

World Data Centre for Aerosol: Status & News 2017

Fiebig, M.; Fjæraa, A.M.; Tørseth, K. and the EBAS-team
WDCA at the Norwegian Institute for Air Research

Items Covered

- WDCA setup: Quick Review
- WDCA Status: Key numbers and figures
 - Stations Reporting
 - Access Statistics
- Services and Ongoing WDCA Activities
 - Submission portal with instant feedback
 - Data Identification Services
 - Use of licenses in European research infrastructures
 - Interoperability: metadata and data servers
 - Feedback portal

The WDCA Homepage: www.gaw-wdca.org

The screenshot shows the homepage of the WMO Global Atmosphere Watch World Data Centre for Aerosols. The page features a navigation menu with links for Home, Submit Data, Browse / Obtain Data, How's the aerosol?, Publications, Contributors, and Contact. The main content area is titled "The World Data Centre for Aerosols (WDCA)" and provides information about the GAW programme, its goals, and the observation core parameters. A sidebar on the left lists "News & Events" including the AAAR 30th Annual Conference and the EGU General Assembly 2018. A sidebar on the right lists "GAW Links" to various related organizations and data centers.

**WMO Global Atmosphere Watch
World Data Centre for Aerosols**

Home Submit Data Browse / Obtain Data How's the aerosol? Publications Contributors Contact

September 25, 2017

News & Events

AAAR 30th Annual Conference
October 16-20, 2017
Raleigh Convention Center
Raleigh, NC

EGU General Assembly 2018
General Assembly of the
European Geosciences Union,
08 - 13 April 2018, Vienna,
Austria [read more...](#)

IAC 2018
10th International Aerosol
Conference
September 2-7, 2018
America's Center
St. Louis, MO, USA [read more](#)

The World Data Centre for Aerosols (WDCA)
is the data repository and archive for microphysical, optical, and chemical properties of atmospheric aerosol of the [World Meteorological Organisation's \(WMO\) Global Atmosphere Watch \(GAW\)](#) programme.

"The goal of the Global Atmosphere Watch (GAW) programme is to ensure long-term measurements in order to detect trends in global distributions of chemical constituents in air and the reasons for them. With respect to aerosols, the objective of GAW is to determine the spatio-temporal distribution of aerosol properties related to climate forcing and air quality on multi-decadal time scales and on regional, hemispheric and global spatial scales."

GAW aerosol long-term observation core parameters:

- Physical Properties:
 - particle number concentration (size integrated)
 - particle number size distribution
 - particle mass concentration (two size fractions)
 - cloud condensation nuclei number concentration (at various super-saturations)
- Optical Properties:
 - light scattering coefficient (various wavelengths)
 - light hemispheric backscattering coefficient (various wavelengths)
 - light absorption coefficient (various wavelengths)
- Chemical Properties:
 - mass concentration of major chemical components (two size fractions)
- Column and Profile:
 - aerosol optical depth (various wavelengths)
 - vertical profile of aerosol backscattering coefficient
 - vertical profile of aerosol extinction coefficient

Additional parameters recommended for long-term or intermittent observation:

- dependence of aerosol properties on relative humidity
- detailed, size segregated chemical composition

The extent of the observation programme varies between observatories networked in GAW. The observations are reported by the GAW observatories on a voluntary basis, while the station infrastructure is a contribution of the participating national authorities to the GAW programme.

GAW Links

- [WMO Global Atmosphere Watch - GAW](#)
- [GAW Scientific Advisory Group for Aerosol](#)
- [GAW Station Information System - GAW SIS](#)
- [World Calibration Centre for Aerosol Physics \(WCCAP\)](#)
- [World Optical Depth Research and Calibration Centre \(WODRCC\)](#)
- [Global Atmosphere Watch Aerosol Lidar Observation Network](#)
- [World Data Centre for Greenhouse Gases - WDCGG](#)
- [World Data Centre for Remote Sensing of the Atmosphere - WDC-BSA1](#)
- [World Data Centre for Precipitation Chemistry - WDCPC](#)
- [World Ozone and Ultraviolet Radiation Data Centre - WUODC](#)

- Updated «Publications» page containing relevant SOP references for stations starting new measurements.
- Links to other GAW nodes.



Instructions for Submitting Aerosol Data to EBAS, i.e. WDCA: <http://ebas-submit.nilu.no/>

The screenshot shows the EBAS Data Submission Manual website. The main heading is "EBAS Data Submission Manual". Below the heading, there are navigation tabs: "Submit Data", "Data Policy", "Standard Operating Procedures", "Near real-time data submissions", and "Software Tools". The "Submit Data" tab is selected. The page content is titled "General introduction" and includes the following text:

The EBAS atmospheric database, originally designed for the [European Monitoring and Evaluation Programme \(EMEP\)](#), archives today data on atmospheric composition from ground stations around the globe as well as aircraft platforms. Co-operating frameworks and projects include:

- [The Convention on Long-Range Transboundary Air Pollution - EMEP](#)
- [The WMO Global Atmosphere Watch Programme](#)
- [The Arctic Monitoring and Assessment Programme \(AMAP\)](#)
- [The EU-project Aerosols, Clouds, and Trace gases Research InfraStructure Network \(ACTRIS\)](#)

Data providers benefit from improved data dissemination through EBAS with an increased number of collaborations. Data submitted to EBAS are protected by a [fair-use data policy](#) while some projects/programmes requests a more restrictive data policy. The association of data to projects thus defines the associated data policy.

Submission Format

Data submitted to EBAS need to be formatted in the EBAS NASA-Ames format by the data provider. The EBAS NASA-Ames format is based on the ASCII text NASA-Ames 1001 format, but contains additional metadata specifications ensuring proper documentation, and is designed to be easily understandable (see [reasons behind this setup](#)). This page provides links to data reporting templates for reporting data to EBAS.

Submission Procedure

The normal mode of submitting data to EBAS is the regular, annual data submission (see left margin, top). The deadline for a submission depends on the framework or project the dataset is associated with. EBAS also offers advanced data reporting that establishes complete traceability of the measurement and data analysis process. Participation in the advanced data reporting scheme is voluntary unless required by the associated project or framework. The usual steps for submitting data for the first time include:

1. **Initial contact with EBAS:** Please establish the initial contact with EBAS by writing an e-mail to ebas@nilu.no. In your mail, please indicate the station you are intending to report data for. If your station is part of the Global Atmosphere Watch programme, please also provide us the GAW/SIS station ID (if you wish to register a new GAW site, please follow the instructions available at <https://gaw.wiss.meteoswiss.ch>). See also the GAW Implementation Plan for further details: <http://www.wmo.int/pages/prog/arep/gaw/documents/IPFinalDraftMay11.pdf>
2. **IDs:** We will provide three further IDs: 1) the EBAS station code; 2) the EBAS platform code; 3) a code for your lab analysing the data, which you will need for the metadata in your submission. The three letter GAW IDs and the IDs used in the CLRTAP EMEP database EBAS were introduced independently and are maintained for consistency.
3. **Selection of time series to report:** For sites that have been in operation back in time, we encourage that the full historic time series is submitted to the database (multi-year submission is easy to accommodate, but timeseries needs to be split according to any significant changes with regards to instrumentation, etc).

- Information on data formats for data submitters and users, procedure of data submission and download, data policy, submission status.
- Page for software tools for data providers.



Observations with Reporting Support

Regular / Advanced (traceable):

- Particle number concentration
- Particle number size distribution (sub-micron)
- Cloud Condensation Particle Number Conc. / Size dist.
- Scattering Coefficient
- Absorption Coefficient

Regular only:

- Aerosol optical depth
- PM mass (gravimetric)
- PM mass (online)

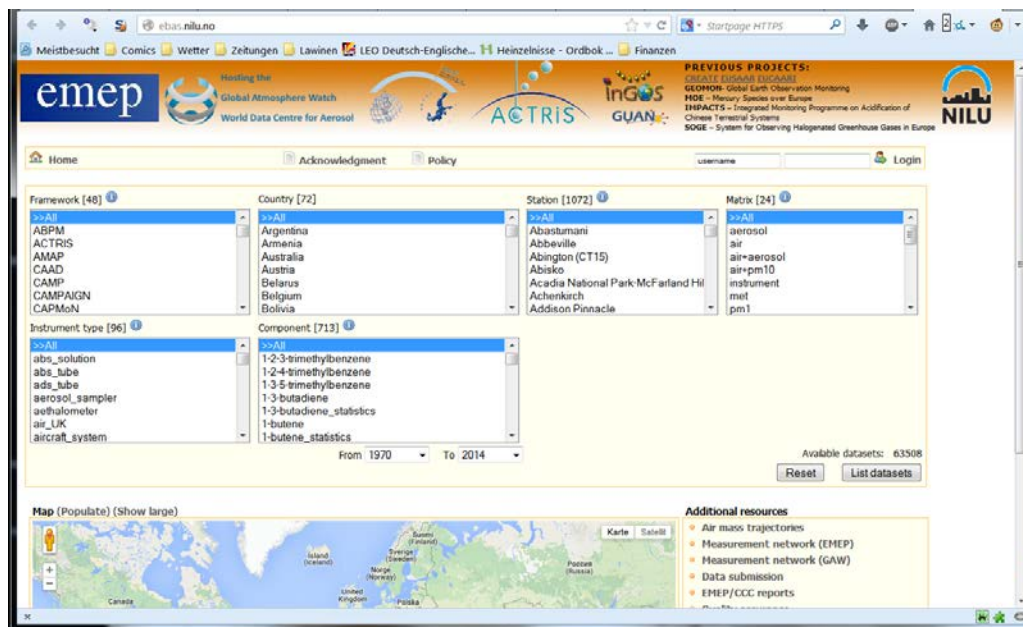
recently added:

- Aerosol Chemical Composition (GAW standard)
- Aerosol Chemical Speciation (online, AMS / ACSM)
- Particle number size distribution (super-micron, OPC, APS)
- Met. Base parameters

WDCA Data Access – Hosted in EBAS

- Originally the data archive of the European part of the UN Convention for Long-Range Transport of Air Pollution (CLRTAP), the European Monitoring and Evaluation Programme (EMEP)
- Today's relational database used since the mid-90s on varying hardware.
- Since about year 2000 also used by other projects and frameworks.
- Web-interface since 2009, linking also other tools.

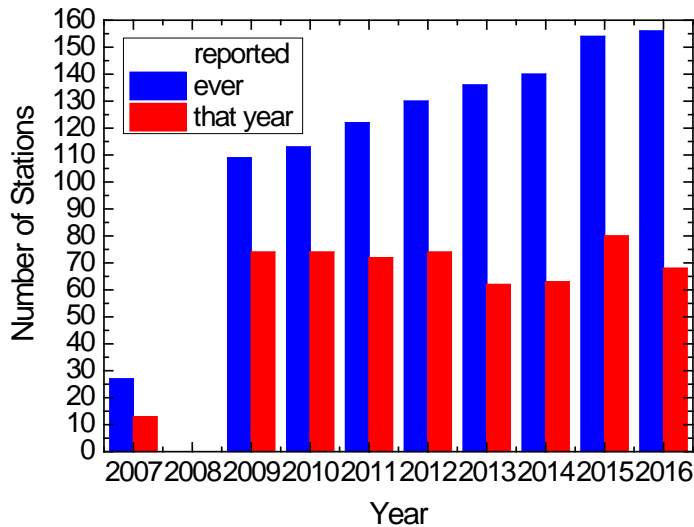
WDCA Web-Interface



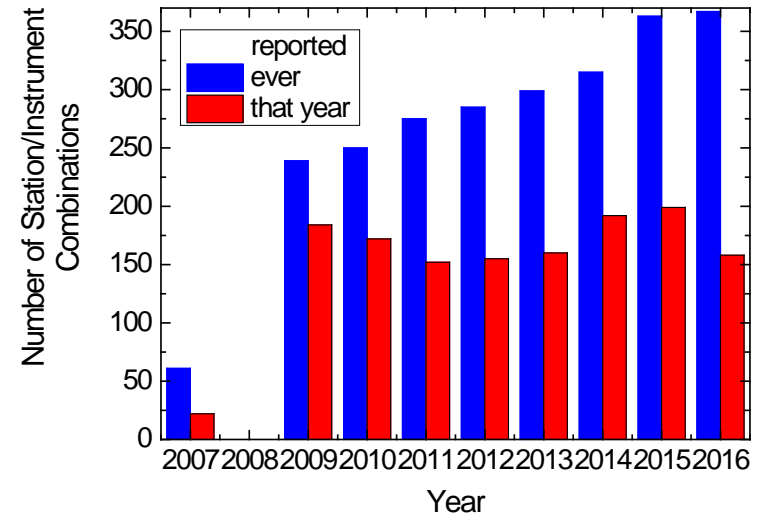
- Co-hosted with other frameworks / projects (EMEP, ACTRIS, GUAN, InGOS, ...) in EBAS relational database.
- Features:
 - Revision history (prerequisite for data citation / DOI)
 - Traceable data reporting
 - Atmospheric variability, instrument uncertainty (precision, accuracy, both constant or time dependent).
 - Extensive set of metadata (SOP, calibration standards, inlet config., ..., also time dependent if not constituting ruptures)

Status of Ongoing Data Collection, Key Numbers

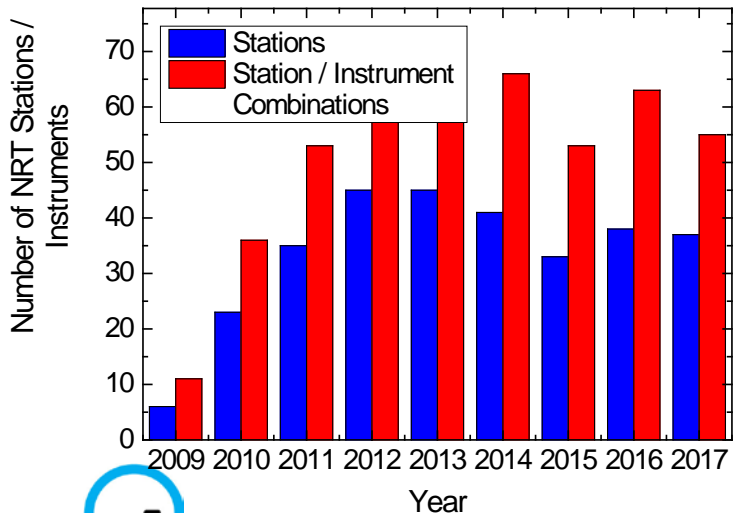
Number of Stations Reporting



Number of Station/Inst. Reported



Number of NRT Stations / Instruments

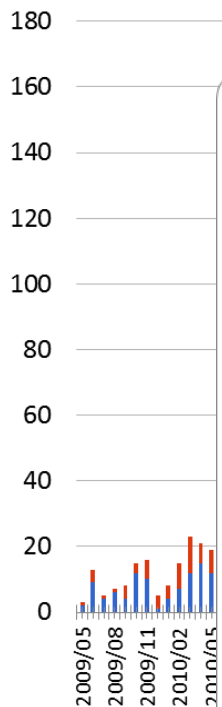


- Number of stations and instruments reporting is increasing again.
- The same for NRT stations and instruments.

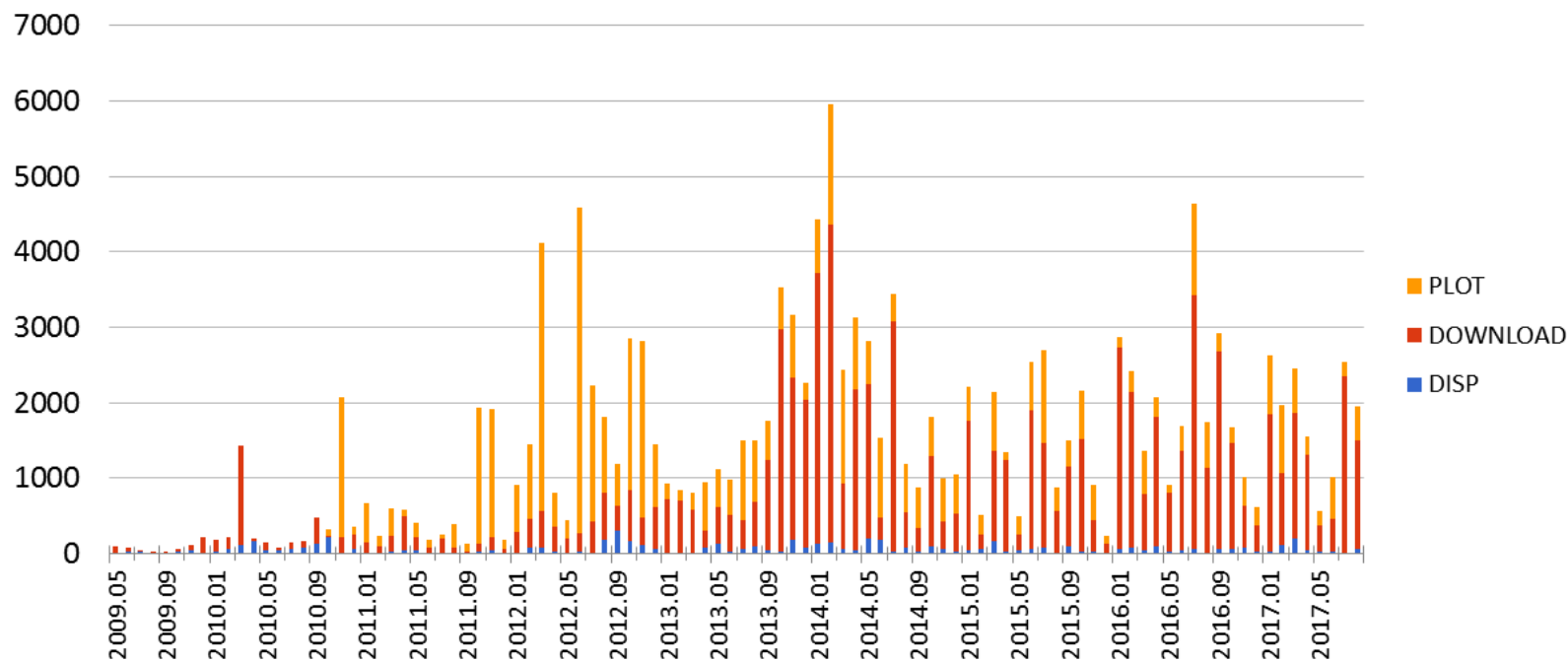


How Much Are WDCA Data Used?

Data Access: #Unique client IPs (WDCA)



Data Access: Instrument/Component Years (WDCA)



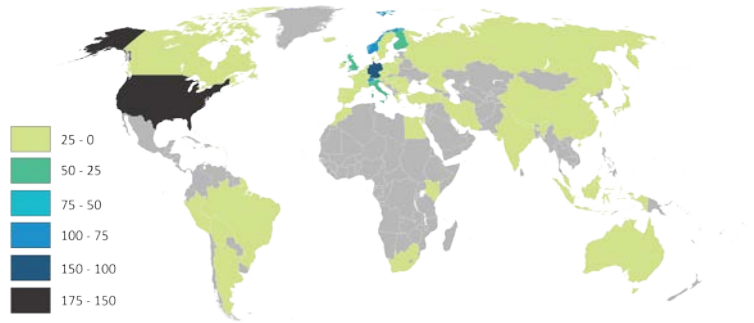
Plots by P. Eckhardt

WMO GAW ET-WDC meeting 2017, 2-5 October, Kjeller

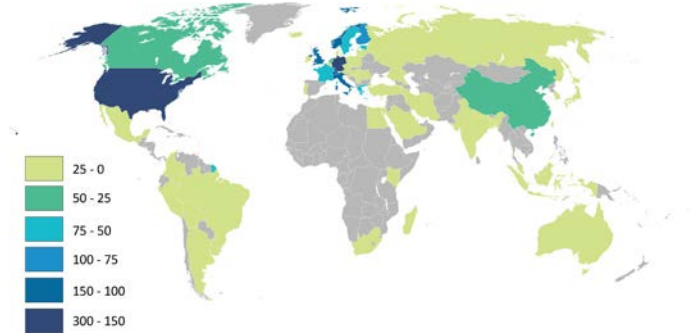


Where Are the WDCA Users Located? Number of Unique Users (IPs) by Country (2009-2013)

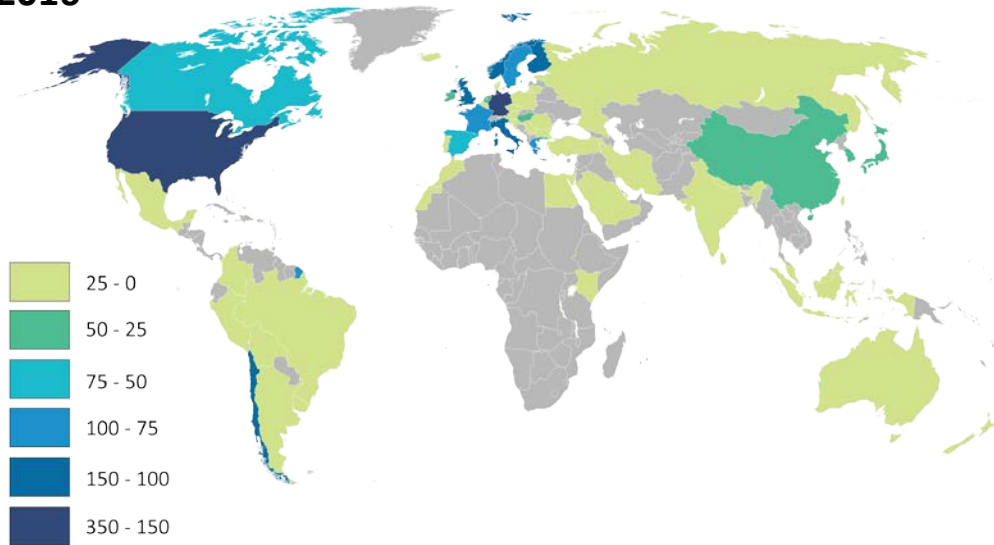
2014



2015



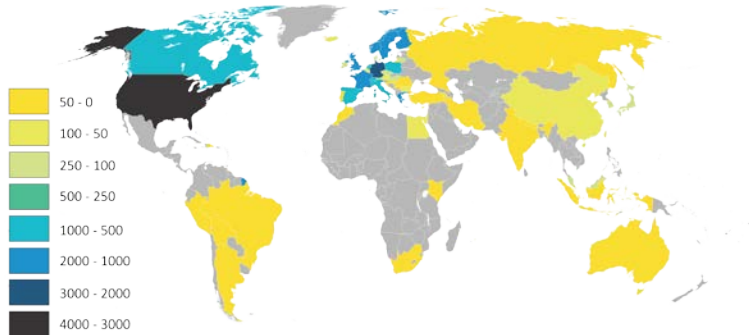
2016



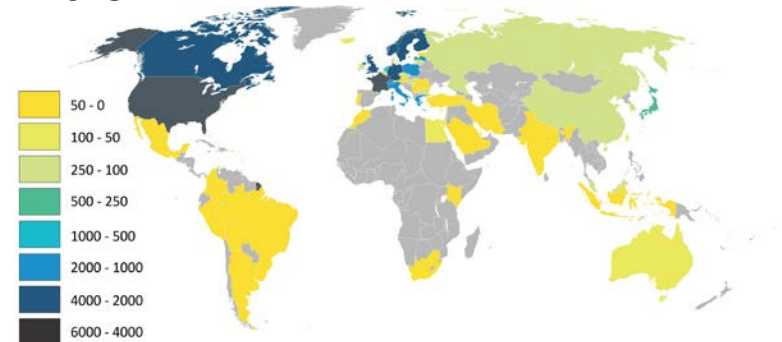
- more unique users in Canada, Europe, China.
- Distribution similar over the years
- absolute numbers are increasing.

Where Are the WDCA Users Located? Number of Annual Datasets (station / instrument) Downloaded

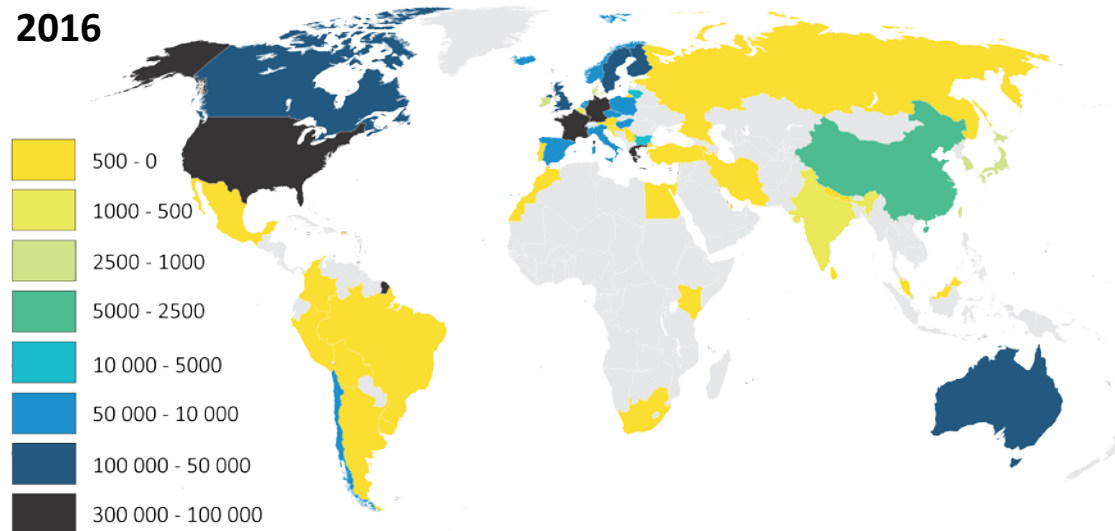
2014



2015



2016



- more download from Canada, Europe, China, Russia.
- Distribution similar over the years.
- More “heavy user” countries.
- Absolute numbers increase.

EBAS Services in the Data Life Cycle



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Regular / Traceable:

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- OC / EC concentration

recently added:

- Met. Base parameters

DAQ Software for Use at Station to Participate in NRT Service

Meistbesucht Comics Wetter Zeitungen Lawinen LEO Deutsch-Englisch... Heinzelnisse - Ordbok... Finanzen

Web Site Search... LOGIN

Submit Data Data Policy Standard Operating Procedures Near real-time data submissions Software Tools

Submit Data September 25, 2017

General introduction

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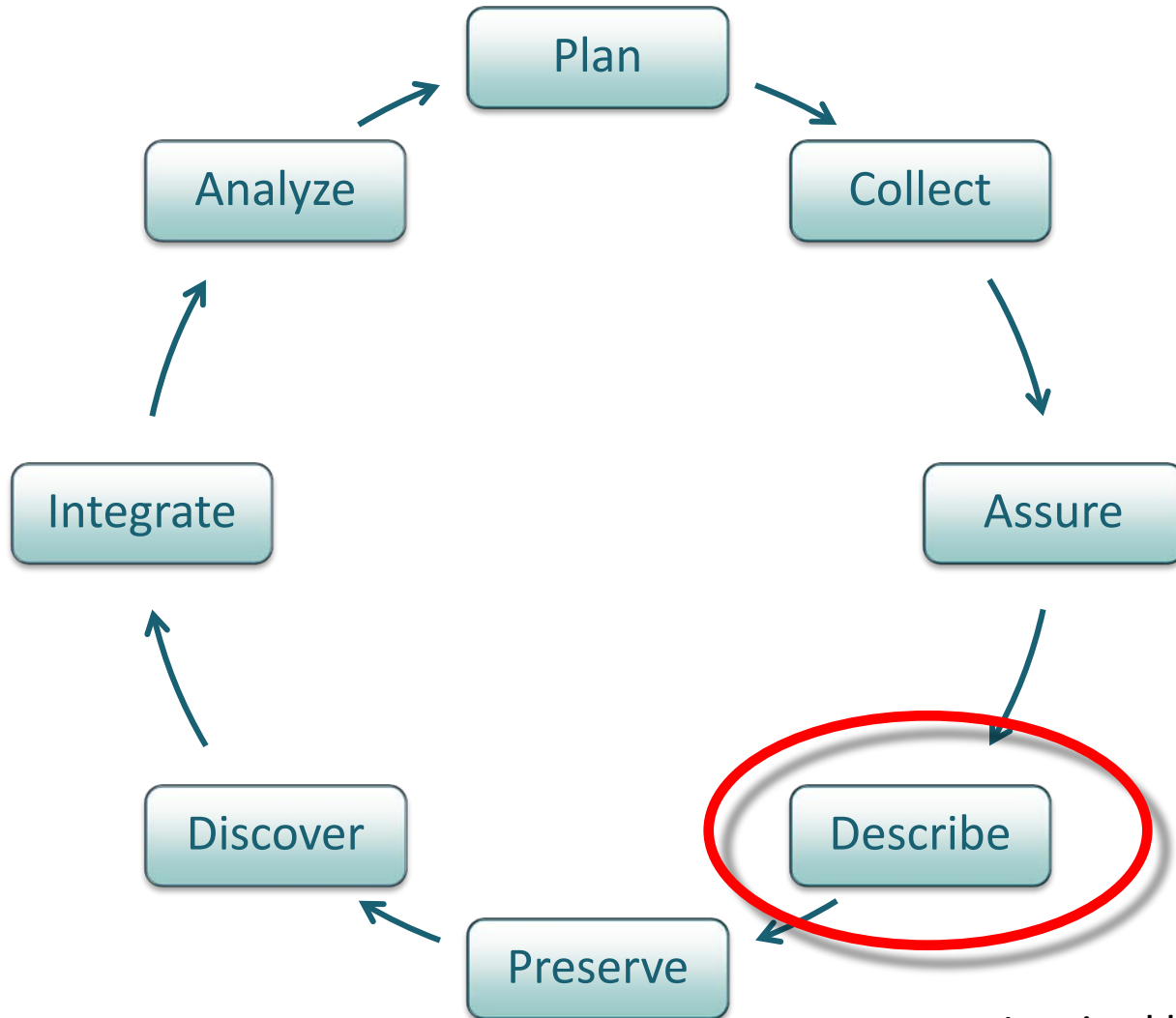
Funded by:



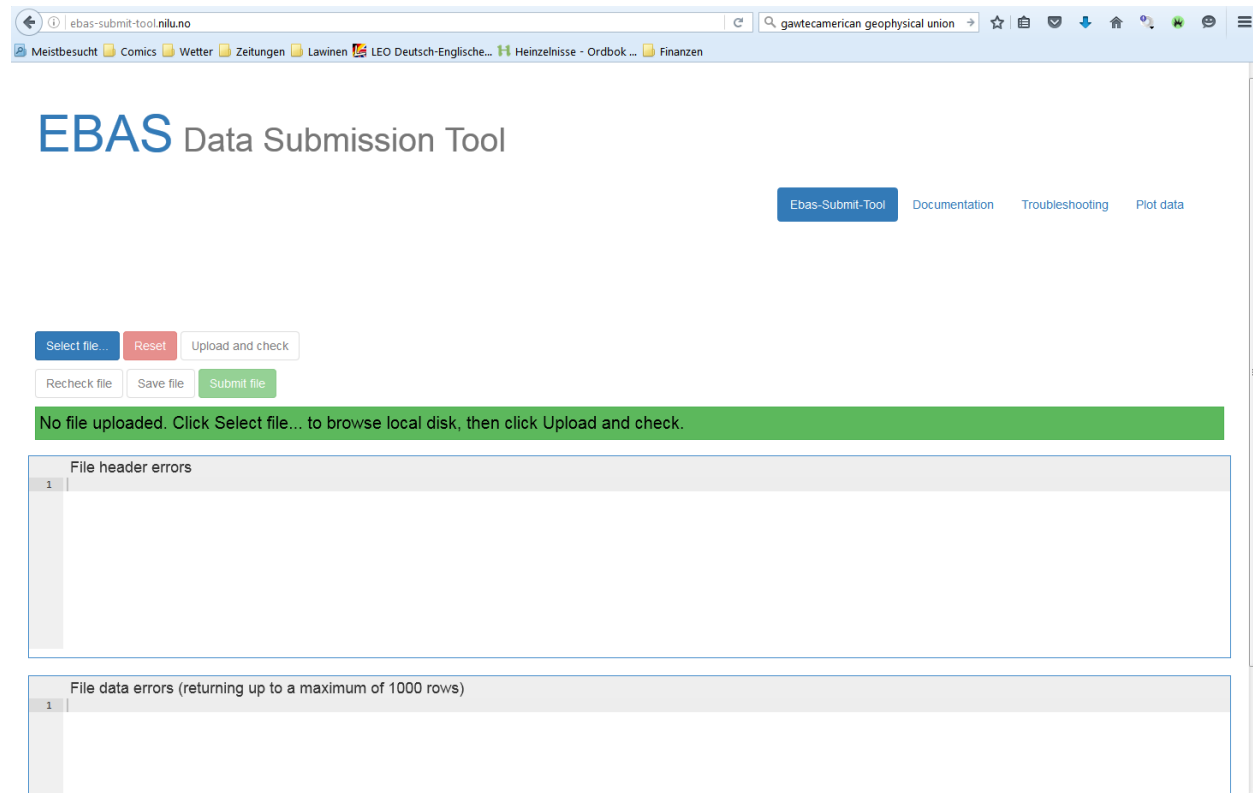
WMO GAW ET-WDC meeting 2017, 2-5 October, Kjeller



EBAS Services in the Data Life Cycle



EBAS Data Submission Tool: ebas-submit-tool.nilu.no



Funded by:



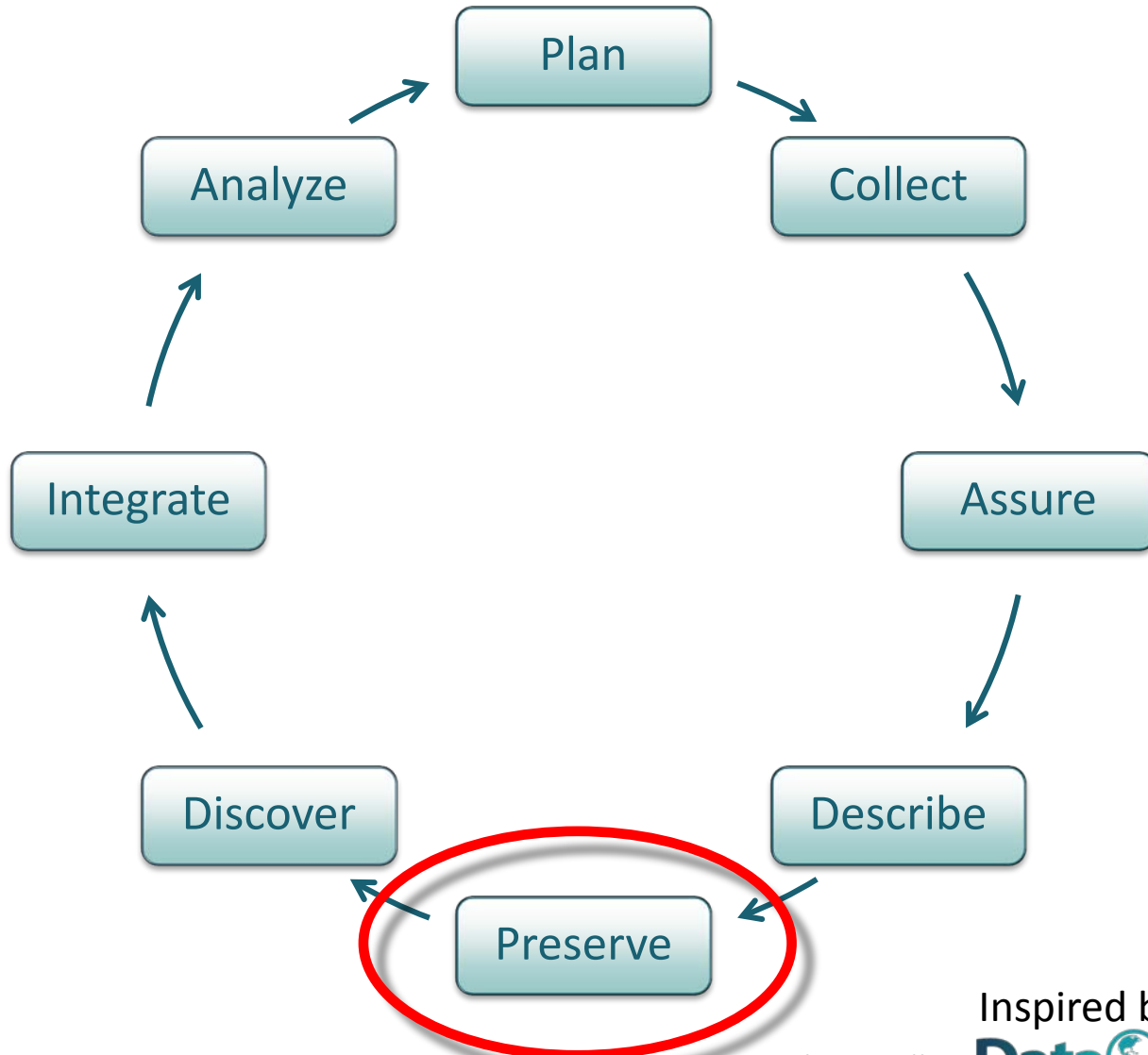
- For syntax / sanity checking data submissions before submission, submission option when tests passed.
- Data provider receives direct feedback, same engine as used internally.
- Community forum for discussing submission issues.
- Funded by ACTRIS



WMO GAW ET-WDC meeting 2017, 2-5 October, Kjeller



EBAS Services in the Data Life Cycle



Data Citation Services:

DIOs can be used in 2 ways (at least):

1. Identification of all data archived at fixed granularity – provides quantifiable credit to data provider
 2. Identification of user selected data collections – provides ease of use of data
- Type 2 DOIs need to link correctly to type 1 DOIs to facilitate correct accounting of data use – prerequisite for open data policy!!!
 - Current focus on implementing type 1 DOIs.
 - Work with relevant frameworks (RDA etc.) to specify type 2 DOIs correctly.

Funded by:



EBAS Services in the Data Life Cycle



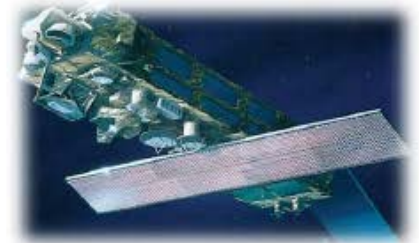
The global observing system for atmospheric composition



Balloons



Airplanes



Satellites



Trains



Ground-based stations



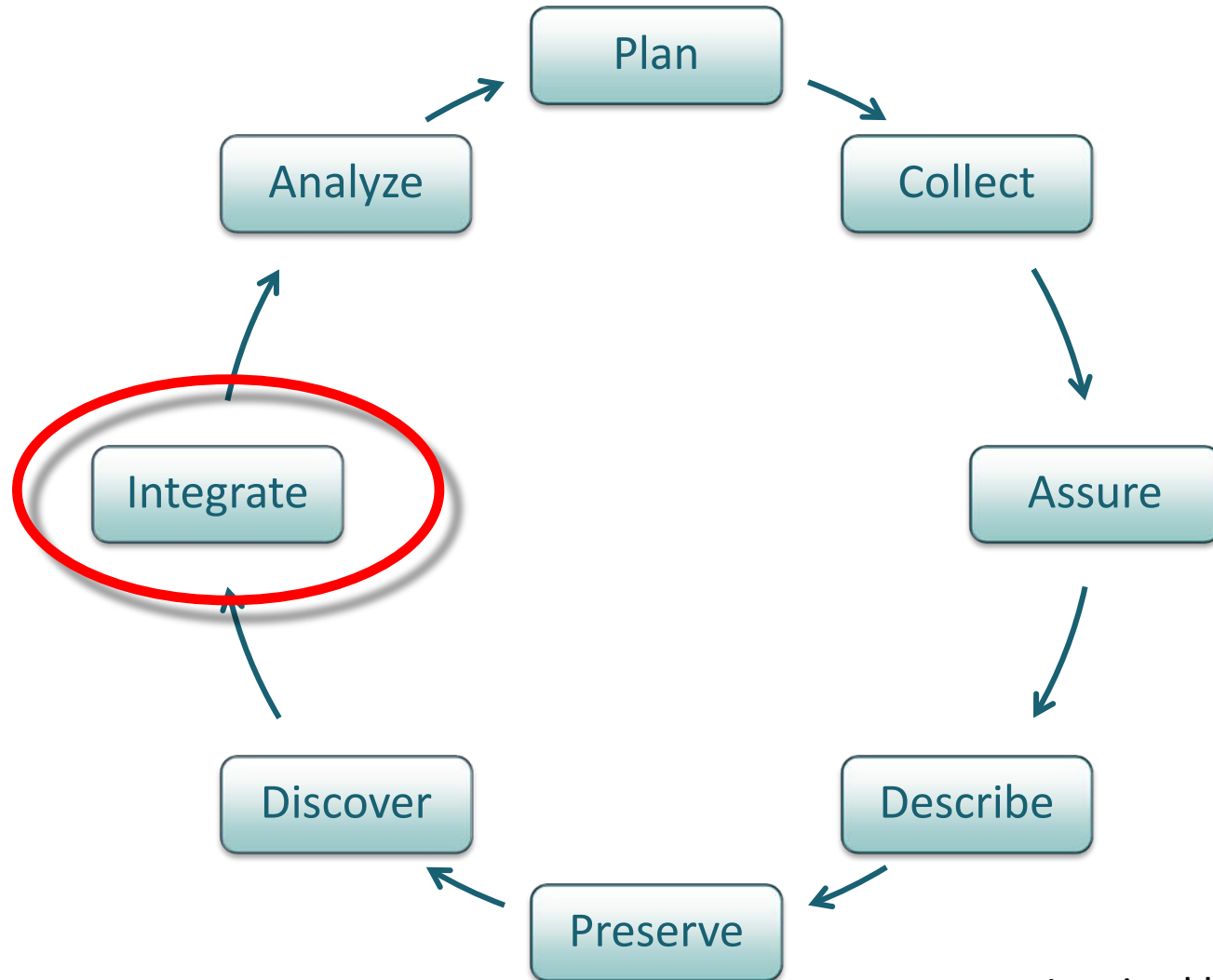
Ships



...

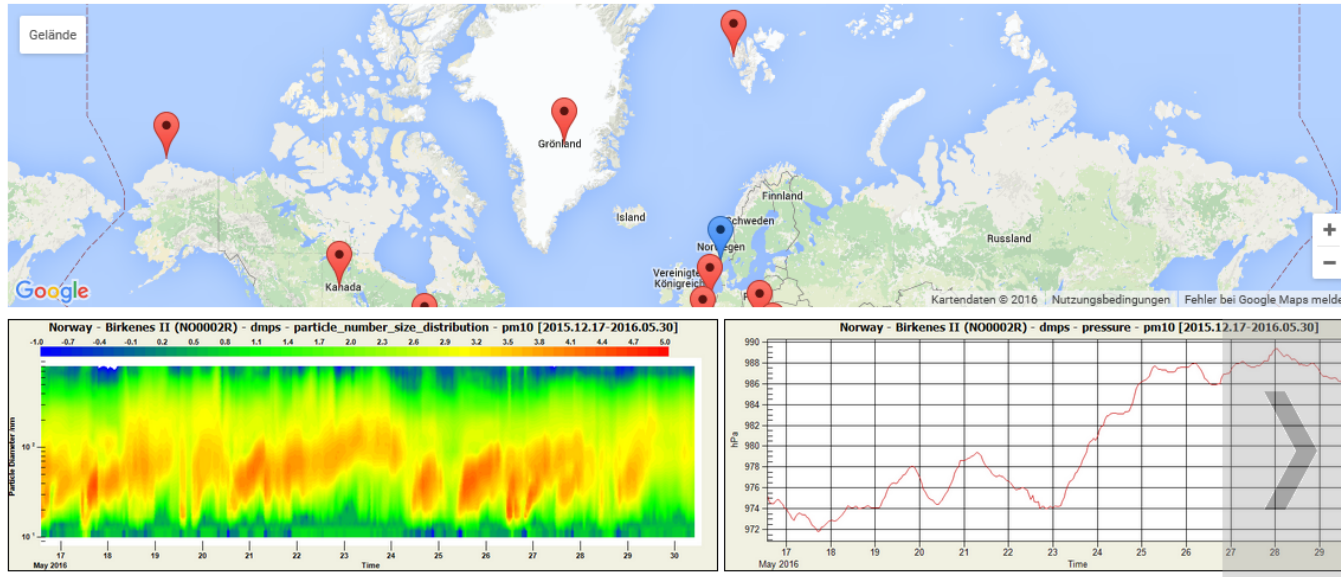


EBAS Services in the Data Life Cycle



NRT Showcase: ebas-nrt-showcase.nilu.no

Latest Near-Real-Time Data



This service has been funded or supported by the Norwegian Institute for Air Research (NILU), the EU research infrastructure ACTRIS (Aerosols, Clouds, and Trace gases Research InfraStructure), the European Monitoring and Evaluation Programme (EMEP), and the WMO Global Atmosphere Watch (GAW) programme.

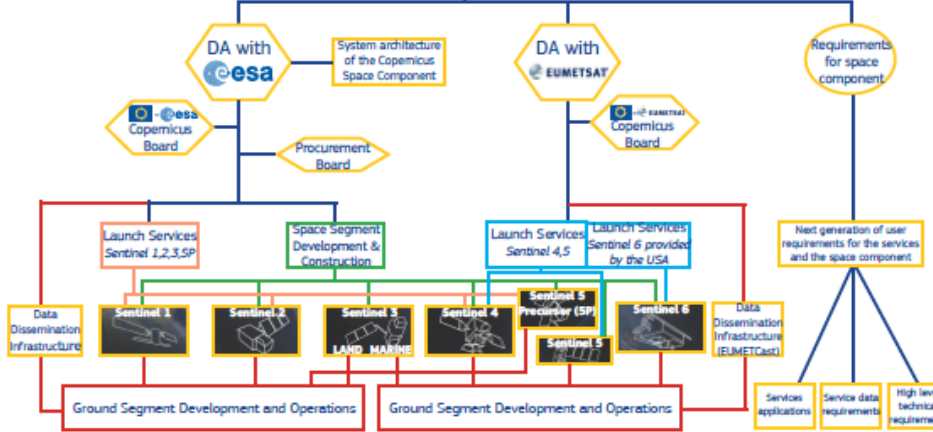
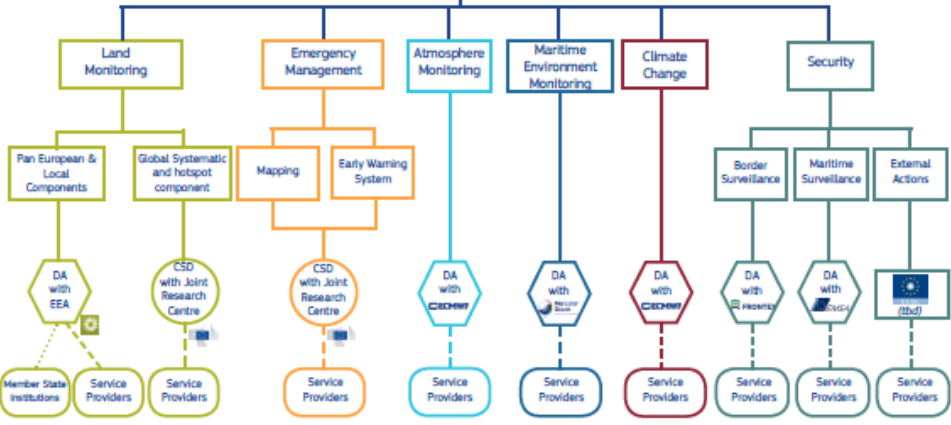


- Low-threshold access to «our» NRT data.
- Demonstrate what GAW & associated infrastructures / frameworks can provide.



Copernicus Programme

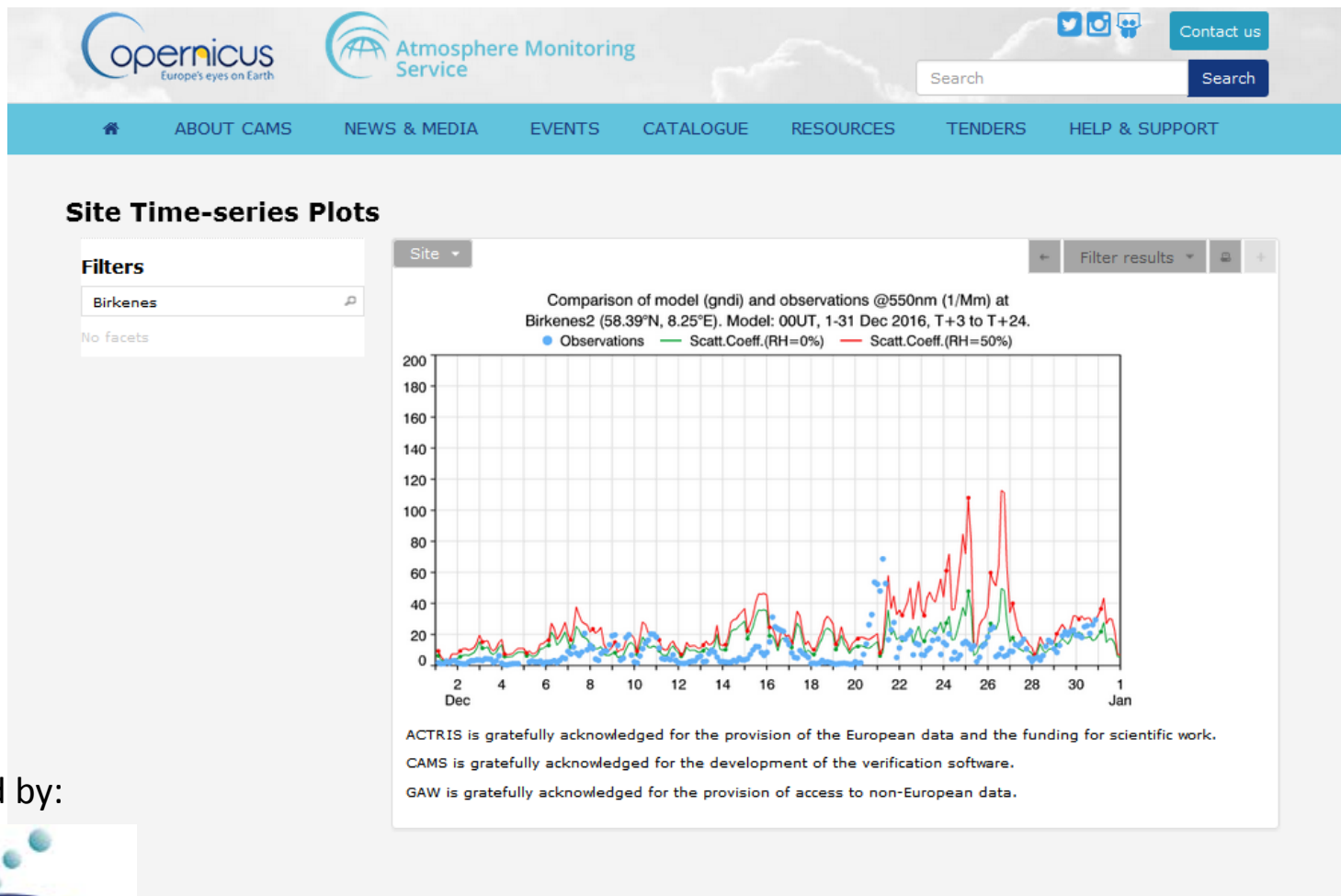
Europe's eyes on Earth



Legend:

- Implementation ready (to be defined)
- Commercial contracts
- Starts
- Copernicus component
- Service Providers
- Joint Management
- Direct Management
- Implementation by ESA
- Integration component
- ESA - Copernicus Manager
- ESA - Copernicus Service Agency
- ESA/ESA - European Organization for the Exploitation of Meteorological Satellites
- ESA - Copernicus International Agency
- ESA - Copernicus User Satellite Center
- ESA/ESA - The European Agency for the Exploitation of Operational Meteorological Satellites
- ESA/ESA - The European Agency for the Exploitation of the External Services of the Sentinel Satellites of the Copernicus Programme
- ESA/ESA - The European Centre for Medium-Range Weather Forecasts

Pilot: Integration with ECMWF, Validation Tool



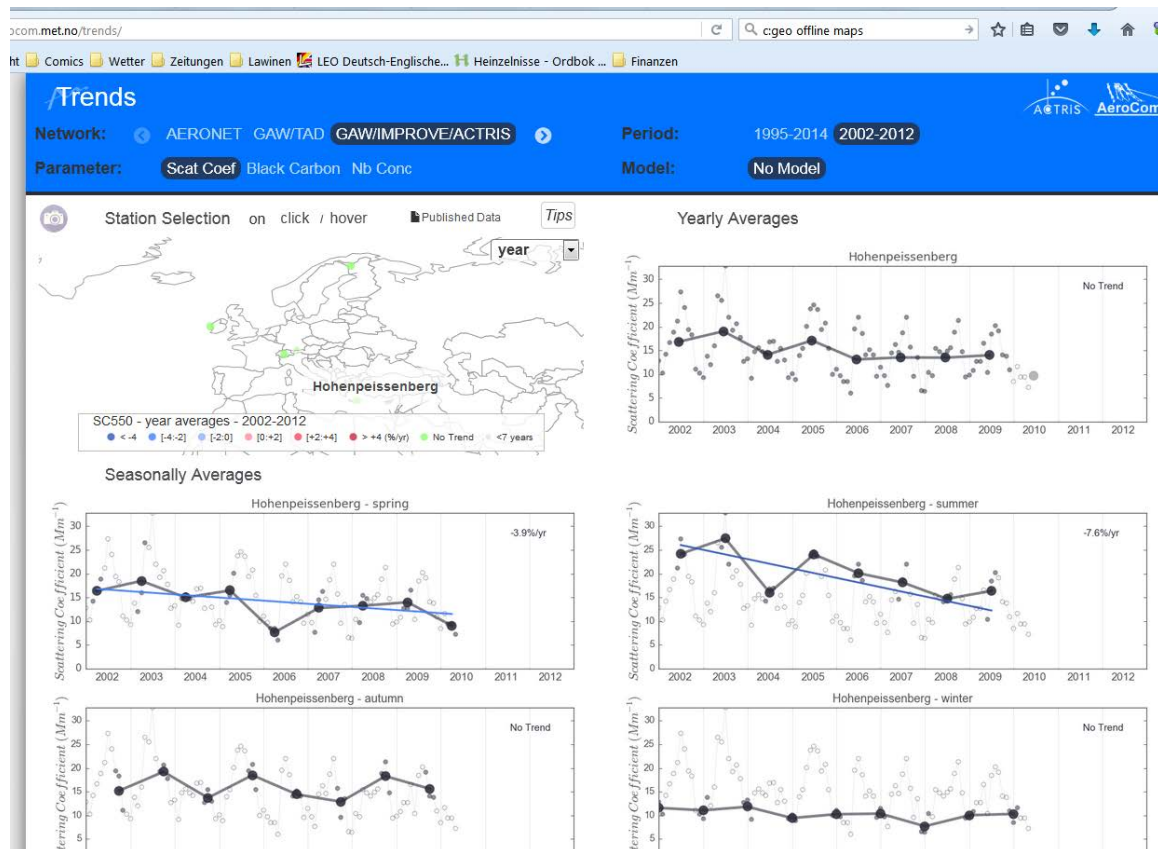
Funded by:



EBAS Services in the Data Life Cycle



Trend Tool: aerocom.met.no/trends/



Funded by:



- Set up by AeroCom (M. Schulz) at met.no within ACTRIS.
- Selected observations are analysed for trends and plotted.
- Offline analysis, «regularly» updated.



User Feedback Portal: ebas-feedback.nilu.no

The screenshot displays the user feedback portal interface. At the top, it shows the user is logged in as Markus (Markus Fiebig - administrator) on 2014-01-17 16:29 CET. The page is divided into four main sections:

- Unassigned [^] (1 - 10 / 16)**: A list of 10 feedback items, including issues like "Wet deposition as 'virtual' dataset in NASA-Ames output" and "Outreach showcase for NRT data".
- Reported by Me [^] (1 - 10 / 13)**: A list of 10 feedback items reported by the user, such as "Outreach showcase for NRT data" and "Short information on QA procedure at data centre".
- Resolved [^] (0 - 0 / 0)**: A section for resolved issues, currently empty.
- Recently Modified [^] (1 - 10 / 17)**: A list of 10 recently modified items, including "Wet deposition as 'virtual' dataset in NASA-Ames output" and "Outreach showcase for NRT data".

Funded by:



- 2 functions:

- Records general user feedback and tracks fate.
- Records data quality issues found while using the data, facilitates follow-up.



Funding Frameworks



Environmental Research
Infrastructures Providing Shared
Solutions for Science and Society



