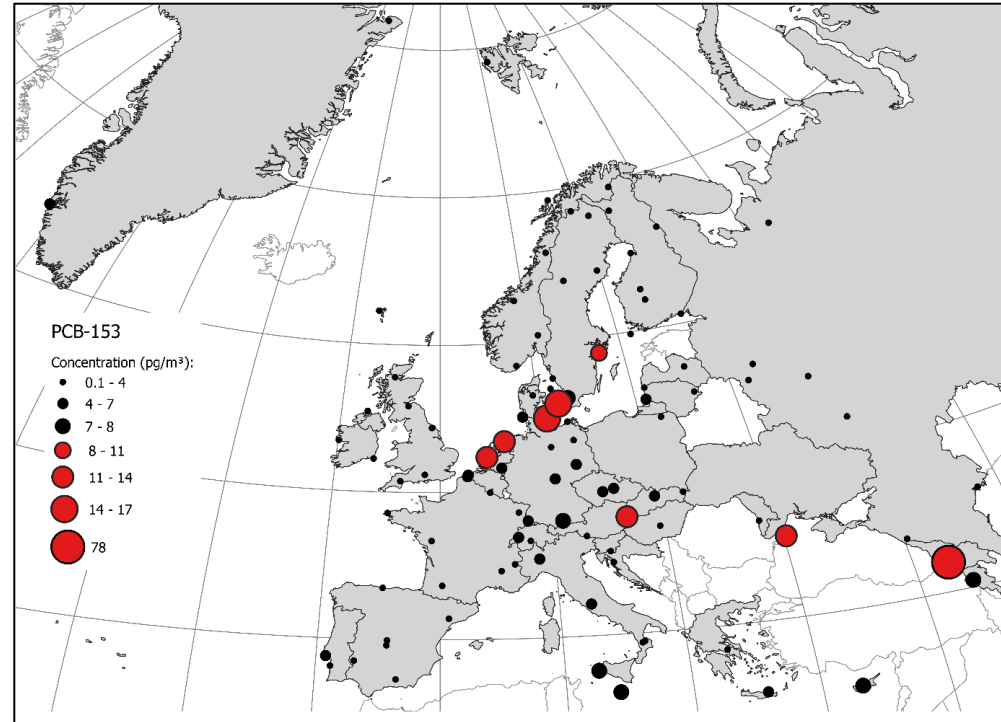
Conducted IMPs:

- June 2006 and January 2007. Chemical composition of PM
- Oct. 2008 and March 2009. Carbonaceous aerosols
- 2012. One year ACSM measurements
- July 2012 and January 2013 Geochemistry of PM₁₀
- 2016 (and 2006) POP passive campaign
- December 2017 - March 2018. Apportionment of eBC

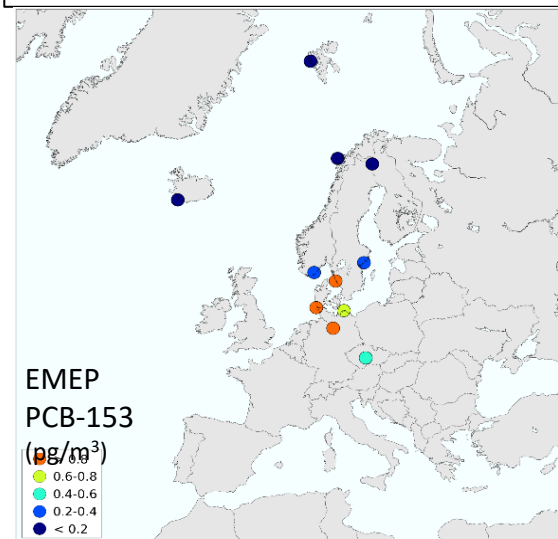


- Summer 2022 (and 2023?) on the relation between ozone episodes and VOCs

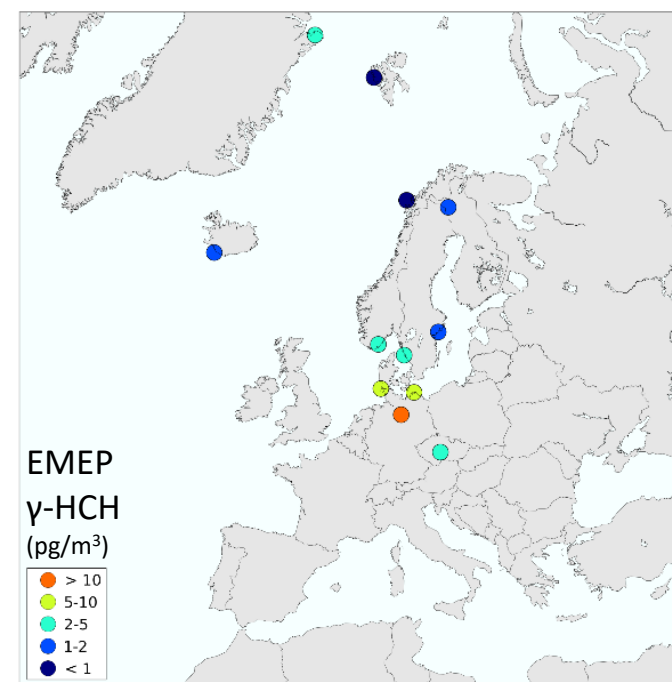
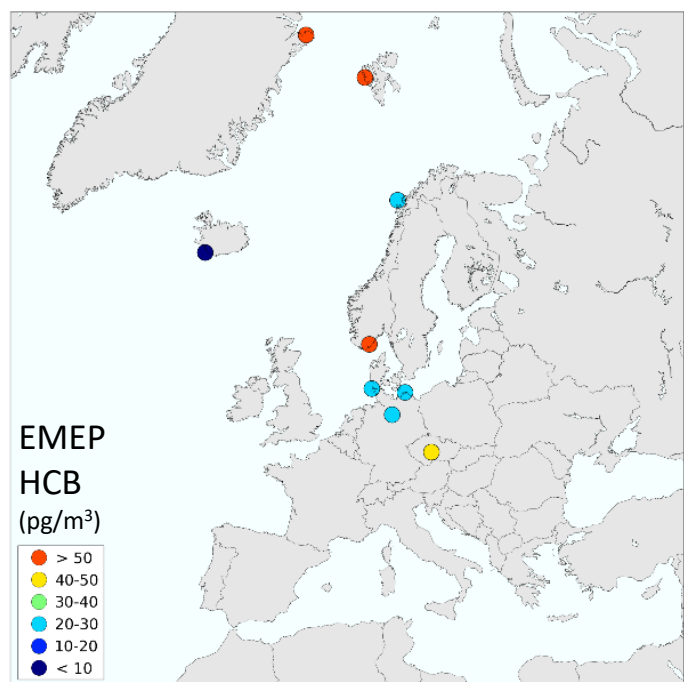
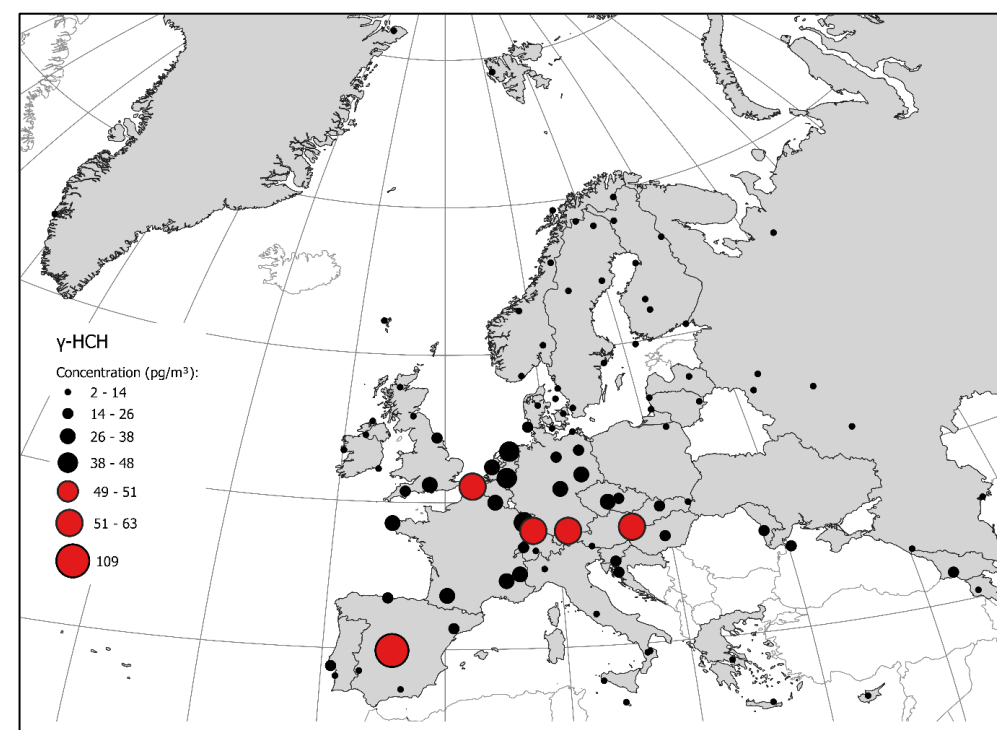
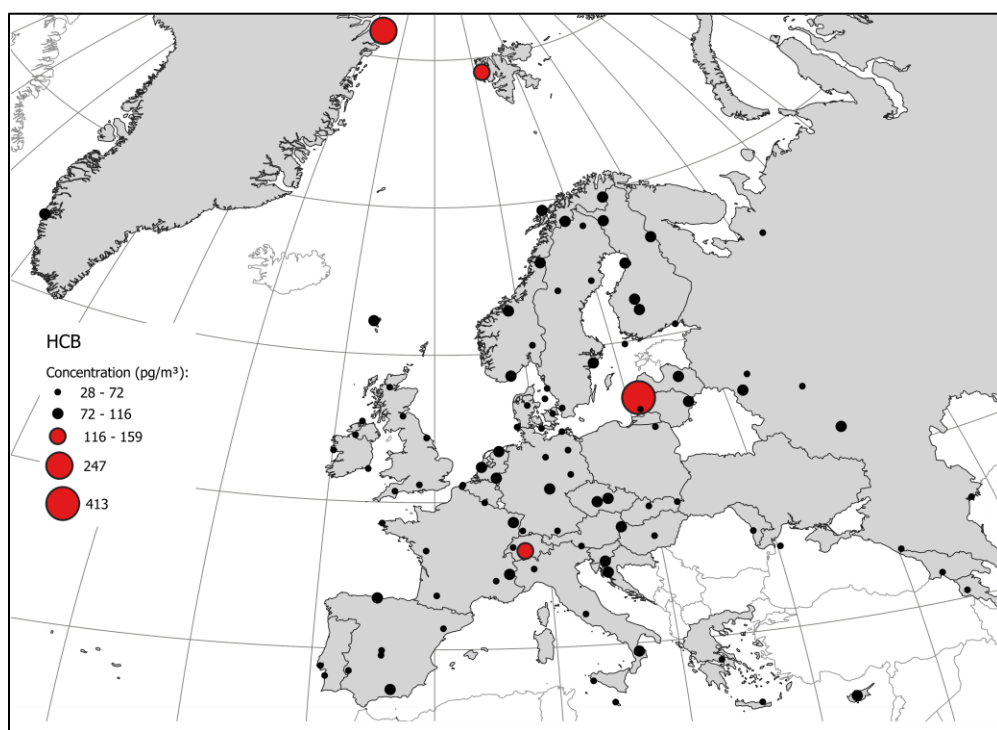
Passive sampling of POPs in IMP 2016



Active
sampling in
2016

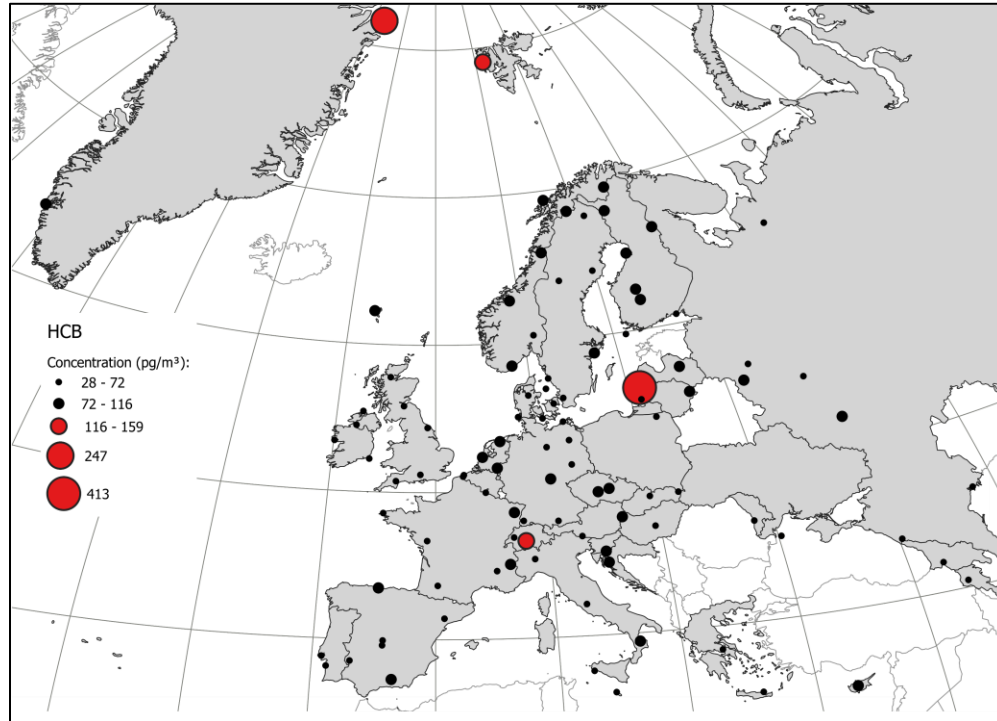


101 sites across 33
countries in Europe.
96 of the sites are
EMEP sites

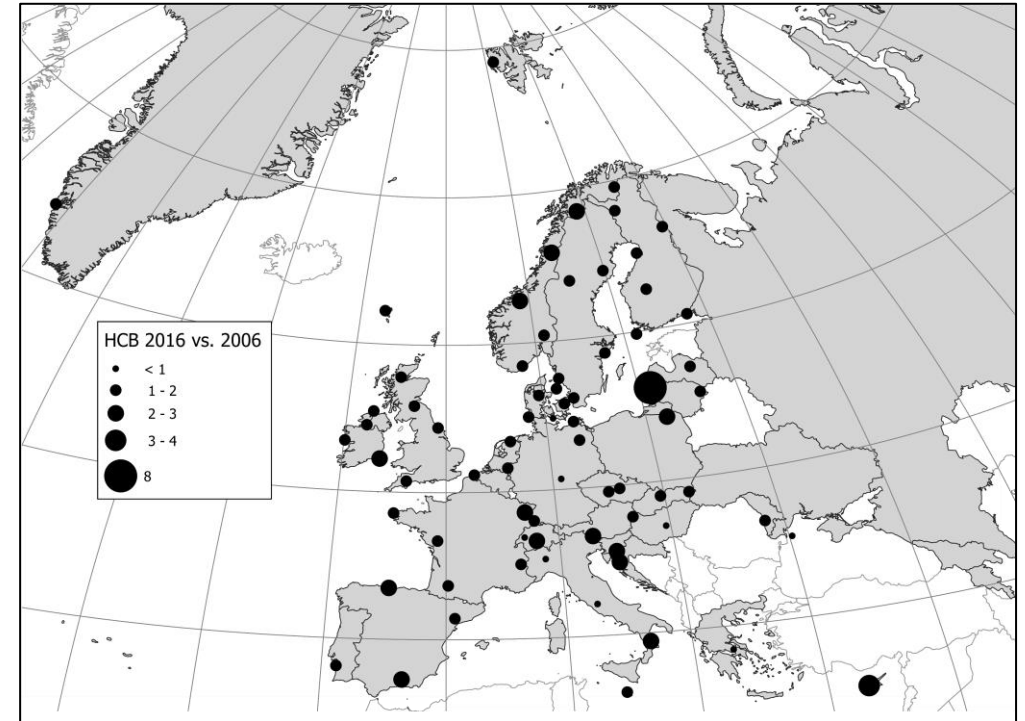


Comparison to a PAS campaign conducted in 2006

HCB, 2016



HCB 2016/2006



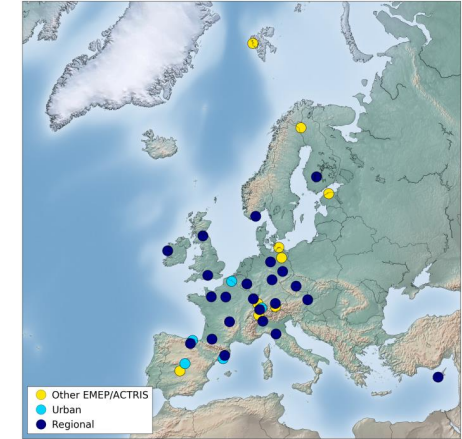
Concentrations of **HCB increased at 89% of the sites**. The same pattern has been identified by the EMEP network. For most of the other targeted POPs, a decrease was observed at most sites.

Monitoring of chemicals of emerging concern (CECs) and microplastics

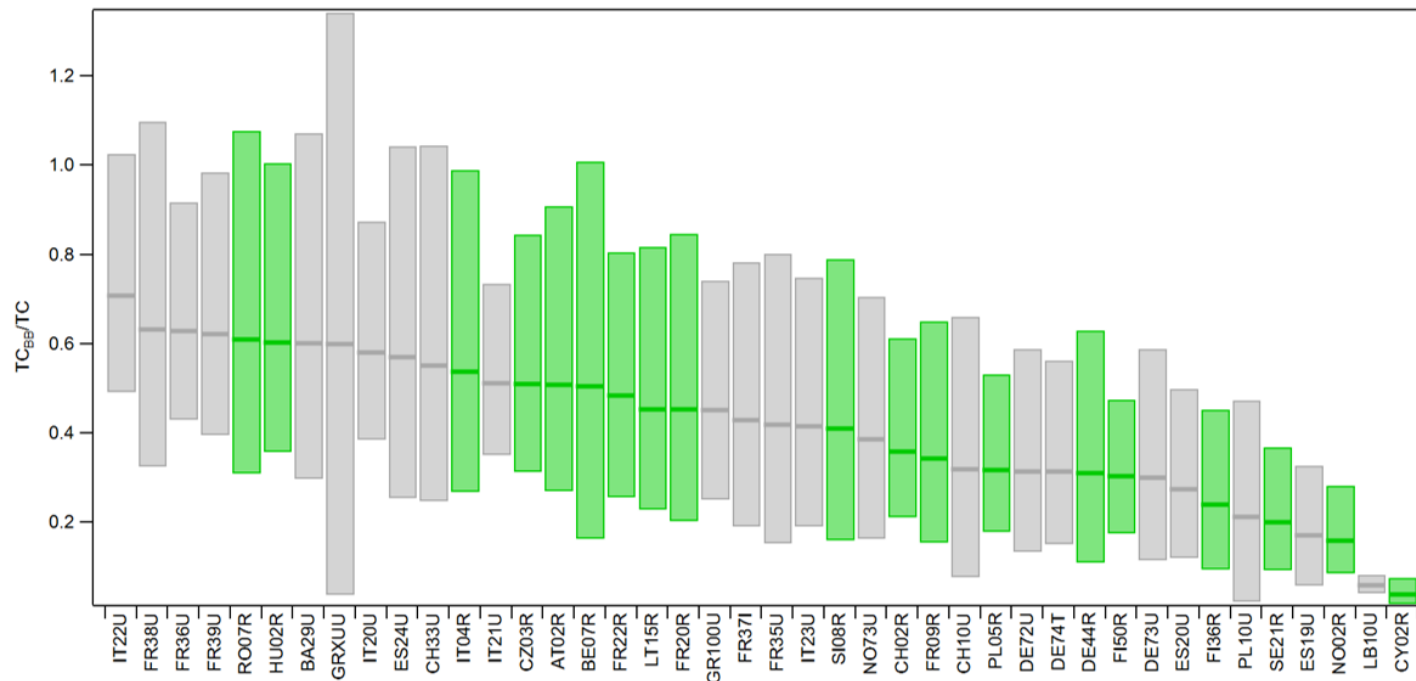
- Repeat PAS campaigns for POPs under EMEP in 2026 (every 10 years)?
 - Add one PAS with other adsorbent to include CECs?
- Measurements of microplastic at EMEP sites in a newly funded Norwegian project called MAGIC:
 - “Atmospheric filter samples will be collected at 12 sites across Europe for one year, all part of the EMEP monitoring network»
 - Includes method development
- Workshop on field and measurement techniques for CECs and microplastic in 2023 (back-to-back meeting with the modelling groups)
 - A preparatory survey on measurement methods will be provided

IMP winter 2017/2018

Using the levoglucosan data to assess the contribution of biomass burning to total carbon (TC)



TC from biomass burning / TC at
42 urban and rural background sites



Results:

- large contributor (> 30%) at most sites
- likely dominating (> 40%) at more than 50% of the sites

More detailed investigation of the importance of RWB planned ahead:

- Site specific issues
- Compare with modelled results
- Compare with Positive Matrix Factorization (PMF) of eBCbb/eBCff from the absorption measurements from the same IMP

- Discussed at the TFMM may 2021 and included in the workplan 2022-2023.
- Several planning meetings autumn 2021/winter 2022, incl. possibilities for financial support. **Great thanks to ESIG !**
- Established cooperation with ACTRIS, RI-URBAN and ACROSS



Sampling instructions

Links to these documents available at the TFMM web page: <https://projects.nilu.no/ccc/tfmm/index.html>

IMP 2022: ozone episodes during summer heat waves

Background:

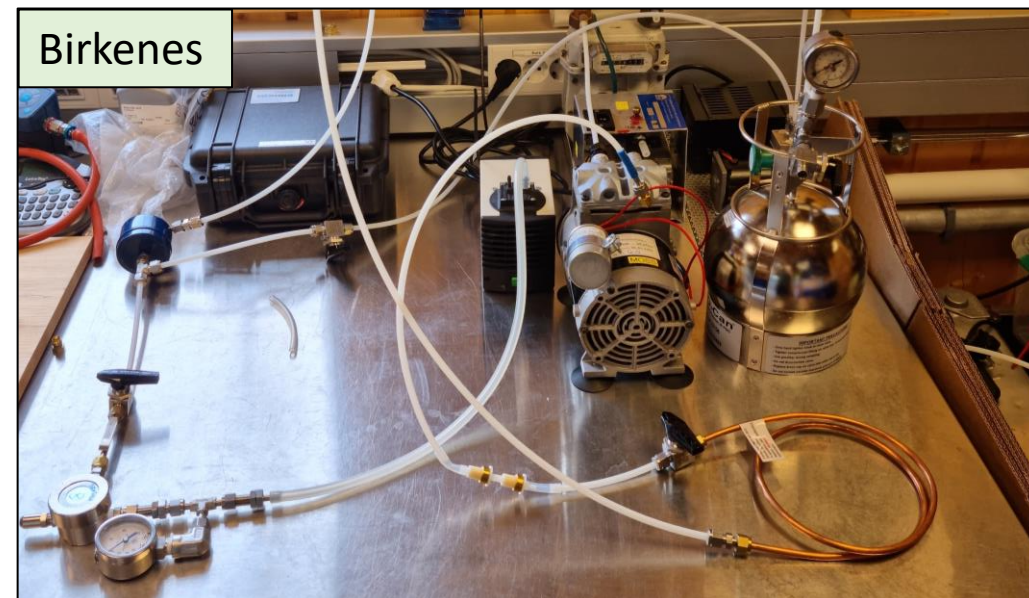
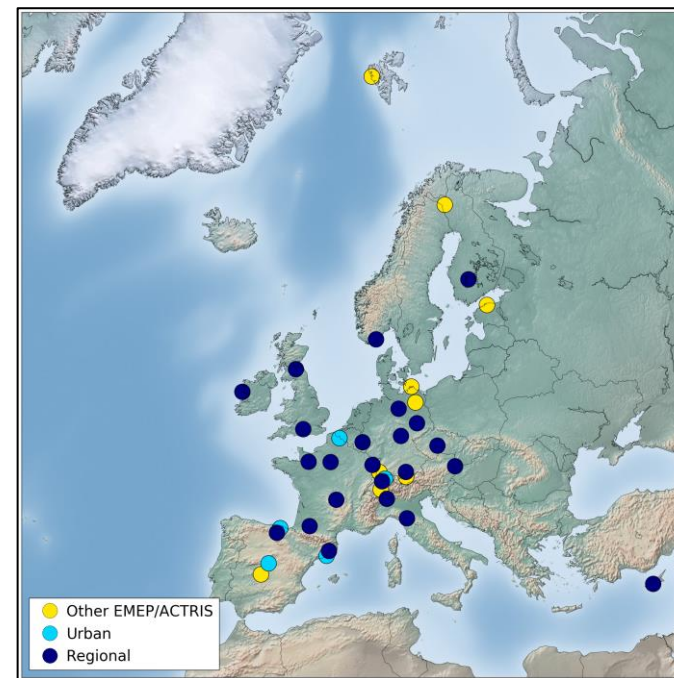
- High ozone episodes are typically underpredicted by atmospheric transport models
- Decrease in summer peaks, but the reductions are lower compared to the reductions in NMVOC and NO_x emissions
- VOC observations in EMEP is limited in respect of compounds (few sites with O-VOCs and terpenes) and frequency (grab sampling at several)
- Biogenic secondary organic aerosols (BSOA) important secondary pollutant.

Setup:

- Sites with ozone and NO_x/NO₂. Preferably also PM/EC/OC
- Forecast ozone episode, daily check from mid June (Met Norway/INERIS)
- One week intensive campaign was defined (12- 19 July)
- Parties supplement their regular EMEP observation to include all relevant VOCs
- Increase sampling frequency to daily sampling all the sites or monitors when available

Centralised labs for the manual observations:

- Canister air sampler: **non-methane hydrocarbons (NMHC)**, at Juelich, Germany
- DNPH cartridge: **O-VOCs** at ITM France
- Tenax tubes: **monoterpenes** at FMI, Finland
- Include organic aerosols (EC/OC and tracers for biogenic SOA). **BSOA tracer** analyses taking part of EC/OC filters (Grenoble, France)

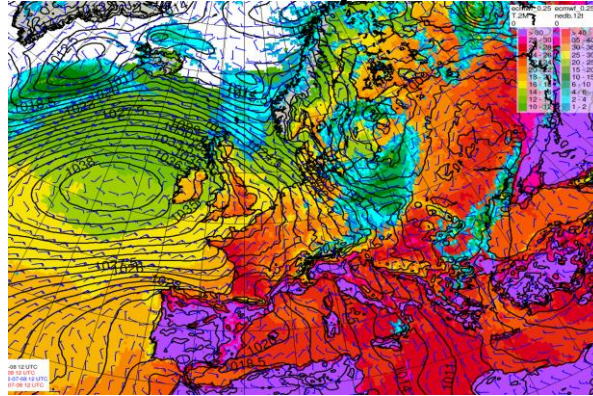




Weather analysis Task Force

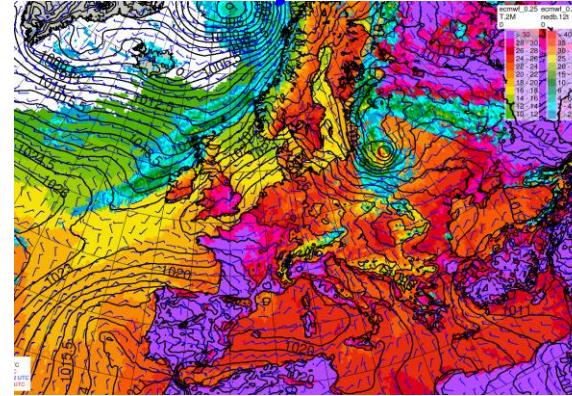
ECMWF
10-day
forecasts

8 July 12:00



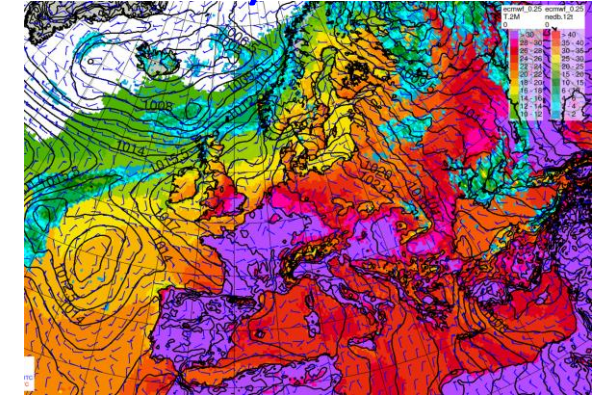
Beginning of July: persistent High over N. Atl, west of the UK caused the inflow of humid Atlantic air, clouds, precipitation

12 July 12:00



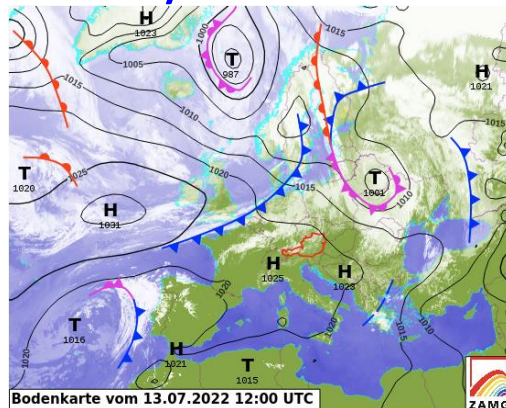
The High started moving eastward, over land and was determining the weather over W/C/S Europe and the south of N Europe in 12-20 July period

15 July 12:00

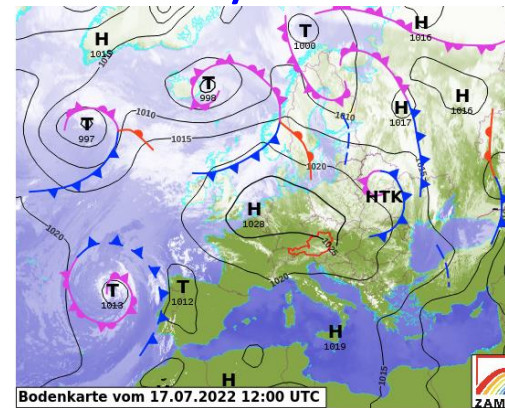


ZAMG
weather
maps

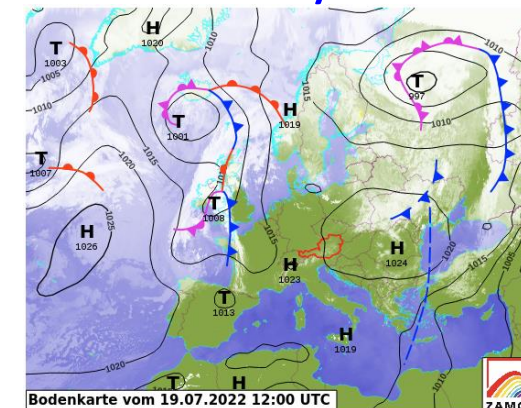
13 July 12:00



17 July 12:00



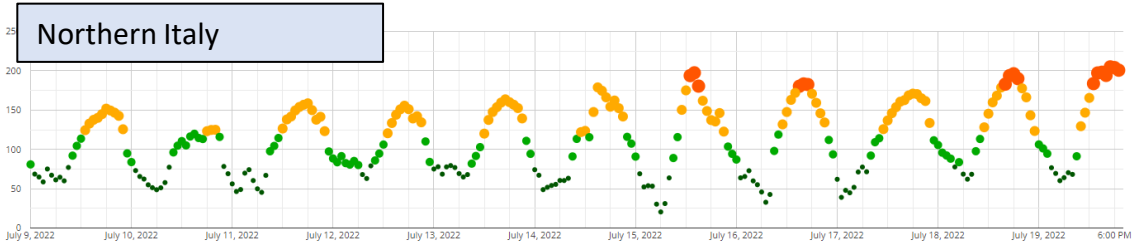
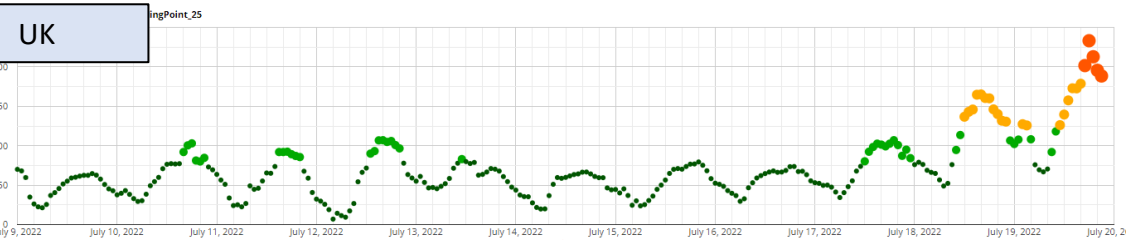
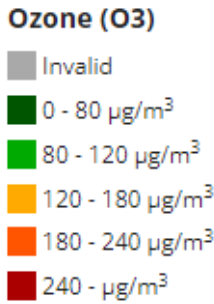
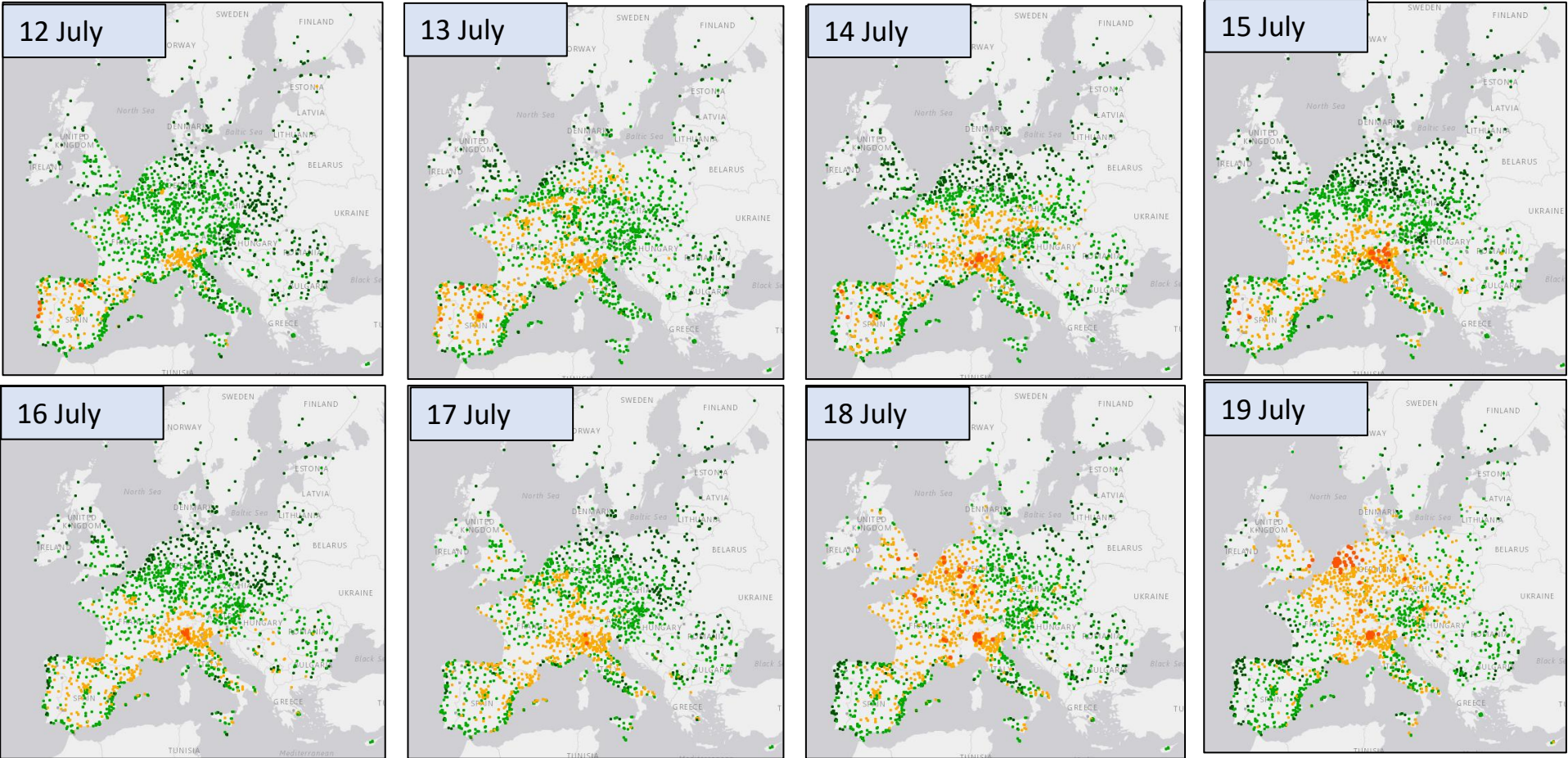
19 July 12:00



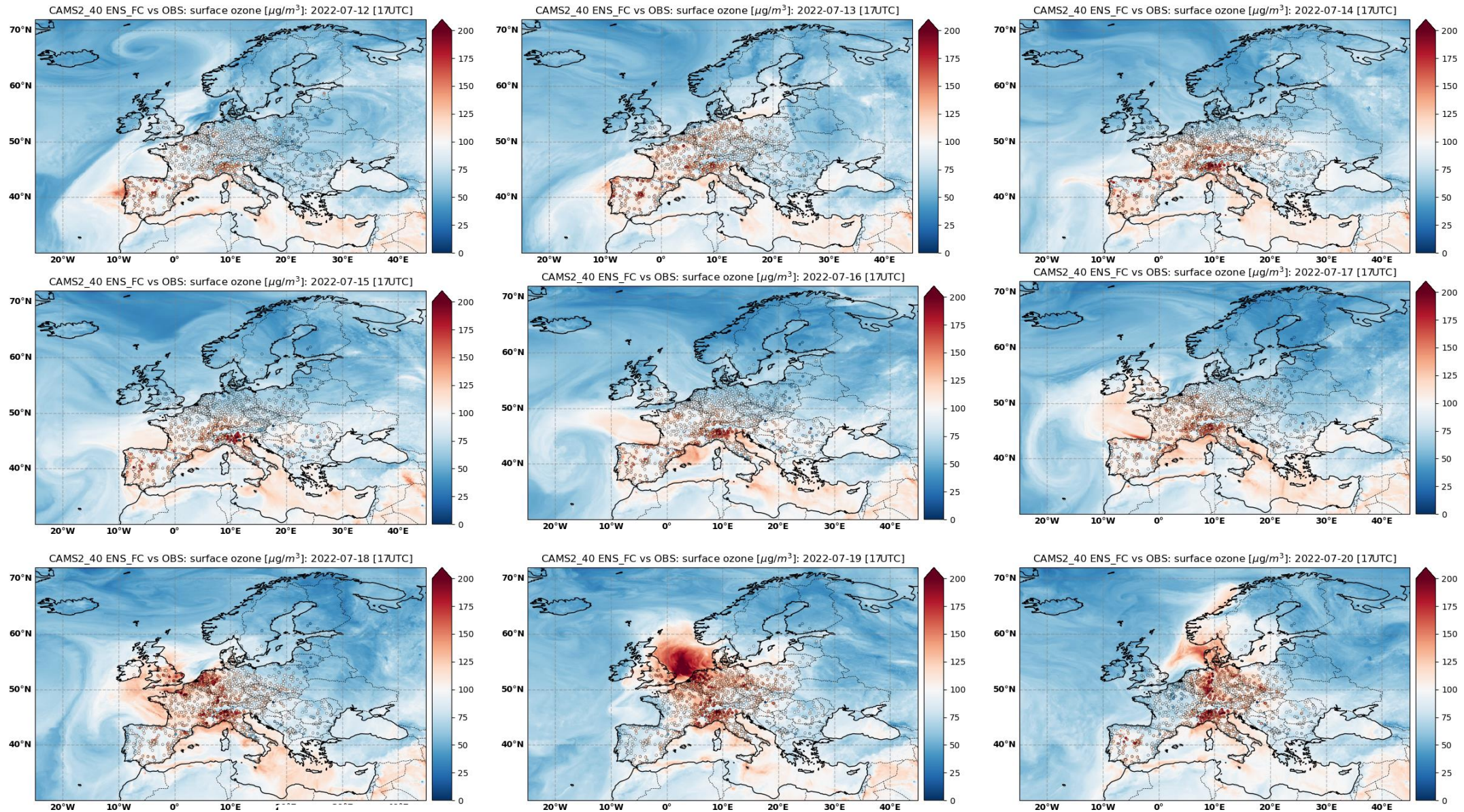
This summer had several heat waves. In the targeted week, we experiences large scale high ozone episodes



From:
<https://www.eea.europa.eu/data-and-maps/explore-interactive-maps/up-to-date-air-quality-data>:



Hourly ozone for 12 - 20 July 2022 (17UTC): CAMS Ensemble Forecast vs EEA observations

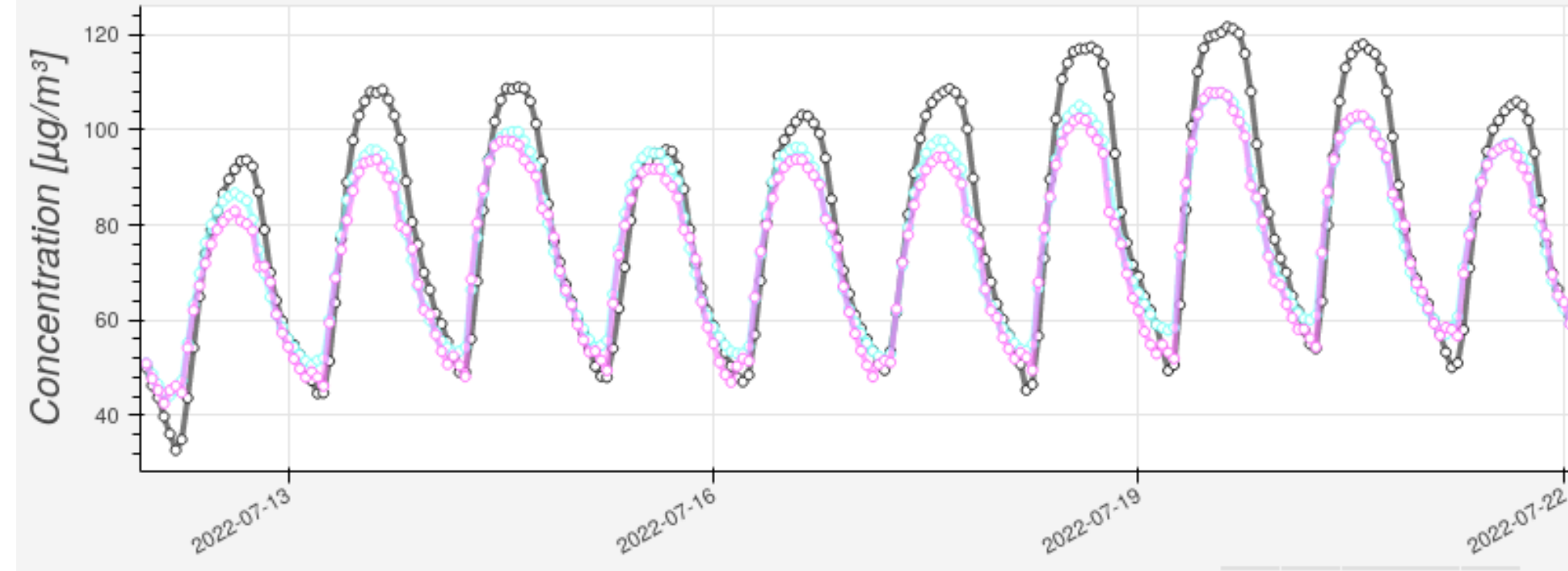


Comparing aggregated concentrations from models and EEA O₃ observations

12 Jul 2022 .. 22 Jul 2022

Update per

O₃ spatial median of hourly concentration - Europe



- ENSEMBLE MEDIAN
- MOCAGE
- CHIMERE
- EMEP
- SILAM
- LOTOS-EUROS
- EURAD-IM
- MATCH
- DEHM
- GEMAQ
- MINNI
- MONARCH
- OBSERVATIONS

Next steps for ozone summer IMP

- Measurements being analysed at centralised labs and Parties
- Data to be reported to EBAS by the end of October
 - Detailed reporting guidelines will be provided
- Online meeting 17 Oct with all the participants to present preliminary results
- Decide whether the campaign is to be repeated summer 2023.
 - Change setup somehow? I.e. Longer period and fewer sites? Improve geographical coverage east and south?
 - Financial issues to be sorted out-
- Several studies/publications in the coming years are foreseen

Summary

- The monitoring programme is stable with few changes from year to year
- Improvements in the timeliness and quality of the data reporting
- Quality assured data are now open available as soon as they are included in the database (EBAS)
- Scientific development through EMEP intensive measurement periods
 - Source apportionment of carbonaceous aerosols
 - Spatial distribution of POPs. Discuss if to be repeated in 2026, incl. chemicals of emerging concern
 - The connection between VOCs and ozone episodes. Discuss if to be repeated in 2023
- Workshop in 2023 about chemicals of emerging concern and microplastics, on method development etc.