

World Data Centre for Aerosol: Status & News 2014

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WDCA at the Norwegian Institute for Air Research

Items Covered

- WDCA setup, features, services
- WDCA Status: Key numbers and figures
 - Stations Reporting
 - Access Statistics
 - Geographical Coverage
- Database upgrade (still ongoing)
- Aerosol vocabulary for WIS, status
- Further Activities
 - GAWTEC course
 - Trend papers for IPCC AR5
 - Making ground station data usable for satellite validation
- Reports on relevant issues
 - Ongoing discussion on data policy and «substantial»
 - Ongoing discussion on use of DOIs

The WDCA Homepage: www.gaw-wdca.org

The screenshot shows the homepage of the WMO Global Atmosphere Watch World Data Centre for Aerosols (WDCA). The page features a navigation menu with links for Home, Submit Data, Browse / Obtain Data, Publications, Contributors, Contact, and Software. The main content area is titled "The World Data Centre for Aerosols (WDCA)" and describes its role as a data repository for microphysical, optical, and chemical properties of atmospheric aerosols. It also lists GAW Links, including WMO Global Atmosphere Watch - GAW, GAW Scientific Advisory Group for Aerosol, GAW Station Information System - GAWSYS, World Calibration Centre for Aerosol Physics (WCCAP), World Optical Depth Research and Calibration Centre (WORCC), Global Atmosphere Watch Aerosol Lidar Observation Network, World Data Centre for Greenhouse Gases - WDCGG, World Data Centre for Remote Sensing of the Atmosphere - WDC-RSAT, World Data Centre for Precipitation Chemistry - WDCPC, and World Ozone and Ultraviolet.

GLOBAL ATMOSPHERE WATCH

WMO Global Atmosphere Watch
World Data Centre for Aerosols

NILU

Home Submit Data Browse / Obtain Data Publications Contributors Contact Software

Home November 9, 2012

News & Events

GAWTEC Course on Physical Properties of Aerosol - Tuesday, June 05, 2012
GAWTEC 23rd training course, focusing on Physical Properties of Aerosol, November 4 - 17 2012, Schneefernerhaus, Germany
[read more ...](#)

AGU Fall Meeting 2012 - Tuesday, June 05, 2012
3 - 7 Dec 2012, San Francisco, California (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

GAW Links

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

Suchen: MKP

Abwärts Aufwärts Hervorheben Groß-/Kleinschreibung

Web-Interface

The screenshot displays the EBAS web interface. At the top, there is a navigation bar with the EMEP logo and the text "Hosting the Global Atmosphere Watch World Data Centre for Aerosol". Below this, there are logos for ACTRIS, InGOS, and GUAN. A "PREVIOUS PROJECTS" section lists: CREATE EBAS (EBAS), GEOMON - Global Earth Observation Monitoring, MOE - Mercury Species over Europe, IMPACTS - Integrated Monitoring Programme on Acidification of Chinese Terrestrial Systems, and SOGE - System for Observing Halogenated Greenhouse Gases in Europe. The main content area features several dropdown menus for filtering data: Framework [48], Country [72], Station [1072], Matrix [24], Instrument type [96], and Component [713]. A date range selector is set from 1970 to 2014. A "Map (Populate) (Show large)" section shows a map of Europe with a location pin. An "Additional resources" section lists: Air mass trajectories, Measurement network (EMEP), Measurement network (GAW), Data submission, and EMEP/CCC reports. The bottom right corner shows the available datasets count as 63508, with "Reset" and "List datasets" buttons.

- Co-hosted with other frameworks (EMEP, InGOS, GUAN, ...) in EBAS relational database.
- Offers atmospheric variability and instrument uncertainty (precision, accuracy, both constant or time dependent).
- Extensive set of metadata (SOP, calibration standards, inlet config., ..., also time dependent, all after upgrade)

Observations with Reporting Support

Regular / Advanced (traceable):

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

Regular only:

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

To be added:

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

Traceability Implementation at WDCA

Data Level	Description		Used for
0	<ul style="list-style-type: none"> • Annotated raw data • format instrument specific • all data / information for processing to final value. 	<ul style="list-style-type: none"> • contains all parameters provided by instrument as provided • "native" time resolution 	NRT
1	<ul style="list-style-type: none"> • processed to final parameter • invalid data removed 	<ul style="list-style-type: none"> • "native" time resolution • format property specific 	intercomparisons
1.5	<ul style="list-style-type: none"> • aggregated to hourly averages • variability quantified • format property specific • STP correction if necessary 	auto-processed	NRT
2		manual QA	regular collection

- SOP describes steps from one to the next level.
- All levels use EBAS NASA-Ames format.
- chain of data acquisition / processing / QA can be traced back to measurement.
- Archiving with long-term perspective, allows reprocessing.

Plans for Including GALION in WDCA

The screenshot displays the ACTRIS Data Centre website in a Mozilla Firefox browser. The page title is "ACTRIS Data Centre - An atmospheric data portal". The navigation bar includes links for Home, User Manual, Contact, F.A.Q, and About. Below the navigation bar, there are search filters for Variables [142], Locations [1672], Database / Network [21], Type [4], Platform [3], and Matrix [18]. A search form is visible with fields for Latitude, Longitude, Altitude, and Date, and an "Apply" button. Below the search form is a map of the world with various countries labeled, and a "Karte" dropdown menu. The footer contains the copyright information: "Copyright (c) 2011 - 2012 ACTRIS. All rights reserved. Build version: 1.0.4472".

- Portal for distributed data centre implemented through EU-projects.
- Will allow distributed WDCA when including GALION.
- Depends on progress within GALION.
- Portal includes page hosting secondary datasets.

Data Feedback Portal: mantis.nilu.no

The screenshot displays the Mantis Bug Tracker interface for mantis.nilu.no. The page is titled "Data Feedback Portal: mantis.nilu.no" and shows a list of issues categorized into "Unassigned", "Reported by Me", "Resolved", and "Recently Modified".

Unassigned [^] (1 - 10 / 16)

- 0000017 [EBAS-system] Wet deposition as "virtual" dataset in NASA-Ames output [All Projects] Idea / Wish - 2014-01-15 12:46
- 0000016 [EBAS-system] Outreach showcase for NRT data [All Projects] Idea / Wish - 2013-06-26 11:20
- 0000015 [Data center portal] Short information on QA procedure at data centre [All Projects] Idea / Wish - 2013-06-21 10:55
- 0000014 [Data center portal] Guidance on Data Format on Data Download [All Projects] Idea / Wish - 2013-06-21 10:48
- 0000013 [EBAS-system] Data Submission Check / Feedback Tool [All Projects] Idea / Wish - 2013-01-08 15:20
- 0000011 [EBAS-system] aggregated data output as files, NetCDF(-CF) output [All Projects] Idea / Wish - 2013-01-08 12:17
- 0000012 [EBAS-system] Service integrating satellite, aircraft, ground remote sensing, ground in situ data [All Projects] Idea / Wish - 2012-10-26 11:35
- 0000010 [EBAS-system] Annual automatic data submission reminder [All Projects] Idea / Wish - 2012-10-26 11:22
- 0000009 [EBAS-system] QA self-assessment tool [All Projects] Idea / Wish - 2012-10-26 11:02
- 0000004 [Data center portal] Ångström exponent plot [All Projects] Idea / Wish - 2011-10-26 16:12

Reported by Me [^] (1 - 10 / 13)

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- 0000004 [Data center portal] Ångström exponent plot [All Projects] Idea / Wish - 2011-10-26 16:12
- 0000005 [EBAS-system] data levels, data versions, and traceability [All Projects] Idea / Wish - 2011-10-26 16:12

Resolved [^] (0 - 0 / 0)

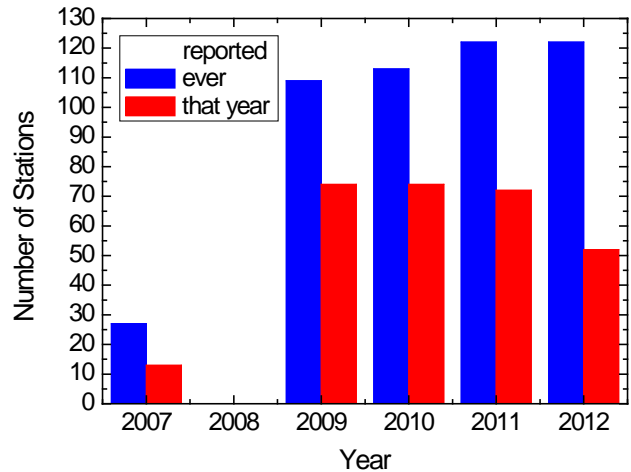
Recently Modified [^] (1 - 10 / 17)

- 0000017 [EBAS-system] Wet deposition as "virtual" dataset in NASA-Ames output [All Projects] Idea / Wish - 2014-01-15 12:46
- 0000016 [EBAS-system] Outreach showcase for NRT data [All Projects] Idea / Wish - 2013-06-26 11:20
- 0000015 [Data center portal] Short information on QA procedure at data centre [All Projects] Idea / Wish - 2013-06-21 10:55

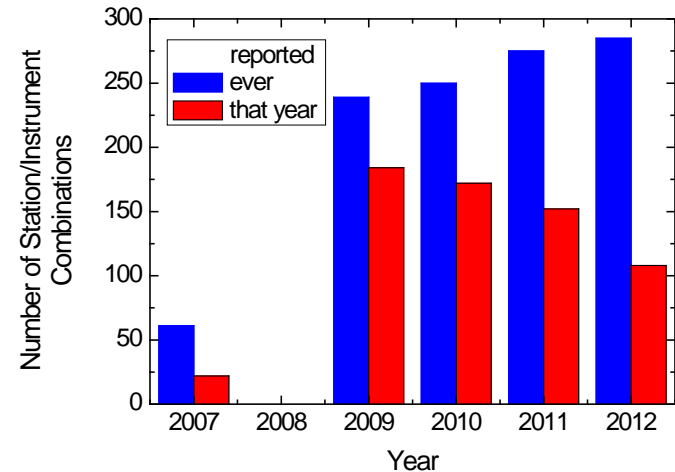
- Allows users to request new features and track their fate.
- Users can see what features have already been proposed, and avoid duplications.

Status of Ongoing Data Collection, Key Numbers

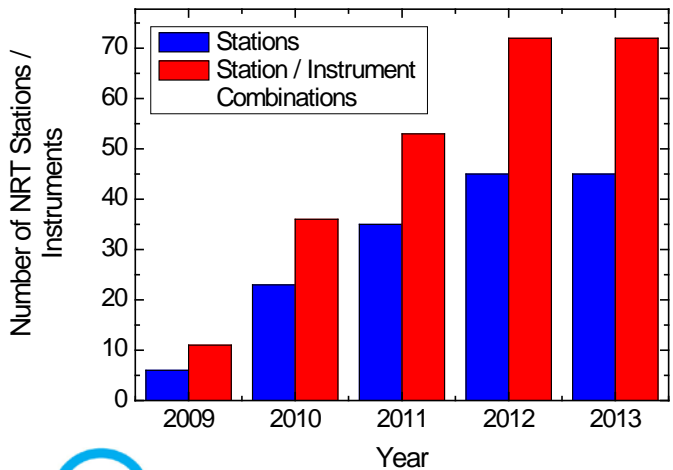
Number of Stations Reporting



Number of Station/Inst. Reported

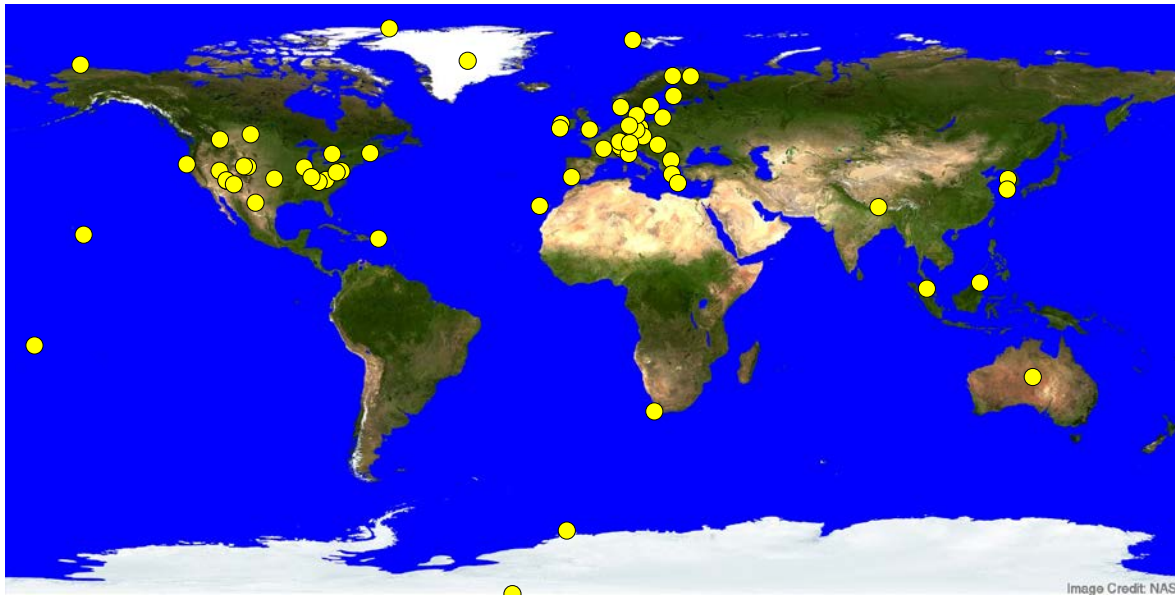


Number of NRT Stations / Instruments



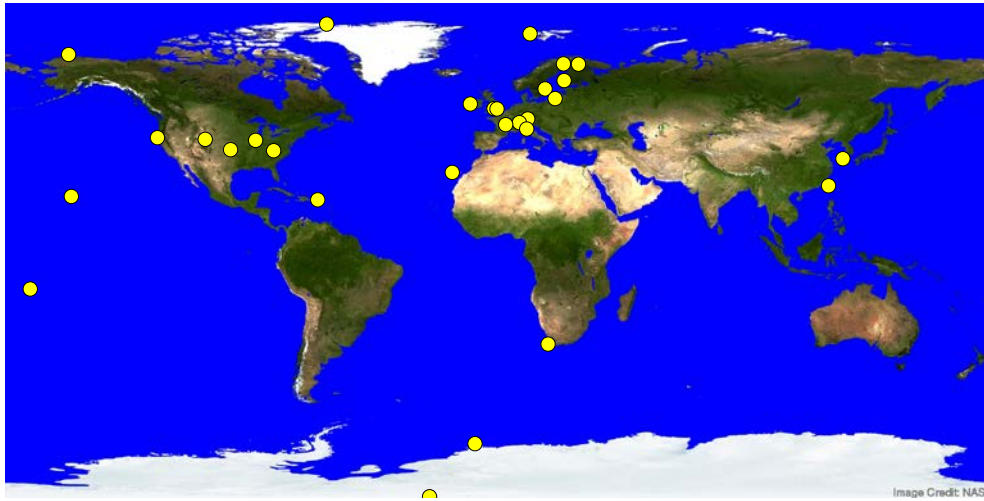
- Number of stations increased by «chasing effort» and collaborations.
- Collaboration with U.S. IMPROVE network.
- Collaboration with European projects (EUSAAR, ACTRIS)

Active Ground Stations Included in WDCA



- 73 sites worldwide
 - Includes European **ACTRIS** sites, **NOAA** network, **IMPROVE** network.
 - Ground in situ observations of **particle number concentration / size distribution, aerosol scattering / absorption coefficient, aerosol optical depth.**
 - Focus on data quality
 - Most sites in Europe and North America
- More sites to come, e.g. Mount Chacaltaya, Bolivia.

Coverage for Microphysical Parameters

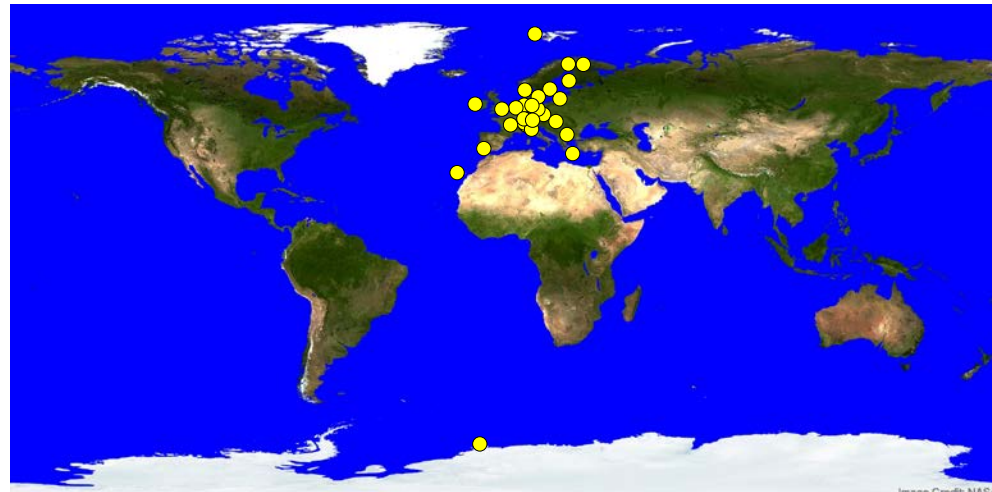


Particle number concentration:

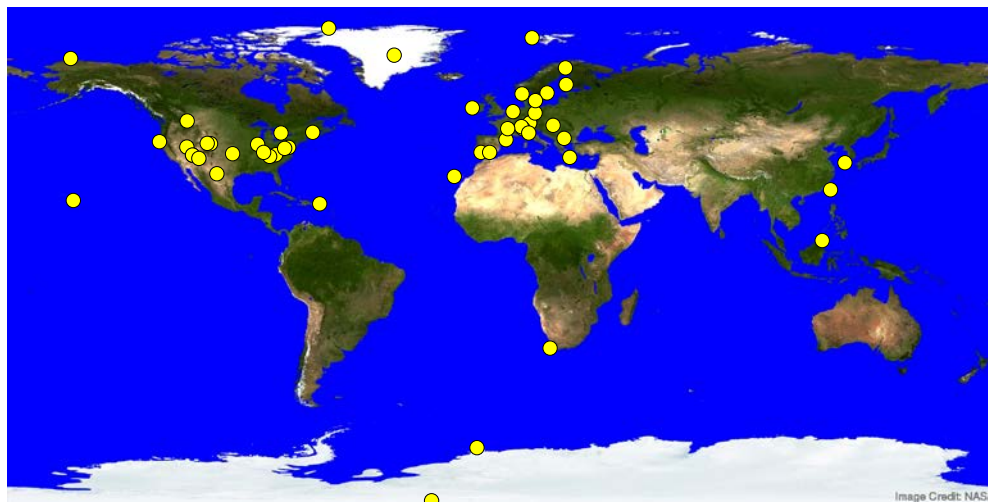
- 29 sites
- 19 sites more than 5 years
- 13 sites more than 10 years

Particle number size distribution

- 28 sites, mainly Europe
- 16 sites more than 5 years
- 5 sites more than 10 years
- **Accuracy: D_p 5%, N 10-15%**



Coverage for Optical Parameters

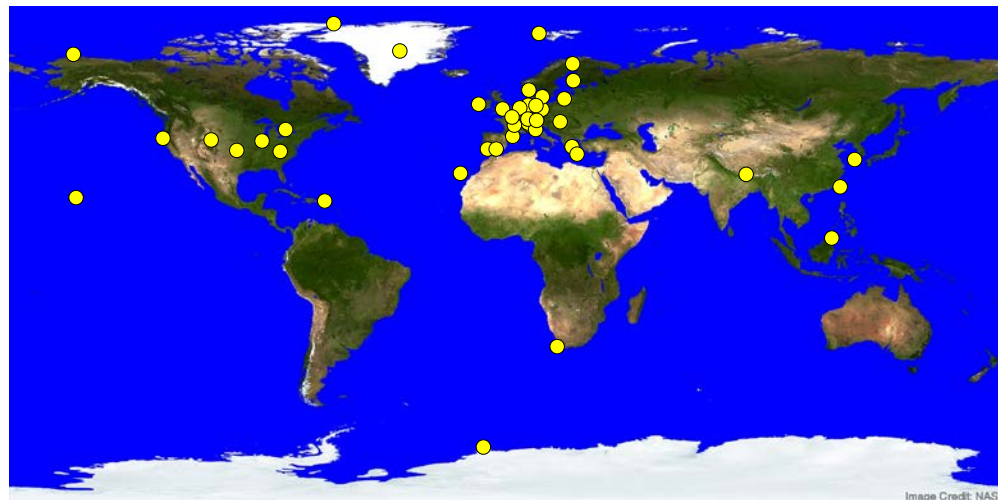


Aerosol scattering coefficient:

- 50 sites
- 32 sites more than 5 years.
- 16 sites more than 10 years
- **accuracy 10% or better.**

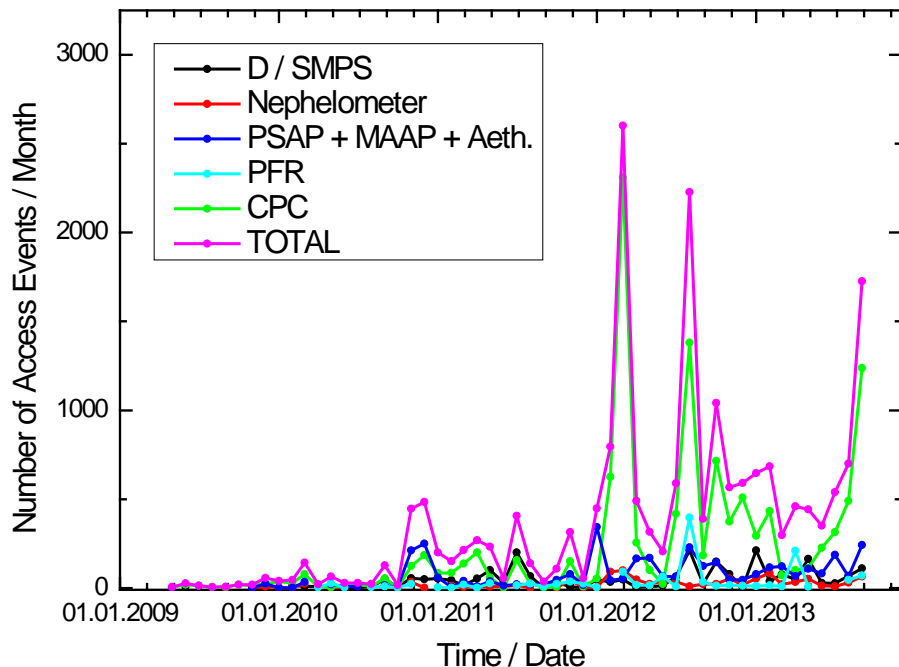
Aerosol absorption coefficient

- 48 sites
- 27 sites more than 5 years.
- 9 sites more than 10 years.
- **Accuracy instrument dependent**

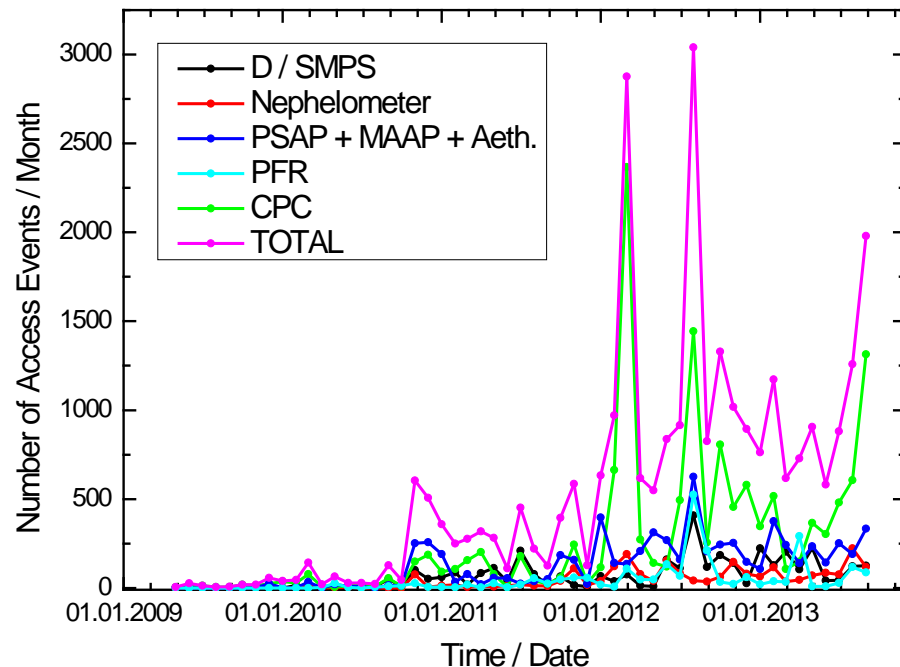


How Much Are WDCA Data Used?

Downloads

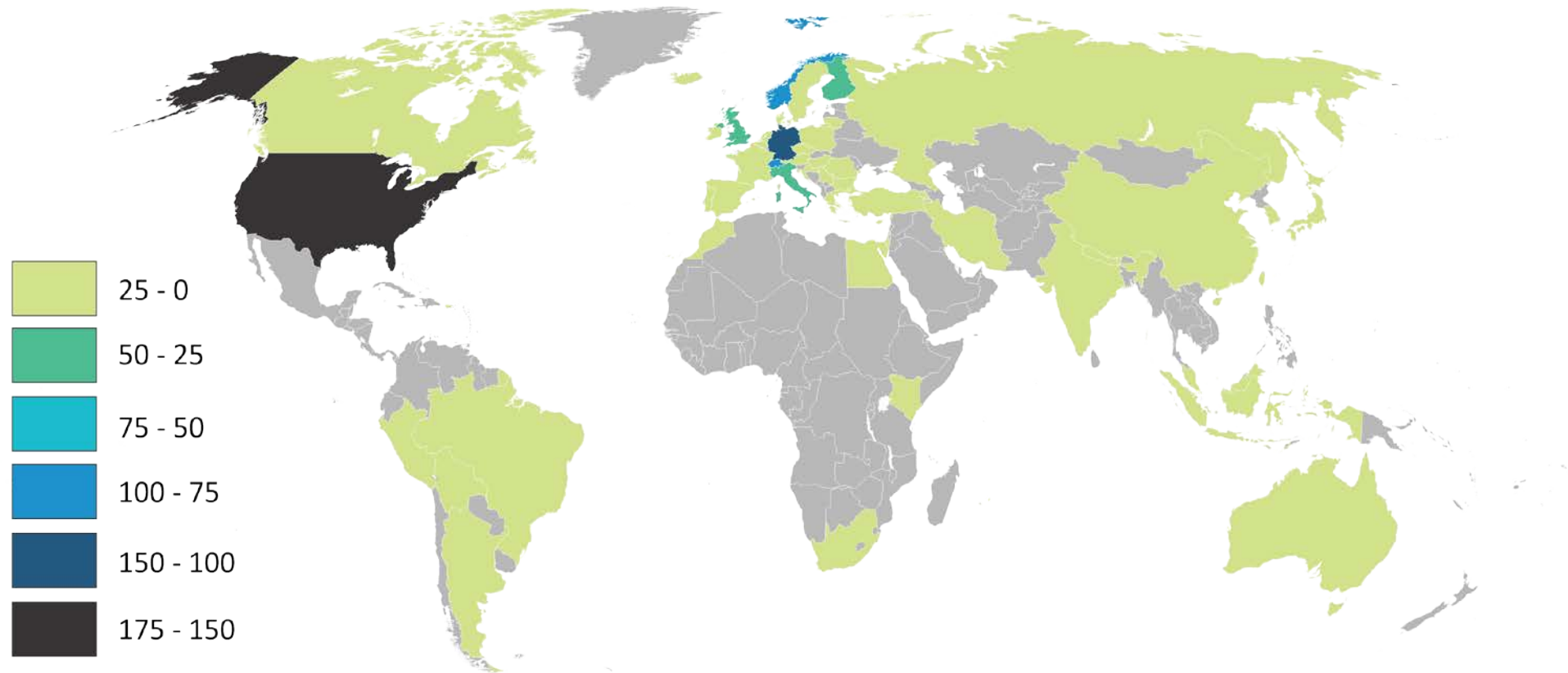


Downloads & Plots

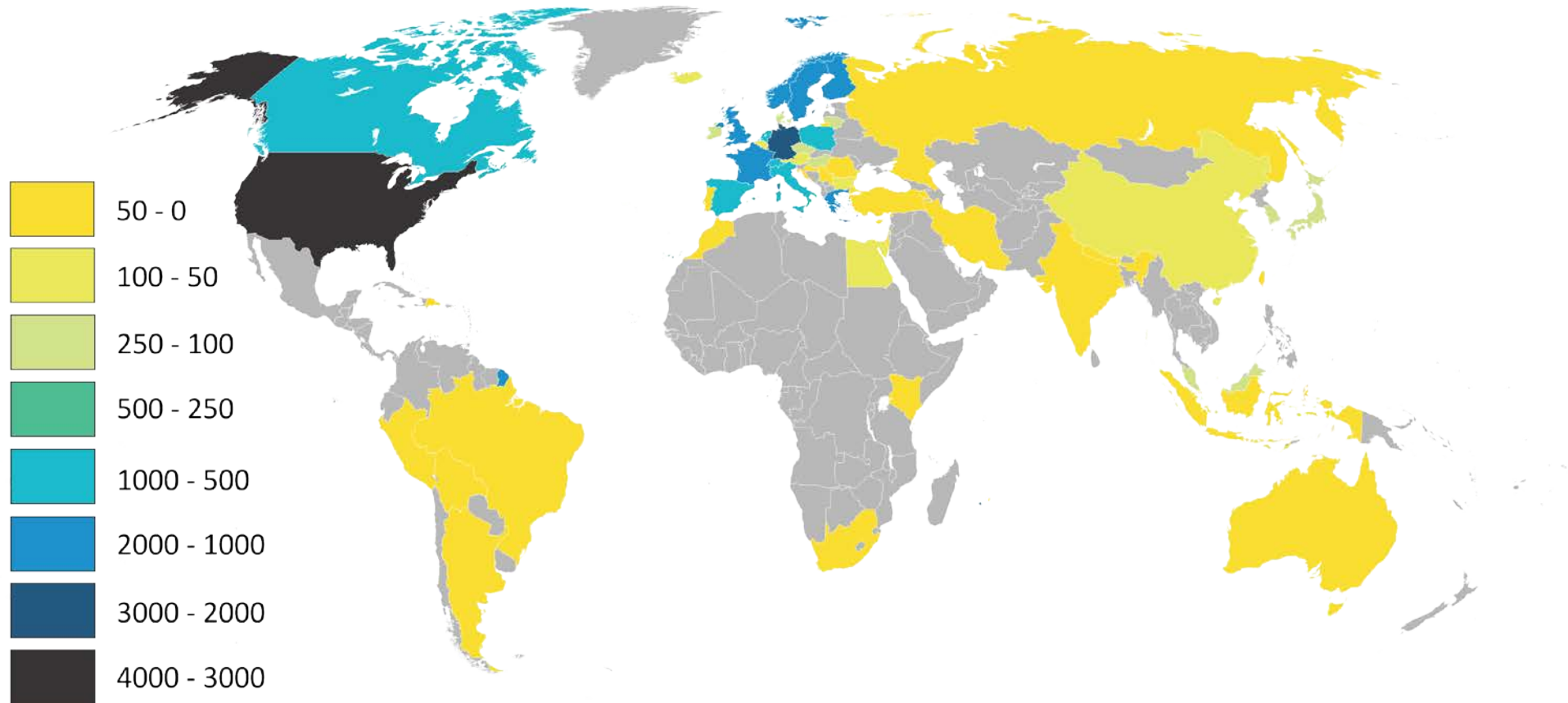


- Our data are being used!
- The use is increasing with time.

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



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



Redesign of Database, Adapted Web-Interface

- Redesign necessary to accomodate:
 - additional and time-dependent metadata items (PIs, serial numbers of otherwise identical instruments, ...).
 - Different data levels storable and searchable.
 - Database should keep revision history of dataset (publication reference).
 - Not just atmospheric variability, also instrumental uncertainty should be documented.
- Challenge in conversion of legacy data where specifications were less strict.
- Improved automatic checks on submission format and content (boundary/outlier check) on roadmap.
- Main challenge: resources!

Terminology for WIS (still ongoing)

1. volume_scattering_coefficient_in_air_due_to_dry_aerosol
2. volume_absorption_coefficient_in_air_due_to_dry_aerosol
3. volume_spherical_backscattering_coefficient_in_air_due_to_dry_aerosol
4. surface_volume_scattering_coefficient_at_stp_in_air_due_to_pm1_dry_aerosol
5. surface_volume_scattering_coefficient_at_stp_in_air_due_to_pm10_dry_aerosol
6. surface_volume_absorption_coefficient_at_stp_in_air_due_to_pm1_dry_aerosol
7. surface_volume_absorption_coefficient_at_stp_in_air_due_to_pm10_dry_aerosol
8. surface_volume_spherical_backscattering_coefficient_at_stp_in_air_due_to_pm1_dry_aerosol
9. surface_volume_spherical_backscattering_coefficient_at_stp_in_air_due_to_pm10_dry_aerosol
10. volume_scattering_coefficient_in_air_due_to_dried_aerosol
11. volume_absorption_coefficient_in_air_due_to_dried_aerosol
12. volume_spherical_backscattering_coefficient_in_air_due_to_dried_aerosol
13. surface_volume_scattering_coefficient_at_stp_in_air_due_to_pm1_dried_aerosol
14. surface_volume_scattering_coefficient_at_stp_in_air_due_to_pm10_dried_aerosol
15. surface_volume_absorption_coefficient_at_stp_in_air_due_to_pm1_dried_aerosol
16. surface_volume_absorption_coefficient_at_stp_in_air_due_to_pm10_dried_aerosol

- Main challenge: co-ordination between SAG, ET-WDC, and CF group.

Further WDCA Activities

- **GAWTEC aerosol course Oct. 2012**
 - Lecture on data submission
- **GEO AQ CoP Data centre interoperability workshop, Sept. 2012, Dublin.**
- **GAW aerosol trend papers for IPCC AR5**
 - Asmi et al., ACP, 2013
 - Collaud Coen et al., ACP, 2013
 - Lessons:
 - improve data quality (time dependence of submitted information due to reporting improvements.)
 - Chase updates from stations.
 - Store product as secondary dataset
- **Participation in ESA aerosol Climate Change Initiative (CCI) project**
 - How to make ground station aerosol data usable for satellite validation?
- **National collaboration project between AeroCom and WDCA / NILU**

Report on Relevant Issues

- Data Policy, what is «substantial use»?
 - Revived discussion in aerosol community.
 - Effort to define what «substantial use» is, but stake holders who want stricter data policy.
 - We should actively promote existing data policy as good and proven compromise between 2 extremes.
- Use of DOIs for WDCs
 - Use costs of DOIs as compared to static links
 - DOI items mustn't change: tracing dataset history at WDC.
 - Contradiction between DOI data policy and GAW data policy.
 - Possible solution: DOI-on-demand.