



# Report on DWD activities and plans

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*German Weather Service, Met. Obs. Hohenpeissenberg*

## Outline

- Activities in months 1-12 (AER, GRG)
- Evaluation: selection of events
- Plans for months 13-30 (AER, GRG)
- Needs & open questions

# Activities I



- Established/configured **access to ECMWF** data server MARS
- **Introduced GEMS** during GMES-, GAW-, NDSC-, and CO-Workshops
- **Requested data** from networks and stations
- Data survey → **compiled tables** of coverage of AOD and selected gases in GAW data bases
- **Retrieved 2003 data** from GAW data bases
- Set up data handling **routines**

# Activities II (AER 4.2)

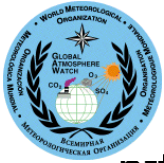


- Comparison of aerosol model AOD from sea salt and desert dust with AOD observations at 13 GAW stations:
  - filter according to Angstrom parameter (particle size)
  - select episodes with Sahara dust observed at GAW stations
  - select sea salt episodes/stations
- Select events in 2003 where desert dust, forest fire or sea salt particles

# Activities III (GRG 4.1)



- Established/configured access to ECMWF data server MARS
- Introduced GEMS during GMES-, GAW-, NDSC-, CO-Workshops
- Requested data from networks and stations
- Data survey → compiled tables of coverage of AOD and selected gases in GAW data bases
- Retrieval of 2003 data from GAW data bases
- Set up data handling routines



# GAW Data Centres

<http://www.woudc.org>

World Ozone and Ultraviolet Radiation Data Centre (WOUDC)

<http://wdca.jrc.it>

World Data Centre for Aerosols

Introduction

Contributors

DATA

Publications

Links

GAWSIS

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What's New

Contact WDCA

IES Links

News

Open Data Set

IES Admin

Contact

Table of Contents:

How to Use the Data Archive

- General Data Submission Information
- The Nairobi Data Exchange Standard for Data Submission
- Data Flags
- Data Submission - Procedure
- Data Set Security Issues
- Data Retrieval
- Further Information

Contents of the WDCA Aerosol Data Archive

- The GAW aerosol program
- Aerosol Optical Depth
- Aerosol Light scattering and backscattering
- Aerosol Chemistry
- Aerosol Light absorption
- Condensation nuclei concentration
- Aerosol Size distributions

Non-AMSSTO format data sets

Structure of the Data Archive

- NAEASTO archive
- NonNAEASTO archive
- Link to Data Archive

<http://www.empa.ch/gaw/gawsis>

GAWSIS STATION INFORMATION SYSTEM

by QA/SAC Switzerland

- Find Information
- Edit/Add Information
- Provide Feed-back

Home Extended Search Edit/Add Information Feed-back FAQs & Glossary About Logout

QuickFind

Select by Station type

Global  Regional  Contributing

Select by Parameter

Individual Station Report

Contact Information

GO! Clear

GAW World Data Centres

- WDCGG (Gases)
- WRDC (Radiation)
- WOUDC (Ozone/UV)
- WDCA (Aerosols/AOD)
- WDCPC (Precipitation)

What's New

2005-11-07 Registered users of GAWSIS can click on **Edit/Add Information** to request their password and have it sent to their registered e-mail address.

2005-03-09 GAWSIS synchronized with WRDC (as of 2004-10-09) and WDCGG (as of 2004-10-19). As a result, some duplicate data series exist for now. Note: Not all entries could be synchronized due to ambiguities.

31-Jan-2006

Legend: GAW Regional Station, Contributing Station, GAW Global Station

coords="240,163,5" href="reports.asp?StationID

Using the Data Archive

- How to Register, Submit and Retrieve Data from the WOUDC Archive
- Documentation (File Formats, Utility Software Notes etc.)
- Utility and Analysis Software
- ISO 3166 Country Codes

Archive

- Data Set Security Issues
- Data Archive Search Form
- Link to Data Archive
- Recent Data Submissions
- Browser Data Management System (BDMS)

Summaries and Reports

- Annual Data Report on CD-ROM
- Revised Data Sets - Information and History
- Total Ozone Summary Data - Daily and Monthly Means
- Spectral UV Monthly Summaries and Plots
- Total Ozone Trend Assessments

Maps and Graphs

- Station Maps
- Total Ozone Maps
- Time-Series Graphs

WRDC database

You are visitor no. 4801

Welcome to WRDC database!

Regions: WMO 2

Show non-active

World Data Centre for Greenhouse Gases

CO2 concentration

The World Data Centre for Greenhouse Gases (WDCGG) is established under the Global Atmosphere Watch (GAW) programme to collect, archive and provide data for greenhouse (CO2, CH4, N2O, HFC, PFC and mixed (SF6, SF2, SO2, HFC, PFC) gases and methane oxide in the atmosphere and ocean, measured under GAW and other programmes.

From this web site, you can obtain information including WDCGG publications and measurement data that have been contributed by participating and individual researchers in the world. Please note that you should properly reference the data, when you use and publish them, by using the contributor and the source of the data and that any information on this web site should be used only for non-commercial purposes.

Introduction: An explanation of WDCGG

Data: Single description of the present status of greenhouse gases and related gases (retrieved from Data Summary 2002)

Station: Inventory station directory and archive

Data: All the data collected by WDCGG is to be distributed and to be used in a graph (update: more a month)

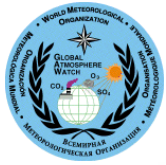
Publications: "Global Data Report", "WDCGG Data Summary" and present publications list ("Global Data Report" update: more a month)

Equipment: Data reporting guidelines

Links

<http://wrdc.mgo.rssi.ru>

<http://gaw.kishou.go.jp/wdogg.html>



# WDCA quality assurance for PFR instruments



PMOD-WORCC (World Optical Depth Radiation Calibration Centre)  
Christoph Wehrli

Physikalisch-Meteorologisches Observatorium Davos World Radiation Center



Portrait	Projects	Calibrations & Instruments Sales	FTP-Server	Publications & Annual Reports	Links & Events
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**PMOD/WRC**

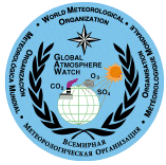
Dorfstrasse 33 Phone: +41 81-417 5111  
CH-7260 Davos Dorf FAX: +41 81-417 5100  
Switzerland Email:



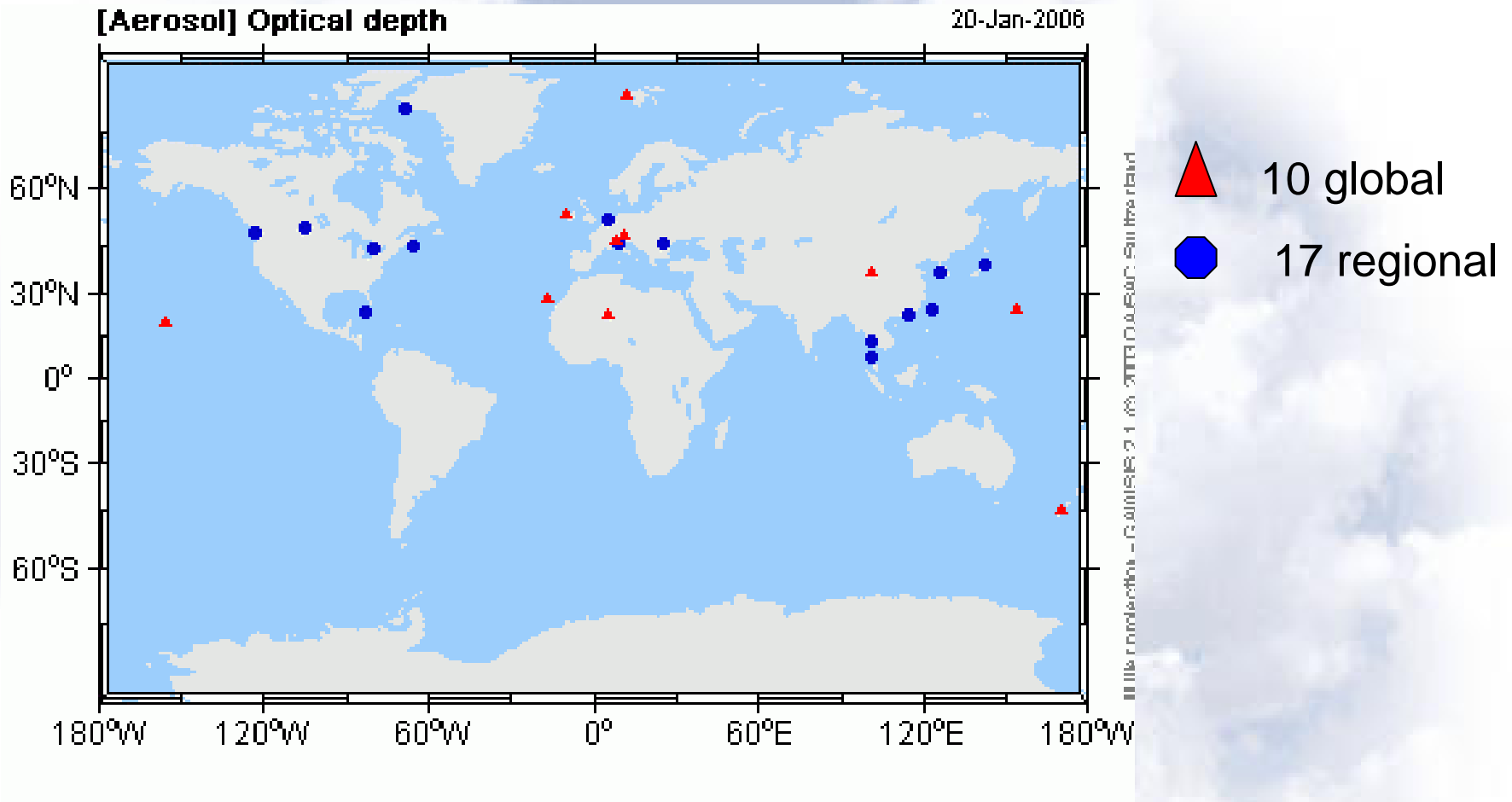
[Swiss-Russian Seminar, March 13-15., 2006](#)

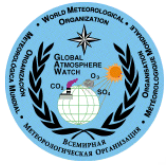
Weltstrahlungszentrum - Centre Mondial de Rayonnement - World Radiation Center - Physikalisch-Meteorologisches Observatorium Davos

**WMO/GAW Report 162**  
(<http://www.wmo.ch/web/arep/gaw/gawreports.html>)



# Data Overview - AOD I

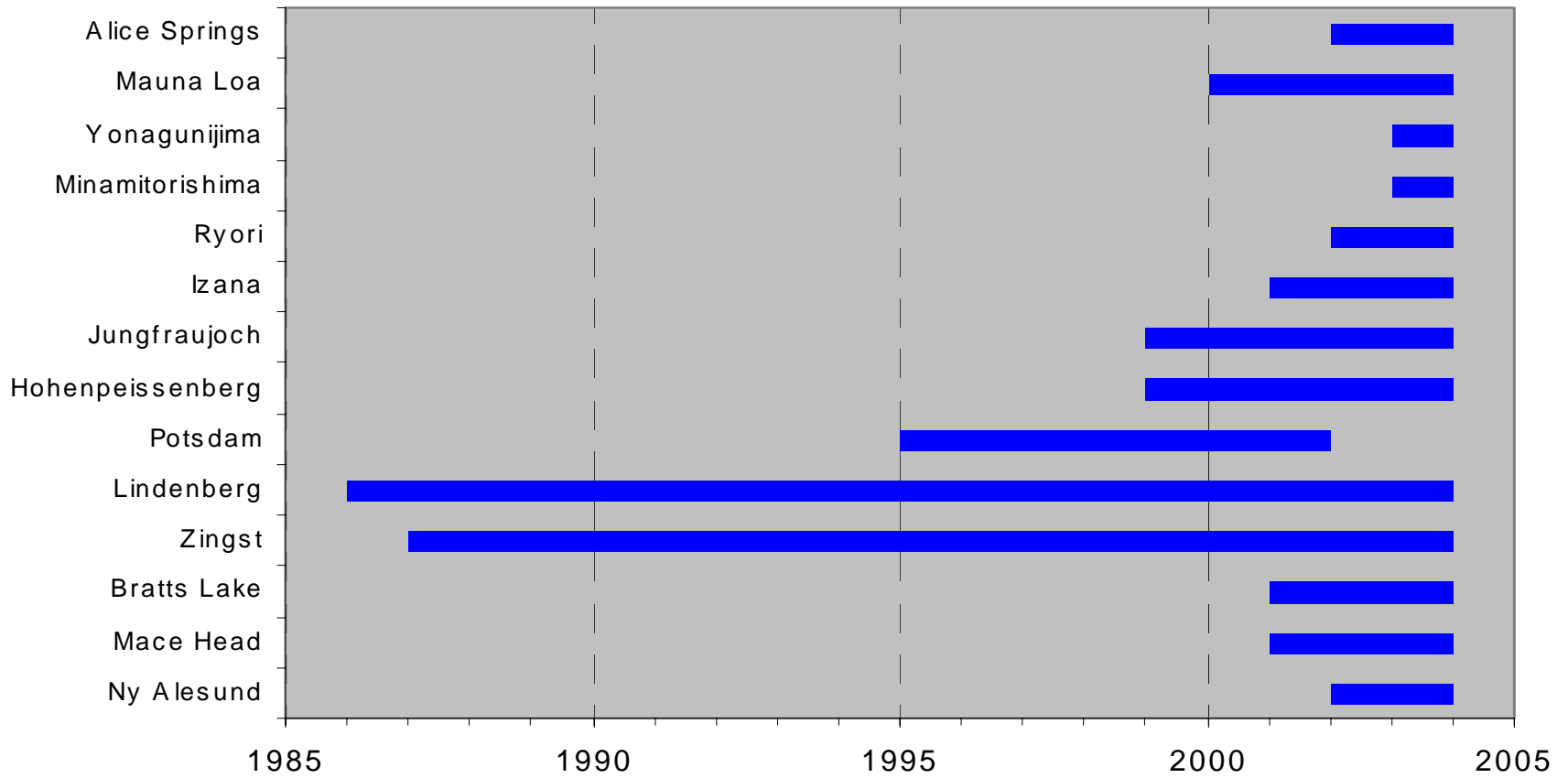




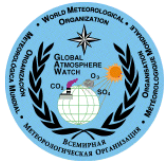
# Data Overview - AOD II



## AOD data from reporting GAW stations (WDCA data base)





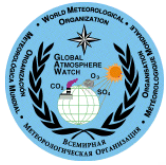


# Data Overview - AOD III



## AOD data from GAW regional stations (current status)

DeBilt	2	5.18	52.1	<a href="mailto:stammes@knmi.nl">stammes@knmi.nl</a>	Contacted		
Fundata	1384	25.3	45.46	<a href="mailto:manea@meteo.inmh.ro">manea@meteo.inmh.ro</a>	Address?? --> Homepage not useful		
Tamanrasset	1377	5.5	22.78	<a href="mailto:m_mimouni_dz@yahoo.com">m_mimouni_dz@yahoo.com</a>	Delivered 'turbidity (= AOD?)' data for 2003		
Thule	200	-68.76	76.51	<a href="mailto:pe@dmi.dk">pe@dmi.dk</a>	Contacted		
Lauder	370	169.68	45.03	<a href="mailto:p.johnston@niwa.cri.nz">p.johnston@niwa.cri.nz</a>	Contacted		
Anmyeon-do (Korea)	45	126.3	36.54	<a href="mailto:cbc@kma.go.kr">cbc@kma.go.kr</a>	Byoung forwarded request to new KGAWO		
Yuen Ng Fun (China)	86	114.3	22.4	<a href="mailto:xiaoye@cams.cma.gov.cn">xiaoye@cams.cma.gov.cn</a>	Contacted		
Bangna Bangkok (Thai)	53	100.6	13.67	<a href="mailto:duanchai@metnet.tmd.go.th">duanchai@metnet.tmd.go.th</a>	Contacted		
Songkhla (Thai)	4	100.6	7.2	<a href="mailto:ozone568@metnet.tmd.go.th">ozone568@metnet.tmd.go.th</a>	Contacted		
Waliguan	3810	100.9	36.28	<a href="mailto:zhaulx@cams.cma.gov.cn">zhaulx@cams.cma.gov.cn</a>	Lingxi forwarded mail to PI for Aerosol (CAI)		
Kejimikijik (Can)	127	-65.2	44.4	<a href="mailto:bruce.mcarthur@ec.gc.ca">bruce.mcarthur@ec.gc.ca</a>	Contacted		
Egbert (Can)	253	-79.8	44	<a href="mailto:bruce.mcarthur@ec.gc.ca">bruce.mcarthur@ec.gc.ca</a>	"		
Saturna Island (Can)	178	-123.1	48.7	<a href="mailto:bruce.mcarthur@ec.gc.ca">bruce.mcarthur@ec.gc.ca</a>	"		
La Habana (Cuba)	50	-82.4	23.15	<a href="mailto:jcpelaez@met.inf.cu">jcpelaez@met.inf.cu</a>	Contacted		
Ispra	209	8.6	45.8	<a href="mailto:julian.groebner@pmodw.ch">julian.groebner@pmodw.ch</a>	Contacted (now at PMOD --> CIMEL, in AERO)		

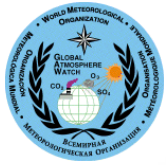


# Data Overview - AOD IV



## AOD 2003 data in WDCA data base





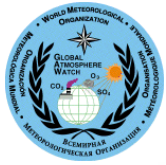
# Data Overview - GRG I



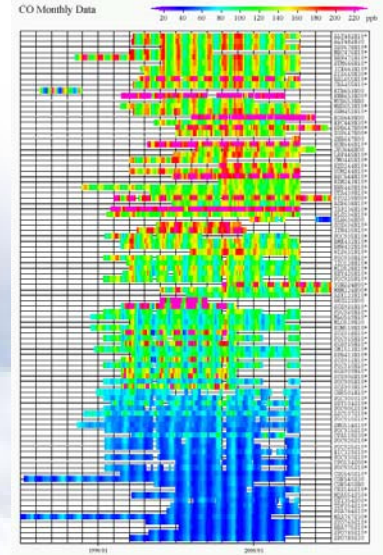
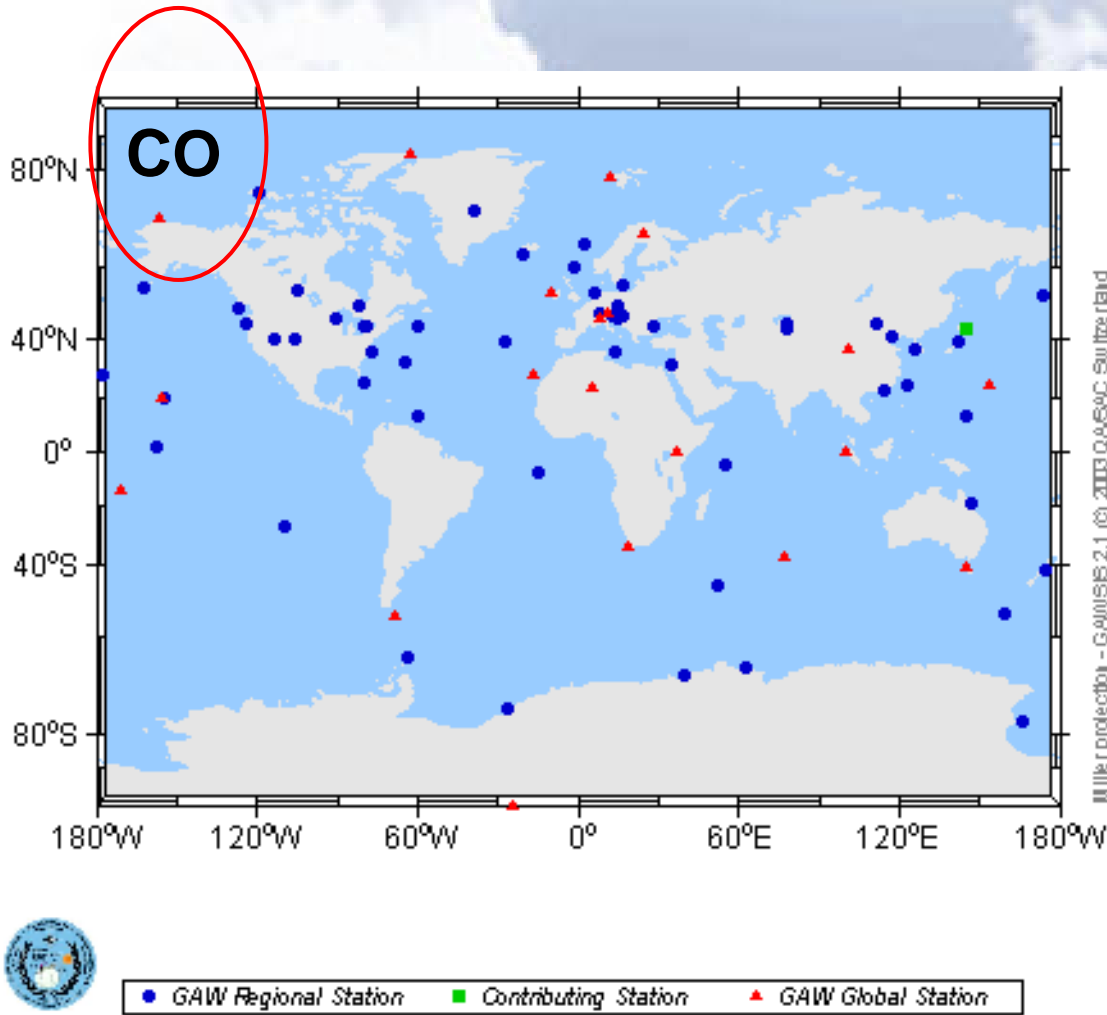
## Number of Stations by Parameter and Region

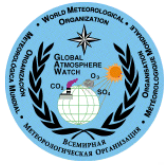
	Region I	Region II	Region III	Region IV	Region V	Region VI	Antarctica	Mobile	Total
<b>Station</b>	12	30	8	62	33	117	21	29	312
<b>Country</b>	8	10	5	6	7	31	8	3	66
<b>O<sub>3</sub></b>	4	6	2	17	5	47	4		85
<b>CO</b>	6	9	3	16	14	21	8	3	80
<b>NO<sub>2</sub></b>				1	2	42			45
<b>NO</b>						11			11
<b>NO<sub>x</sub></b>						6			6
<b>NO<sub>y</sub></b>						3			3
<b>SO<sub>2</sub></b>					2	46			48

Region I: Africa, II: Asia, III: South America, IV: North/Central America, V: South-West Pacific, VI: Europe

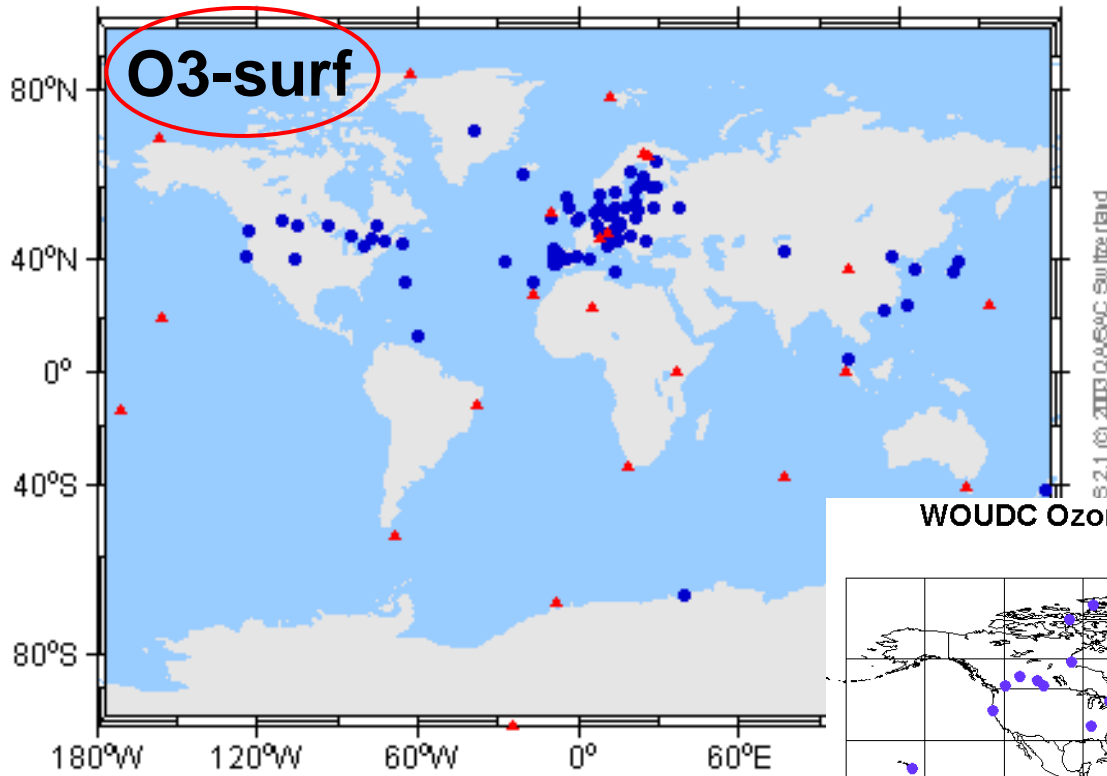


# Data Overview - GRG II

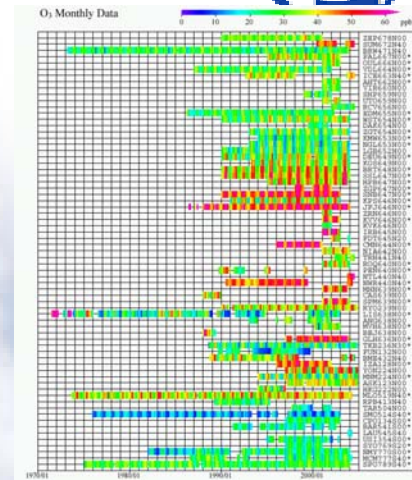




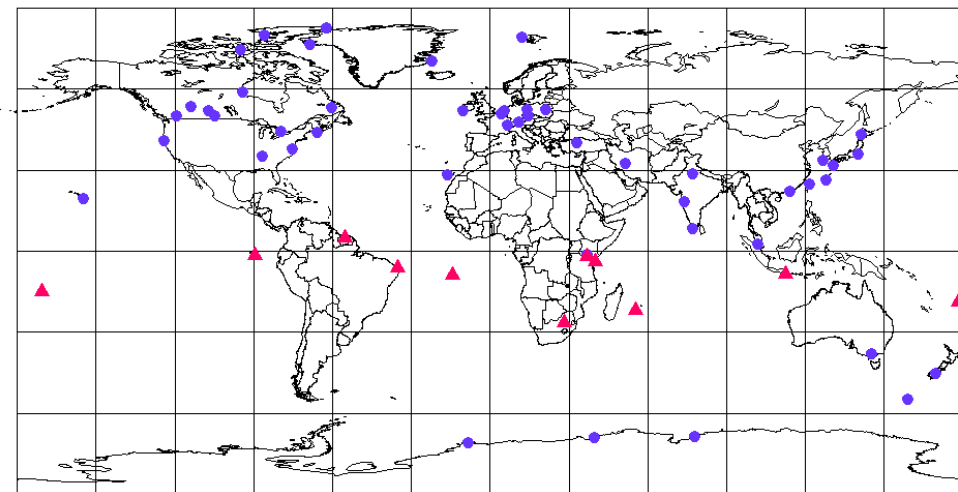
# Data Overview - GRG III



S 2.1 © 2003 GAW SAC Switzerland

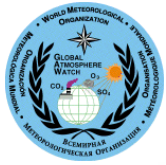


WOUDC Ozonesonde Platforms - Data years 2002 - 2005

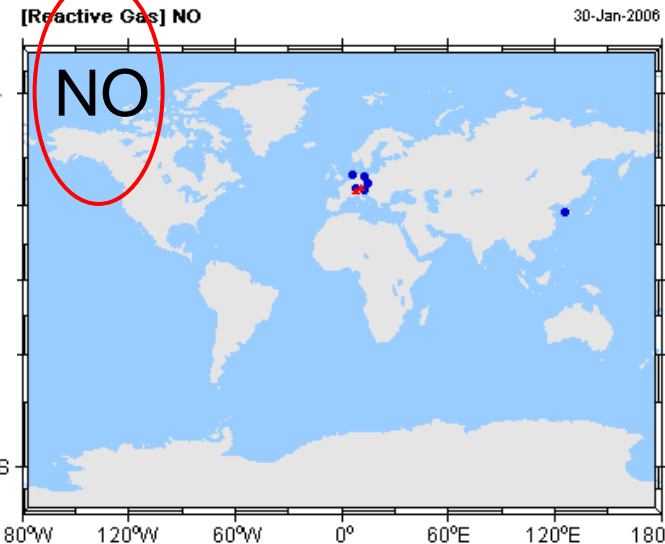
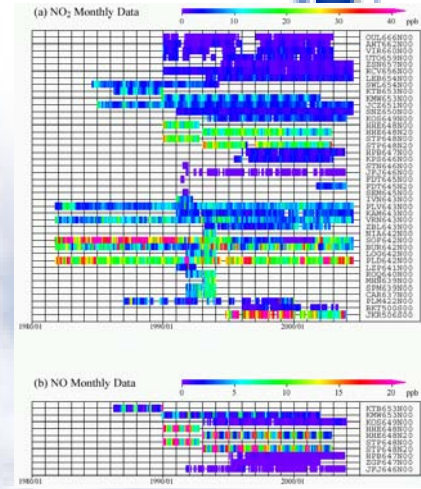
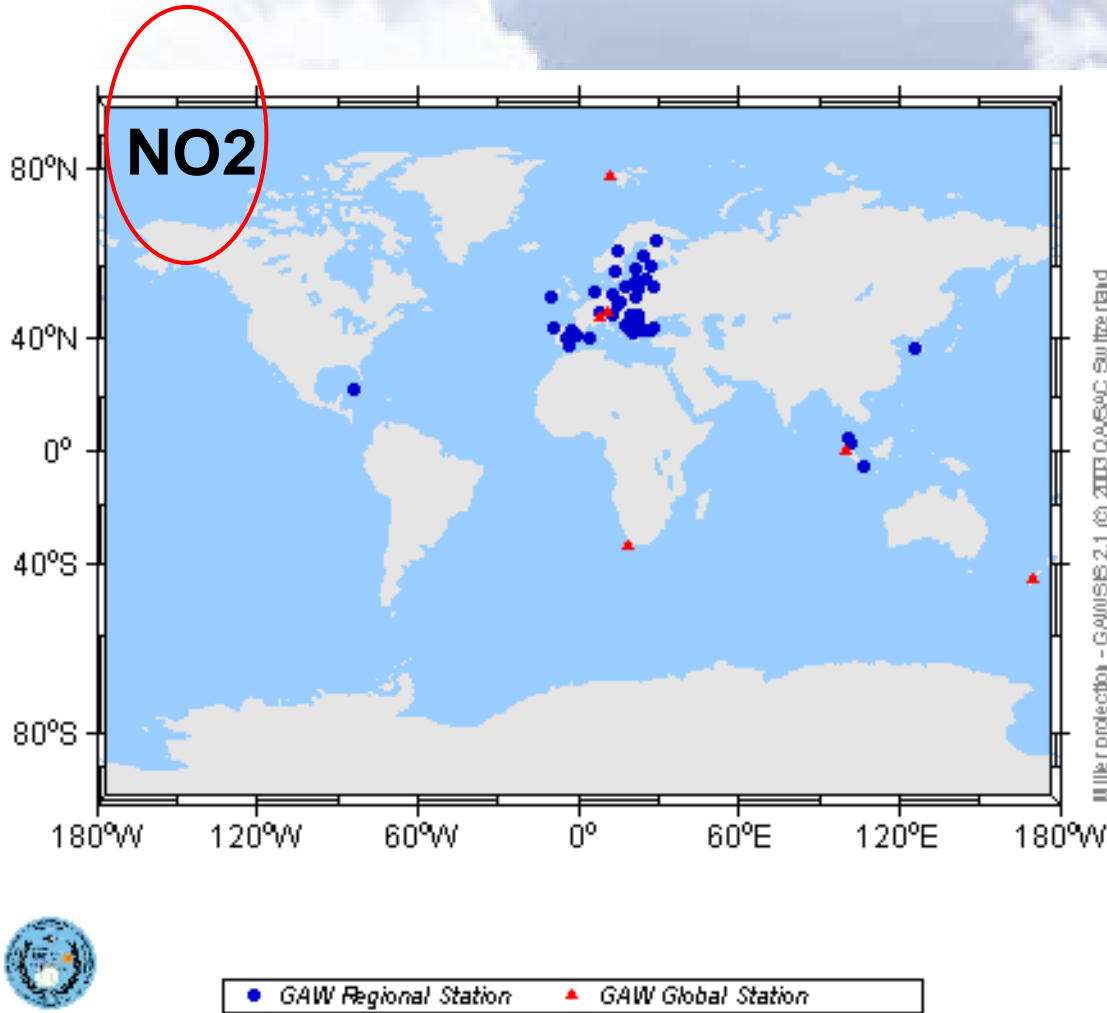


● GAW Regional Station    ▲ GAW Global Station

● WMO-GAW and Other Network Sites    ▲ SHADOZ Sites



# Data Overview - GRG IV



# Aerosol Model Evaluation



Prelim. comparison of aerosol model (Morcrette) and GAW observations

Period: Jan - June 2003

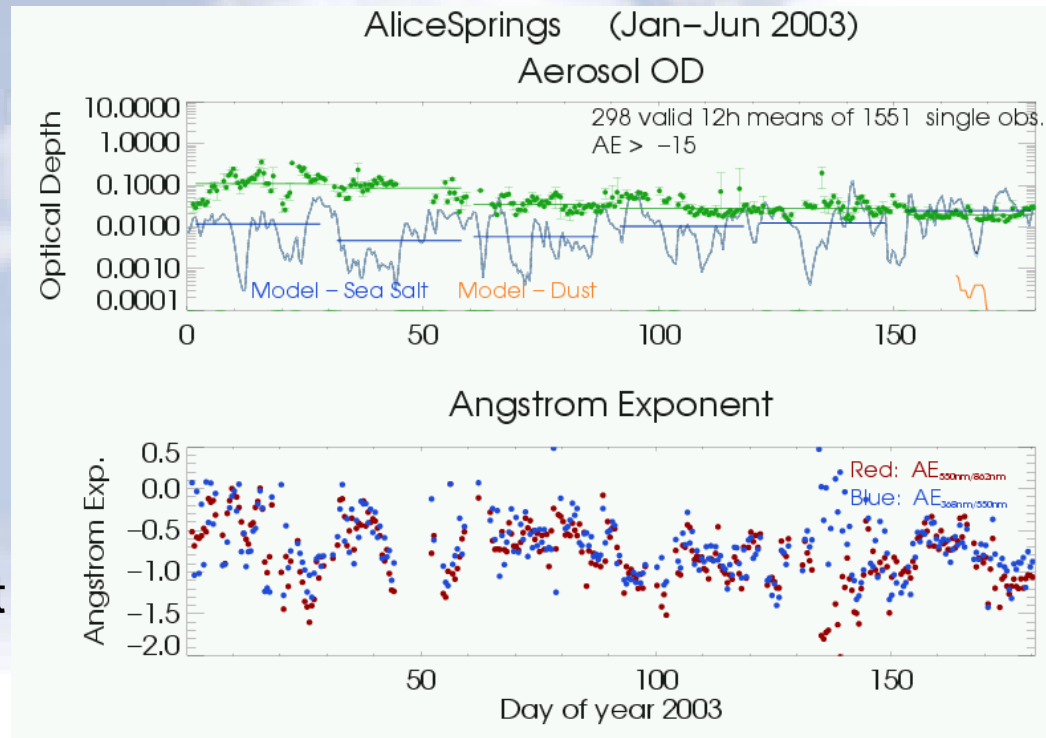
Stations: 13 GAW global stations

Parameter: AOD

**Model: Sea salt, desert dust**

**Observations: Total AOD**

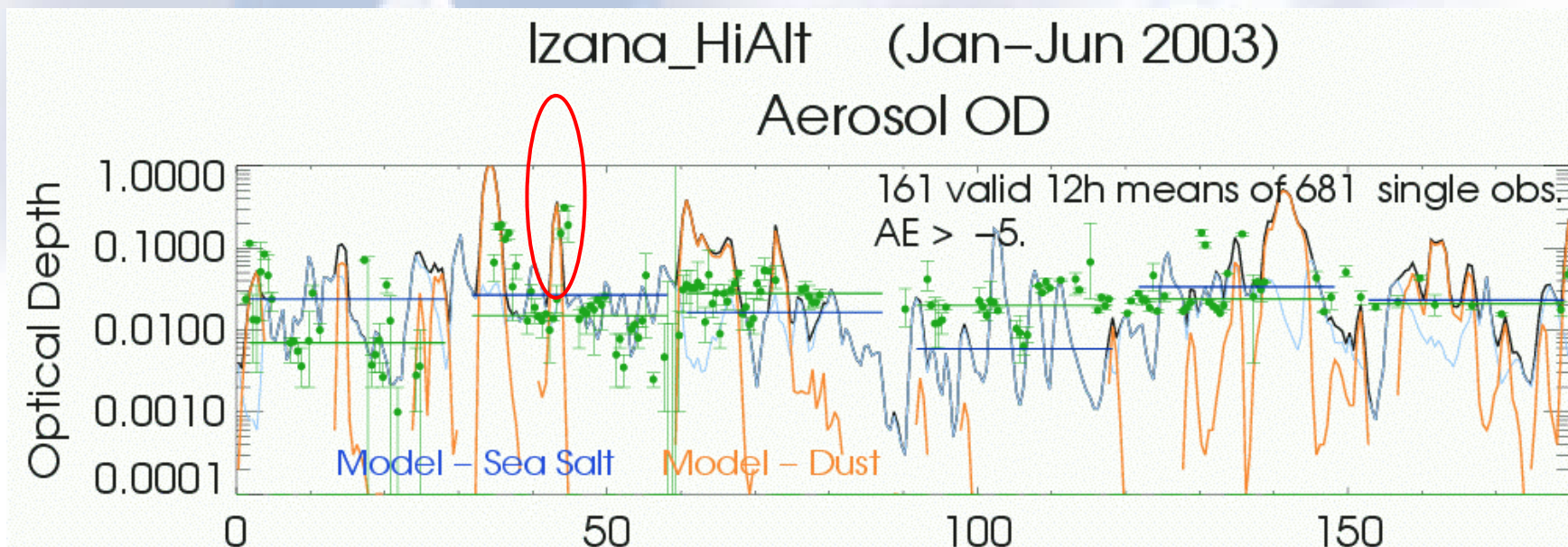
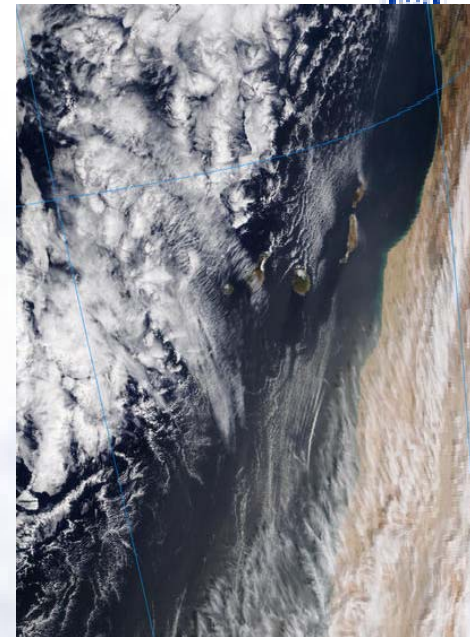
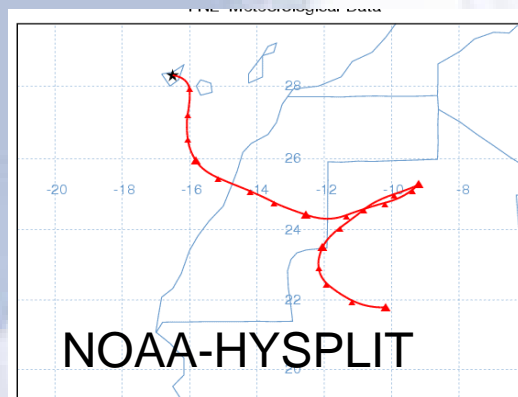
Filtering station AOD according to Angstrom Exponent does not reduce large differences



# Episode<sub>s</sub> I

Sahara dust at Izana GAW station on 13 Feb 2003

*Searching for events in  
central Europe...*



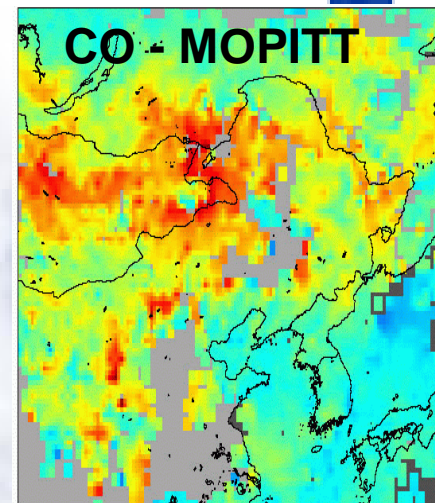
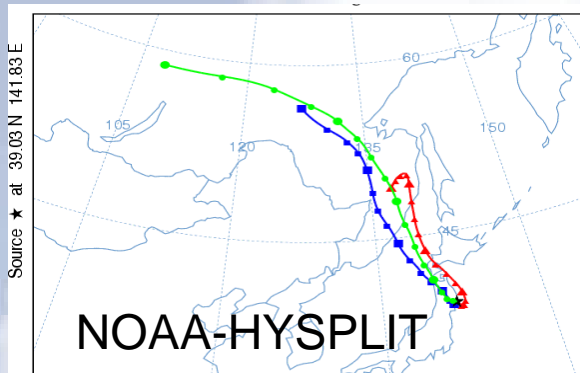


# Episode<sub>s</sub> II



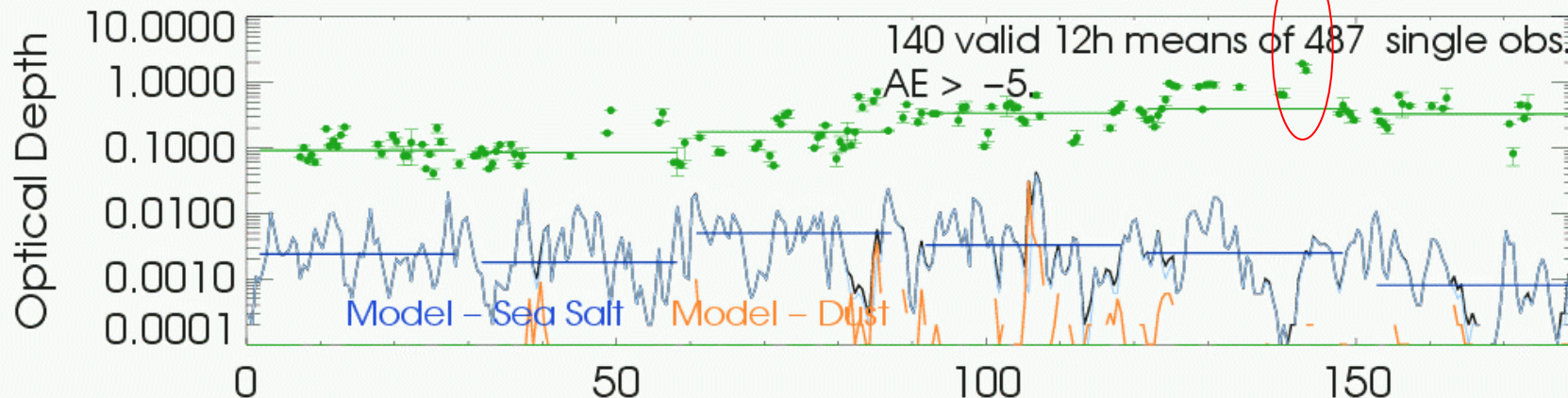
Forestfire plume at Ryori GAW station on 23 May 2003

*Searching for events with signatures in AOD, CO, NO<sub>x</sub>*



Ryori (Jan–Jun 2003)

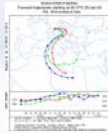
Aerosol OD



# Sahara Dust in central Europe in 2003



23/28 January (14)



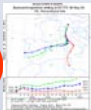
24/27 February (12)

10/11 March (12)

20-27 March (16)

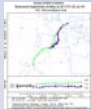
8 April (12)

5-7 May (14)



15 July (14)

22 July (14)

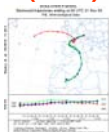


6-16 August (20)

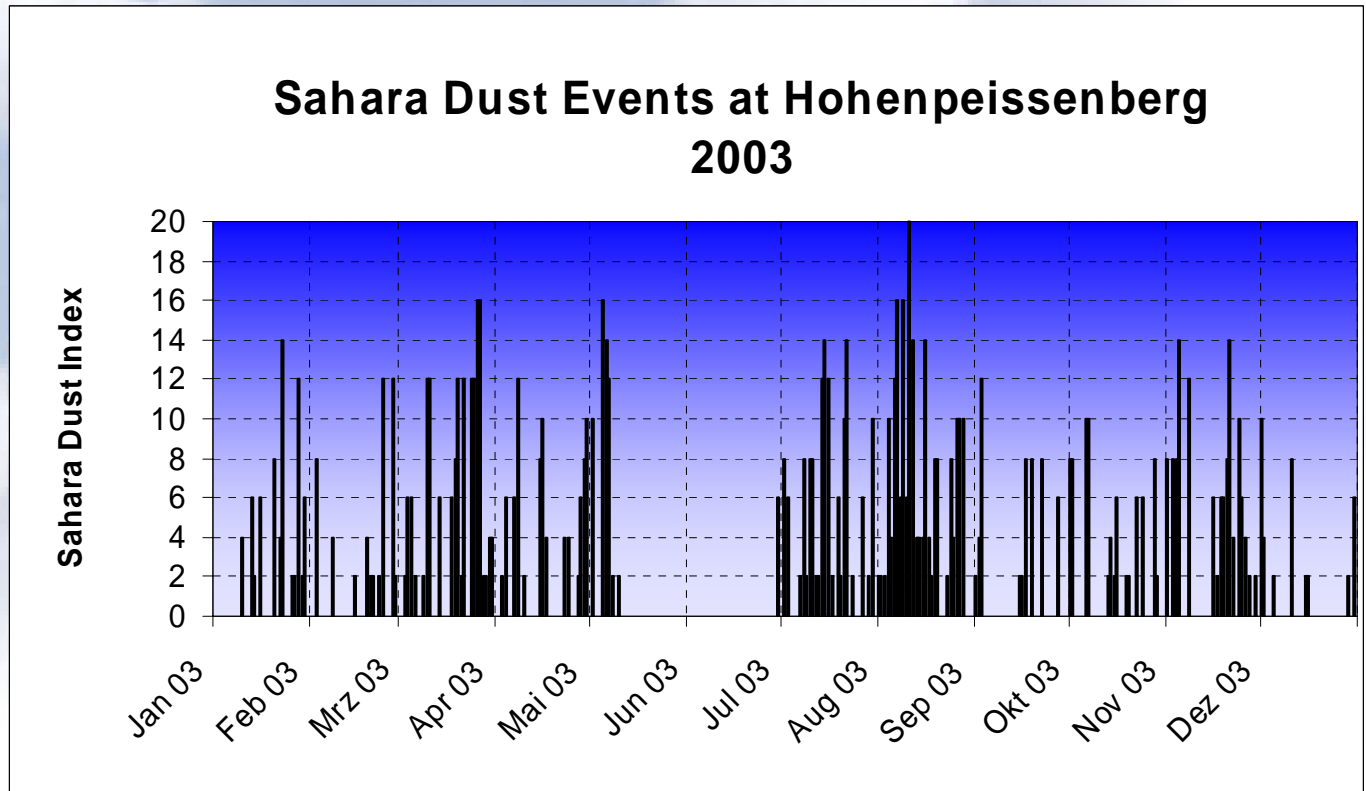
3 September (12)

5,8 November (14)

21 November (14)



*red: Sahara origin confirmed by b-traj*





## CO Long-range transport episodes

1-12 Jan	Pollution over China
15-20 Jan	Bushfires in SE-Australia
27 Jan–3 Feb	Fires in N-Africa
27 Jan–2 Feb	Pollution over China
20–25 Feb	Fires in SE-Asia
13 Feb–4 Mar	Fires in northern S-America, SE-Asia, W-Africa
18–22 Mar	Fires in central America
3–13 Apr	Fires in SE-Asia
...	



# Plans for Project Months 13 - 30



- continue (spectral) AOD validation based on GAW global and regional database (target year 2003), identify / select specific events suitable for model evaluation
- extend validation of reanalysis runs from year 2003 to longer period (e.g., 1996-2005) incl. validation of modelled aerosol radiative effects on surface irradiance
- continue to complete GAW aerosol optical properties database (station contacts) and begin with transition to real-time data flow (DWD as GAW/GEMS interface)
- establish / improve quality level characterization of station AOD data incl. station characteristics
- collaborate with RMIB on AOD validation
- merge task 4.2 validation results to support overall validation by NUIG
- collaborate with modellers to identify model deficits and improve model(s)



# Plans for Project Months 13 - 30



- Evaluate GRG model runs with GAW global and regional database (target year 2003)
- identify / select specific events suitable for model evaluation
- extend validation of reanalysis runs from year 2003 to longer period (e.g., 1996-2005)
- continue to complete GAW trace gas database (station contacts) and begin with transition to real-time data flow (DWD as GAW/GEMS interface)
- establish / improve quality level characterization of station trace gas data incl. station characteristics
- collaborate with modellers to identify model deficits and improve model(s)



# Open Questions & Needs

- **Redundant data in different data bases → co-ordination**
- **“Real time“ (tbd.) data flow**
- **Data format and delivery**
  - reanalysis data
  - real time data in operational phase
- **Regular meeting/telcons between observers and evaluators**
- **Evaluate on basis of existing measurement data**

## Initial Parameters for Validation:

- Reactive Gases: ground-based CO, O<sub>3</sub>, NO<sub>x</sub>; **O<sub>3</sub> profiles**
- Aerosol: Optical depth (AOD)

### 3 STEPS

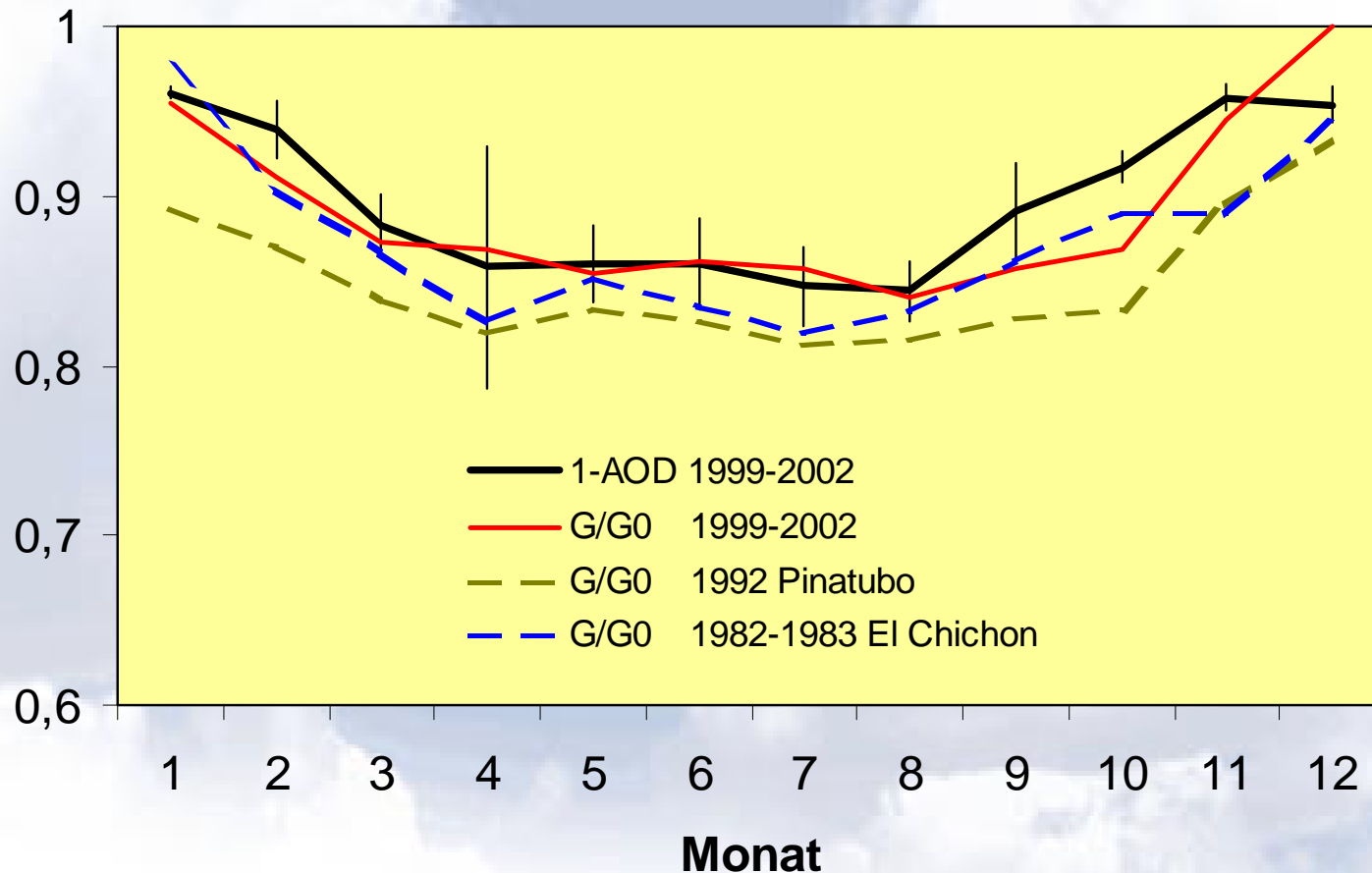
- EVALUATION OF STATISTICAL DIFFERENCES (model vs. measurements)
- IDENTIFICATION OF MODEL DEFICITS (critical assessment of observational data accuracy - e.g. station environment)
- PROPOSAL FOR MODEL IMPROVEMENT (joint effort with modellers)

# Meteorological Observatory Hohenpeissenberg



$R/R_0$  = global radiation normalized to Rayleigh atmosphere

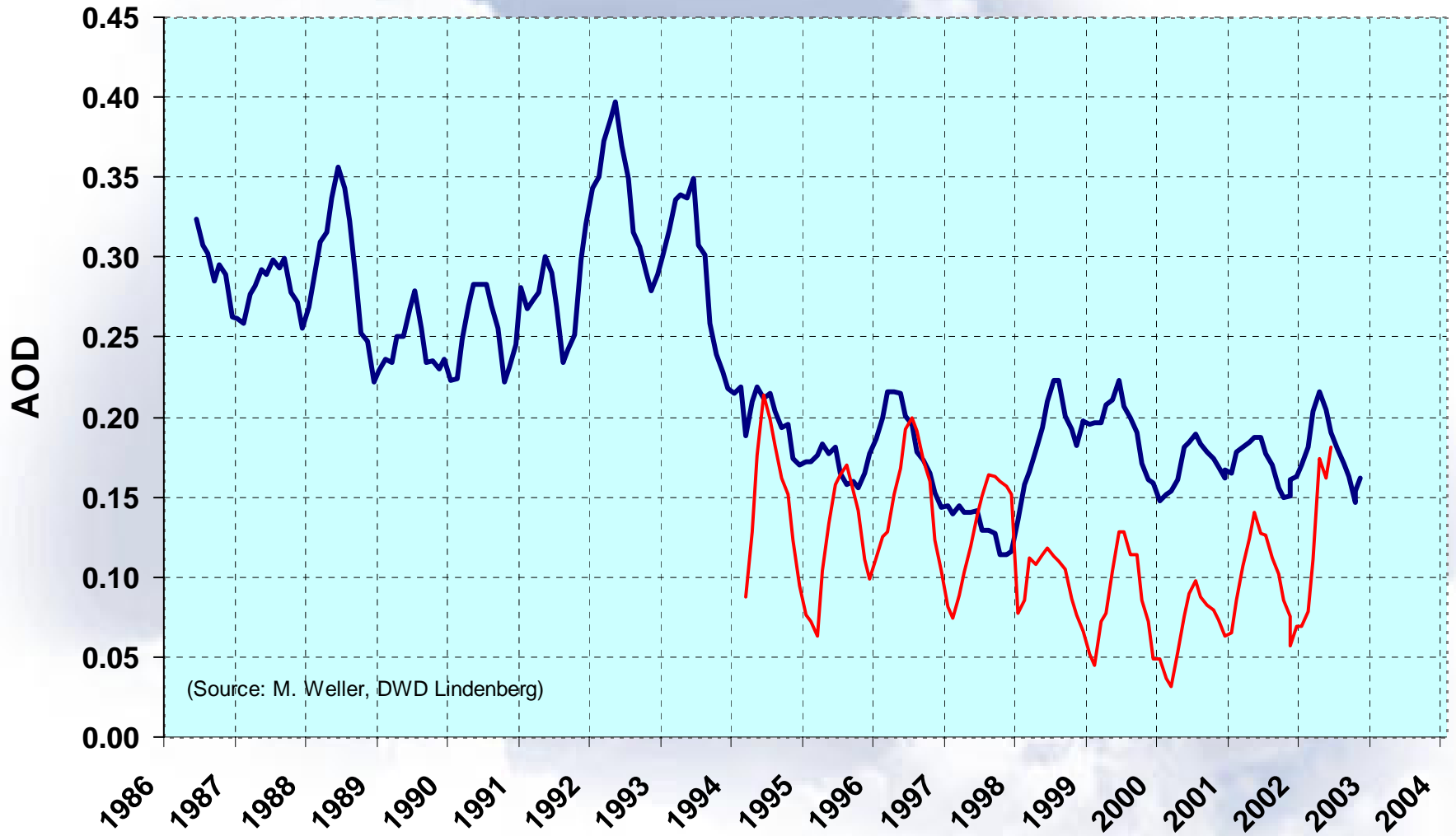
AOD = aerosol optical depth (550 nm), scale inverted



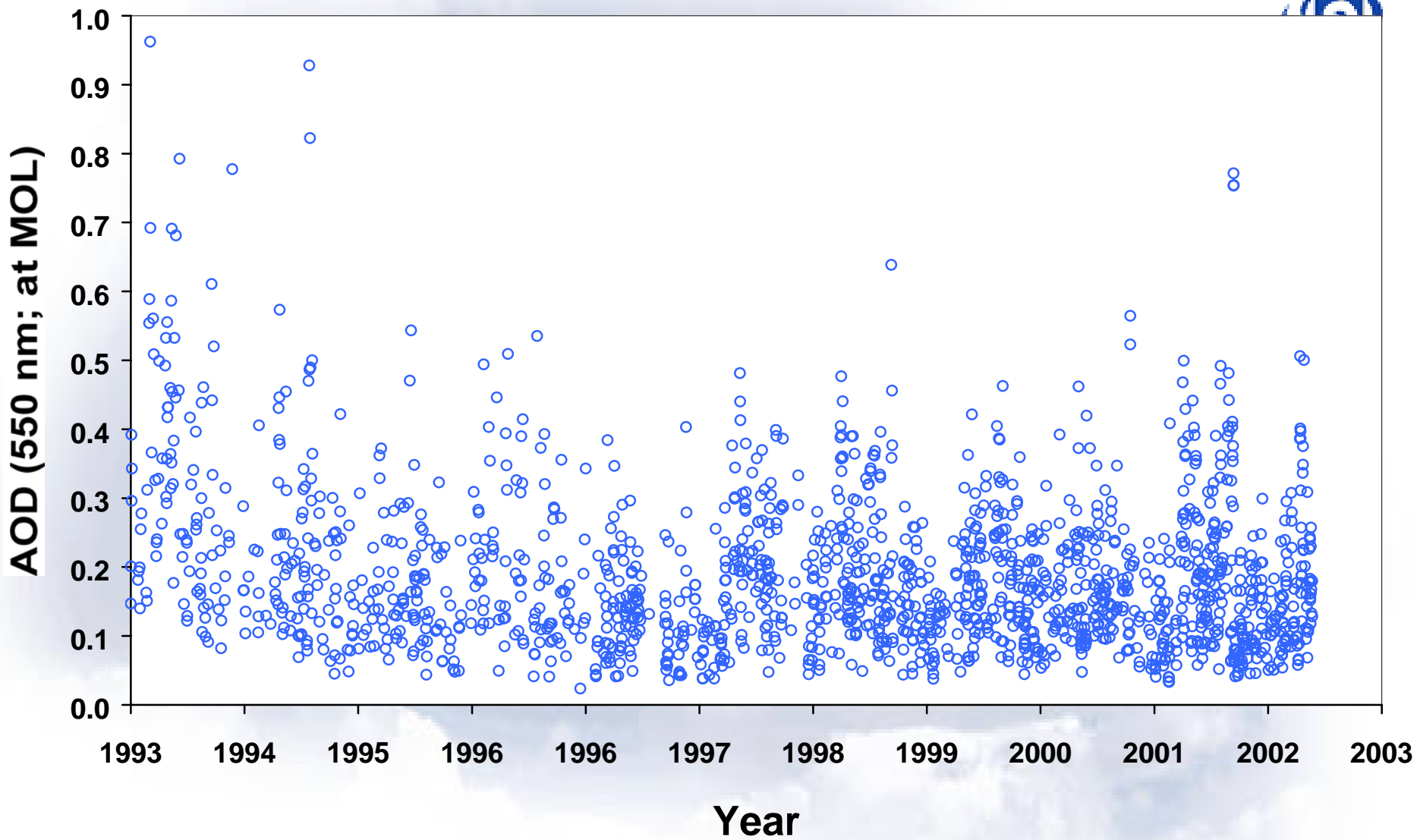
At blue sky conditions in summer the atmospheric aerosol reflects about 10% more of the global radiative input as compared to winter.

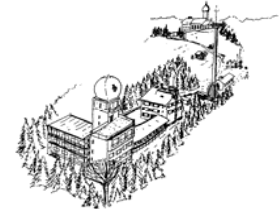


Seven month running average of AOD at 0.55  $\mu\text{m}$  for  
Lindenberg and Hohenpeissenberg (Germany)

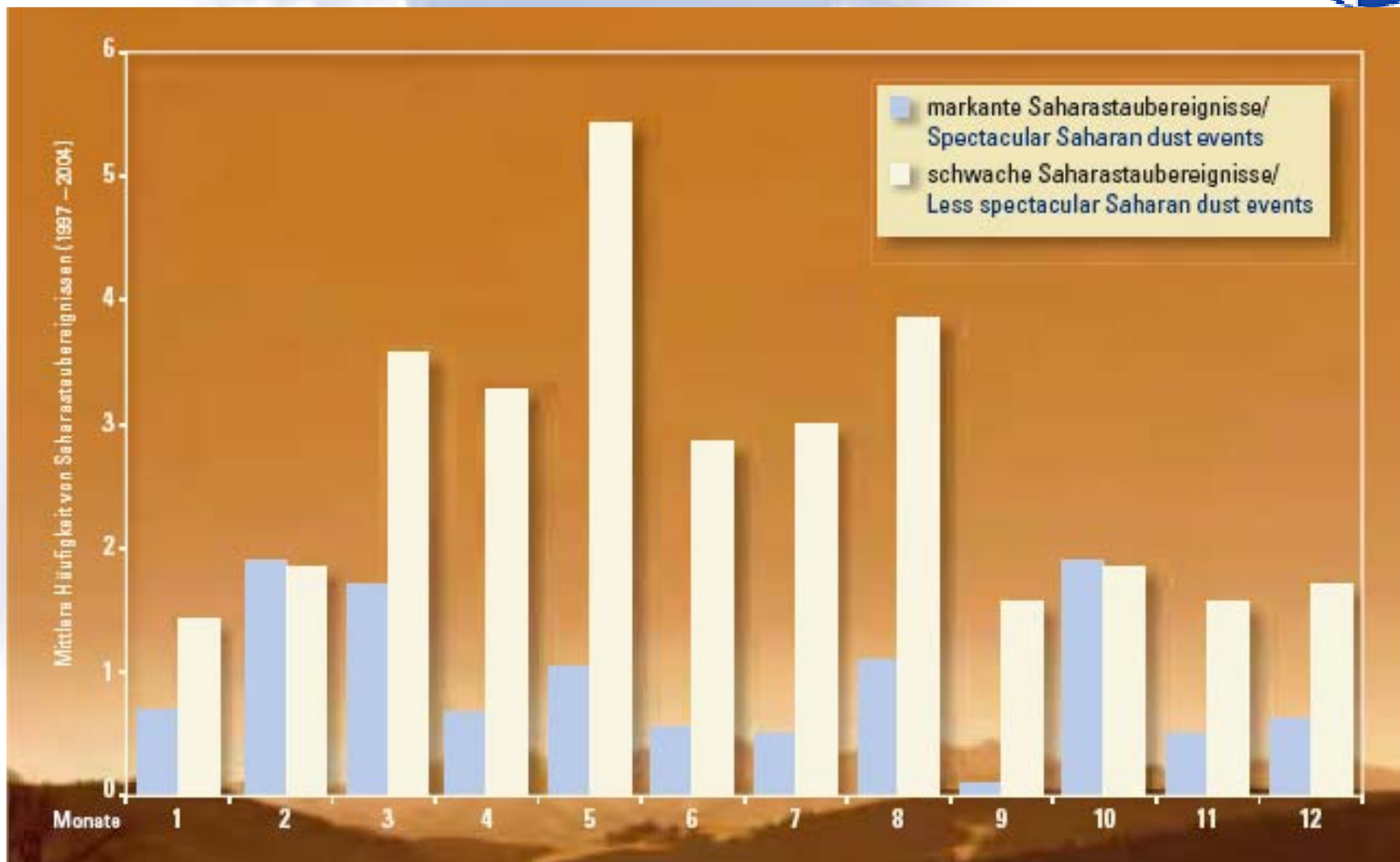


(Source: M. Weller, DWD Lindenberg)

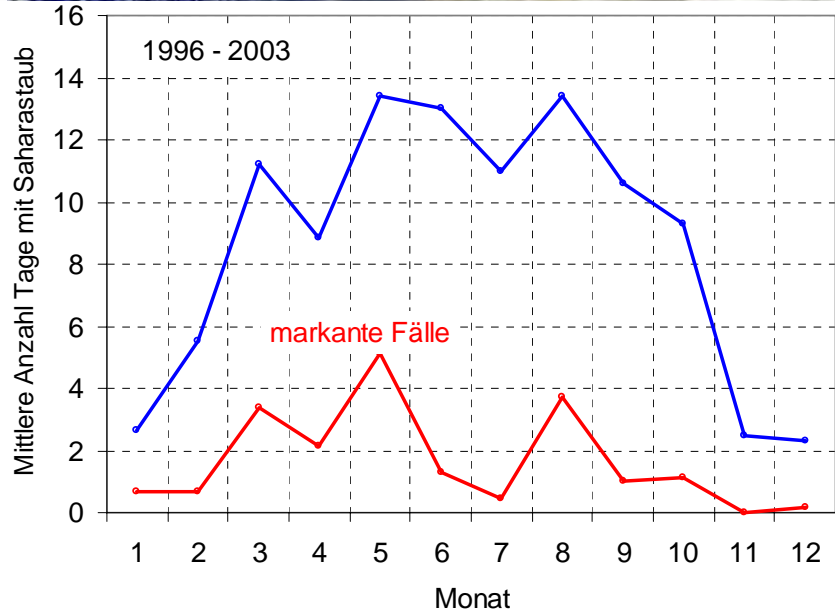
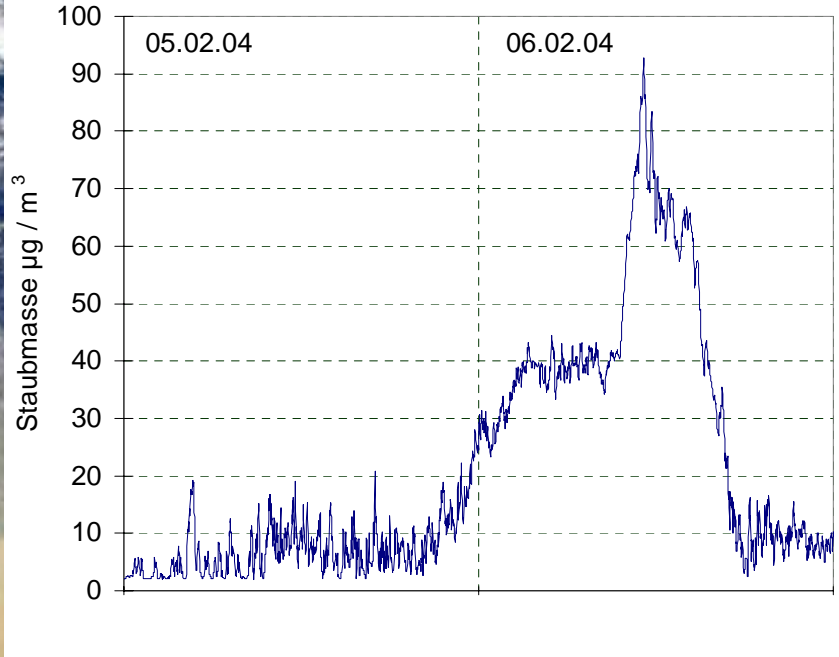




## Mean Annual Frequency of **Saharan Dust Events** Hohenpeissenberg (1997-2004)



# Deutscher Wetterdienst Global Atmosphere Watch



## Größenverteilung der Aerosolpartikeln am MOHp im Oktober 2000

