Use of in-situ data in CAMS

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ECMWF

Atmosphere Monitoring

The CAMS service chain

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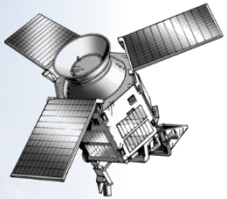
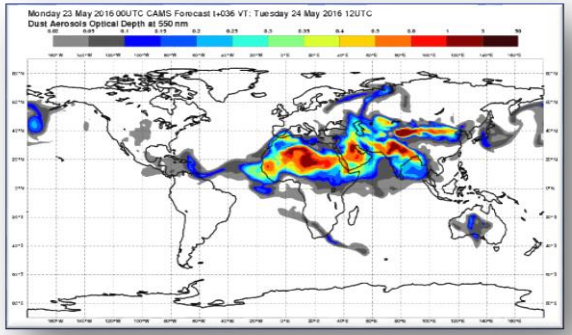
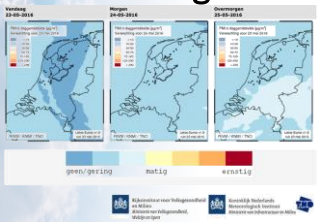
Space Agencies

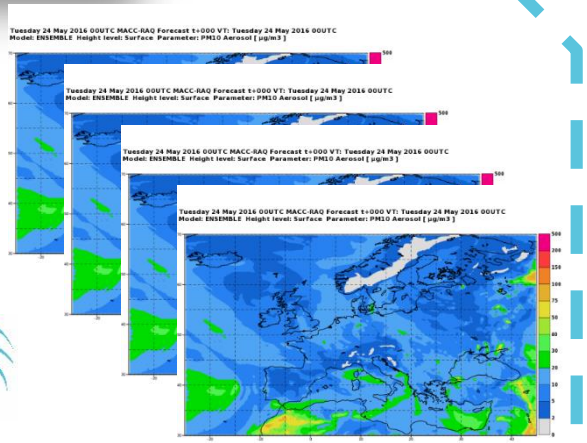




In-situ observations

National agencies





SMEs

Citizens

Scientists

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Use of in-situ observations

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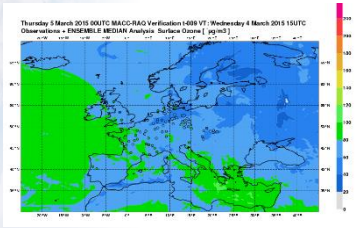
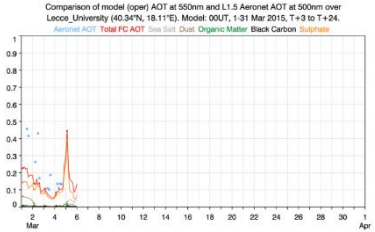
CAMS products

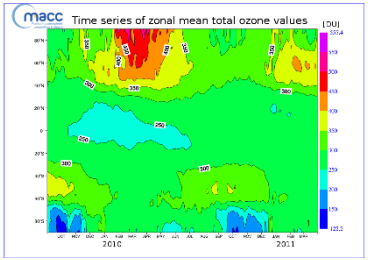
QC/QA

Timeliness

Real-Time	Near-Real-Time	A posteriori	Final
< 3 hours	< 2-3 days	< 1 month	< 1 year
Automated Filtering, flagging	Semi-automated	Manual, Expertise Semi-validated	Expertise + Validated
Assimilation (Verification)	Verification (Assimilation)	Validation Interim re-analyses R&D	Reanalyses Validation R&D







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Some examples

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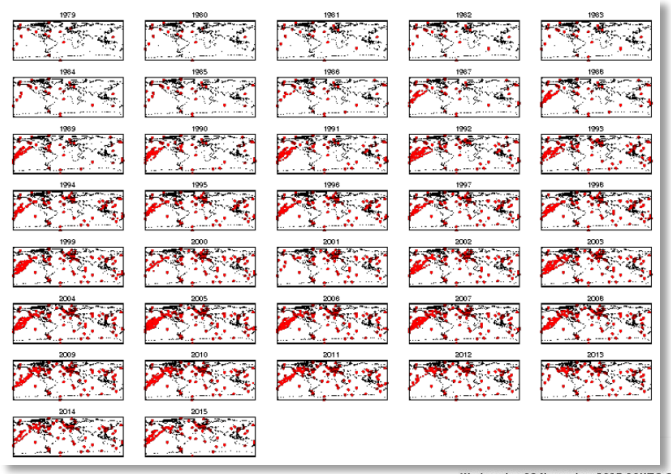
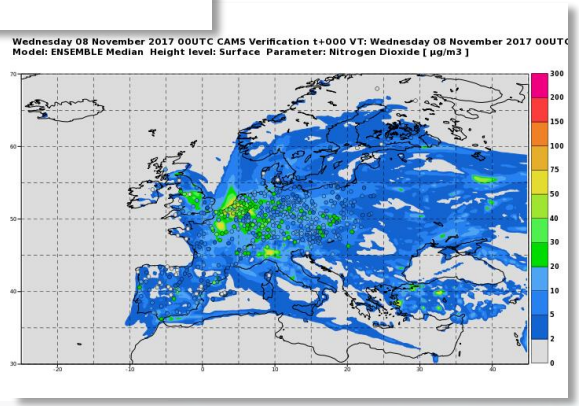
Global forecasts



CO2 fluxes

UV forecasts



Regional forecasts

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CAMS requirements

- Global data sets where possible
- Good quality control
- Good timeliness (< 1 month)
- Good metadata
- Easy to use data policy

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CAMS SPECIFIC IN-SITU DATA CONTRACTS

A range of dedicated directly negotiated contracts with the main networks that monitor atmospheric composition in Europe and worldwide.

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Contract with ICOS: long term observations on greenhouse gas emissions and concentrations in the atmosphere

ICOS Atmosphere Thematic Centre

ICOS is a European Research Infrastructures selected as an ESFRI landmark. It provides the long-term observations required to understand the present state and predict future behaviour of climate, the global carbon cycle and greenhouse gases emissions.

ICOS already provides the atmospheric observations with a good timeliness, but relies on a research infrastructure.

To establish a data stream that is fit-for-purpose for validation activities, CAMS supports the following activities:

- Improve the robustness and management of a reliable preparation, transmission and quality control of rapid delivery atmospheric ICOS data
- Develop and implement diagnostic software to handle instrumental anomalies in the data
- Develop and implement diagnostic software to detect physical anomalies in the observations that might impact the validation of the CAMS forecast products

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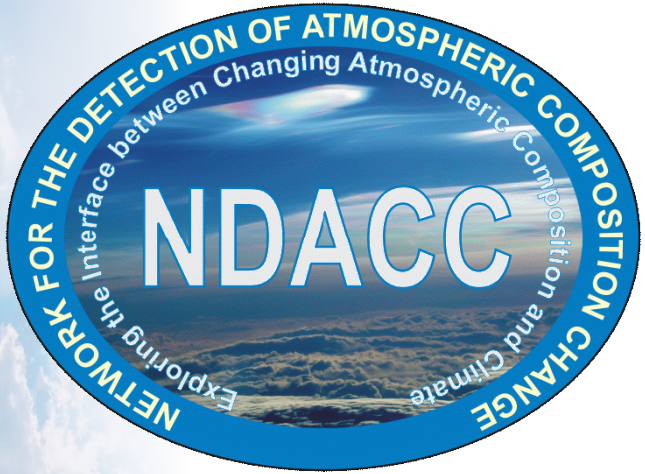
Contract with NDACC: state of stratosphere and upper troposphere via ground-based remote sensing



NDACC is composed of more than 70 high-quality, remote-sensing research stations for observing and understanding the physical and chemical state of the stratosphere and upper troposphere and for assessing the impact of stratosphere changes on the underlying troposphere and on global climate.

NDACC has around 30 sites around the world that deliver observations within the required 1-year latency. Currently, data formats are not fully harmonized and issues with metadata regularly occur.

To establish a data stream that is fit-for-purpose for validation activities, CAMS supports the following activities:

- Improved automated quality control and monitoring of data files (consistent metadata, standard quality checks on reported values, etc.)
- Increase timeliness from current 1 year to 1 month

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CAMS IN SITU CONTRACT ABOUT EUROPEAN AIR QUALITY

This contract is jointly managed by ECMWF/CAMS and the European Environment Agency.

European Environment Agency

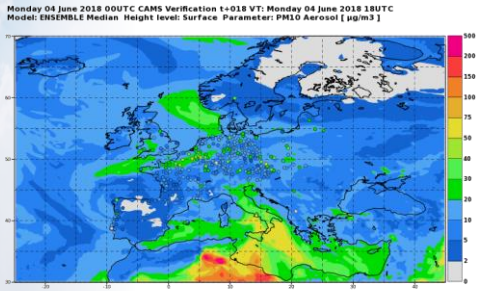
Contractors are: TRACASA (lead) and 4sfera, Spain.

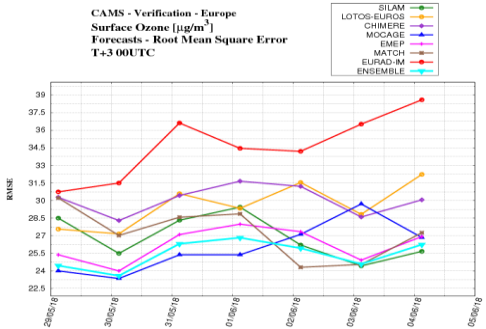
tracasa

4sfera innova

Three main activities:

- (1) Consolidate and expand EEA's IT infrastructure for acquiring, processing (QC/QA) and serving European Air quality "up-to-date" data. Use of Cloud Computing technologies for further scalability.





Primary use in CAMS is for assimilation and verification, which requires a very high level of operationality (timeliness, coverage, quality control...).

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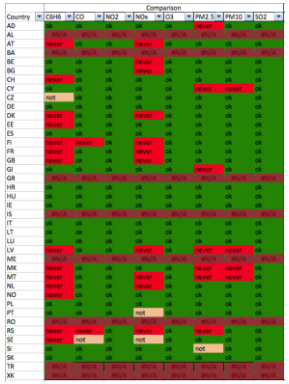
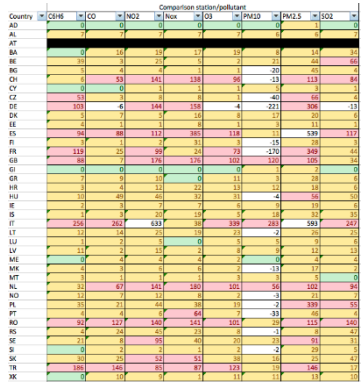
CAMS IN SITU CONTRACT ABOUT EUROPEAN AIR QUALITY

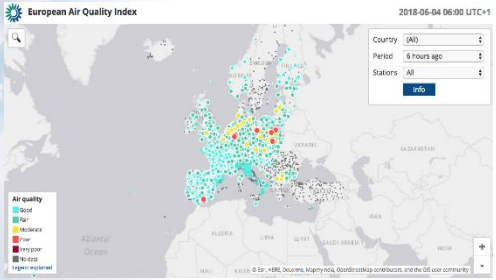
- (2) Engage with EEA Member States to support increase in data reported through EEA's up-to-date system.

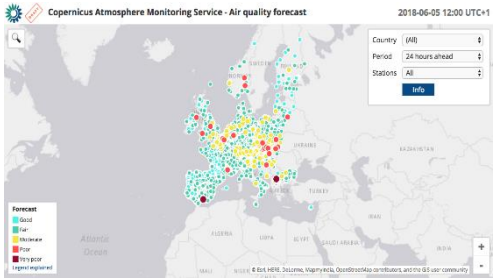
Detailed liaison work with Member States is now in progress to improve reporting through EEA's "up-to-date" system. Target: more countries, more species, more sites!





- (3) Work on seamless integration of CAMS forecasts in EEA's European Air Quality Index website (currently only observations and CAMS is used for gap filling).





A "CAMS viewer" is being developed, allowing to link observations (already available publicly) and CAMS forecasts. Ultimate objective is a seamless integration showing past days and next days information.

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ECMWF's support within CAMS to other networks and infrastructes currently in preparation

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2 contracts: aerosol vertical profiles (CNR, Italy) and advanced composition measurements in Europe (CNRS, France)

Contracts about pollen observations (Medical Uni Vienna, Austria)

2 contracts: supporting sites outside of Europe (MeteoSwiss, Switzerland) and composition measurements in Europe (NILU, Norway)

NRT aircraft measurements (IAGOS, Int.)

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Cross-cutting issues

- Data policies are often restricted and difficult to handle within a Copernicus operational service
- Potential strong synergy with data needs from Copernicus Space Component, which could probably be exploited a bit more
- CAMS support is focused on European organised networks. This leaves access to other networks vulnerable (e.g. TCCON, US networks)

Thank you!

More info:
atmosphere.copernicus.eu

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