

# The GAW World Data Centre for Aerosols

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**<http://ies.jrc.cec.eu.int/wdca/>**

# Outline

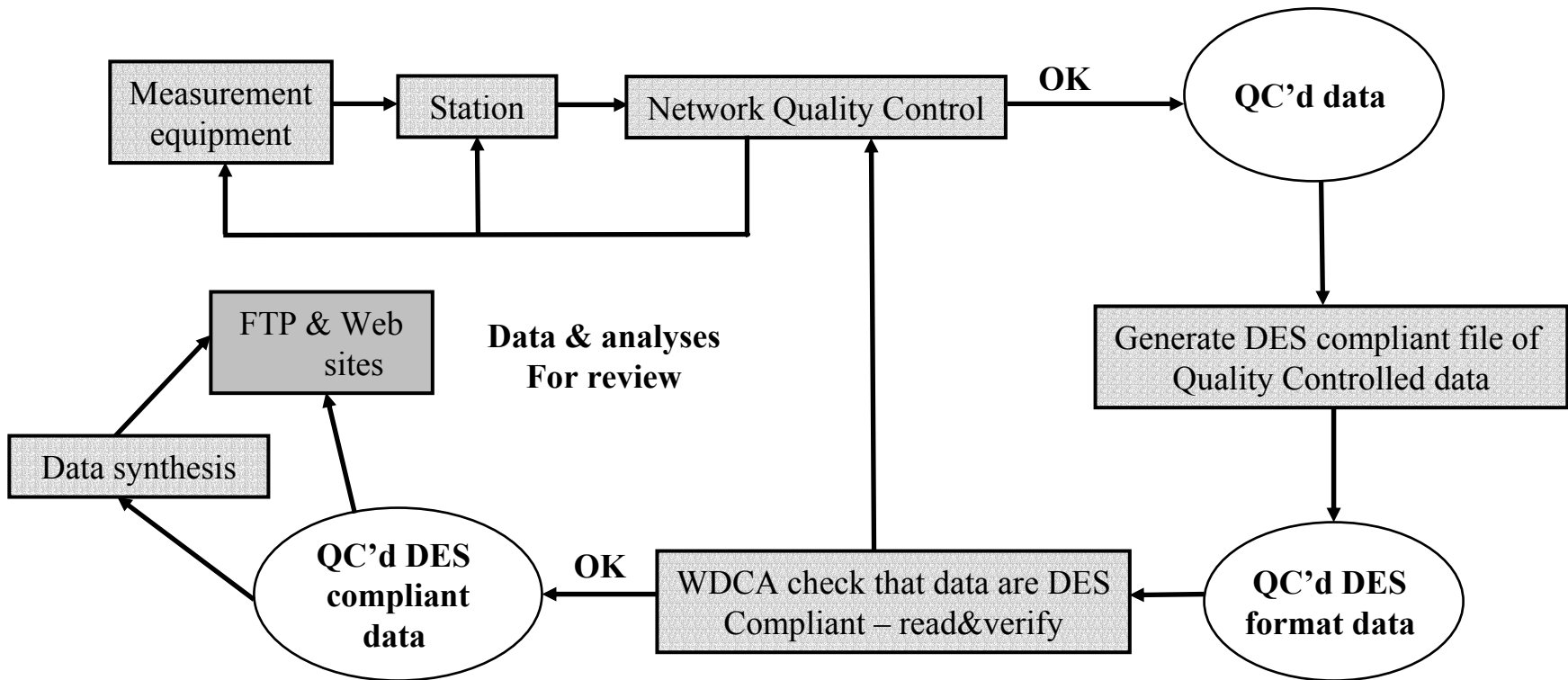
- Introduction & acknowledgements
- Data Flow in GAW aerosol program
- Data Availability: Global Stations, AOD
- Web Pages, data & meta-data

# Organisations that have contributed data to WDCA

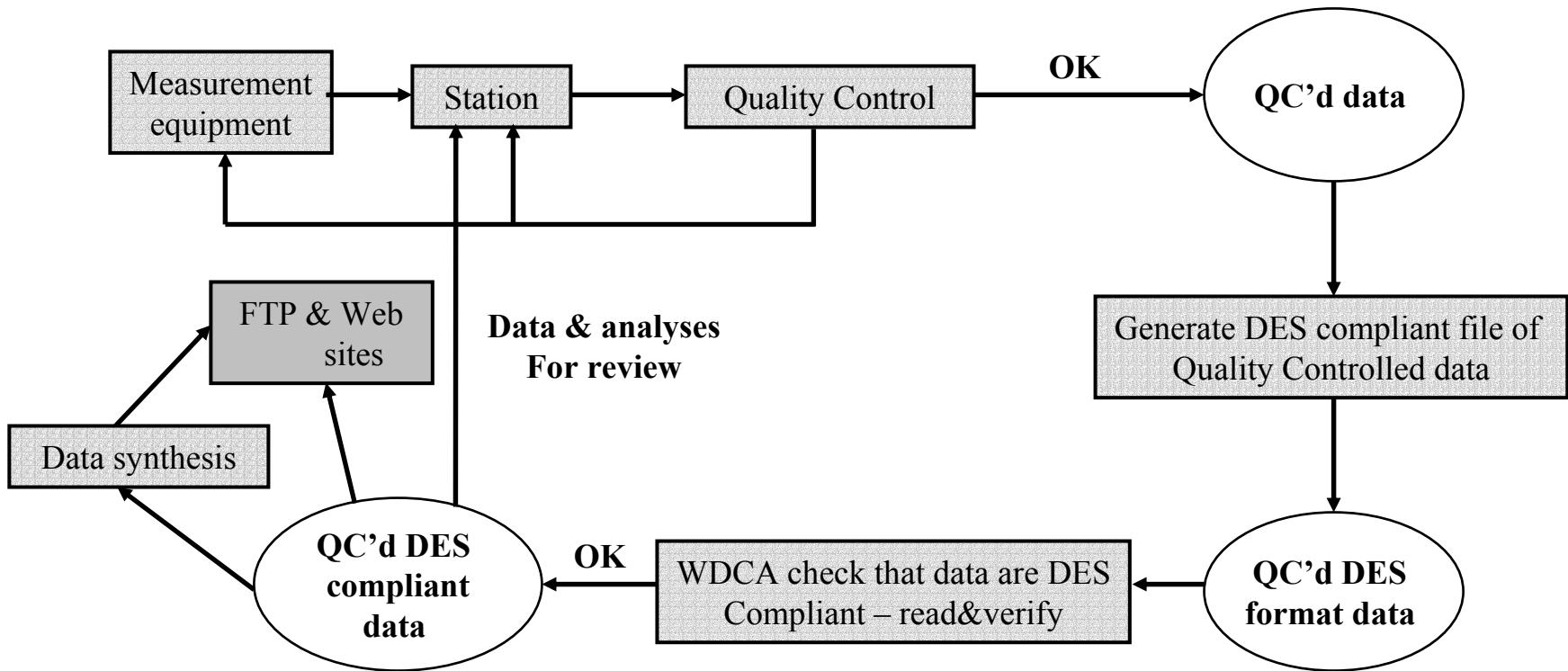
<b>PMOD/WRC</b>	Physikalisch-Meteorologische Observatorium Davos / World Radiation Centre, Switzerland
<b>CMDL</b>	NOAA Climate Monitoring and Diagnostics Laboratory
<b>MSC</b>	Meteorological Service of Canada
<b>DWD HOP</b>	Deutscher Wetterdienst, Hohenpeissenberg Meteorological Observatory
<b>DWD LIN</b>	Deutscher Wetterdienst, Lindenberg Meteorological Observatory
<b>JMA</b>	Japanese Meteorological Agency
<b>NILU</b>	Norwegian Institute for Air Research
<b>PSI</b>	Paul Scherrer Institute, Switzerland
<b>NUI,G</b>	National University of Ireland, Galway
<b>UM-RSMAS</b>	University of Miami, Rosenstiel School of Marine and Atmospheric Sciences
<b>CHMI</b>	Czech Hydrometeorological Institute
<b>FMI</b>	Finnish Meteorological Institute, Air Quality Research
<b>MDE</b>	Ecole de Mines de Douai, France
<b>UBA</b>	Umweltbundesamt, Langen, Germany
<b>EPA</b>	Irish Environmental Protection Agency, Ireland
<b>JRC</b>	Joint Research Centre, Ispra, Italy

<b>IMPROVE</b>	Interagency Monitoring of Protected Visual Environments, USA
<b>UH-SOEST</b>	University of Hawaii, Department of Oceanography
<b>NERI</b>	National Environmental Research Institute, Denmark
<b>UJF</b>	University Joseph Fourier, France
<b>FMI</b>	Finnish Meteorological Institute
<b>CSIRO</b>	Commonwealth Scientific and Industrial Research Organisation, Australia
<b>AWI</b>	Alfred Wegener Institute, Bremerhaven, Germany
<b>RIVM</b>	Netherlands National Institute of Public Health and Environmental Protection,
<b>IMGW</b>	Polish Institute of Meteorology and Water Management
<b>SHMI</b>	Slovak Hydrometeorological Institute
<b>DGCEA</b>	Dirección General de Calidad y Evaluación Ambiental del Ministerio de Medio Ambiente, Spain
<b>IVL</b>	Swedish Environmental Institute
<b>EMPA</b>	Swiss Federal Laboratories for Materials Testing and Research
<b>LHMA</b>	Latvian Hydrometeorological Agency
<b>AEA Tech</b>	AEA Technology, National Environmental Technology Centre, UK

# Data Flow to and from WDCA: Networks e.g. EMEP, PFR



# Data Flow to and from WDCA: Single Station



# Data Submission and Retrieval from WDCA

## Data Submission

### Data and Metadata Format:

NARSTO data exchange standard (DES) extended CSV.

NARSTO DES includes all the file metadata. Additional files provide more detailed information.

### Submission:

Data are sent by ftp or email

### Quality Analysis at WDCA:

NARSTO quality analysis system – checks conformity with the DES and internal integrity of the data. QA summary added to each file archived, only posted to ftp site when no errors/warnings.

## Data Retrieval

### Procedure:

Data available online from WDCA ftp server. Data also supplied by email

### Catalogue:

Maps of active sites for each parameter with links to site page and data

### Archive:

Both NARSTO and non-NARSTO archives accessible via ftp.

### Data:

Data in NARSTO DES format.

### Products:

Limited site by site analyses – time histories etc, will be available from the new site.

# Status of Aerosol Data from GAW Global Stations

Station	AOD	Mass	Chemistry	Light Scat.	Light Abs.	CN	CCN	Size Dist.	Chem. Size	Lidar
Alert		1980+	1980+		1989+					
Ny Alesund	2000+		1990+							
Point Barrow				1976+	1988+	1977+				
Pallas-Sodankyla				2000+		1996+				
Mace Head	2000+	1998+	1988+	1997+	1989+	1991+	1994+	1994+		
Zugsptize-Hohenpeissenberg	1999+	1996+	1997+	1999+	1995+	1995+		1996+	1997+	
Jungfraujoch	1999+			1995+	1995+	1995+				
Mount Waliguan	1994+				1994+					
Izana	2000+		1992-1996							
Minamitorishima	1995+									
Assekrem-Tamanrasset		1997+			1997	1997+				
Mauna Loa	2000+		1990+	1974+	1990+	1975+				
Mount Kenya										
Bukit Koto Tabang		1997+			1997-2000					
Arembepe										
American Samoa				1977-1990		1977-1999				
Cape Point			1992-1996							
Amsterdam Island					1991+					
Lauder										1993+
Cape Grim			1983+		1990+	1976+	1981+	1992-1996		
Ushuaia					1994-1997					
Neumayer				2000+	1995+	1982				
South Pole				1979+	1987+	1974+				

**Data Set Submitted, Data set not yet submitted**

# WDCA Aerosol Optical Depth: Status

- **PFR Data from:**
  - Hohenpeissenberg, Mauna Loa, Ny Alesund
  - Jungfraujoch, Bratt's Lake, Ryori
- **German AOD network data from:**
  - Potsdam, Zingst
- **Indian AOD network**
  - 10 stations newly equipped with multi-channel sun photometers, contact made, future data transmission to WDCA.



# WDCA Web interface

Acknowledgement of data providers

Data submission & retrieval instructions, pages for each parameter:  
AOD; Light Scattering, Chemistry; Light Absorption; CN; Size distributions




Links to GAW pages & data providers

GAW station information system

Welcome to the Global Atmosphere Watch World Data Centre for Aerosols - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address <http://rea.eu.jrc.it/netshare/wilson/WDCA/> Go Links

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 The World Data Centre for Aerosols is one of five recognised World Data Centres which are part of the Global Atmosphere Watch (GAW) program of the World Meteorological Organization (WMO). The WDCA is operated by the Climate Change Unit of the [Institute for Environment and Sustainability](#) of the [Joint Research Centre](#) of the European Commission and is located in Ispra Italy.

The other data centres are:

- [World Data Centre for Ozone and Ultraviolet Radiation \(WOUDC\) Toronto, Canada.](#)
- [World Data Centre for Greenhouse Gases \(WDCGG\) Tokyo, Japan](#)
- [World Radiation Data Centre \(WRDC\) St. Petersburg, Russia](#)
- [World Data Centre for Precipitation Chemistry \(WDCPC\) Albany, USA](#)

In addition to the data centres an online catalogue of GAW activities the [GAW Station Information System \(GAWSIS\) Dubendorf, Switzerland](#) has been set up by EMPA, the Swiss Federal Laboratories for Materials Testing and Research.

The purpose and long-term goal of GAW is to provide data, scientific assessments, and other information on the atmospheric composition and related physical characteristics of the background atmosphere from all parts of the globe. These are required to improve understanding of the behaviour of the atmosphere and its interactions with the oceans and the biosphere and will enable prediction of the future states of the earth-atmosphere system.

For more information: [wdca-contact@jrc.it](mailto:wdca-contact@jrc.it)

Created : 2003/10/27 Modified : 2004/01/30 Url of this page : [http://ies.jrc.ec.eu.int/wdca/home\\_box.html](http://ies.jrc.ec.eu.int/wdca/home_box.html)

# WDCA Aerosol Optical Depth Archive

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Address: <http://rea.ei.jrc.it/netshare/wilson/WDCA/>

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1. **Introduction**

Aerosol optical depth (AOD) is a quantitative measure of the extinction of solar radiation by aerosol scattering and absorption between the point of observation and the top of the atmosphere. It is a measure of the integrated columnar aerosol load and the single most important parameter for evaluating direct radiative forcing. AOD can be determined from the ground through measurements of the spectral transmission of solar radiation through the atmosphere using rather simple and relatively inexpensive instruments pointed directly at the sun called sunphotometers or filter radiometers. Routine ground based AOD observations are of utmost importance for the calibration and validation of AOD retrievals from satellites. In addition they are necessary to correct for aerosol effects in the retrieval of other satellite products. The Ångström exponent, which gives an indication of the column integrated aerosol size distribution, can be derived from simultaneous AOD measurements at several wavelengths.

Aerosol optical depth (AOD) is not directly measurable, but rather must be retrieved from observations of atmospheric spectral transmission. The solar irradiance  $I$  at a given wavelength can be expressed as  $I=I_0 \exp(-\tau)$  with  $I_0$  the extraterrestrial (top-of-the-atmosphere) irradiance of the sun,  $m$  the air mass and  $\delta$  the total optical depth. The air mass equals 1 for a vertical path and is roughly proportional to  $1/\cos z$  with  $z$  the zenith angle of the sun during the observation. The total optical depth  $\delta$  at a given wavelength is composed of several components such as scattering by gas molecules,  $\delta_R$  (Rayleigh scattering), extinction by aerosol particles,  $\delta_A$ , absorption of trace gases,  $\delta_G$ , like ozone, and possible cloud contamination. Thus, the AOD can be obtained from the total optical depth by subtracting modelled estimates of the other components  $\delta_A = \delta - \delta_R - \delta_G$ . Because AOD is essentially a difference between two larger numbers, it is very sensitive to small calibration errors and to a minor degree also to the methods chosen to model the other components. More sophisticated instruments like sky-scanning radiometers can be used to determine other very important optical parameters including single-

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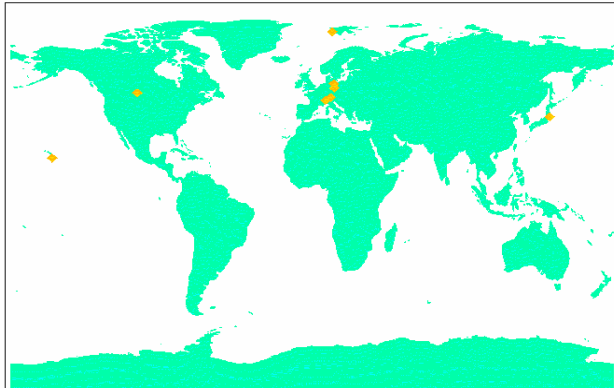
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2. Sites that have submitted AOD data to WDCA (click on the symbols to go to a site description from GAWSIS)



3. **The AOD Data Archive**

4. **Links**

GAW Precision Filter Radiometer Network and the [World Optical Depth Research and Calibration Centre](#)

[German AOD network](#)

[Baseline Surface Radiation Network](#)

[AERONET](#)

# Example: Bratt's Lake

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**Station Characteristics**

**Bratt's Lake, Canada (BRA)**  
Regional fixed station in WMO RA IV - North/Central America

GAW ID: 50°13"N 104°43"W (592 m a.s.l.)

station established: full operation

station status: Db (Cooler Humid - Continental cool summer)

climate zone: description  
Bratt's Lake is a combined Baseline Surface Radiation Network (BSRN) and Canadian Acid Precipitation Monitoring Network (CAPMoN) site, located in the praries about 30 km SSW of Regina.

**Contact Person(s)**

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url:

**GAW function**  
station function: Measurement leader: Aerosol

**GAW function**  
station function: Measurement leader: Aerosol Optical Depth

**Measurement Program**

type	parameter	method	start	end	data
Aerosol	Mass (major inorganic components)	*Filter sampling	08.14.2001	ongoing	
	Optical depth	Precision Filter Radiometer	1.5.2001	ongoing	<a href="#">2001-2</a>
Ozone					
Precipitation					

Site data from GAWSIS

Site description

Site Contacts

Measurement Program

Data from FTP site