

# Copernicus Atmosphere Monitoring Service (CAMS)

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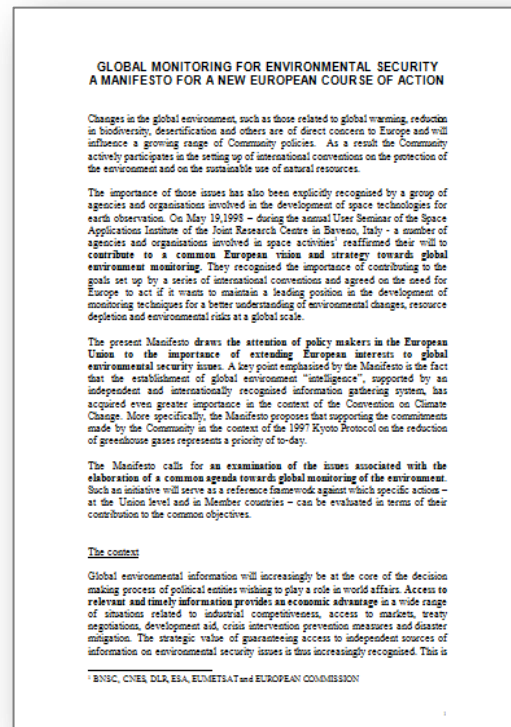
Funded by  
the European Union

Implemented by  ECMWF

# A SIGNIFICANT HERITAGE

- 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)

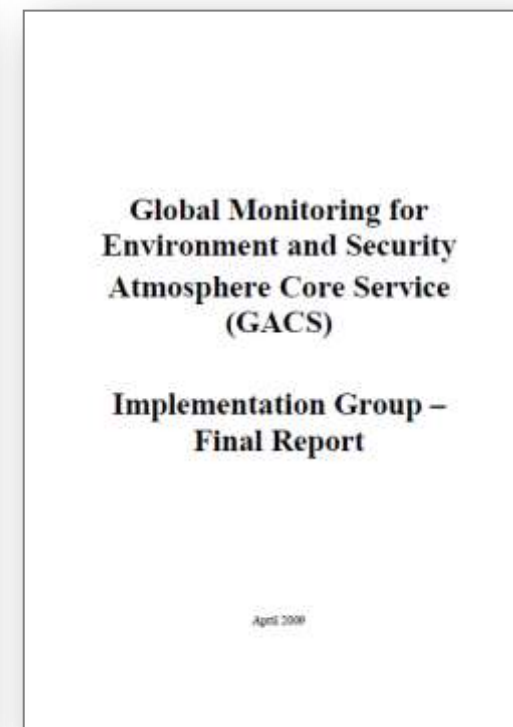
## Strategy



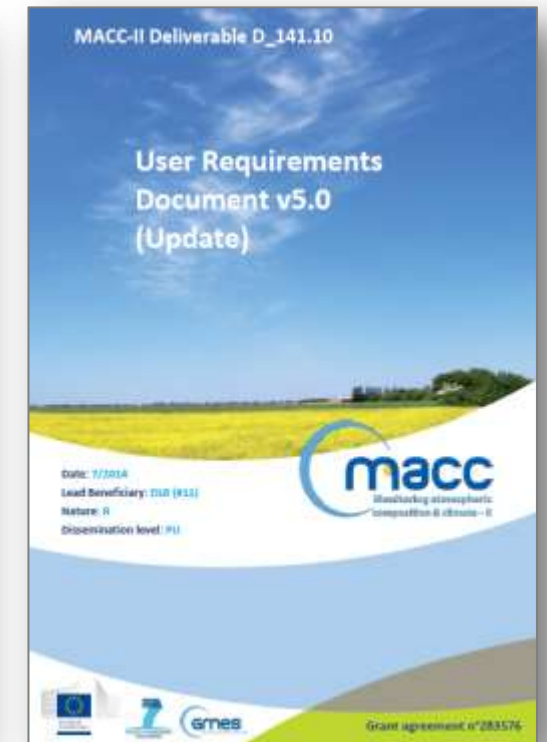
## Socio-economic impact



## Experts

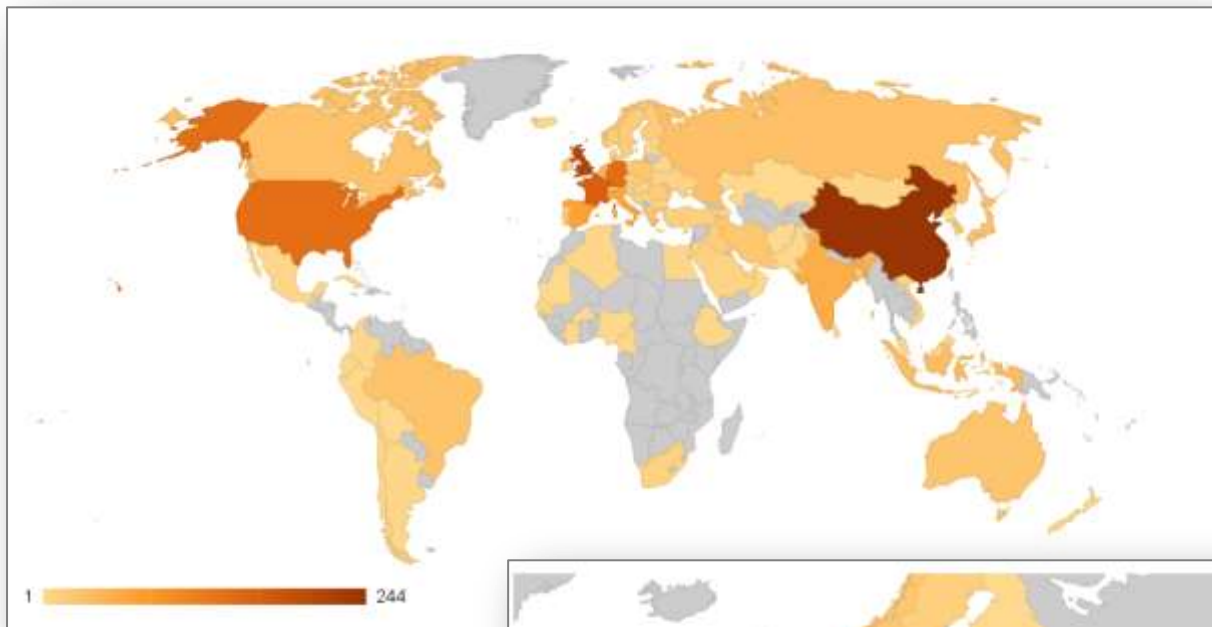


## Users

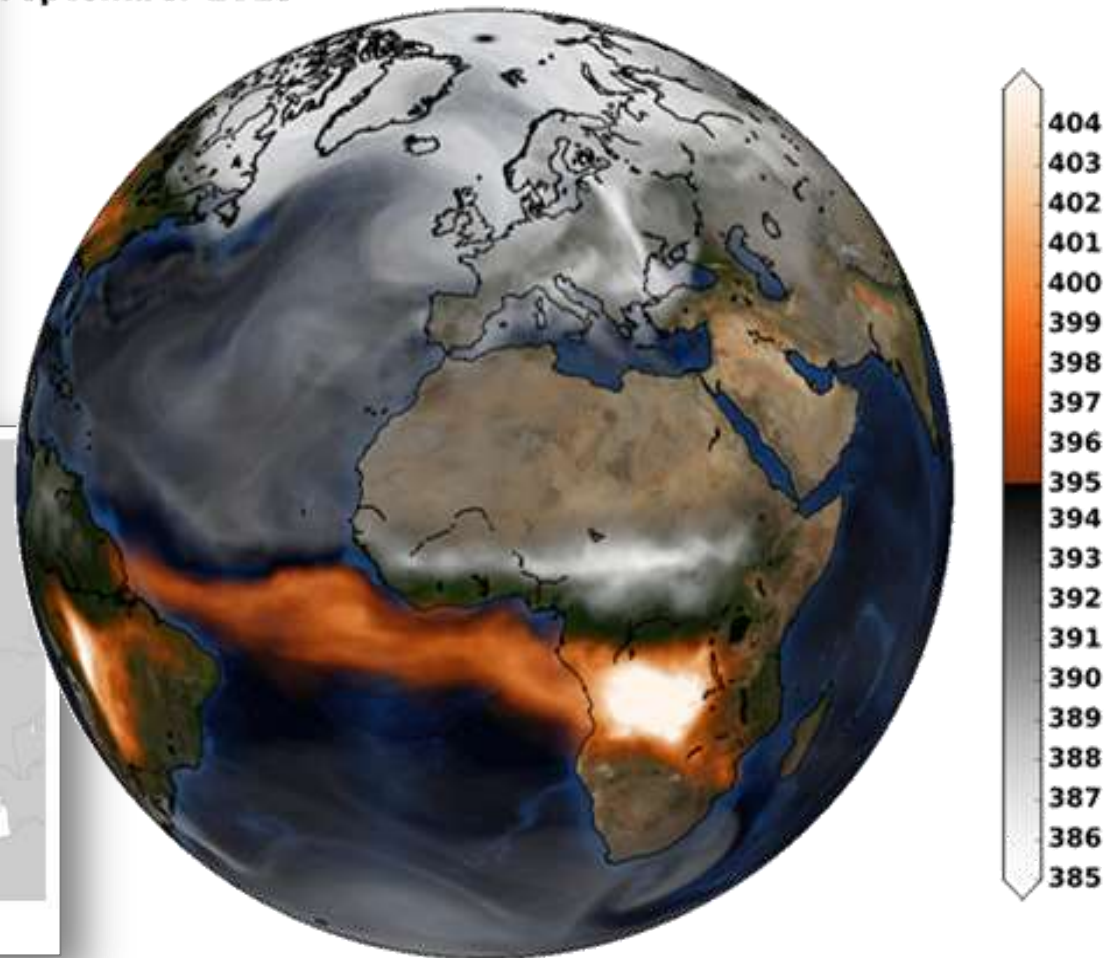


# EXISTING USERS, PRE-OPERATIONAL PRODUCTS

A sample product

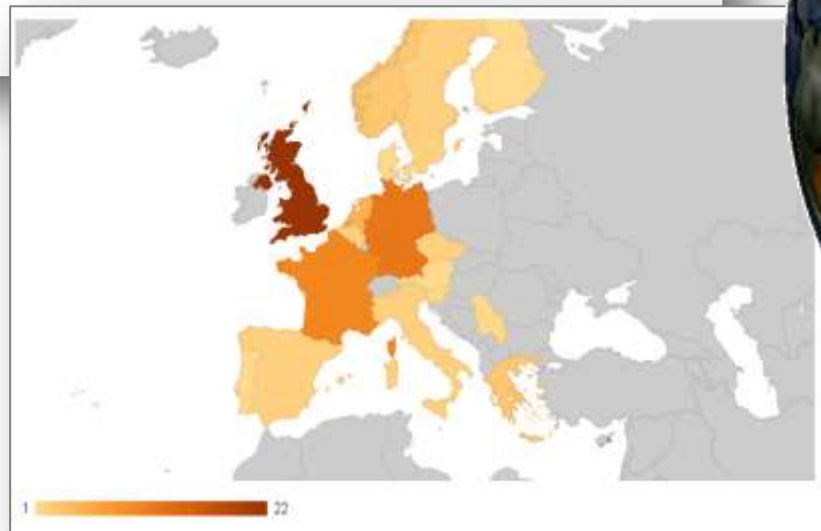


MACC column-averaged dry-air mole fraction of CO2 [ppm]  
September 2013



Users of the global re-analysis product

Users of the NRT European Air Quality forecasts



# CAMS PRECURSOR PORTFOLIO



## AIR QUALITY AND ATMOSPHERIC COMPOSITION

European air quality analyses, forecasts and assessments in support of reporting and policy making, pollen forecasts, global transport of constituents/pollutants...



## CLIMATE FORCING

Distributions of aerosol components and their radiative impacts, *other radiative forcings*...



## OZONE LAYER AND UV

Monitoring and forecasting of the ozone layer / hole, UV index, *UV radiation (crops, ecosystems)*...



## SOLAR RADIATION

Estimates of solar irradiance at surface, improved potential yield assessments for solar plants...



## EMISSIONS AND SURFACE FLUXES

Estimates of human emissions globally and in Europe (high-resolution), emissions by wildfires, surface fluxes of CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O...





# Copernicus Operations...

## ...New Opportunities

New providers

User expansion

New downstream applications





European Environment Agency



## In-Situ Observations

**Global Production**

**Regional Production**

**Supplementary Services**

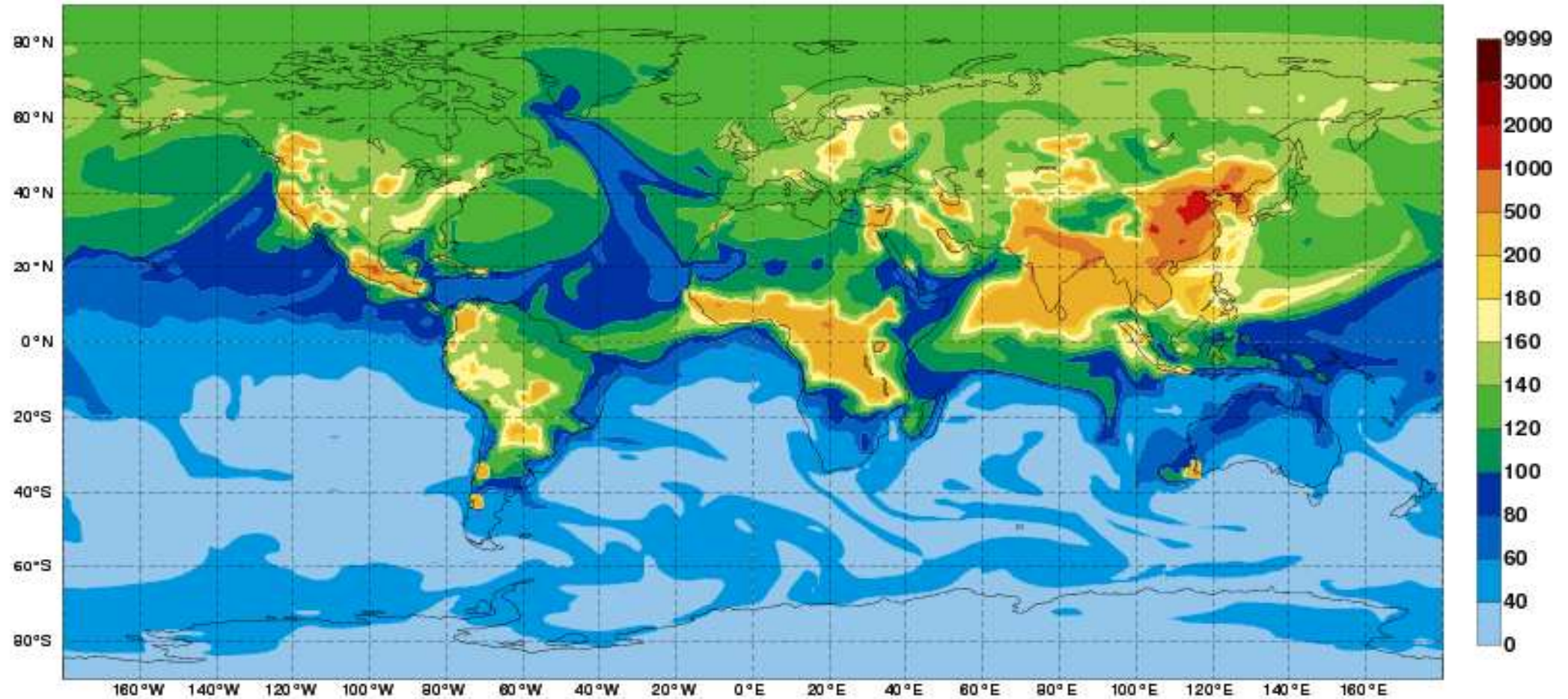
**Activities in support of production: Validation, Emissions**

**Communications, Training, User Interaction, Use cases**



# CAMS ARCHITECTURE ELEMENTS (GLOBAL)

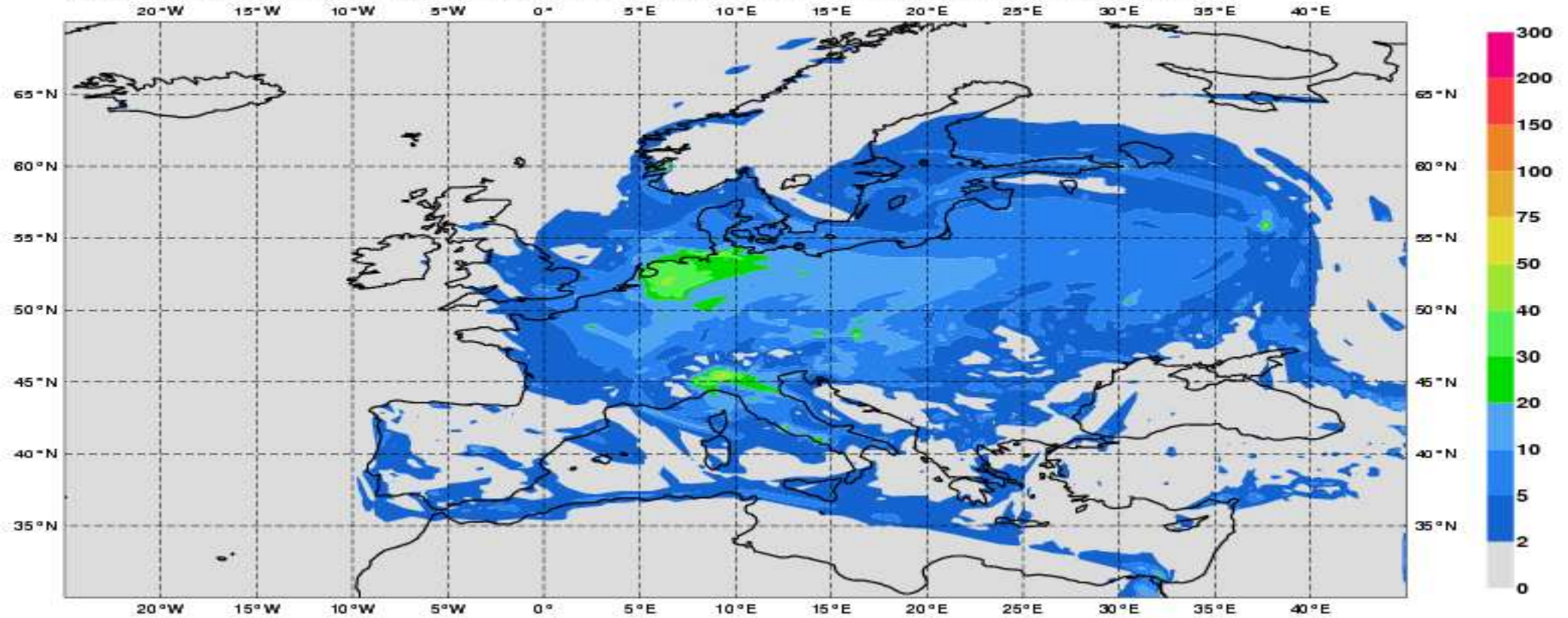
Sunday 1 February 2015 00UTC MACC Forecast t+036 VT: Monday 2 February 2015 12UTC  
Surface Carbon Monoxide [ ppbv ]





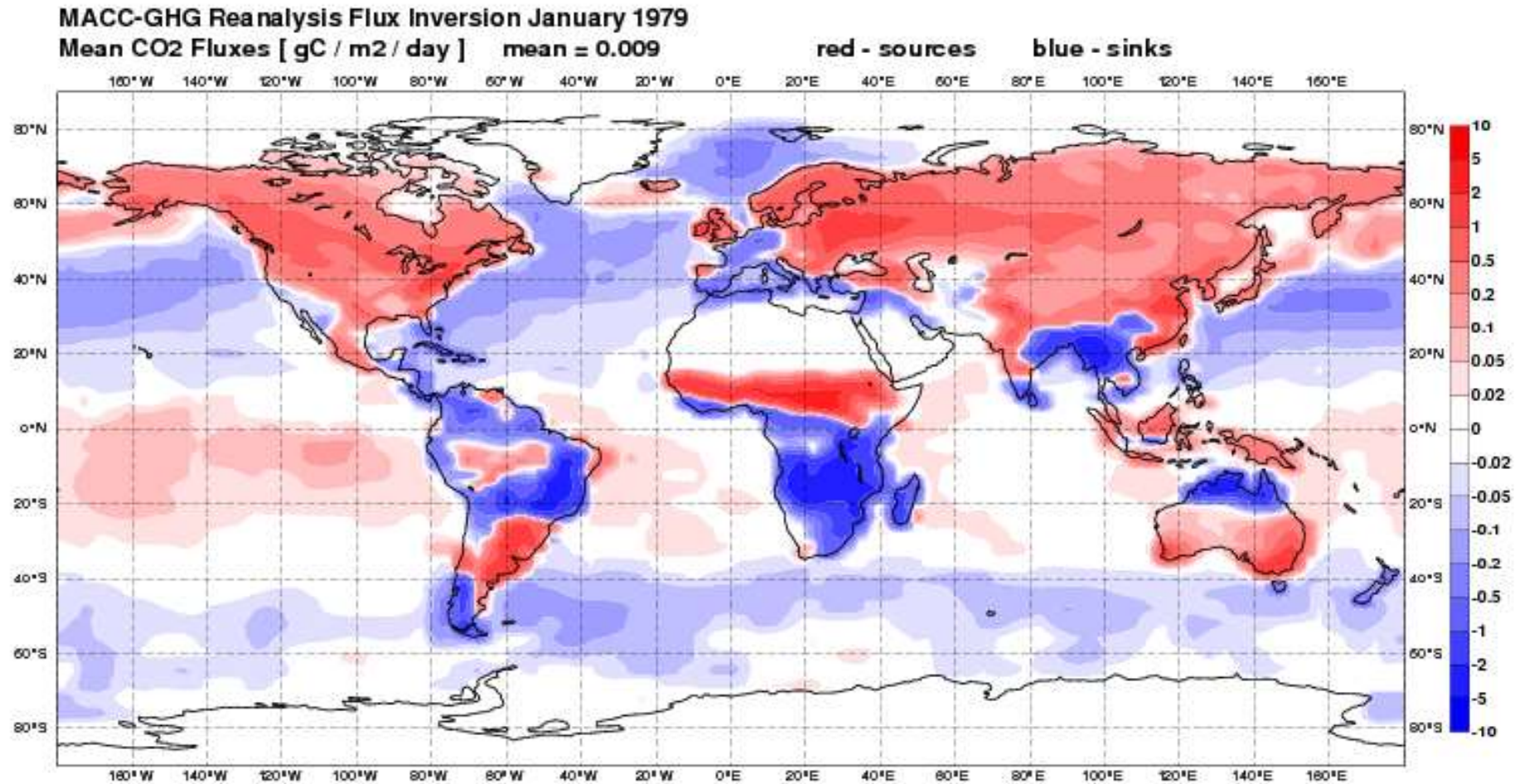
# CAMS ARCHITECTURE ELEMENTS (REGIONAL)

Sunday 1 February 2015 00UTC MACC-RAQ Forecast t+005 VT: Sunday 1 February 2015 05UTC  
Model: ENSEMBLE MEDIAN Height level: Surface Parameter: Nitrogen Dioxide [  $\mu\text{g}/\text{m}^3$  ]



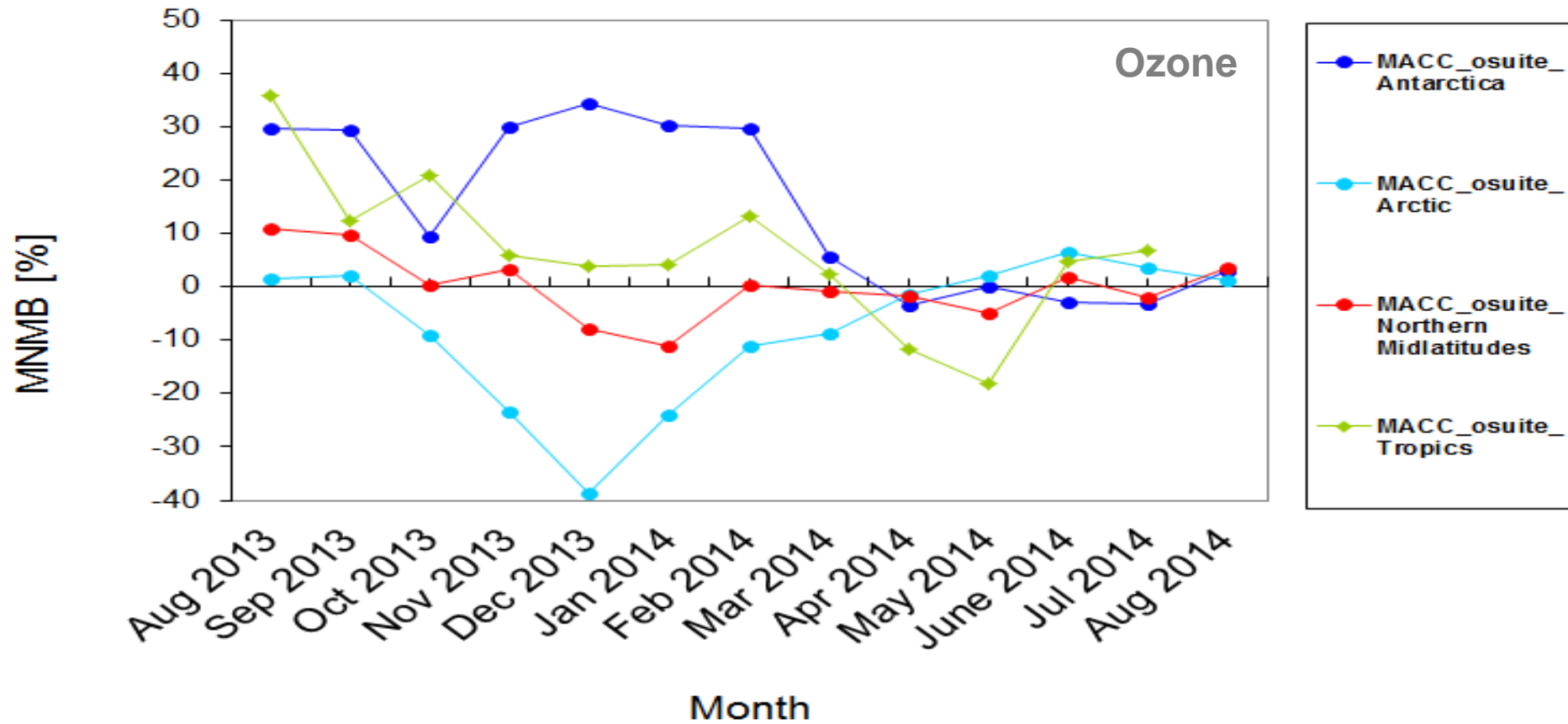


# CAMS ARCHITECTURE ELEMENTS (SUPPLEMENTARY SERVICES)



# CAMS ARCHITECTURE ELEMENTS (OTHER ASPECTS)

## Free Troposphere 2013-2014



## CAMS ORGANISATION & FUTURE PROCUREMENTS

- Most CAMS architecture elements are procured within this phase for a duration of 3 years. In this period, there will be a few additional procurements (multiple, smaller size): use cases; activities in support of communications and training; (additional) satellite data processing. A second phase will follow in 2018.
- CAMS cross-cutting aspects will be handled by a service-level board comprising ECMWF management and one responsible person for each contract (monthly teleconference or meeting).
- Yearly timescale: plan & budget, activity reports...
- Yearly gathering event foreseen (contractors, users, stakeholders, community...)
- Continuity of service for the users will be ensured by the current MACC-III providers until the operational contracts are in effect.

