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. Why? Atmospheric composition and its changes affect our health and well-being.

CAMS focus

- emissions
- mitigation
- exposure
- adaptation
- ozone
- NOx
- greenhouse gases
- PM
- air quality
- climate change
- ozone hole
- impacts
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)
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.

How? From Earth Observation to policy-quality products
Global Production
ECMWF Global Model
Assimilation of satellite observations

Regional Production
Ensemble of European AQ Models (7+)
Data assimilation of AQ observations & satellite observations

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 Überschreitung des Tagesmittels von 50ug/m3 (PM10)

2007

Basiert auf Ensemble von re-analysis von regionalen Modellen (AQ Boden Stationen assimiliert)
Are “coarse” (10-15km res.) forecasts useful?

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 SO$_2$ 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 …

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Thank you