



Service Product Portfolio

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CAMS Service Product Portfolio

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ECMWF
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Service Product Portfolio

The CAMS Service Product Portfolio (SPP) provides an overview of all the services and products delivered by the Copernicus Atmosphere Monitoring Service. While the on-line Catalogue accessible on the CAMS web site (<http://atmosphere.copernicus.eu>) is the main point of access for the CAMS data, graphics and metadata, this SPP allows users to get a quick overview of the products provided by the service. The SPP is organised in four main categories and fourteen products lines, as described in the table below.

| Portfolio | Product groups |
|---------------------------|--------------------------------|
| A. Regional products | Real-time analyses |
| | Real-time forecasts |
| | Interim annual reanalyses |
| | Annual reanalyses |
| B. Global products | Real-time analyses |
| | Real-time forecasts |
| | Reanalyses |
| C. Supplementary products | Policy support products |
| | Solar radiation |
| | Greenhouse gas flux inversions |
| | Climate forcings |
| D. Emissions products | Anthropogenic emissions |
| | Fire emissions |
| | Natural emissions |

An overview of all the CAMS product lines is given in the four tables below. The remainder of this document lists each currently available product line in its own data sheet, providing more detailed information.



A. Regional products

The regional products are provided by an ensemble of air quality models (5-10 members) for the European domain. The services consist of daily near real-time analyses and forecasts, daily delayed-mode interim re-analyses based on fast-track in-situ observations, and annual re-analyses based on fully validated in-situ observations.

| A. Regional products | | |
|-----------------------------|----------------|-------------------------------------------------------------------|
| Real-time analyses | A.1.1 | European-scale air quality analysis from model ensemble |
| | A.1.2 | European-scale air quality analysis from Model #1 |
| | ... | ... |
| | A.1.N+1 | European-scale air quality analysis from Model #N |
| Real-time forecasts | A.2.1 | European-scale air quality forecasts from model ensemble |
| | A.2.2 | European-scale air quality forecasts from Model #1 |
| | ... | ... |
| | A.2.N+1 | European-scale air quality forecasts from Model #N |
| Interim annual reanalyses | A.3.1 | European-scale air quality interim reanalysis from model ensemble |
| | A.3.2 | European-scale air quality interim reanalysis from Model #1 |
| | ... | ... |
| | A.3.N+1 | European-scale air quality interim reanalysis from Model #N |
| Annual reanalyses | A.4.1 | European-scale air quality reanalysis from model ensemble |
| | A.4.2 | European-scale air quality reanalysis from Model #1 |
| | ... | ... |
| | A.4.N+1 | European-scale air quality reanalysis from Model #N |



B. Global products

The global products are provided by the ECMWF Integrated Forecast System (IFS). The services consist of daily real-time analyses and forecasts, and a re-analysis, currently for the period 2003 - 2007. Species include aerosol, reactive gases (only a subset is directly constrained by observations), and carbon dioxide and methane. The global products cover both the troposphere and stratosphere.

| B. Global products | | |
|---------------------------|--------------|--------------------------------------------------------------------------|
| Real-time analyses | B.1.1 | Global analyses of aerosol concentrations |
| | B.1.2 | Global analyses of chemical species |
| Real-time forecasts | B.2.1 | Global forecasts of aerosol concentrations |
| | B.2.2 | Global forecasts of aerosol optical depth at 550 nm |
| | B.2.3 | Global forecasts of total aerosol optical depth at multiple wavelengths |
| | B.2.4 | Global forecasts of chemical species |
| | B.2.6 | Global forecasts of greenhouse gases |
| Reanalyses | B.3.1 | Global reanalysis of aerosol concentrations |
| | B.3.2 | Global reanalysis of aerosol optical depth at 550 nm |
| | B.3.3 | Global reanalysis of total aerosol optical depth at multiple wavelengths |
| | B.3.4 | Global reanalysis of chemical species |
| | B.3.6 | Global reanalysis of greenhouse gases |



C. Supplementary products

This section of the CAMS portfolio comprises four categories of supplementary products, which are built on top of the global and regional ones:

- The policy support products consist of assessment reports making the raw regional re-analysis data easier accessible for policy users, scenario runs to support emission reductions on short and longer term, and source-receptor calculations providing information on the origin of polluted air.
- The solar radiation products include global forecasts of UV radiation supporting the health sector as well as data bases of clear-sky and all-sky solar irradiances to support the solar energy sector.
- The greenhouse gases flux inversion products consists of estimates of surface fluxes and the corresponding atmospheric distributions for some of the key greenhouse gases.
- The climate forcings service element provides estimates of the climate forcing of aerosol based on the global re-analysis. In the future this service will be extended to greenhouse gases (carbon dioxide, methane, nitrous oxide, and tropospheric ozone) as well.

| C. Supplementary products | | |
|--------------------------------|-------|------------------------------------------------------------------------------------------------------------------------|
| Policy support products | C.1.1 | Interim assessment reports based on the interim European reanalyses |
| | C.1.2 | Assessment reports based on the European reanalyses performed with validated data |
| | C.1.3 | "Green scenarios" with reduced level of anthropogenic emission |
| | C.1.4 | Emission reduction scenarios in support of future policy developments |
| | C.1.5 | Country source-receptor calculations |
| | C.1.6 | Regional source-receptor calculations |
| Solar radiation | C.2.1 | Global solar UV index forecast |
| | C.2.2 | Clear-sky surface solar irradiation |
| | C.2.3 | Total-sky surface solar irradiation |
| Greenhouse gas flux inversions | C.3.1 | Flux inversion reanalysis of global methane – Fluxes and atmospheric concentrations based on surface observations only |
| | C.3.2 | Flux inversion reanalysis of global nitrous oxide – Fluxes and atmospheric concentrations |
| | C.3.3 | Flux inversion reanalysis of global carbon dioxide – Fluxes and atmospheric concentrations |
| | C.3.4 | Flux inversion reanalysis of global methane – Fluxes and atmospheric concentrations |
| Climate forcings | C.4.1 | Aerosol-radiation radiative forcing based on global reanalysis |
| | C.4.2 | Aerosol-cloud radiative forcing based on global reanalysis |
| | C.4.3 | Radiative forcing of CO ₂ and CH ₄ based on global reanalysis |



| | | |
|--|--------------|-----------------------------------------------------------------------------------------------|
| | C.4.4 | Radiative forcing of tropospheric and stratospheric O ₃ based on global reanalysis |
|--|--------------|-----------------------------------------------------------------------------------------------|



D. Emission products

The CAMS emission products are an important input for the global and regional production systems. In parallel, they are provided as end products for users.

| D. Emissions products | | |
|------------------------------|--------------|--------------------------------------------------------------------------------|
| Anthropogenic emissions | D.1.1 | European anthropogenic emissions - air pollutants |
| | D.1.2 | Global anthropogenic emissions |
| | D.1.3 | Global ship emissions |
| | D.1.4 | European anthropogenic emissions - greenhouse gases |
| Fire emissions | D.2.1 | Biomass burning emissions based on Fire Radiative Power satellite observations |
| Natural emissions | D.3.1 | Global natural emissions |
| | D.3.2 | Global biogenic emissions |
| | D.3.3 | Global volcanic emissions |



Definition of Product Service status

All CAMS products are assigned a Product Service Status that describes the maturity of the service. The four different levels are described below. Only Pre-operational and operational products are listed in this Service Product Portfolio.

In development: Product is under development. Limited data sets might be made available upon request for early evaluation purposes.

Experimental production: Product is routinely¹ produced and available upon request. There is no guarantee on product availability, accuracy is not necessarily monitored, and timeliness is not yet necessarily in line with user requirements.

Pre-operational: Product is routinely¹ produced and available through the Product Catalogue on the web site. Expected product timeliness, availability and accuracy are as much in line with agreed user requirements as possible and are documented in the Service Specification document. Monitoring of input data, timeliness and availability of output data, and quality of output data against independent observations is in place, where possible. Validation of products is available through Validation reports and through monitoring plots linked from the Product Catalogue.

Operational: Product is routinely¹ produced and available through the Product Catalogue on the web site. Product timeliness, availability and accuracy are in line with agreed user requirements and are documented in the Service Specification document. Monitoring of input data, timeliness and availability of output data, and quality of output data against available independent observations is in place. Validation of products is available through Validation reports and through monitoring plots linked from the Product Catalogue. A production and support infrastructure is in place that seeks to meet the targets specified in the Service Specification document. The Service Specification and the extent to which the Services meet the documented requirements will be evaluated at least on an annual basis.

¹ The word 'routinely' is here used to describe all products that are updated on a regular basis. However, the update cycle varies for each product. For instance, global and regional forecasts are produced daily, while regional reanalyses are produced annually. The update frequency for each product is documented in the Service Product Portfolio



European-scale air quality analysis from model ensemble

| | |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product ID | A.1.1 |
| Status | Operational |
| Description | This service provides the ensemble median of the European-scale air quality analyses for every hour of the previous day. The maps provided are only representative for large scale phenomena, they cannot reproduce local aspects of air pollution. |
| Product family | Regional analyses |
| Species | O ₃ , NO ₂ , CO, SO ₂ , PM _{2.5} , PM ₁₀ , NO, NH ₃ , NMVOCs, PANs |
| Geographical area | Europe (-25.0, 45.0, 30.0, 70.0) |
| Vertical coordinate | Height levels |
| Vertical coverage | Surface, 50m, 250m, 500m, 1000m, 2000m, 3000m, 5000m |
| Horizontal resolution | 0.1°x0.1° |
| Time coverage | 1 October 2015 - current |
| Time resolution | Hourly |
| Update frequency | Daily |
| Dissemination mechanism | FTP, Data Server |
| Data format | NetCDF, GRIB |
| Dissemination time | 11:30UTC for the previous day analysis |
| Key performance indicator | Available on time 95% on an annual basis |
| Data access | On-line catalogue |

European-scale air quality analysis from Chimere

| | |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product ID | A.1.2 |
| Status | Operational |
| Description | This service provides European-scale air quality analyses for every hour of the previous day provided by the CHIMERE model. The maps provided are only representative for large scale phenomena, they cannot reproduce local aspects of air pollution. |
| Product family | Regional analyses |
| Species | O ₃ , NO ₂ , CO, SO ₂ , PM _{2.5} , PM ₁₀ , NO, NH ₃ , NMVOCs, PANs |
| Geographical area | Europe (-25.0, 45.0, 30.0, 70.0) |
| Vertical coordinate | Height levels |
| Vertical coverage | Surface, 50m, 250m, 500m, 1000m, 2000m, 3000m, 5000m |
| Horizontal resolution | 0.1°x0.1° |
| Time coverage | 1 October 2015 - current |
| Time resolution | Hourly |
| Update frequency | Daily |
| Dissemination mechanism | FTP |
| Data format | NetCDF |
| Dissemination time | 9:45UTC for the previous day analysis |
| Key performance indicator | Available on time 95% on an annual basis |
| Data access | On-line catalogue |

European-scale air quality analysis from EMEP

| | |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product ID | A.1.3 |
| Status | Operational |
| Description | This service provides European-scale air quality analyses for every hour of the previous day provided by the EMEP model. The maps provided are only representative for large scale phenomena, they cannot reproduce local aspects of air pollution. |
| Product family | Regional analyses |
| Species | O ₃ , NO ₂ , CO, SO ₂ , PM _{2.5} , PM ₁₀ , NO, NH ₃ , NMVOCs, PANs |
| Geographical area | Europe (-25.0, 45.0, 30.0, 70.0) |
| Vertical coordinate | Height levels |
| Vertical coverage | Surface, 50m, 250m, 500m, 1000m, 2000m, 3000m, 5000m |
| Horizontal resolution | 0.1°x0.1° |
| Time coverage | 1 October 2015 - current |
| Time resolution | Hourly |
| Update frequency | Daily |
| Dissemination mechanism | FTP |
| Data format | NetCDF |
| Dissemination time | 8:45UTC for the previous day analysis |
| Key performance indicator | Available on time 95% on an annual basis |
| Data access | On-line catalogue |

European-scale air quality analysis from EURAD

| | |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product ID | A.1.4 |
| Status | Operational |
| Description | This service provides European-scale air quality analyses for every hour of the previous day provided by the EURAD model. The maps provided are only representative for large scale phenomena, they cannot reproduce local aspects of air pollution. |
| Product family | Regional analyses |
| Species | O ₃ , NO ₂ , CO, SO ₂ , PM _{2.5} , PM ₁₀ , NO, NH ₃ , NMVOCs, PANs |
| Geographical area | Europe (-25.0, 45.0, 30.0, 70.0) |
| Vertical coordinate | Height levels |
| Vertical coverage | Surface, 50m, 250m, 500m, 1000m, 2000m, 3000m, 5000m |
| Horizontal resolution | 0.1°x0.1° |
| Time coverage | 1 October 2015 - current |
| Time resolution | Hourly |
| Update frequency | Daily |
| Dissemination mechanism | FTP |
| Data format | NetCDF |
| Dissemination time | 9:45UTC for the previous day analysis |
| Key performance indicator | Available on time 95% on an annual basis |
| Data access | On-line catalogue |

European-scale air quality analysis from LOTOS-EUROS

| | |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product ID | A.1.5 |
| Status | Operational |
| Description | This service provides European-scale air quality analyses for every hour of the previous day provided by the LOTOS-EUROS model. The maps provided are only representative for large scale phenomena, they cannot reproduce local aspects of air pollution. |
| Product family | Regional analyses |
| Species | O ₃ , NO ₂ , CO, SO ₂ , PM _{2.5} , PM ₁₀ , NO, NH ₃ , NMVOCs, PANs |
| Geographical area | Europe (-25.0, 45.0, 30.0, 70.0) |
| Vertical coordinate | Height levels |
| Vertical coverage | Surface, 50m, 250m, 500m, 1000m, 2000m, 3000m, 5000m |
| Horizontal resolution | 0.1°x0.1° |
| Time coverage | 1 October 2015 - current |
| Time resolution | Hourly |
| Update frequency | Daily |
| Dissemination mechanism | FTP |
| Data format | NetCDF |
| Dissemination time | 10:00UTC for the previous day analysis |
| Key performance indicator | Available on time 95% on an annual basis |
| Data access | On-line catalogue |

European-scale air quality analysis from MATCH

| | |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product ID | A.1.6 |
| Status | Operational |
| Description | This service provides European-scale air quality analyses for every hour of the previous day provided by the MATCH model. The maps provided are only representative for large scale phenomena, they cannot reproduce local aspects of air pollution. |
| Product family | Regional analyses |
| Species | O ₃ , NO ₂ , CO, SO ₂ , PM _{2.5} , PM ₁₀ , NO, NH ₃ , NMVOCs, PANs |
| Geographical area | Europe (-25.0, 45.0, 30.0, 70.0) |
| Vertical coordinate | Height levels |
| Vertical coverage | Surface, 50m, 250m, 500m, 1000m, 2000m, 3000m, 5000m |
| Horizontal resolution | 0.1°x0.1° |
| Time coverage | 1 October 2015 - current |
| Time resolution | Hourly |
| Update frequency | Daily |
| Dissemination mechanism | FTP |
| Data format | NetCDF |
| Dissemination time | 10:00UTC for the previous day analysis |
| Key performance indicator | Available on time 95% on an annual basis |
| Data access | On-line catalogue |

European-scale air quality analysis from MOCAGE

| | |
|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product ID | A.1.7 |
| Status | Operational |
| Description | This service provides European-scale air quality analyses for every hour of the previous day provided by the MOCAGE model. The maps provided are only representative for large scale phenomena, they cannot reproduce local aspects of air pollution. |
| Product family | Regional analyses |
| Species | O ₃ , NO ₂ , CO, SO ₂ , PM _{2.5} , PM ₁₀ , NO, NH ₃ , NMVOCs, PANs |
| Geographical area | Europe (-25.0, 45.0, 30.0, 70.0) |
| Vertical coordinate | Height levels |
| Vertical coverage | Surface, 50m, 250m, 500m, 1000m, 2000m, 3000m, 5000m |
| Horizontal resolution | 0.1°x0.1° |
| Time coverage | 1 October 2015 - current |
| Time resolution | Hourly |
| Update frequency | Daily |
| Dissemination mechanism | FTP |
| Data format | NetCDF |
| Dissemination time | 10:30UTC for the previous day analysis |
| Key performance indicator | Available on time 95% on an annual basis |
| Data access | On-line catalogue |

European-scale air quality analysis from SILAM

| | |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product ID | A.1.8 |
| Status | Operational |
| Description | This service provides European-scale air quality analyses for every hour of the previous day provided by the SILAM model. The maps provided are only representative for large scale phenomena, they cannot reproduce local aspects of air pollution. |
| Product family | Regional analyses |
| Species | O ₃ , NO ₂ , CO, SO ₂ , PM _{2.5} , PM ₁₀ , NO, NH ₃ , NMVOCs, PANs |
| Geographical area | Europe (-25.0, 45.0, 30.0, 70.0) |
| Vertical coordinate | Height levels |
| Vertical coverage | Surface, 50m, 250m, 500m, 1000m, 2000m, 3000m, 5000m |
| Horizontal resolution | 0.1°x0.1° |
| Time coverage | 1 October 2015 - current |
| Time resolution | Hourly |
| Update frequency | Daily |
| Dissemination mechanism | FTP |
| Data format | NetCDF |
| Dissemination time | 09:30UTC for the previous day analysis |
| Key performance indicator | Available on time 95% on an annual basis |
| Data access | On-line catalogue |

European-scale air quality forecast from model ensemble

| | |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product ID | A.2.1 |
| Status | Operational |
| Description | This service provides the ensemble median of the European-scale air quality forecasts for every hour up to 4 days in advance. The maps provided are only representative for large scale phenomena, they cannot reproduce local aspects of air pollution. |
| Product family | Regional forecasts |
| Species | O ₃ , NO ₂ , CO, SO ₂ , PM _{2.5} , PM ₁₀ , NO, NH ₃ , NMVOCs, PANs, Birch pollen (seasonal) |
| Geographical area | Europe (-25.0, 45.0, 30.0, 70.0) |
| Vertical coordinate | Height levels |
| Vertical coverage | Surface, 50m, 250m, 500m, 1000m, 2000m, 3000m, 5000m |
| Horizontal resolution | 0.1°x0.1° |
| Time coverage | 1 October 2015 - current |
| Time resolution | Hourly |
| Update frequency | Daily |
| Dissemination mechanism | FTP |
| Data format | NetCDF, GRIB |
| Dissemination time | 06:45UTC for the 00:00UTC 1 st -day and 2 nd -day forecast ; 08:30UTC for the 00:00UTC 3 rd -day and 4 th -day forecast |
| Key performance indicator | Available on time 95% on an annual basis |
| Data access | On-line catalogue |

European-scale air quality forecast from CHIMERE

| | |
|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product ID | A.2.2 |
| Status | Operational |
| Description | This service provides European-scale air quality forecasts for every hour up to 4 days in advance provided by the CHIMERE model. The maps provided are only representative for large scale phenomena, they cannot reproduce local aspects of air pollution. |
| Product family | Regional forecasts |
| Species | O ₃ , NO ₂ , CO, SO ₂ , PM _{2.5} , PM ₁₀ , NO, NH ₃ , NMVOCs, PANs, Birch pollen (seasonal) |
| Geographical area | Europe (-25.0, 45.0, 30.0, 70.0) |
| Vertical coordinate | Height levels |
| Vertical coverage | Surface, 50m, 250m, 500m, 1000m, 2000m, 3000m, 5000m |
| Horizontal resolution | 0.1°x0.1° |
| Time coverage | 1 October 2015 - current |
| Time resolution | Hourly |
| Update frequency | Daily |
| Dissemination mechanism | FTP |
| Data format | NetCDF |
| Dissemination time | 06:00 UTC |
| Key performance indicator | Available on time 95% on an annual basis |
| Data access | On-line catalogue |

European-scale air quality forecast from EMEP

| | |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product ID | A.2.3 |
| Status | Operational |
| Description | This service provides European-scale air quality forecasts for every hour up to 4 days in advance provided by the EMEP model. The maps provided are only representative for large scale phenomena, they cannot reproduce local aspects of air pollution. |
| Product family | Regional forecasts |
| Species | O ₃ , NO ₂ , CO, SO ₂ , PM _{2.5} , PM ₁₀ , NO, NH ₃ , NMVOCs, PANs, Birch pollen (seasonal) |
| Geographical area | Europe (-25.0, 45.0, 30.0, 70.0) |
| Vertical coordinate | Height levels |
| Vertical coverage | Surface, 50m, 250m, 500m, 1000m, 2000m, 3000m, 5000m |
| Horizontal resolution | 0.1°x0.1° |
| Time coverage | 1 October 2015 - current |
| Time resolution | Hourly |
| Update frequency | Daily |
| Dissemination mechanism | FTP |
| Data format | NetCDF |
| Dissemination time | 02:00 UTC |
| Key performance indicator | Available on time 95% on an annual basis |
| Data access | On-line catalogue |

European-scale air quality forecast from EURAD

| | |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product ID | A.2.4 |
| Status | Operational |
| Description | This service provides European-scale air quality forecasts for every hour up to 4 days in advance provided by the EURAD model. The maps provided are only representative for large scale phenomena, they cannot reproduce local aspects of air pollution. |
| Product family | Regional forecasts |
| Species | O ₃ , NO ₂ , CO, SO ₂ , PM _{2.5} , PM ₁₀ , NO, NH ₃ , NMVOCs, PANs, Birch pollen (seasonal) |
| Geographical area | Europe (-25.0, 45.0, 30.0, 70.0) |
| Vertical coordinate | Height levels |
| Vertical coverage | Surface, 50m, 250m, 500m, 1000m, 2000m, 3000m, 5000m |
| Horizontal resolution | 0.1°x0.1° |
| Time coverage | 1 October 2015 - current |
| Time resolution | Hourly |
| Update frequency | Daily |
| Dissemination mechanism | FTP |
| Data format | NetCDF |
| Dissemination time | 06:00 UTC |
| Key performance indicator | Available on time 95% on an annual basis |
| Data access | On-line catalogue |

European-scale air quality forecast from LOTOS-EUROS

| | |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product ID | A.2.5 |
| Status | Operational |
| Description | This service provides European-scale air quality forecasts for every hour up to 4 days in advance provided by the LOTOS-EUROS model. The maps provided are only representative for large scale phenomena, they cannot reproduce local aspects of air pollution. |
| Product family | Regional forecasts |
| Species | O ₃ , NO ₂ , CO, SO ₂ , PM _{2.5} , PM ₁₀ , NO, NH ₃ , NMVOCs, PANs, Birch pollen (seasonal) |
| Geographical area | Europe (-25.0, 45.0, 30.0, 70.0) |
| Vertical coordinate | Height levels |
| Vertical coverage | Surface, 50m, 250m, 500m, 1000m, 2000m, 3000m, 5000m |
| Horizontal resolution | 0.1°x0.1° |
| Time coverage | 1 October 2015 - current |
| Time resolution | Hourly |
| Update frequency | Daily |
| Dissemination mechanism | FTP |
| Data format | NetCDF |
| Dissemination time | 04:00 UTC |
| Key performance indicator | Available on time 95% on an annual basis |
| Data access | On-line catalogue |

European-scale air quality forecast from MATCH

| | |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product ID | A.2.6 |
| Status | Operational |
| Description | This service provides European-scale air quality forecasts for every hour up to 4 days in advance provided by the MATCH model. The maps provided are only representative for large scale phenomena, they cannot reproduce local aspects of air pollution. |
| Product family | Regional forecasts |
| Species | O ₃ , NO ₂ , CO, SO ₂ , PM _{2.5} , PM ₁₀ , NO, NH ₃ , NMVOCs, PANs, Birch pollen (seasonal) |
| Geographical area | Europe (-25.0, 45.0, 30.0, 70.0) |
| Vertical coordinate | Height levels |
| Vertical coverage | Surface, 50m, 250m, 500m, 1000m, 2000m, 3000m, 5000m |
| Horizontal resolution | 0.1°x0.1° |
| Time coverage | 1 October 2015 - current |
| Time resolution | Hourly |
| Update frequency | Daily |
| Dissemination mechanism | FTP |
| Data format | NetCDF |
| Dissemination time | 03:00 UTC |
| Key performance indicator | Available on time 95% on an annual basis |
| Data access | On-line catalogue |

European-scale air quality forecast from MOCAGE

| | |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product ID | A.2.7 |
| Status | Operational |
| Description | This service provides European-scale air quality forecasts for every hour up to 4 days in advance provided by the MOCAGE model. The maps provided are only representative for large scale phenomena, they cannot reproduce local aspects of air pollution. |
| Product family | Regional forecasts |
| Species | O ₃ , NO ₂ , CO, SO ₂ , PM _{2.5} , PM ₁₀ , NO, NH ₃ , NMVOCs, PANs, Birch pollen (seasonal) |
| Geographical area | Europe (-25.0, 45.0, 30.0, 70.0) |
| Vertical coordinate | Height levels |
| Vertical coverage | Surface, 50m, 250m, 500m, 1000m, 2000m, 3000m, 5000m |
| Horizontal resolution | 0.1°x0.1° |
| Time coverage | 1 October 2015 - current |
| Time resolution | Hourly |
| Update frequency | Daily |
| Dissemination mechanism | FTP |
| Data format | NetCDF |
| Dissemination time | 00:30 UTC |
| Key performance indicator | Available on time 95% on an annual basis |
| Data access | On-line catalogue |

European-scale air quality forecast from SILAM

| | |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product ID | A.2.8 |
| Status | Operational |
| Description | This service provides European-scale air quality forecasts for every hour up to 4 days in advance provided by the SILAM model. The maps provided are only representative for large scale phenomena, they cannot reproduce local aspects of air pollution. |
| Product family | Regional forecasts |
| Species | O ₃ , NO ₂ , CO, SO ₂ , PM _{2.5} , PM ₁₀ , NO, NH ₃ , NMVOCs, PANs, Birch pollen (seasonal) |
| Geographical area | Europe (-25.0, 45.0, 30.0, 70.0) |
| Vertical coordinate | Height levels |
| Vertical coverage | Surface, 50m, 250m, 500m, 1000m, 2000m, 3000m, 5000m |
| Horizontal resolution | 0.1°x0.1° |
| Time coverage | 1 October 2015 - current |
| Time resolution | Hourly |
| Update frequency | Daily |
| Dissemination mechanism | FTP |
| Data format | NetCDF |
| Dissemination time | 03:00 UTC |
| Key performance indicator | Available on time 95% on an annual basis |
| Data access | On-line catalogue |

European-scale air quality interim reanalysis from model ensemble

| | |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product ID | A.3.1 |
| Status | Operational |
| Description | This service provides the ensemble median of the European-scale air quality interim reanalyses. The maps provided are only representative for large scale phenomena, they cannot reproduce local aspects of air pollution. |
| Product family | Interim annual reanalyses |
| Species | O ₃ , NO ₂ , PM _{2.5} , PM ₁₀ |
| Geographical area | Europe (-25.0, 45.0, 30.0, 70.0) |
| Vertical coordinate | Height levels |
| Vertical coverage | Surface |
| Horizontal resolution | 0.1°x0.1° |
| Time coverage | 2016 - 2017 |
| Time resolution | Hourly |
| Update frequency | Daily |
| Dissemination mechanism | Data server |
| Data format | NetCDF |
| Dissemination time | N/A |
| Key performance indicator | Available on time 95% on an annual basis |
| Data access | On-line catalogue |

European-scale air quality reanalysis from model ensemble

| | |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product ID | A.4.1 |
| Status | Operational |
| Description | This service provides the ensemble median of the European-scale air quality reanalyses. The maps provided are only representative for large scale phenomena, they cannot reproduce local aspects of air pollution. |
| Product family | Annual reanalyses |
| Species | O ₃ , NO ₂ , PM _{2.5} , PM ₁₀ |
| Geographical area | Europe (-25.0, 45.0, 30.0, 70.0) |
| Vertical coordinate | Height levels |
| Vertical coverage | Surface |
| Horizontal resolution | 0.1°x0.1° |
| Time coverage | 2010 - 2015 |
| Time resolution | Hourly |
| Update frequency | Daily |
| Dissemination mechanism | Web site |
| Data format | Graphics |
| Dissemination time | N/A |
| Key performance indicator | Available on time 95% on an annual basis |
| Data access | On-line catalogue |

Global analyses of aerosol concentrations

| | |
|----------------------------------|-----------------------------------------------------------------------------------------|
| Product ID | B.1.1 |
| Status | Operational |
| Description | This service provides daily global analyses of aerosol concentrations. |
| Product family | Global analyses |
| Parameter | Mass mixing ratios of Black carbon, Organic carbon, Dust, Sea salt, Sulfates |
| Geographical area | Global |
| Vertical coordinate | Model levels, Pressure levels |
| Vertical coverage | ML 1 - 60, PL 1000 925 850 700 500 400 300 250 200 150 100 70 50 30 20 10 7 5 3 2 1 hPa |
| Horizontal resolution | T511 (Approx. 40 km) |
| Time coverage | 1 July 2015 - current |
| Time resolution | 6-hourly |
| Update frequency | 12-hourly |
| Dissemination mechanism | FTP, Data Server |
| Data format | NetCDF, GRIB |
| Dissemination time | 10:00 UTC for the 00UTC analysis; 22:00UTC for the 12UTC analysis |
| Key performance indicator | Available on time 95% on an annual basis |
| Data access | On-line catalogue |

Global analyses of chemical species

| | |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product ID | B.1.2 |
| Status | Operational |
| Description | This service provides daily analyses of chemical species. |
| Product family | Global analyses |
| Parameter | O ₃ , CO, NO, NO ₂ , PAN, HNO ₃ , CH ₂ O, SO ₂ , CH ₄ , C ₅ H ₈ , C ₂ H ₆ , OH, C ₃ H ₈ , O ₃ S, HO ₂ |
| Geographical area | Global |
| Vertical coordinate | Surface, Model levels, Pressure levels |
| Vertical coverage | Total column, ML 1 - 60, PL 1000 925 850 700 500 400 300 250 200 150 100 70 50 30 20 10 7 5 3 2 1 hPa |
| Horizontal resolution | T511 (Approx. 40 km) |
| Time coverage | 1 July 2015 - current |
| Time resolution | 6-hourly |
| Update frequency | 12-hourly |
| Dissemination mechanism | FTP, Data Server |
| Data format | NetCDF, GRIB |
| Dissemination time | 10:00 UTC for the 00UTC analysis; 22:00UTC for the 12UTC analysis |
| Key performance indicator | Available on time 95% on an annual basis |
| Data access | On-line catalogue |

Global forecasts of aerosol concentrations

| | |
|----------------------------------|-----------------------------------------------------------------------------------------|
| Product ID | B.2.1 |
| Status | Operational |
| Description | This service provides daily global forecasts up to 5 days of aerosol concentrations. |
| Product family | Global forecasts |
| Parameter | Mass mixing ratios of Black carbon, Organic carbon, Dust, Sea salt, Sulfates |
| Geographical area | Global |
| Vertical coordinate | Model levels, Pressure levels |
| Vertical coverage | ML 1 - 60, PL 1000 925 850 700 500 400 300 250 200 150 100 70 50 30 20 10 7 5 3 2 1 hPa |
| Horizontal resolution | T511 (Approx. 40 km) |
| Time coverage | 1 July 2015 - current |
| Time resolution | 3-hourly |
| Update frequency | Daily |
| Dissemination mechanism | FTP, Data Server |
| Data format | NetCDF, GRIB |
| Dissemination time | 10:00 UTC for the 00UTC 5-day forecast; 22:00UTC for the 12UTC 5-day forecast |
| Key performance indicator | Available on time 95% on an annual basis |
| Data access | On-line catalogue |

Global forecasts of aerosol optical depth at 550 nm

| | |
|----------------------------------|---------------------------------------------------------------------------------------------|
| Product ID | B.2.2 |
| Status | Operational |
| Description | This service provides daily global forecasts up to 5 days of optical depth (AOD) at 550 nm. |
| Product family | Global forecasts |
| Parameter | Black carbon, Organic carbon, Dust, Sea salt, Sulfates AOD |
| Geographical area | Global |
| Vertical coordinate | Surface |
| Vertical coverage | Total column |
| Horizontal resolution | T511 (Approx. 40 km) |
| Time coverage | 1 July 2015 - current |
| Time resolution | hourly |
| Update frequency | Daily |
| Dissemination mechanism | FTP, Data Server |
| Data format | NetCDF, GRIB |
| Dissemination time | 10:00 UTC for the 00UTC 5-day forecast; 22:00UTC for the 12UTC 5-day forecast |
| Key performance indicator | Available on time 95% on an annual basis |
| Data access | On-line catalogue |

Global forecasts of aerosol total aerosol optical depth at multiple wavelengths

| | |
|----------------------------------|-------------------------------------------------------------------------------------------------------------------|
| Product ID | B.2.3 |
| Status | Operational |
| Description | This service provides daily forecasts up to 5 days of total aerosol optical depth at 469, 550, 670, 865, 1240 nm. |
| Product family | Global forecasts |
| Parameter | Total AOD |
| Geographical area | Global |
| Vertical coordinate | Surface |
| Vertical coverage | Total column |
| Horizontal resolution | T511 (Approx. 40 km) |
| Time coverage | 1 July 2015 - current |
| Time resolution | hourly |
| Update frequency | Daily |
| Dissemination mechanism | FTP, Data Server |
| Data format | NetCDF, GRIB |
| Dissemination time | 10:00 UTC for the 00UTC 5-day forecast; 22:00UTC for the 12UTC 5-day forecast |
| Key performance indicator | Available on time 95% on an annual basis |
| Data access | On-line catalogue |

Global forecasts of chemical species

| | |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product ID | B.2.4 |
| Status | Operational |
| Description | This service provides daily forecasts up to 5 days of chemical species. |
| Product family | Global forecasts |
| Parameter | O ₃ , CO, NO, NO ₂ , PAN, HNO ₃ , CH ₂ O, SO ₂ , CH ₄ , C ₅ H ₈ , C ₂ H ₆ , OH, C ₃ H ₈ , O ₃ S, HO ₂ |
| Geographical area | Global |
| Vertical coordinate | Surface, Model levels, Pressure levels |
| Vertical coverage | Total column, ML 1 - 60, PL 1000 925 850 700 500 400 300 250 200 150 100 70 50 30 20 10 7 5 3 2 1 hPa |
| Horizontal resolution | T511 (Approx. 40 km) |
| Time coverage | 1 July 2015 - current |
| Time resolution | hourly for total column, 3-hourly for 3D fields |
| Update frequency | Daily |
| Dissemination mechanism | FTP, Data Server |
| Data format | NetCDF, GRIB |
| Dissemination time | 10:00 UTC for the 00UTC 5-day forecast; 22:00UTC for the 12UTC 5-day forecast |
| Key performance indicator | Available on time 95% on an annual basis |
| Data access | On-line catalogue |

Global forecasts of greenhouse gases

| | |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------|
| Product ID | B.2.6 |
| Status | Pre-operational |
| Description | This service provides near-real-time forecasts of CO ₂ , CH ₄ and CO at high spatial resolution. |
| Product family | Global forecasts |
| Parameter | CO ₂ , CH ₄ , CO |
| Geographical area | Global |
| Vertical coordinate | Surface, Model levels, Pressure levels |
| Vertical coverage | Total column, ML 1 - 60, PL 1000 925 850 700 500 400 300 250 200 150 100 70 50 30 20 10 7 5 3 2 1 hPa |
| Horizontal resolution | 2015 - 2016: T11279 (Approx. 16 km); 2017 - present: Tco1279 (approx. 9 km) |
| Time coverage | 2015 - present |
| Time resolution | 3-hourly |
| Update frequency | Daily |
| Dissemination mechanism | On request |
| Data format | NetCDF, GRIB |
| Dissemination time | 12:00UTC for the pervious day 00:00UTC 10-day forecast |
| Key performance indicator | Available on time 95% on an annual basis |
| Data access | On-line catalogue |

Global reanalysis of aerosol concentrations

| | |
|----------------------------------|-----------------------------------------------------------------------------------------|
| Product ID | B.3.1 |
| Status | Operational |
| Description | This service provides a global reanalysis of aerosol concentrations going back to 2003 |
| Product family | Global reanalyses |
| Parameter | Mass mixing ratios of Black carbon, Organic carbon, Dust, Sea salt, Sulfates |
| Geographical area | Global |
| Vertical coordinate | Model levels, Pressure levels |
| Vertical coverage | ML 1 - 60, PL 1000 925 850 700 500 400 300 250 200 150 100 70 50 30 20 10 7 5 3 2 1 hPa |
| Horizontal resolution | T255 (Approx. 80 km) |
| Time coverage | Currently January 2003 - 31 December 2007 |
| Time resolution | 3-hourly |
| Update frequency | Multi-annual |
| Dissemination mechanism | WebAPI |
| Data format | NetCDF, GRIB |
| Dissemination time | N/A |
| Key performance indicator | Available 95% of time |
| Data access | On-line catalogue |

Global reanalysis of aerosol optical depth at 550 nm

| | |
|----------------------------------|--------------------------------------------------------------------------------------------------|
| Product ID | B.3.2 |
| Status | Operational |
| Description | This service provides a global reanalysis of aerosol optical depth at 550 nm going back to 2003. |
| Product family | Global reanalyses |
| Parameter | Black carbon, Organic carbon, Dust, Sea salt, Sulfates AOD |
| Geographical area | Global |
| Vertical coordinate | Surface |
| Vertical coverage | Total column |
| Horizontal resolution | T255 (Approx. 80 km) |
| Time coverage | Currently January 2003 - 31 December 2007 |
| Time resolution | 3-hourly |
| Update frequency | Multi-annual |
| Dissemination mechanism | WebAPI |
| Data format | NetCDF, GRIB |
| Dissemination time | N/A |
| Key performance indicator | Available 95% of time |
| Data access | On-line catalogue |

Global reanalysis of aerosol total optical depth at multiple wavelengths

| | |
|----------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| Product ID | B.3.3 |
| Status | Operational |
| Description | This service provides global reanalysis of total aerosol optical depth at 469, 550, 670, 865, 1240 nm, going back to 2003 |
| Product family | Global reanalyses |
| Parameter | Total AOD |
| Geographical area | Global |
| Vertical coordinate | Surface |
| Vertical coverage | Total column |
| Horizontal resolution | T255 (Approx. 80 km) |
| Time coverage | Currently January 2003 - 31 December 2007 |
| Time resolution | 3-hourly |
| Update frequency | Multi-annual |
| Dissemination mechanism | WebAPI |
| Data format | NetCDF, GRIB |
| Dissemination time | N/A |
| Key performance indicator | Available 95% of time |
| Data access | On-line catalogue |

Global reanalysis of chemical species

| | |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product ID | B.3.4 |
| Status | Operational |
| Description | This service provides global reanalysis of chemical species that are directly constrained by observations. |
| Product family | Global reanalyses |
| Parameter | O ₃ , CO, NO, NO ₂ , PAN, HNO ₃ , CH ₂ O, SO ₂ , CH ₄ , OH, C ₅ H ₈ , C ₂ H ₆ , C ₃ H ₈ , O ₃ S, HO ₂ |
| Geographical area | Global |
| Vertical coordinate | Surface, Model levels, Pressure levels |
| Vertical coverage | Total column, ML 1 - 60, PL 1000 925 850 700 500 400 300 250 200 150 100 70 50 30 20 10 7 5 3 2 1 hPa |
| Horizontal resolution | T255 (Approx. 80 km) |
| Time coverage | Currently January 2003 - 31 December 2007 |
| Time resolution | Monthly, 3-hourly |
| Update frequency | Multi-annual |
| Dissemination mechanism | WebAPI |
| Data format | NetCDF, GRIB |
| Dissemination time | N/A |
| Key performance indicator | Available 95% of time |
| Data access | On-line catalogue |

Interim assessment reports based on the interim European reanalyses

| | |
|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product ID | C.1.1 |
| Status | Operational |
| Description | This service provides reports using non-validated up-to-date observations and selected modelled data from the CAMS services. Its timeliness is considerably advanced with respect to other existing European-wide air quality assessments. Since the CAMS Interim Annual Assessment is based on non-validated data, the report does not aim at presenting a quantification of the background European air quality situation regarding regulatory objectives, but rather a characterization of each year's air quality status with respect to previous years and an analysis of the origin of identified episodes. |
| Product family | Policy support |
| Parameter | PM ₁₀ , Birch pollen, PM _{2.5} , NO ₂ , O ₃ |
| Geographical area | Europe (-25.0, 45.0, 30.0, 70.0) |
| Vertical coordinate | Surface |
| Vertical coverage | Report |
| Horizontal resolution | N/A |
| Time coverage | 2015, 2016 |
| Time resolution | Annual |
| Update frequency | Annually |
| Dissemination mechanism | Web site |
| Data format | Report |
| Dissemination time | N/A |
| Key performance indicator | TBD |
| Data access | On-line catalogue |

Assessment reports based on the European reanalyses performed with validated data

| | |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product ID | C.1.2 |
| Status | Pre-operational |
| Description | This service provides annual assessment reports with validated information on the state and evolution of background concentrations of air pollutants in Europe. The reports are based on best available information from the CAMS model ensemble combined with observations through data assimilation techniques. They include a number of regulatory indicators for policy use and detailed information on the origin of specific pollution episodes. |
| Product family | Policy support |
| Parameter | PM ₁₀ , Birch pollen, PM _{2.5} , NO ₂ , O ₃ |
| Geographical area | Europe (-25.0, 45.0, 30.0, 70.0) |
| Vertical coordinate | Surface |
| Vertical coverage | Report |
| Horizontal resolution | N/A |
| Time coverage | 2007-2014 |
| Time resolution | Annual |
| Update frequency | Annually |
| Dissemination mechanism | Web site |
| Data format | Report |
| Dissemination time | N/A |
| Key performance indicator | TBD |
| Data access | On-line catalogue |

Green scenarios

| | |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product ID | C.1.3 |
| Status | Operational |
| Description | The green scenario products are intended to help policy users in the design of policy responses to prevent severe air pollution episodes. The green scenarios provide daily regular information on the expected effect that short term measures on either traffic and residential emissions may have on the forecasted pollution episodes. |
| Product family | Policy support |
| Parameter | PM ₁₀ , PM _{2.5} , NO ₂ , O ₃ |
| Geographical area | Europe (-25.0, 45.0, 30.0, 70.0) |
| Vertical coordinate | Height levels |
| Vertical coverage | Surface |
| Horizontal resolution | 0.1°x0.1° |
| Time coverage | - |
| Time resolution | Daily |
| Update frequency | Daily |
| Dissemination mechanism | Web site |
| Data format | Graphics |
| Dissemination time | N/A |
| Key performance indicator | TBD |
| Data access | On-line catalogue |

Emission reduction scenarios

| | |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product ID | C.1.4 |
| Status | Operational |
| Description | The Gothenburg policy scenario allows exploring how the in 2020 through implementation of the National Emission Ceilings Directive (2001/81/EC) or the UN Gothenburg Protocol on acidification, eutrophication and ground level ambient pollutant concentrations and exposure will be reduced. |
| Product family | Policy support |
| Parameter | PM ₁₀ , PM _{2.5} , NO ₂ , O ₃ |
| Geographical area | Europe (-25.0, 45.0, 30.0, 70.0) |
| Vertical coordinate | Height levels |
| Vertical coverage | Surface |
| Horizontal resolution | 0.1°x0.1° |
| Time coverage | - |
| Time resolution | Daily |
| Update frequency | Daily |
| Dissemination mechanism | Web site |
| Data format | Graphics |
| Dissemination time | N/A |
| Key performance indicator | TBD |
| Data access | On-line catalogue |

Country source-receptor calculations

| | |
|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product ID | C.1.5 |
| Status | Pre-operational |
| Description | The service provides for a selection of European countries how much the local air pollution can be attributed to local sources and how much is imported through long-range transport. |
| Product family | Policy support |
| Parameter | PM ₁₀ , O ₃ |
| Geographical area | Europe (-25.0, 45.0, 30.0, 70.0) |
| Vertical coordinate | Height levels |
| Vertical coverage | Surface |
| Horizontal resolution | 0.1°x0.1° |
| Time coverage | - |
| Time resolution | |
| Update frequency | On demand |
| Dissemination mechanism | Web site |
| Data format | Graphics |
| Dissemination time | N/A |
| Key performance indicator | TBD |
| Data access | On-line catalogue |

Regional source-receptor calculations

| | |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product ID | C.1.6 |
| Status | Operational |
| Description | The service provides for European capitals how much the local air pollution can be attributed to local sources and how much is imported through long-range transport. |
| Product family | Policy support |
| Parameter | O ₃ , PM ₁₀ |
| Geographical area | Europe (-25.0, 45.0, 30.0, 70.0) |
| Vertical coordinate | Height levels |
| Vertical coverage | Surface |
| Horizontal resolution | N/A |
| Time coverage | - |
| Time resolution | Hourly |
| Update frequency | Daily |
| Dissemination mechanism | Web site |
| Data format | Graphics |
| Dissemination time | N/A |
| Key performance indicator | TBD |
| Data access | On-line catalogue |

Global solar UV index forecast

| | |
|----------------------------------|----------------------------------------------------------------------------------------------|
| Product ID | C.2.1 |
| Status | Operational |
| Description | This service provides daily forecasts up to 5 days for the total sky and clear sky UV index. |
| Product family | Solar radiation |
| Parameter | UV index |
| Geographical area | Global |
| Vertical coordinate | Surface |
| Vertical coverage | Radiation at surface |
| Horizontal resolution | T511 (Approx. 40 km) |
| Time coverage | 1 July 2015 - current |
| Time resolution | hourly |
| Update frequency | Daily |
| Dissemination mechanism | FTP, Data server |
| Data format | NetCDF, GRIB |
| Dissemination time | 10:00UTC for the 00UTC 5-day forecast; 22:00UTC for the 12UTC 5-day forecast |
| Key performance indicator | Available on time 95% on an annual basis |
| Data access | On-line catalogue |

Clear-sky surface solar irradiation

| | |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product ID | C.2.2 |
| Status | Operational |
| Description | The McClear Clear-Sky Irradiation service, available worldwide, delivers time series of irradiation that would be observed at a specific site under clear sky conditions, with a time step ranging from 1 min to 1 month. The Global, Direct and Diffuse Horizontal Irradiation, as well as the Direct Normal Irradiation are provided. |
| Product family | Solar radiation |
| Parameter | Global, direct and diffuse radiation on horizontal surface, direct normal radiation. In the detailed 1 minute expert mode additional information on input parameters as solar geometry, aerosols, water vapour, ozone, surface albedo and on radiation without the bias correction being applied. |
| Geographical area | Global |
| Vertical coordinate | Surface |
| Vertical coverage | Radiation at surface |
| Horizontal resolution | Interpolated to point of interest |
| Time coverage | 1 January 2004 - (current - 2 days) |
| Time resolution | 1-minute, 15-minute, hourly, daily, monthly |
| Update frequency | Daily |
| Dissemination mechanism | Data server, on-request processing |
| Data format | ASCII, NetCDF |
| Dissemination time | 16UTC for (current - 2 days) |
| Key performance indicator | time to process a 1-year request, time to process a 10-year request, availability of servers to users, availability of service to user |
| Data access | On-line catalogue |

Total-sky surface solar irradiation

| | |
|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product ID | C.2.3 |
| Status | Operational |
| Description | The CAMS Radiation service provides time series of Global, Direct, and Diffuse Irradiations on horizontal surface, and Direct Irradiation on a normal plane (DNI) for the actual weather conditions as well as for clear-sky conditions. The geographical coverage is the field-of-view of the Meteosat satellite, roughly speaking Europe, Africa, Atlantic Ocean, Middle East (-66° to 66° in both latitudes and longitudes). |
| Product family | Solar radiation |
| Parameter | Global, direct and diffuse radiation on horizontal surface, direct normal radiation (both bias-corrected and non-bias corrected values are provided). In the detailed 1 minute expert mode additional information on input parameters as solar geometry, clouds, aerosols, water vapour, ozone, surface albedo and on radiation without the bias correction being applied. |
| Geographical area | Meteosat satellite field-of-view |
| Vertical coordinate | Surface |
| Vertical coverage | Radiation at surface |
| Horizontal resolution | 3-5 km interpolated to point of interest |
| Time coverage | 1 February 2004 - (current - 2 days) |
| Time resolution | 1-minute, 15-minute, hourly, daily, monthly |
| Update frequency | Daily |
| Dissemination mechanism | Data server, on-request processing |
| Data format | ASCII, NetCDF |
| Dissemination time | 16UTC for (current - 2 days) |
| Key performance indicator | time to process a 1-year request, time to process a 10-year request, availability of servers to users, availability of service to user |
| Data access | On-line catalogue |

Flux inversion reanalysis of global methane – Fluxes and atmospheric concentrations based on surface observations only

| | |
|----------------------------------|-------------------------------------------------------------------------------|
| Product ID | C.3.1 |
| Status | Operational |
| Description | CH ₄ inversion reanalysis using surface observations only |
| Product family | Greenhouse gas fluxes |
| Parameter | CH ₄ surface fluxes and atmospheric CH ₄ concentrations |
| Geographical area | Global |
| Vertical coordinate | Surface, Model levels |
| Vertical coverage | Surface flux, ML 1 - 25, total column |
| Horizontal resolution | 6°x4° |
| Time coverage | 2000 - 2016 |
| Time resolution | Monthly (flux), daily (concentration), 6-hourly (total column) |
| Update frequency | Annually |
| Dissemination mechanism | Data server |
| Data format | NetCDF |
| Dissemination time | N/A |
| Key performance indicator | TBD |
| Data access | On-line catalogue |

Flux inversion reanalysis of global nitrous oxide - Fluxes and atmospheric concentrations

| | |
|----------------------------------|------------------------------------------------------------------------------|
| Product ID | C.3.2 |
| Status | Operational |
| Description | N ₂ O atmospheric inversion using surface air sample measurements |
| Product family | Greenhouse gas fluxes |
| Parameter | N ₂ O surface fluxes, atmospheric N ₂ O concentrations |
| Geographical area | Global |
| Vertical coordinate | Surface, Model levels |
| Vertical coverage | Surface flux, ML 1 - 39 |
| Horizontal resolution | 3.75°x1.9° |
| Time coverage | 1996 - 2016 |
| Time resolution | Monthly (fluxes), 3-hourly (concentrations) |
| Update frequency | Annually |
| Dissemination mechanism | Data server |
| Data format | NetCDF |
| Dissemination time | N/A |
| Key performance indicator | Bias to aircraft measurements in the free troposphere |
| Data access | On-line catalogue |

Flux inversion reanalysis of global carbon dioxide - Fluxes and atmospheric concentrations

| | |
|----------------------------------|-----------------------------------------------------------------------------|
| Product ID | C.3.3 |
| Status | Operational |
| Description | CO ₂ atmospheric inversion using surface air-sample measurements |
| Product family | Greenhouse gas fluxes |
| Parameter | CO ₂ surface fluxes, atmospheric CO ₂ concentrations |
| Geographical area | Global |
| Vertical coordinate | Surface, Model levels |
| Vertical coverage | Surface flux, ML 1 - 39, total column |
| Horizontal resolution | 3.75°x1.9° |
| Time coverage | 1979 - 2017 |
| Time resolution | Monthly (fluxes), 3-hourly (fluxes, concentrations) |
| Update frequency | Twice per year |
| Dissemination mechanism | Data server |
| Data format | NetCDF |
| Dissemination time | N/A |
| Key performance indicator | Bias to aircraft measurements in the free troposphere |
| Data access | On-line catalogue |

Flux inversion reanalysis of global methane – Fluxes and atmospheric concentrations based on surface & satellite observations

| | |
|----------------------------------|-------------------------------------------------------------------------------|
| Product ID | C.3.4 |
| Status | Operational |
| Description | CH ₄ inversion reanalysis using surface and satellite observations |
| Product family | Greenhouse gas fluxes |
| Parameter | CH ₄ surface fluxes and atmospheric CH ₄ concentrations |
| Geographical area | Global |
| Vertical coordinate | Surface, Model levels |
| Vertical coverage | Surface flux, ML 1 - 25, total column |
| Horizontal resolution | 6°x4° |
| Time coverage | 2009 - 2016 |
| Time resolution | Monthly (flux), daily (concentration), 6-hourly (total column) |
| Update frequency | Annually |
| Dissemination mechanism | Data server |
| Data format | NetCDF |
| Dissemination time | N/A |
| Key performance indicator | TBD |
| Data access | On-line catalogue |

Aerosol-radiation radiative forcing based on global reanalysis

| | |
|----------------------------------|------------------------------------------------------------------------------------------------------------------|
| Product ID | C.4.1 |
| Status | Pre-operational |
| Description | This service provides the aerosol-radiation radiative forcing and radiative effect based on the MACC reanalysis. |
| Product family | Climate forcings |
| Parameter | Aerosol-radiation radiative forcing and radiative effect |
| Geographical area | Global |
| Vertical coordinate | Surface |
| Vertical coverage | Surface |
| Horizontal resolution | 1.125° x 1.125° |
| Time coverage | 2003 - 2012 |
| Time resolution | Monthly |
| Update frequency | Multi-annual |
| Dissemination mechanism | Data server |
| Data format | NetCDF |
| Dissemination time | N/A |
| Key performance indicator | TBD |
| Data access | On-line catalogue |

Aerosol-cloud radiative forcing based on global reanalysis

| | |
|----------------------------------|-------------------------------------------------------------------------------------------------------------|
| Product ID | C.4.2 |
| Status | Pre-operational |
| Description | This service provides the aerosol-cloud radiative forcing and radiative effect based on the MACC reanalysis |
| Product family | Climate forcings |
| Parameter | Aerosol indirect radiative forcing |
| Geographical area | Global |
| Vertical coordinate | Surface |
| Vertical coverage | Surface |
| Horizontal resolution | 1.125° x 1.125° |
| Time coverage | 2003 - 2012 |
| Time resolution | Monthly |
| Update frequency | Multi-annual |
| Dissemination mechanism | Data server |
| Data format | NetCDF |
| Dissemination time | N/A |
| Key performance indicator | TBD |
| Data access | On-line catalogue |

Radiative forcing of CO₂ and CH₄ based on global reanalysis

| | |
|----------------------------------|------------------------------------------------------------------------------------------------------------------|
| Product ID | C.4.3 |
| Status | Pre-operational |
| Description | This service provides the radiative forcing of CO ₂ and CH ₄ based on the MACC reanalysis. |
| Product family | Climate forcings |
| Parameter | Radiative forcing of CO ₂ and CH ₄ |
| Geographical area | Global |
| Vertical coordinate | Surface |
| Vertical coverage | Surface |
| Horizontal resolution | 3°x3° |
| Time coverage | 2003 - 2012 |
| Time resolution | Daily |
| Update frequency | Multi-annual |
| Dissemination mechanism | Data server |
| Data format | NetCDF |
| Dissemination time | N/A |
| Key performance indicator | TBD |
| Data access | On-line catalogue |

Radiative forcing of tropospheric and stratospheric O₃ based on global reanalysis

| | |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| Product ID | C.4.3 |
| Status | Pre-operational |
| Description | This service provides the radiative forcing of tropospheric and stratospheric O ₃ based on the MACC reanalysis. |
| Product family | Climate forcings |
| Parameter | Radiative forcing of tropospheric and stratospheric O ₃ |
| Geographical area | Global |
| Vertical coordinate | Surface |
| Vertical coverage | Surface |
| Horizontal resolution | 3°x3° |
| Time coverage | 2003 - 2012 |
| Time resolution | Monthly |
| Update frequency | Multi-annual |
| Dissemination mechanism | Data server |
| Data format | NetCDF |
| Dissemination time | N/A |
| Key performance indicator | TBD |
| Data access | On-line catalogue |

European anthropogenic emissions - air pollutants

| | |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| Product ID | D.1.1 |
| Status | Operational |
| Description | This services provides anthropogenic emissions for various air pollutants for the European domain, valid for year 2015 |
| Product family | Anthropogenic emissions |
| Parameter | CO, CH ₄ , SO ₂ , NH ₃ , PM ₁₀ , NMVOCs, PM _{2.5} , NO _x |
| Geographical area | Europe (-25.0, 45.0, 30.0, 70.0) |
| Vertical coordinate | Surface |
| Vertical coverage | Surface flux, point sources and area sources |
| Horizontal resolution | 0.125° x 0.0625° longitude-latitude |
| Time coverage | 1 January 2015 - 31 December 2015 |
| Time resolution | Annual with default profiles for monthly, daily, hourly on request |
| Update frequency | Annual |
| Dissemination mechanism | FTP server, Data server, ECCAD |
| Data format | NetCDF, GRIB |
| Dissemination time | February 2018 |
| Key performance indicator | TBD |
| Data access | On-line catalogue |

Global anthropogenic emissions

| | |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product ID | D.1.2 |
| Status | Operational |
| Description | This services provides anthropogenic emissions for various chemical and greenhouse gas species and aerosols for the global domain, valid for year 2018, based on the EDGAR and CEDS inventories. |
| Product family | Anthropogenic emissions |
| Parameter | CO, NO _x , SO ₂ , NH ₃ , CH ₄ , NMVOCs and 25 speciated VOCs, BC, OC, CO ₂ , PM ₁₀ , PM _{2.5} |
| Geographical area | Global |
| Vertical coordinate | Surface |
| Vertical coverage | Surface flux (point sources and area sources) |
| Horizontal resolution | 0.1°x0.1° longitude-latitude |
| Time coverage | 1 January 2018 - 31 December 2018 |
| Time resolution | Monthly |
| Update frequency | Annual |
| Dissemination mechanism | ECCAD |
| Data format | NetCDF |
| Dissemination time | February 2018 |
| Key performance indicator | TBD |
| Data access | On-line catalogue |

Global ship emissions

| | |
|----------------------------------|-------------------------------------------------------------------------------------------------|
| Product ID | D.1.3 |
| Status | Operational |
| Description | Ship emissions for various chemical species, valid for the year 2015. |
| Product family | Ship emissions |
| Parameter | CO ₂ , CO, NO _x , NMVOCs, SO ₄ , SO ₂ , OC, EC, ash |
| Geographical area | Global |
| Vertical coordinate | Surface |
| Vertical coverage | Surface flux (point sources and area sources) |
| Horizontal resolution | 0.25°x0.25° longitude-latitude |
| Time coverage | 1 January 2016 - 31 December 2018 |
| Time resolution | Daily |
| Update frequency | Annual |
| Dissemination mechanism | ECCAD |
| Data format | NetCDF |
| Dissemination time | July 2018 |
| Key performance indicator | TBD |
| Data access | On-line catalogue |

European anthropogenic emissions - greenhouse gases

| | |
|----------------------------------|------------------------------------------------------------------------------------------------------------------|
| Product ID | D.1.4 |
| Status | Operational |
| Description | This services provides anthropogenic emissions for greenhouse gases for the European domain, valid for year 2015 |
| Product family | Anthropogenic emissions |
| Parameter | CO ₂ (fossil fuel), CO ₂ (bio fuel), CH ₄ |
| Geographical area | Europe (-25.0, 45.0, 30.0, 70.0) |
| Vertical coordinate | Surface |
| Vertical coverage | Surface flux, point sources and area sources |
| Horizontal resolution | 0.125° x 0.0625° longitude-latitude |
| Time coverage | 1 January 2015 - 31 December 2015 |
| Time resolution | Annual with default profiles for monthly, daily, hourly on request |
| Update frequency | Annual |
| Dissemination mechanism | FTP server, Data server, ECCAD |
| Data format | NetCDF, GRIB |
| Dissemination time | February 2018 |
| Key performance indicator | TBD |
| Data access | On-line catalogue |

Biomass burning emissions based on Fire Radiative Power satellite observations

| | |
|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product ID | D.2.1 |
| Status | Operational |
| Description | This service provides daily biomass burning emissions of various aerosol, greenhouse gas, and chemical species based on Fire radiative Power (FRP) satellite observations |
| Product family | Fire emissions |
| Parameter | FRP and emissions |
| Geographical area | Global |
| Vertical coordinate | Surface |
| Vertical coverage | Surface flux |
| Horizontal resolution | 0.1°x0.1° longitude-latitude |
| Time coverage | 1 January 2003 - current |
| Time resolution | Daily |
| Update frequency | Daily |
| Dissemination mechanism | FTP, Data server |
| Data format | NetCDF, GRIB |
| Dissemination time | 06:00UTC for previous day analysis |
| Key performance indicator | Available on time 95% on an annual basis |
| Data access | On-line catalogue |

Global biogenic emissions

| | |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| Product ID | D.3.2 |
| Status | Operational |
| Description | This services provides biogenic volatile organic compounds emissions for various chemical species, valid for the year 2016 |
| Product family | Biogenic emissions |
| Parameter | Isoprene, terpenes, methanol, etc. (21 compounds) |
| Geographical area | Global |
| Vertical coordinate | Surface |
| Vertical coverage | Surface flux (point sources and area sources) |
| Horizontal resolution | 0.5°x0.5° longitude-latitude |
| Time coverage | 1 January 2016 - 31 December 2016 |
| Time resolution | Monthly |
| Update frequency | Annual |
| Dissemination mechanism | ECCAD |
| Data format | NetCDF |
| Dissemination time | February 2018 |
| Key performance indicator | TBD |
| Data access | On-line catalogue |

