

# MACC-III/CAMS

## 3<sup>rd</sup> User Workshop

### Introduction & global services

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**Copernicus**  
Europe's eyes on Earth



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

**GLOBAL MONITORING FOR ENVIRONMENTAL SECURITY  
A MANIFESTO FOR A NEW EUROPEAN COURSE OF ACTION**

Changes in the global environment, such as those related to global warming, reduction in biodiversity, desertification and others are of direct concern to Europe and will influence a growing range of Community policies. As a result the Community actively participates in the setting up of international conventions on the protection of the environment and on the sustainable use of natural resources.

The importance of those issues has also been explicitly recognized by a group of agencies and organisations involved in the development of space technologies for earth observation. On May 19, 1998 – during the annual User Seminar of the Space Applications Institute of the Joint Research Centre in Bolzano, Italy – a number of agencies and organisations involved in space sciences reaffirmed their will to contribute to a common European vision and strategy towards global environment monitoring. They recognised the importance of contributing to the goals set up by a series of international conventions and agreed on the need for Europe to act if it wants to maintain a leading position in the development of monitoring techniques for a better understanding of environmental changes, resource depletion and environmental risks at a global scale.

The present Manifesto draws the attention of policy makers in the European Union to the importance of extending European interests to global environmental security issues. A key point emphasised by the Manifesto is the fact that the establishment of global environment "intelligence", supported by an independent and internationally recognised information gathering system, has acquired even greater importance in the context of the Convention on Climate Change. More specifically, the Manifesto proposes that supporting the commitments made by the Community in the context of the 1997 Kyoto Protocol on the reduction of greenhouse gases represents a priority of to-day.

The Manifesto calls for an examination of the issues associated with the elaboration of a common agenda towards global monitoring of the environment. Such an agenda will serve as a reference framework against which specific actions – at the Union level and in Member countries – can be evaluated in terms of their contribution to the common objectives.

**The content**

Global environmental information will increasingly be at the core of the decision making process of political entities wishing to play a role in world affairs. Access to relevant and timely information provides economic advantage in a wide range of situations related to industrial competitiveness, access to markets, treaty negotiations, development aid, crisis intervention prevention measures and disaster mitigation. The strategic value of guaranteeing access to independent sources of information on environmental security issues is thus increasingly recognised. This is


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## Socio-economic impact

Prepared by:

**PRICEWATERHOUSECOOPERS**

**Main Report  
Socio-Economic Benefits Analysis  
of GMES**



With:  **ESYS** **DMV**

ESA Contract Number 18868/05

Dated  
October 2006

## Experts

**Global Monitoring for  
Environment and Security  
Atmosphere Core Service  
(GACS)**

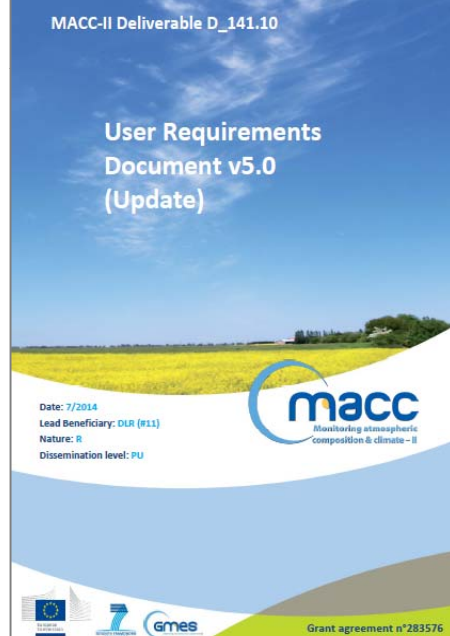
**Implementation Group –  
Final Report**

April 2009

## Users


MACC-II Deliverable D\_141.10

**User Requirements  
Document v5.0  
(Update)**



**macc**  
Monitoring atmospheric  
composition & climate - II

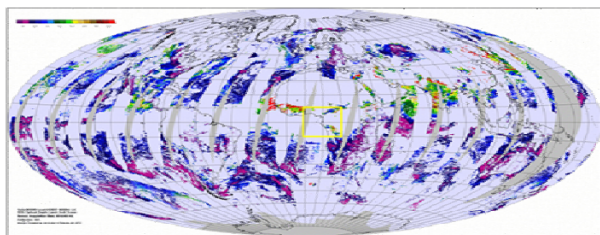
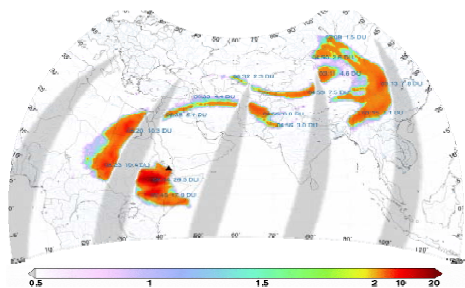
Date: 7/2014  
Lead Beneficiary: DLR (R11)  
Nature: R  
Dissemination level: PU

 **gmes**

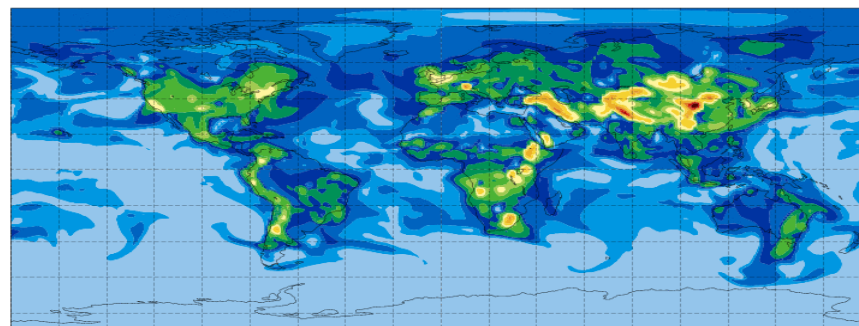
Grant agreement n°283576



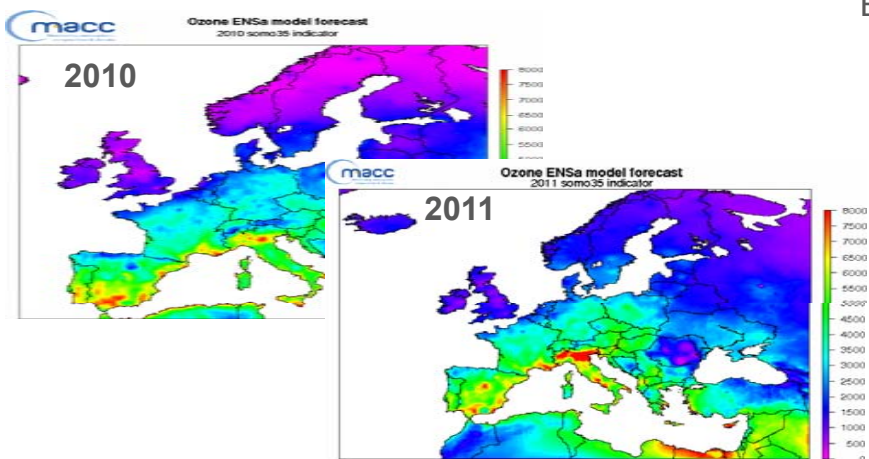
# From EO to policy-relevant products



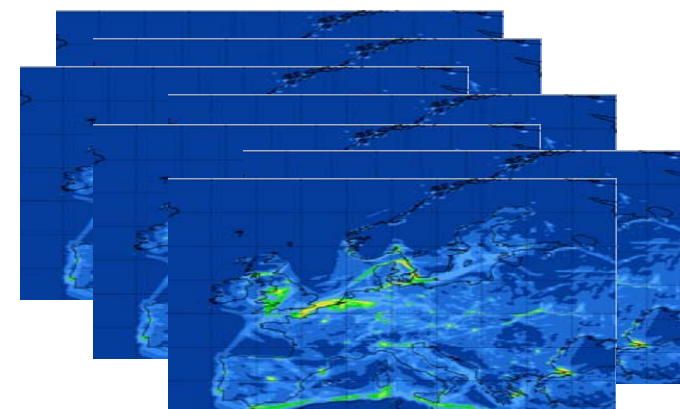
Over 70 EO instruments are assimilated in the global system



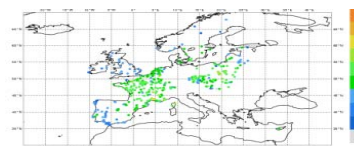
Boundary conditions feed an ensemble of high-resolution European AQ systems (in order to assess uncertainties)



More data are assimilated (in particular hourly surface AQ concentrated by EEA/EIONET)



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.





### Copernicus Atmosphere Monitoring Service

- Operational delivery of atmospheric composition services
- Global and European regional scale
- Initial period from 2015 – 2020
- ECMWF is in charge of implementation

# 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...

## 2015: a year of transition for CAMS

- ★ Service continuity for the existing users
  - ★ Pre-operational service operated and funded by CAMS (ECMWF) and MACC-III (non ECMWF partners) until 30 June 2015
  - ★ Short ad-hoc contracts until operational procurements are in effect
- ★ Procurements in 2015
  - ★ 17 competitive procurements launched in Q1 and Q2 2015 (3-year contracts)
  - ★ 7 directly negotiated procurement (in situ observations, international networks)
- ★ Ramp-up to operations
  - ★ Progressive upgrade to operational status of production activities at ECMWF
  - ★ Hand-over from MACC-III partners to CAMS providers in Q4
  - ★ Establishment of CAMS core documentation (URDB; URAD; SPP; SES)
  - ★ By the end of 2015, full operational budget spending rate established (12M€/y)



While the heritage of the MACC series of projects has been central to the design of CAMS, service elements have been streamlined and re-organised by packages of consistent types of functions in the production chains. This provides a sound basis for operations and gives a fair chance for potential new providers.

### **In-Situ Observations**

**Global Production**

**Regional Production**

**Supplementary Services**

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

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

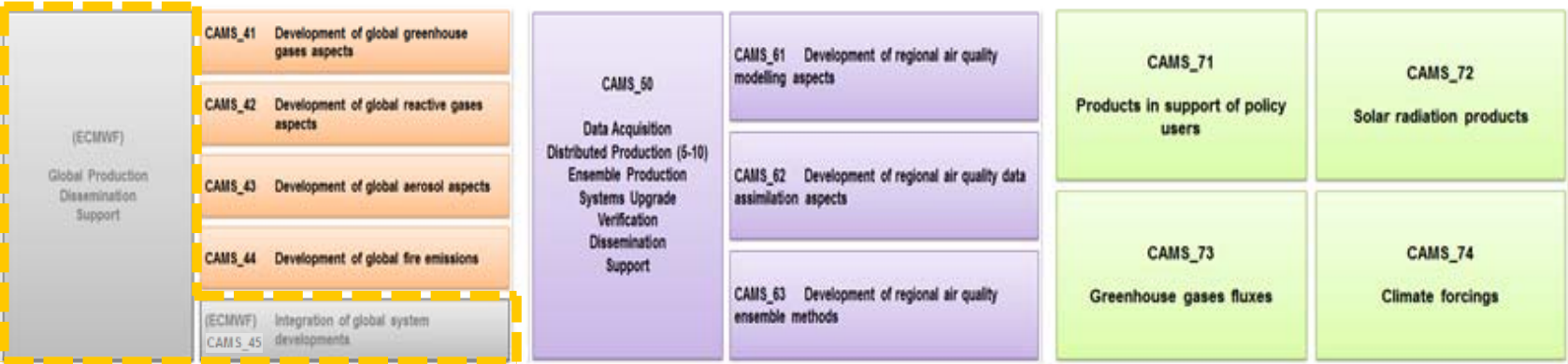


# 17+7 Procurements in 2015



## In-Situ Observations (CAMS\_21 to CAMS\_27: 7 directly negotiated procurements with the above)

ECMWF



**CAMS\_81**  
Global and regional anthropogenic emissions

**CAMS\_84**  
Global and regional a posteriori validation, including focus on the Arctic and Mediterranean areas

**CAMS\_92**  
Specialised global data services

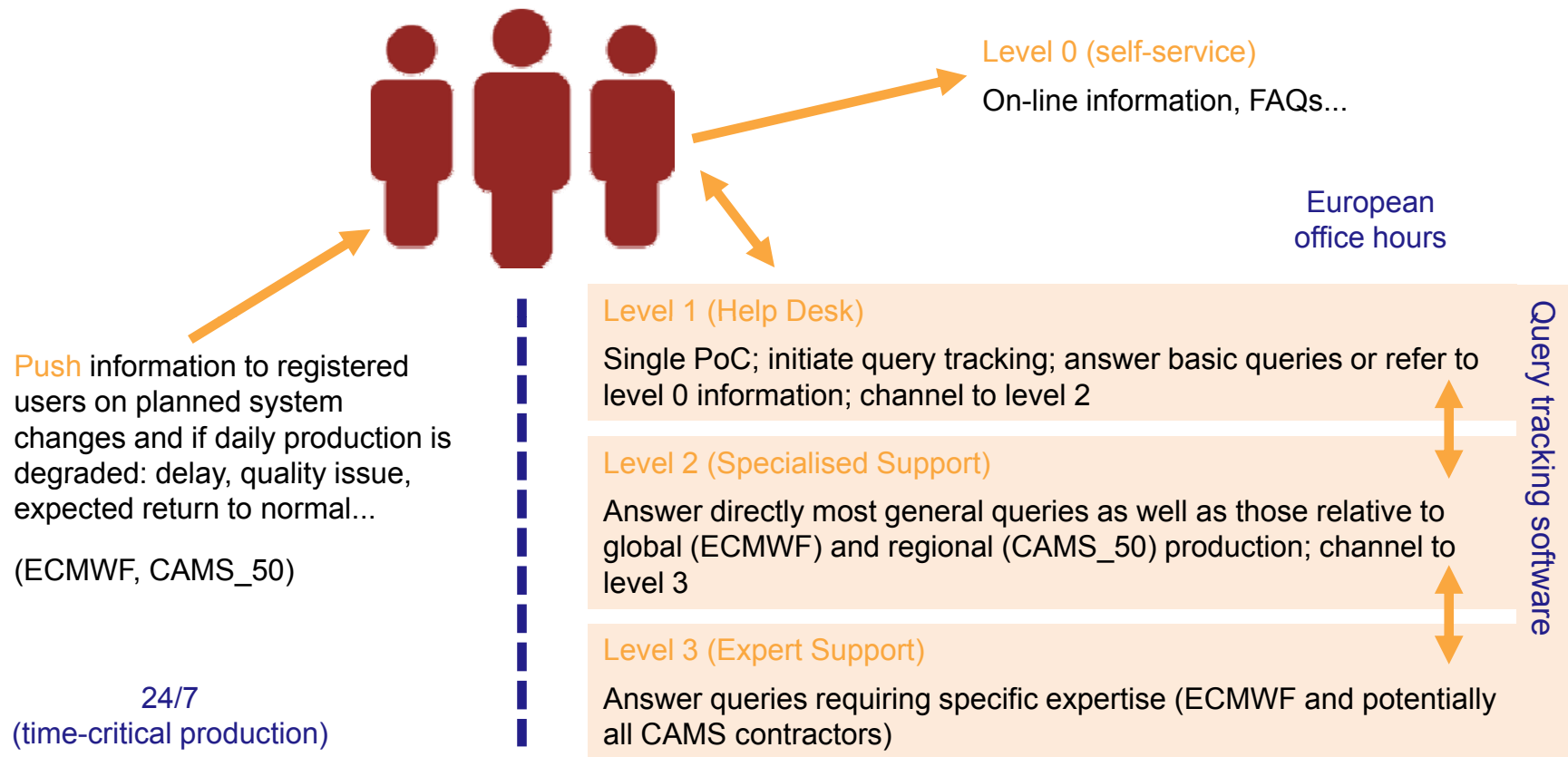
**CAMS\_93**  
Specialised regional data services

**CAMS\_94**  
User interaction activities





# CAMS User Support



# User Requirements



Channelled from:  
User support  
User events, conferences  
CAMS website  
ECMWF, contractors  
DG-GROW, CC/UF  
...

**URDB**  
User Requirement Data Base  
Tracks all expressed requirements; relational database managed by CAMS\_94 contractor

**RAD**  
Requirement Analysis Document  
Processes all entries in the URDB: regroup queries of similar nature; short-/medium-/long- term action or no action (already in the plan, scientific/technical feasibility, irrelevant...); budgetary implications?... Managed by ECMWF with support from CAMS\_94

**SPP**  
Service Products Portfolio  
CAMS outputs



<http://www.copernicus-atmosphere.eu>

Monitoring atmospheric composition & climate Not logged in | [Login](#)

**mac** Monitoring atmospheric composition & climate

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[Home](#) > Catalogue

Product	Name	Service Type	Product Family	Parameter
Air quality & atmospheric composition	MACC-IFS NRT forecast of global dust aerosol optical depth at 550 nm	Air quality & atmospheric composition	Aerosol	Dust AOD
Aerosol				
Dust AOD	MACC-UKMO NRT dust AOD forecast	Air quality & atmospheric composition	Aerosol	Dust AOD

--- Please select a data type ---  
--- Please select a geographic area ---

**Search criteria based on service themes, species, geographic area, etc.**

**MACC-IFS NRT forecast of global dust aerosol optical depth at 550 nm**

Description: This service provides pre-operational daily forecasts up to 5 days for dust aerosol optical depth.

Saturday 3 November 2012 00UTC MACC Forecast 1+012 VT: Saturday 3 November 2012 12UTC  
Dust Aerosols Optical Depth at 550 nm

Service type: Air quality & atmospheric composition  
Product family: Aerosol  
Parameter: Dust AOD  
Geographical area: Global

Vertical coordinate: column  
Time resolution: 3-hourly  
Data type: Model  
Production type: Forecast

Links: [Plots](#) [Data access](#) [Verification results](#) [Validation reports](#) [Contact us](#)

MACC-II is a Collaborative project. It is coordinated by the Institute for Global Environment and Earth System Science (IGEESS).

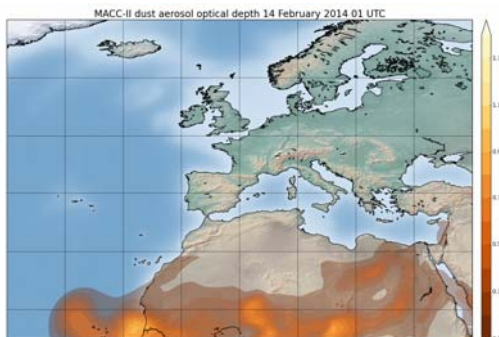
**Products found**

**Pop-up window with product description and links to plots, data, and validation**

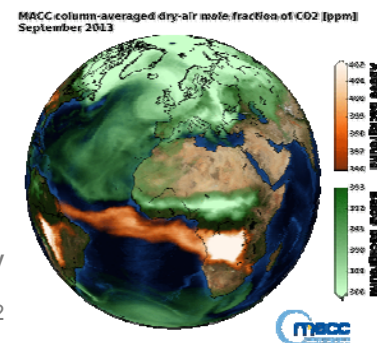
## Global portfolio

Global products	Daily analyses and forecasts of aerosol, chemical species, and greenhouse gases
	Reanalysis of aerosol, chemical species, and greenhouse gases
Supplementary products	Solar radiation
	Greenhouse gas fluxes
	Climate forcing
Emission products	Global anthropogenic emissions
	Daily fire emissions

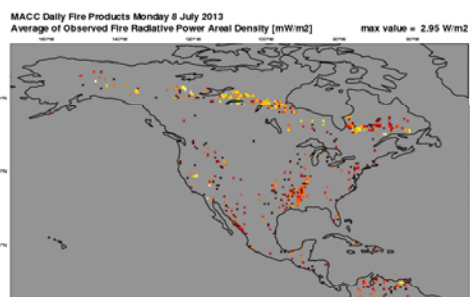




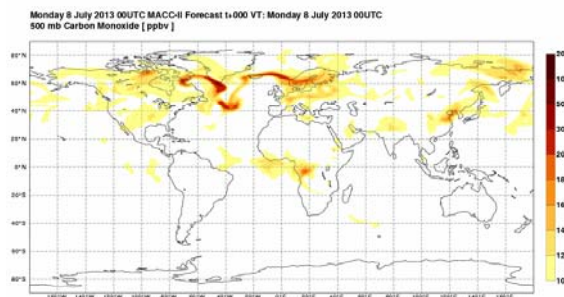
Daily 5-day forecasts of desert dust



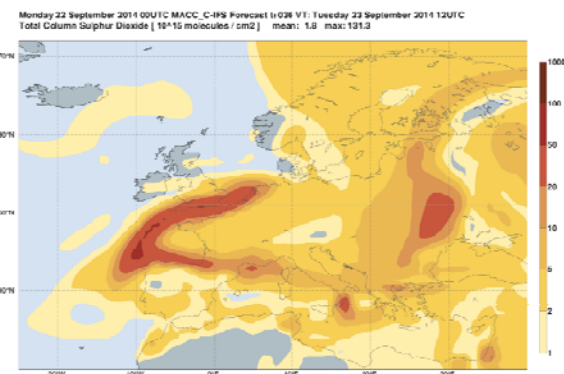
Daily 10-day forecasts of CO<sub>2</sub>



Daily estimates of fire emissions feed into forecast of smoke.



Forecasts of volcanic SO<sub>2</sub> plumes



ECMWF's IFS system has been extended to include aerosols, chemical species, and greenhouse gases : **Composition-IFS (C-IFS)**.

## Desert dust plumes

MACC-III dust aerosol optical depth 15 April 2015 01 UTC

