

The Copernicus Atmosphere Monitoring Service (CAMS)

Status and Plans

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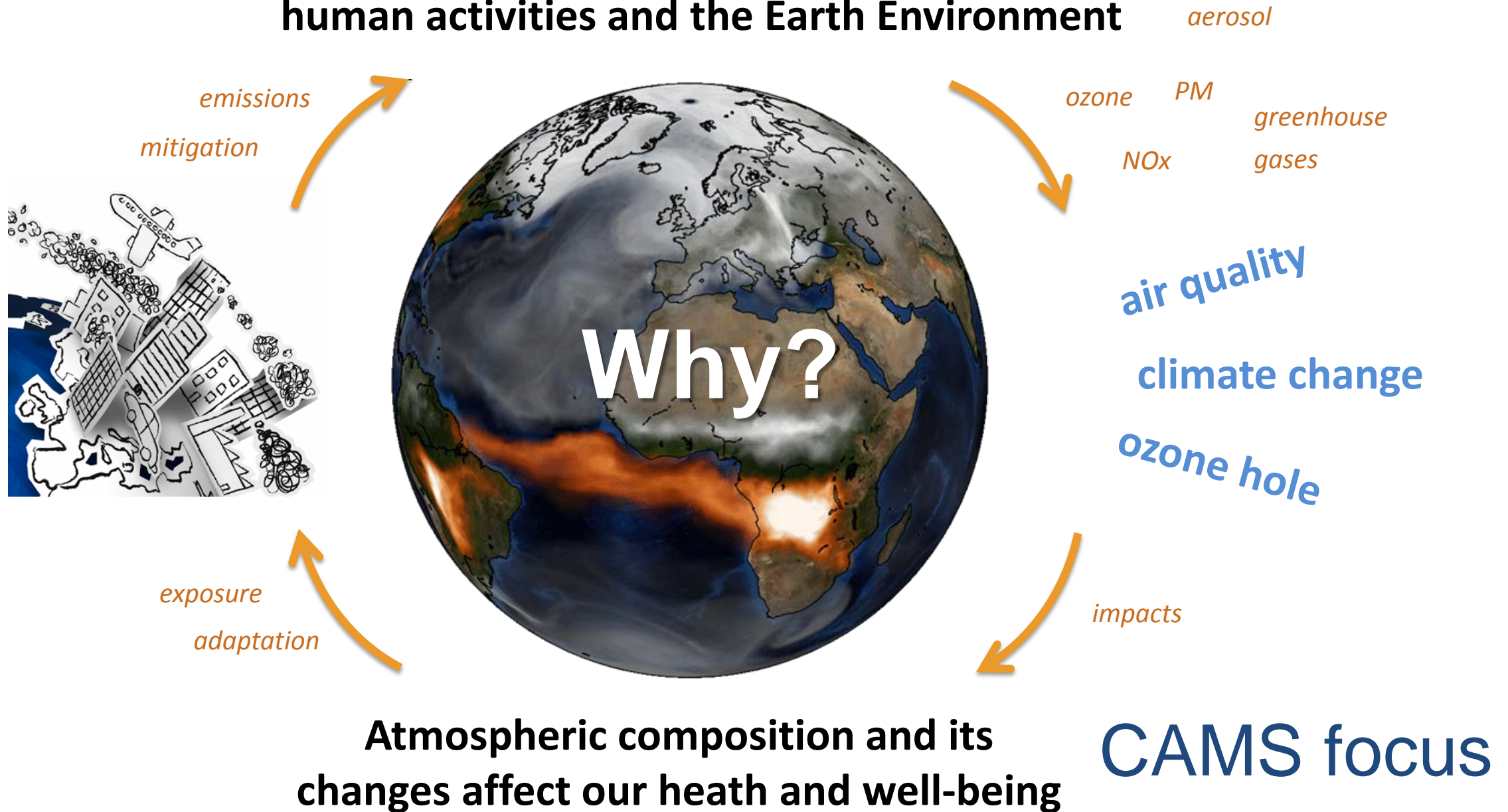


Funded by
the European Union



Implemented by  **ECMWF**

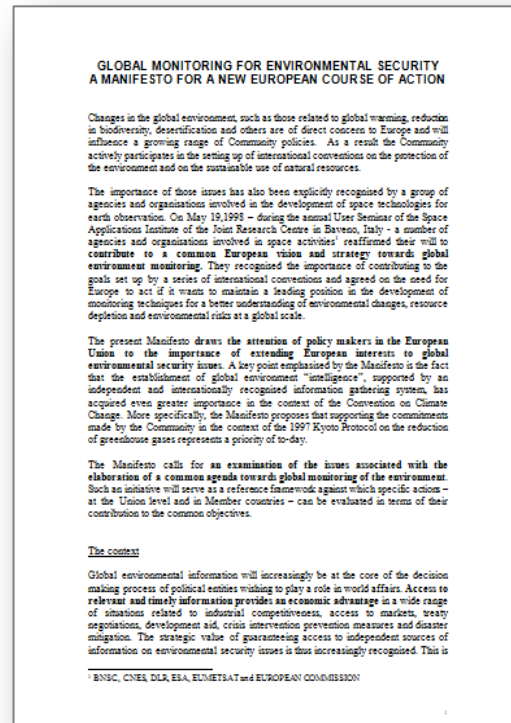
Atmospheric composition is a pivotal between human activities and the Earth Environment



A significant heritage for CAMS

- A decade-long series of R&D projects and an internationally respected European achievement (GEMS, MACC, -II, -III)
- An equally long experience in engaging with users and potential users in Europe and across the world (PROMOTE, MACC, -II, -III)

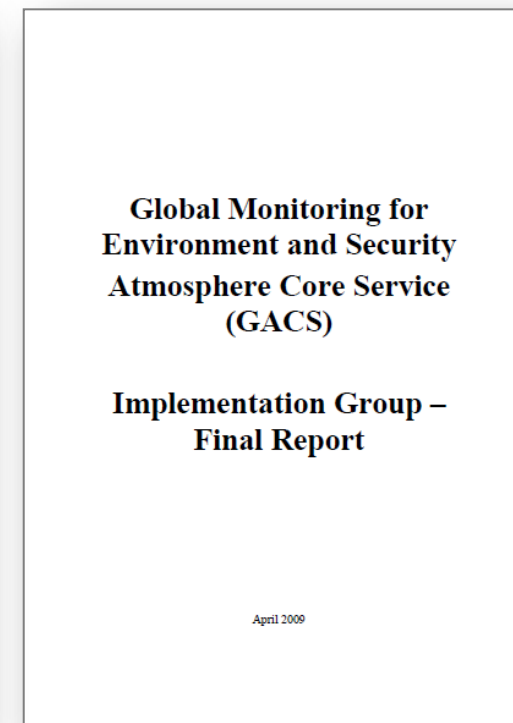
Strategy



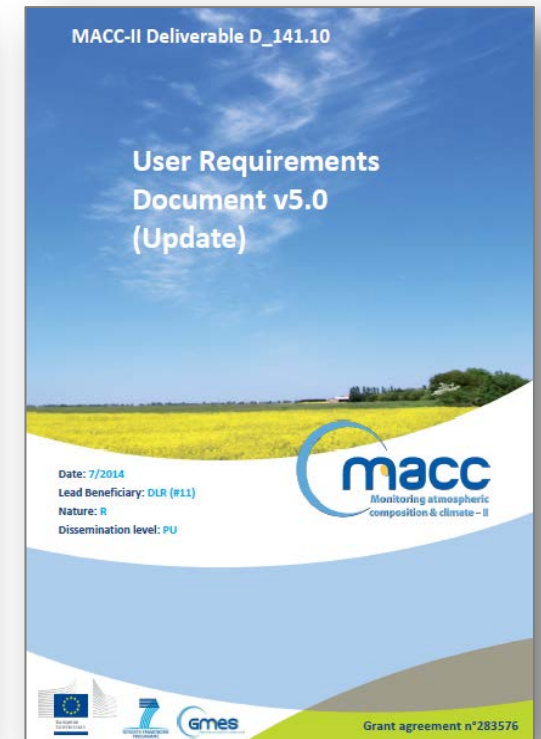
Socio-economic impact



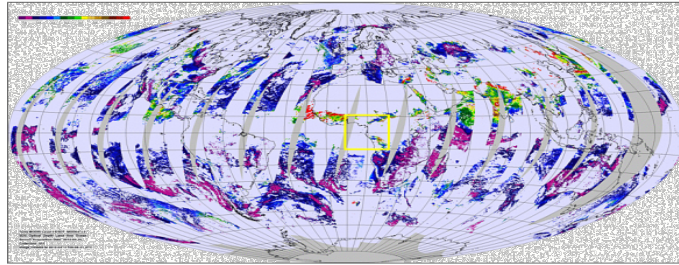
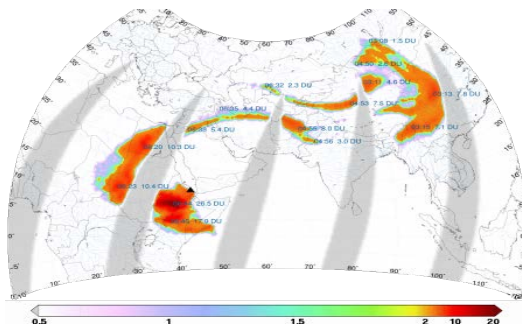
Experts



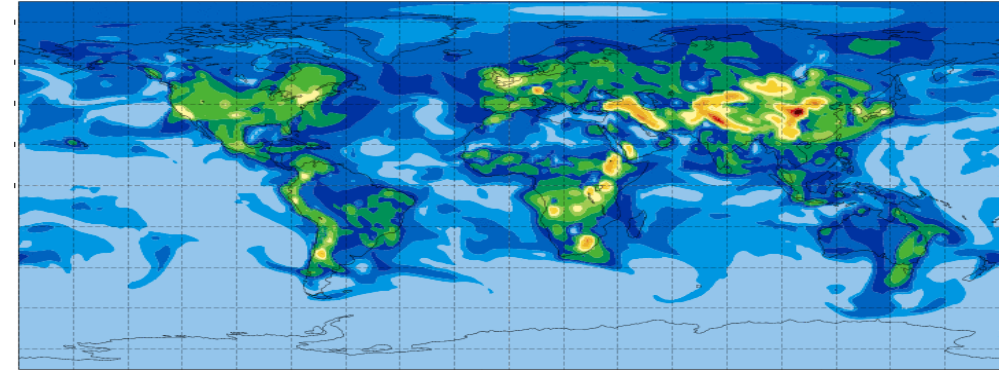
Users



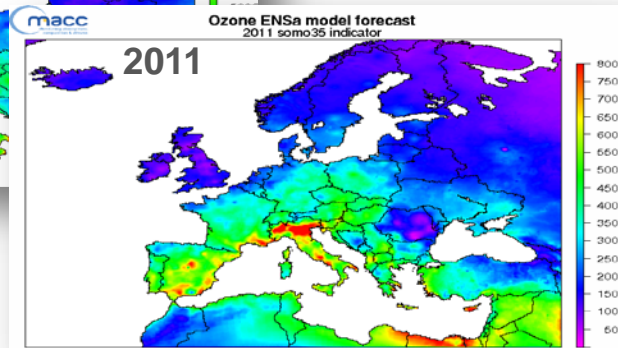
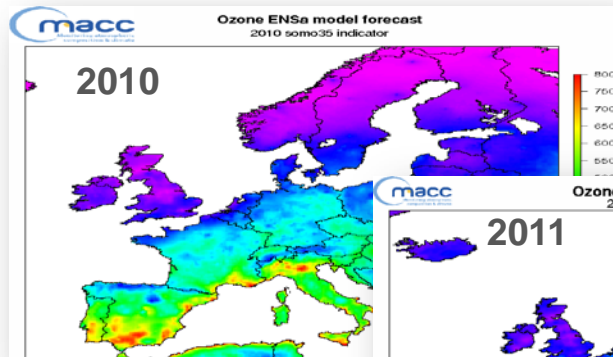
How? From Earth Observation to policy-quality products



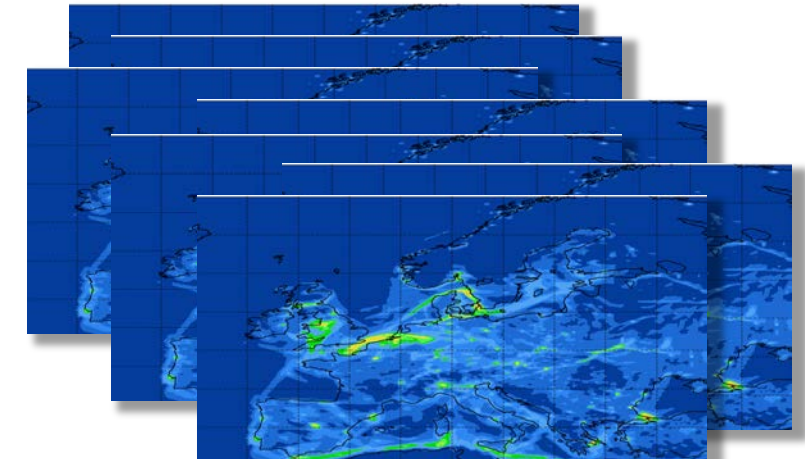
Over 70 EO instruments are assimilated in the global system



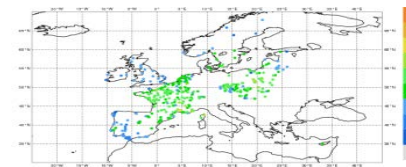
Boundary conditions feed an ensemble of high-resolution European AQ systems (in order to assess uncertainties)

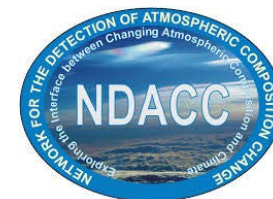


More data are assimilated (in particular in situ) and used for extensive validation



Policy-relevant (here health indicator for ozone) products are delivered. They are “maps with no gaps”, which observations alone don’t provide and are essential to assess impacts.





In-Situ Observations

Global Production

ECMWF Global Model

**Assimilation of satellite
observations**

Regional Production

**Ensemble of European
AQ Models (7+)
Data assimilation of AQ
observations & satellite
obsrvations**

Supplementary Services

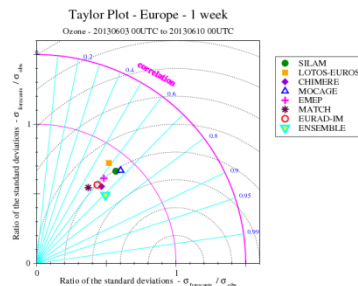
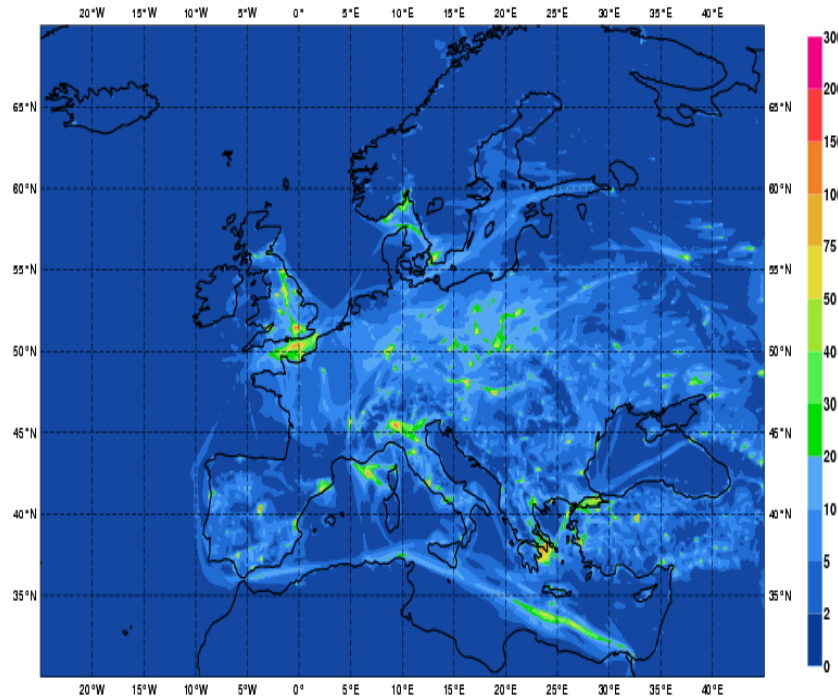
**Policy support
Solar Energy
Climate forcing
GHG fluxes
UV index**

Activities in support of production: Validation, Emissions

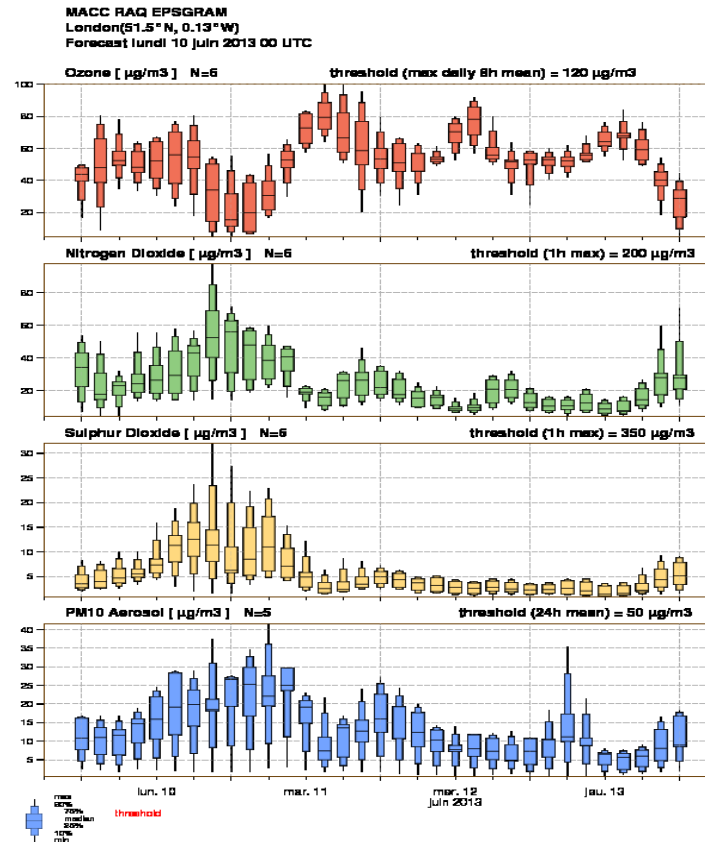
Communications, Training, User Interaction, Use cases

Ensemble of AQ Forecast by regional European models

Europe-wide, ~15 km,
hourly +96h



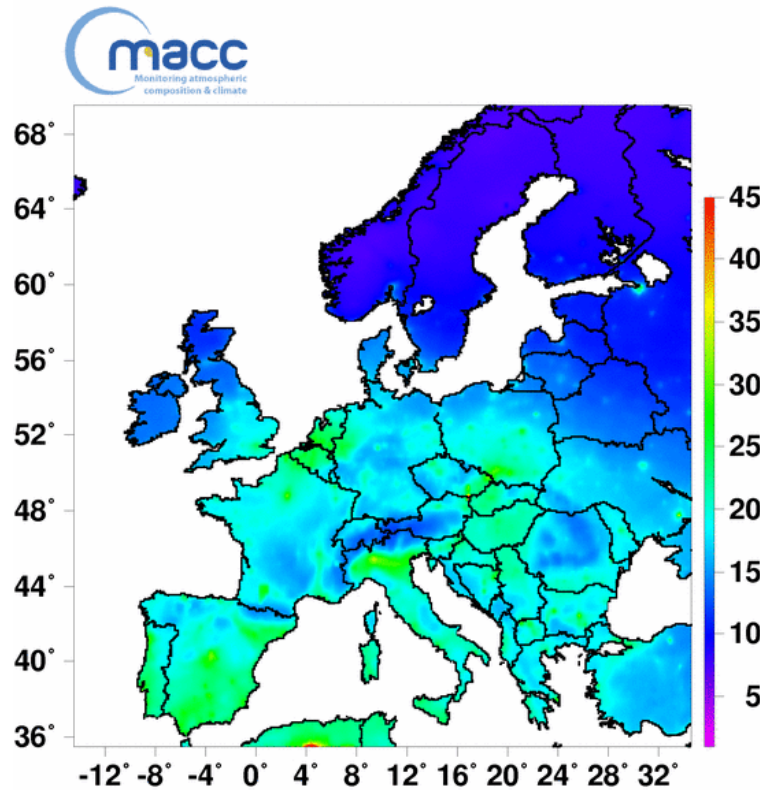
NRT / on-line
evaluation



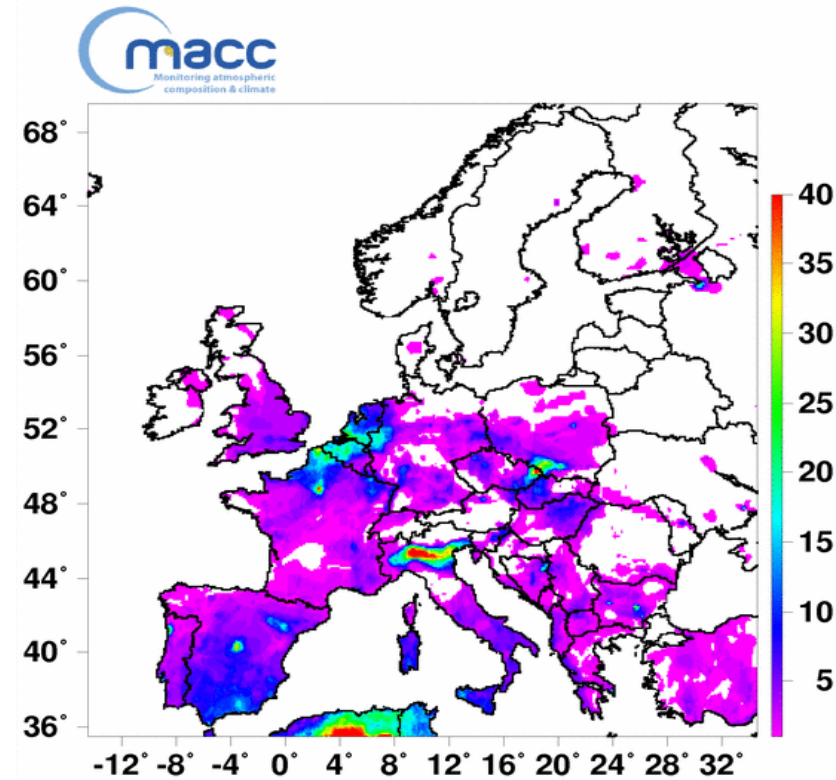
Multi-model spread as a
measure of forecast
uncertainty

250 “power users”
downloading daily air
quality information

Luftgüte Einschätzung nach EU Vorgaben



PM10 Jahresmittel



Anzahl der Tage mit Ueberschreitung
des Tagesmittels von 50ug/m3 (PM10)

*Basiert auf
Ensemble
von re-
analysis von
regionalen
Modellen*

*(AQ Boden
Stationen
assimiliert)*

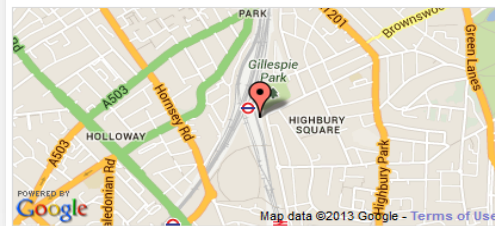
Are “coarse” (10-15km res.) forecasts useful?



Islington Arsenal
Urban Background
station



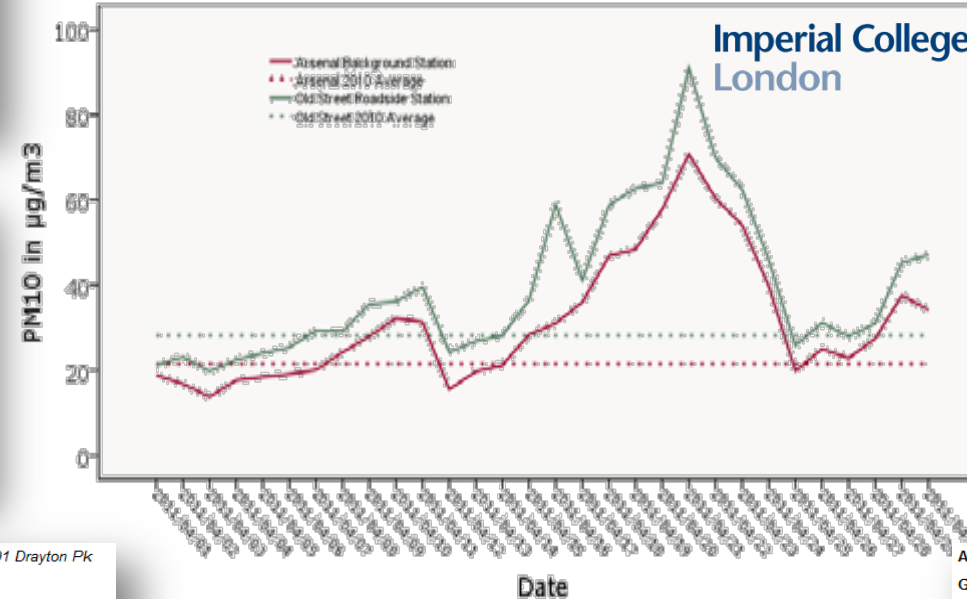
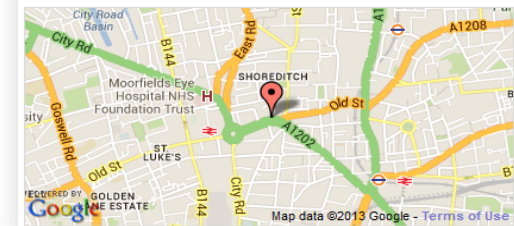
Address: Islington Ecology Centre, 191 Drayton Pk
Grid Ref: 531325, 186032
Latitude & Longitude: 51.557895000000, -0.106989000000
Click on the map to see the nearest street view (if available).



London Old Street
Roadside
station

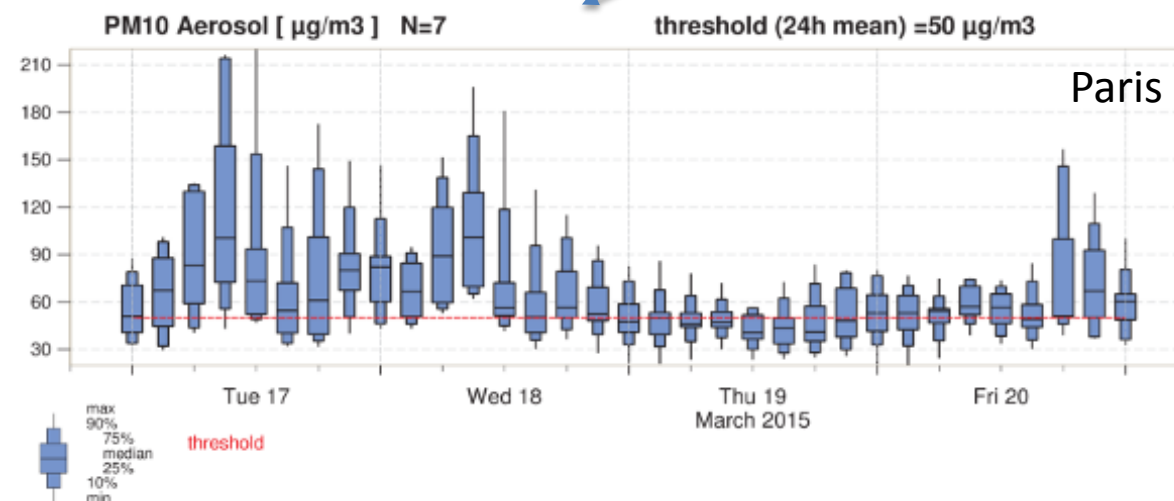
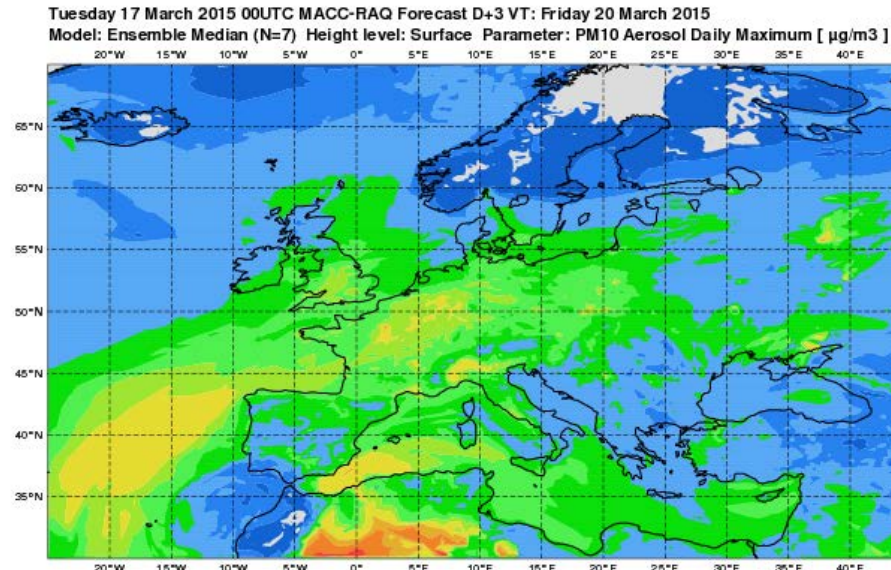
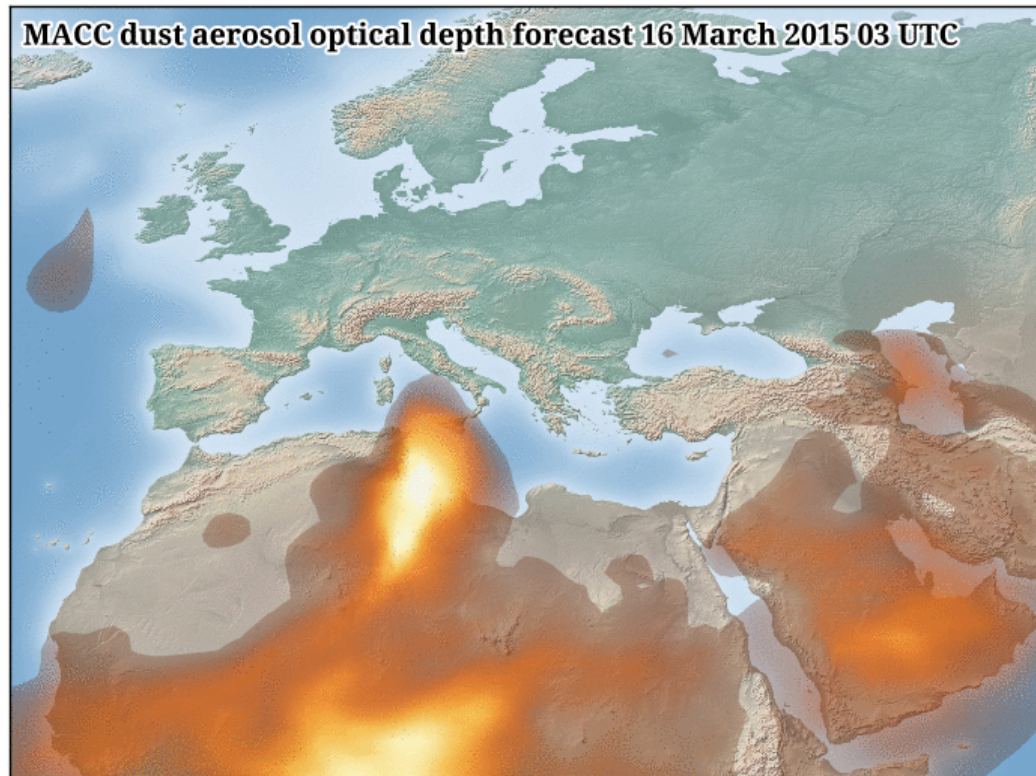


Address: Old Street
Grid Ref: 532947, 182575
Latitude & Longitude: 51.526454000000, -0.084910000000
Click on the map to see the nearest street view (if available).

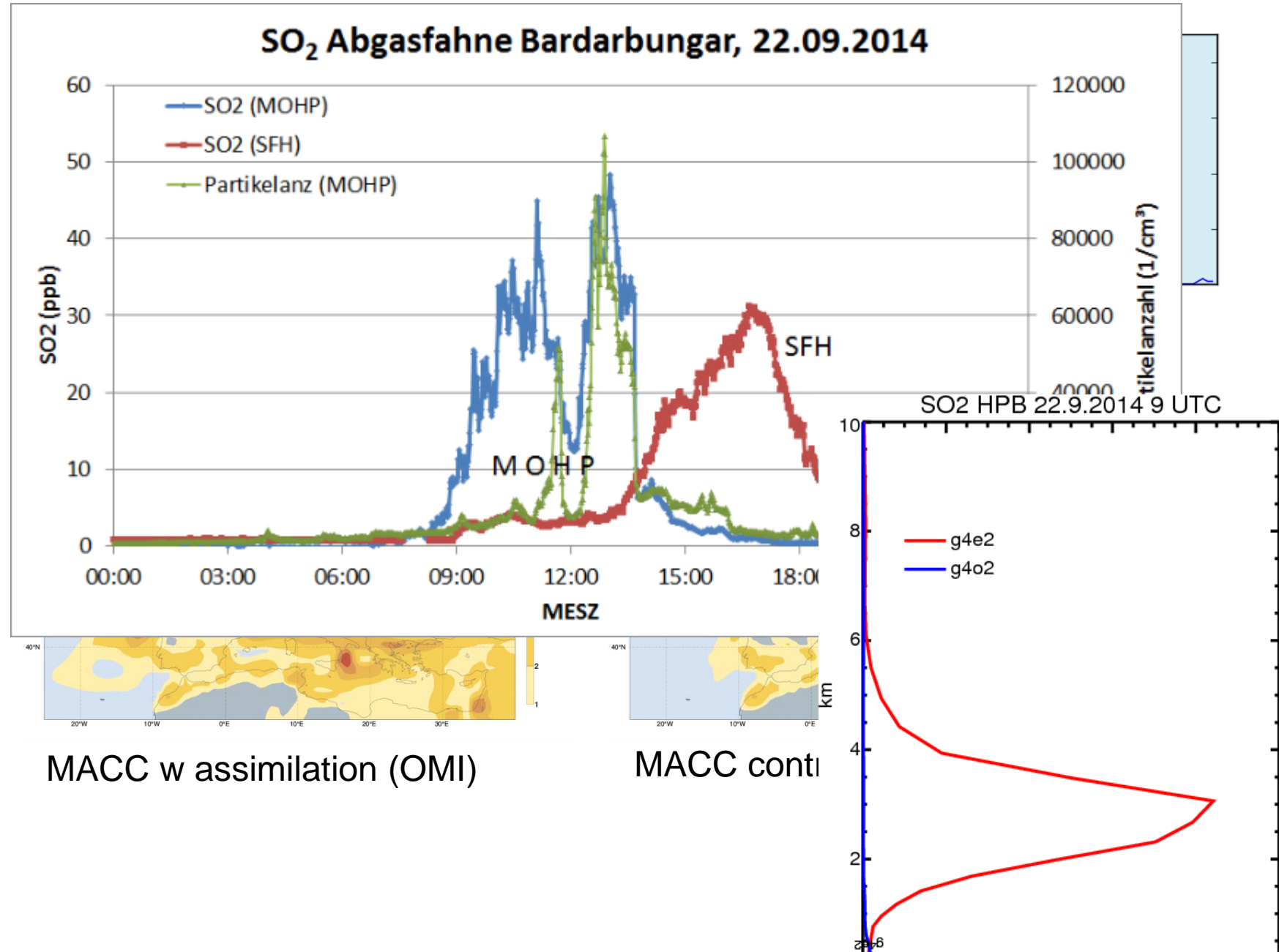


Certainly: “boundary” or “background” values are an essential component of AQ variability, including in cities!

Supporting Policy Implementation and Decision Making



Use case: supporting French authorities on high SO₂ episode



CAMS products for air quality applications

- Global model forecast to account for long range transport of pollutants
- Assimilation of global satellite observations in global forecast
- Global NRT forest fire emissions (0.1 x 0.1)
- Daily AQ forecast by ensemble of regional models
- Re-analysis of atmospheric composition at global and European scale
 - European ensemble of re-analysis using AQ observations
 - NRT, Interim (3month) and fully validated (1+ year) re-analysis
- Timely validation reports based on in-situ data
- Resilient and long-term operational commitment



C3S is user driven

Please let us know your feedback,
requirements ideas ...

Johannes.flemming@ecmwf.int

Thank you




Europe's eyes on Earth



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