

The World Data Center  
for Remote Sensing of the Atmosphere  
WDC-RSAT

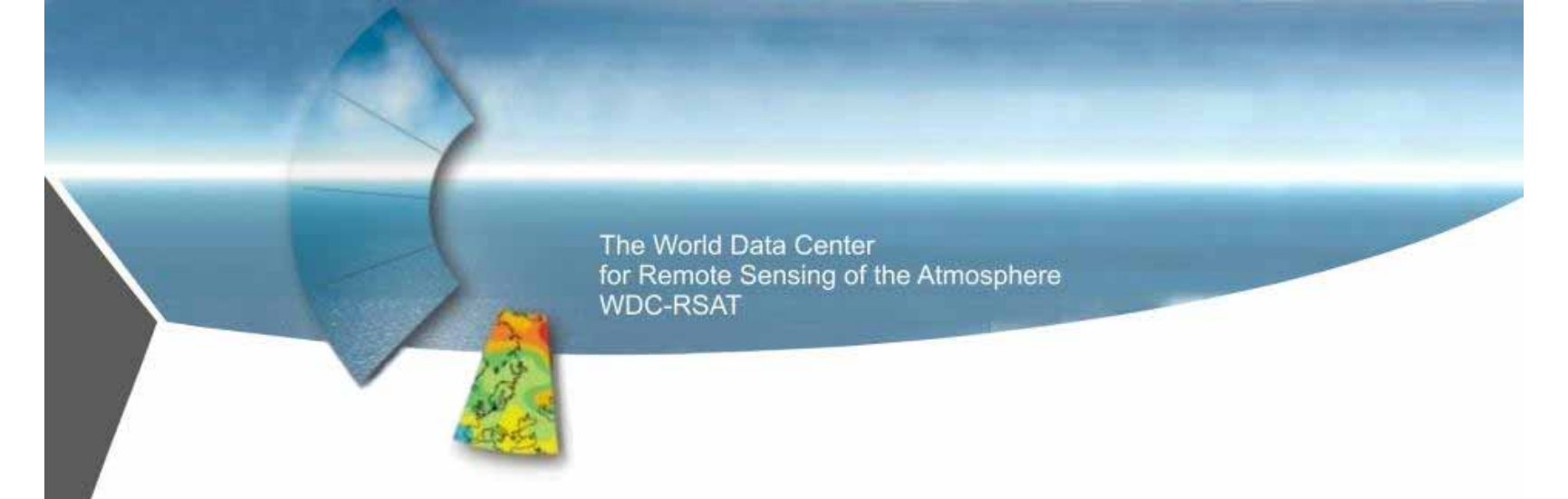
# ICSU/WMO World Data Center for Remote Sensing of the Atmosphere, WDC-RSAT

## Response to needs of data and information

### Status Report ET-WDC Meeting (22-24 May 2012)

Séverine Bernonville, Michael Bittner





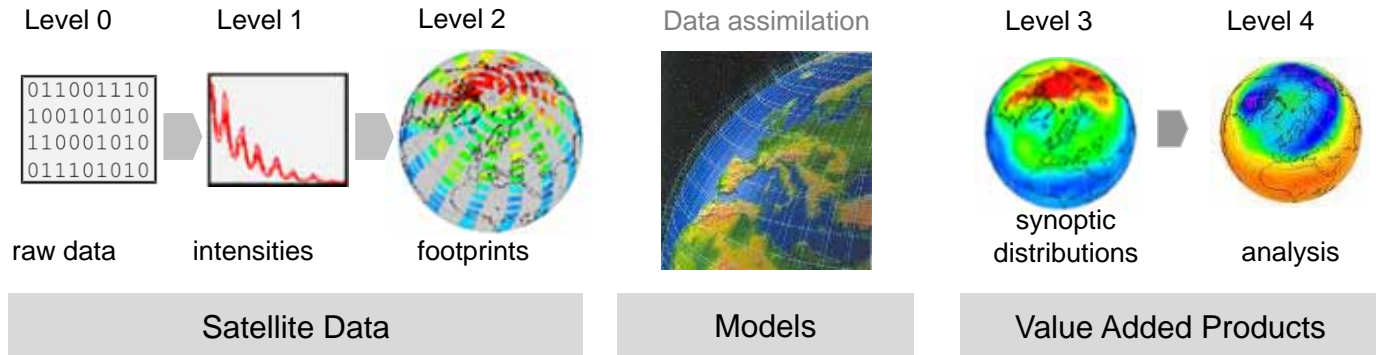
The World Data Center  
for Remote Sensing of the Atmosphere  
WDC-RSAT

## Mission Statement

Provide free, simplified, standardized and sustainable access to atmosphere related satellite based data, information products and services for science, administrative bodies, and industries

# WDC-RSAT Range of Portfolio

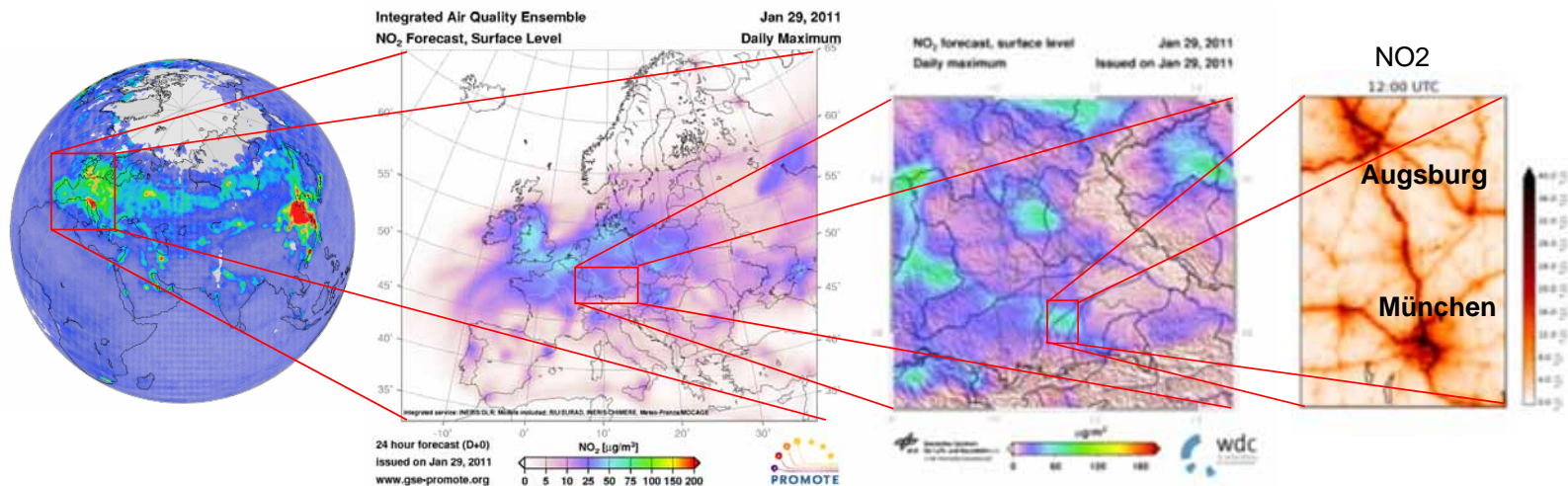
➔ WDC-RSAT acts along all evolution levels of the value adding chain





# Example for WDC-Service: Air quality monitoring on different scales

Results from projects such as ESA-PROMOTE, EU-MyAir / Pasodoble, EU-MACC etc. are implemented at WDC-RSAT for routine operation



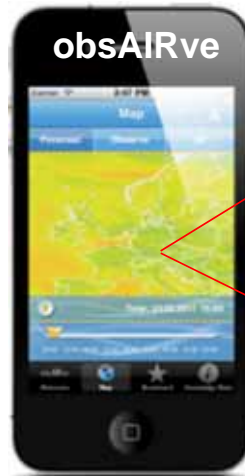
[http://wdc.dlr.de/data\\_products/projects/promote/BY-forecast/index.php](http://wdc.dlr.de/data_products/projects/promote/BY-forecast/index.php)

[http://wdc.dlr.de/data\\_products/projects/promote/blackforest-forecast/index.php](http://wdc.dlr.de/data_products/projects/promote/blackforest-forecast/index.php)



# Developing and operating innovative interfaces to deliver data, information and services

➤ Preparing data for mobile phone applications



CeBit, Hannover, 03/2012



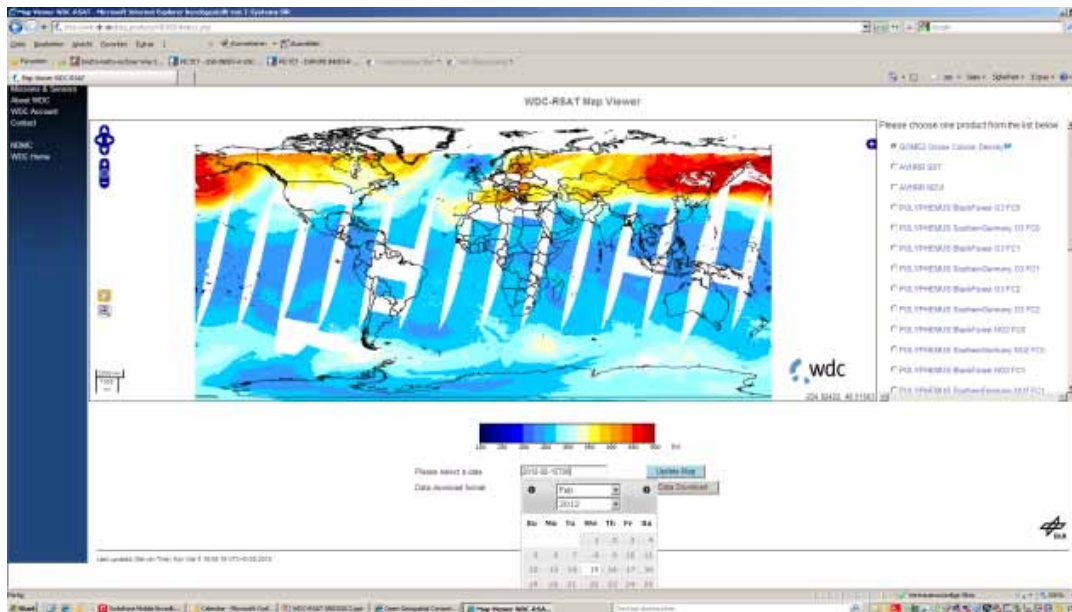
Pilotversion: <http://www.lab.dtrd.de/Obsairve>





# Developing and operating innovative interfaces to deliver data, information and services

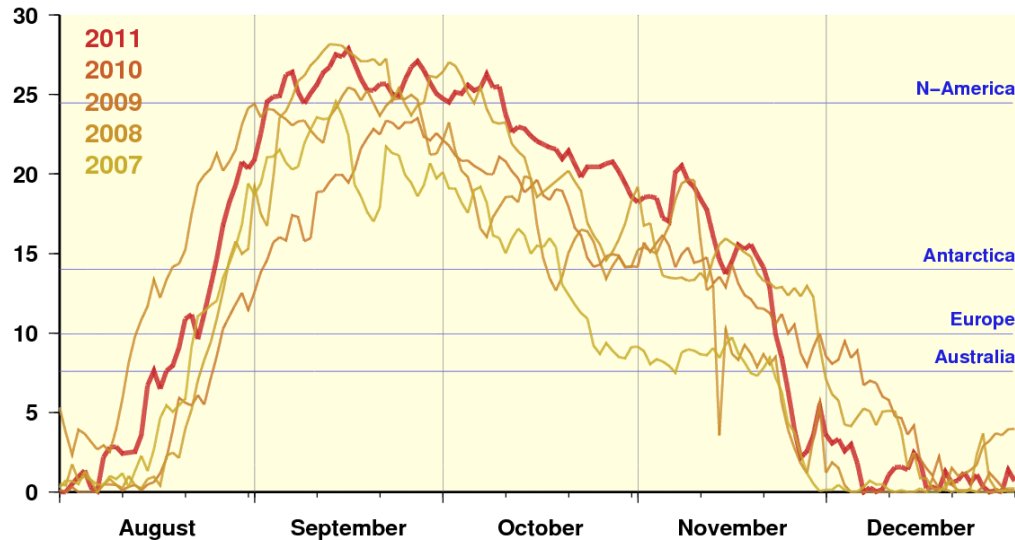
- Preparing data following common standards for use in open geospatial information systems allowing interoperability





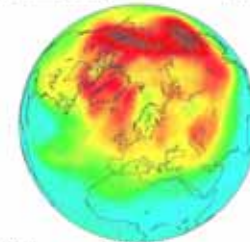
# Convention Monitoring: Montreal Protocol

Ozone Hole: Area [ $10^6 \text{ km}^2$ ]



GOME2 METOP-A  
Ozone Vertical Column Density

Mar 05, 2012  
Northern Hemisphere

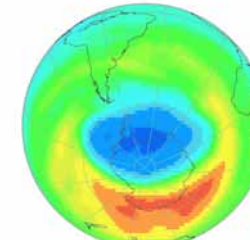


Assimilation: ROSE/DLR  
L2: GDP-4.2 / L4: 0.1  
<http://wdc.dlr.de>

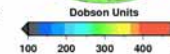


GOME2 METOP-A  
Ozone Vertical Column Density

Nov 12, 2011  
Southern Hemisphere



Assimilation: ROSE/DLR  
L2: GDP-4.2 / L4: 0.1  
<http://wdc.dlr.de>





# WDC-RSAT Portfolio

## Categories of data archived

- Atmospheric trace gases
- Aerosols, Radiation
- Temperatures
- Cloud physical parameters
- Surface parameters (SST, LST, NDVI)
- Spectroscopic data

## Categories of services provided

- Convention Monitoring
- Renewable Energies
- Air Quality & Health
- Hazard Early Detection
- Validation



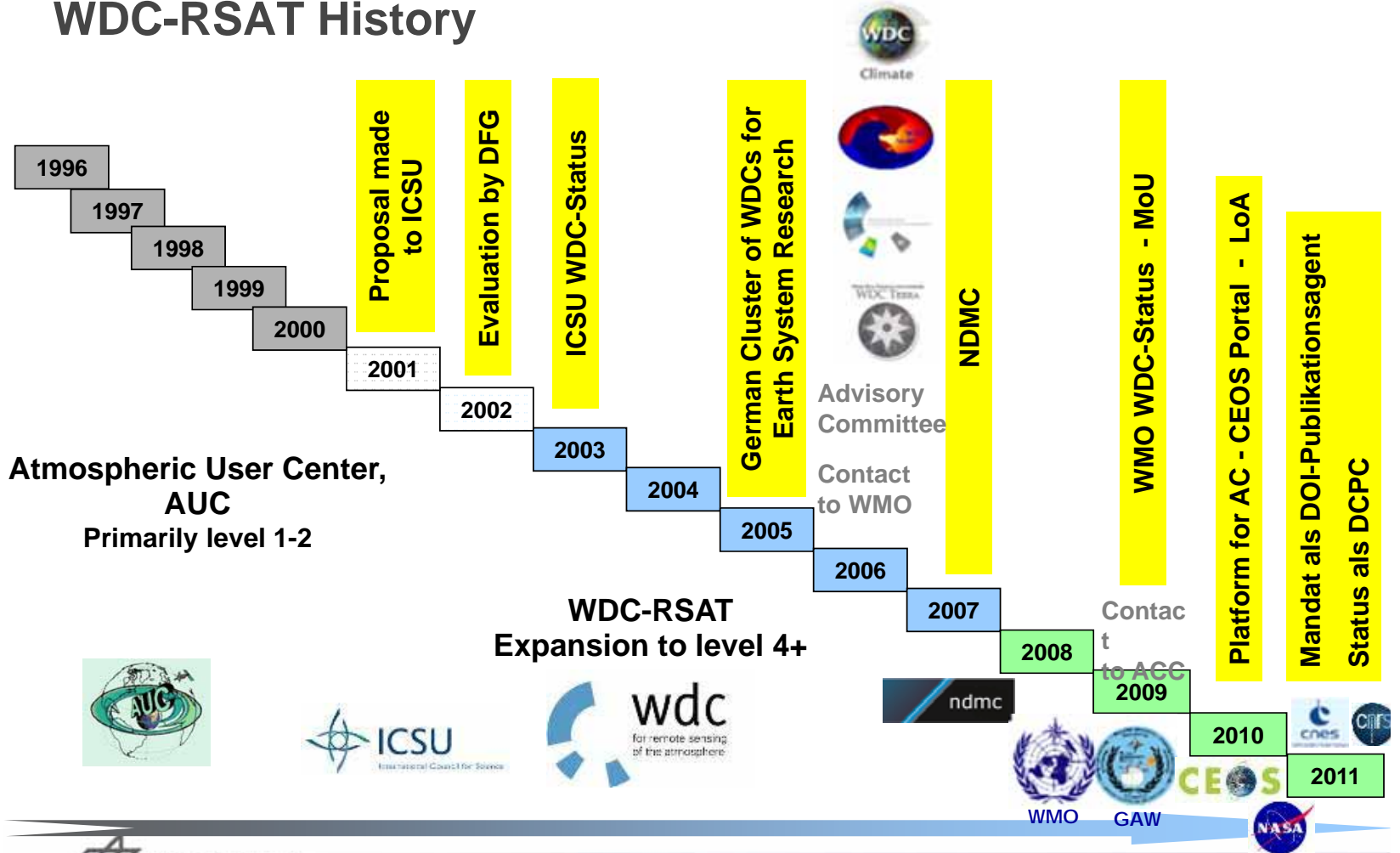
## R&D activities

- Aerosols and Radiation
- Trace Gases
- Dynamics
- Infrasond





# WDC-RSAT History



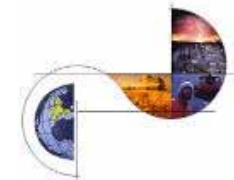


# Highlights of Activities (1/8)

- MoU between WMO and DLR
  - Joint signature 22 July 2009 and renewed in January 2011 for 2 years
  - Meeting in Geneva 03 February 2012 (Prolongation MoU, NDMC, )
  - Establishment of a one-stop-shop for satellite data regarding the chemical and physical composition of the atmosphere (phase 1: aerosol and ozone)
    - One-Stop-Shop Aerosol: [http://wdc.dlr.de/data\\_products/AEROSOLS/](http://wdc.dlr.de/data_products/AEROSOLS/)
  - Participation in SAGs Ozone (Frank Baier) and Aerosol (Thomas Holzer-Popp)
  - Participation in WMO-GAW Expert Team on Near-Real-Time Chemical Data Transfer (ET-NRT-CDT) (Frank Baier)
  - Participation in WMO WDC Expert Team (S  verine Bernonville)
  
- Establishing WIS compatibility as Data Collection Production Center (DCPC)
  - WDC-RSAT is registered as DCPC for the GISC (Global Information System Center) of Germany DWD (German Weather Service)
  - Connection of the WDC-RSAT as WIS DCPC with the GISC of Germany (DWD) for ISO metadata exchange (successful tests – still ongoing)
  - Ongoing development of WDC-RSAT metadata catalogue: ISO 19115 / 19139 compliant WMO Core Profile



# WDC-RSAT within GMES



- ➔ WDC-RSAT contributes to GMES activities and serves as Data Management Platform for data products dissemination using standards (*ISO Metadata 19115, INSPIRE, OGC Web Services*):

## Core Service Preparation Projects

- EU-MACC I, II
- ESA-PROMOTE I, II
- ESA-CCI Aerosols
- ESA-CCI Clouds

## Downstream Service Projects

- EU-PASODOBLE → Air Quality
- EU-ENDORSE → Renewable Energy
- EU-ObsAIRve → Air Quality via Mobile Phone App.

## IT Support Project

- EU-GENESIS

## Non-Satellite Components

- EU-ARISE
- EEA-Eye on Air

# Highlights of Activities (2/8)

- WMO-GAW One Stop Shop for satellite aerosol and ozone datasets at WDC-RSAT:
  - Phase 1 / 2008-2012: The one stop shop was established and is online at [http://wdc.dlr.de/data\\_products/AEROSOLS/](http://wdc.dlr.de/data_products/AEROSOLS/)
  - Iterations with the SAG aerosol and all involved retrieval PIs was conducted to agree on the structure and content; Continuous maintenance and updating together with PIs
  - Currently 20 products are included
  - Development of One-Stop-Shop regarding satellite ozone products is in progress

The screenshot shows the 'Satellite Aerosol Products' table on the WDC-RSAT website. The table lists various aerosol products with columns for Parameters, Retrieval Algorithms, Organizations, Mission / Instruments, and Data Access.

Parameters	Retrieval Algorithms	Organizations	Mission / Instruments	Data Access
AOD	MODIS Collection 1	NASA	EOS Terra/AQUA	Data Access
Five Multi-year AODs				
AOD	MODIS Area Wise	NASA	EOS Terra/AQUA	Data Access
SSA			EOS Terra/AQUA	
AOD	Brewer Ozone Differential (BODD)	University Bremen	ERSST/AGEOS	Data Access
AOD	AMTDR Dual View (AVD)		ERSST/AGEOS	Data Access
AOD	Estimation	DLR	SRS, DARTS-2, ENVISAT/AMTDR, ENVISAT/AMTDR, MTSR/STARR	Data Access
AOD	MSR Level 2 and Level 3 Aerosol Products	NASA	EOS Terra/RSR	Data Access
3x3 Å Ang Str; Rayleigh non-spherical scattering SSA				
Plume Top Height	MODIS Plume Height Climatology Product	NASA	EOS Terra/RSR	Data Access
AOD	PRISM/RSR Aerosols	ESA	ENVISAT/PRISM	Data Access
AOD	AMSAT AOD	NOAA	NOAA/AMSAT	Data Access
AOD	Global Aerosol Climatology Project (GACP)	NASA, JPL	TRMM/ATLAS, POLDER/PRR	Data Access
AOD	European AOD	University Bonn	MODIS/AOD	Data Access
AOD	Alpine AOD	University Bonn	MODIS/AOD	Data Access



# Highlights of Activities (3/8)

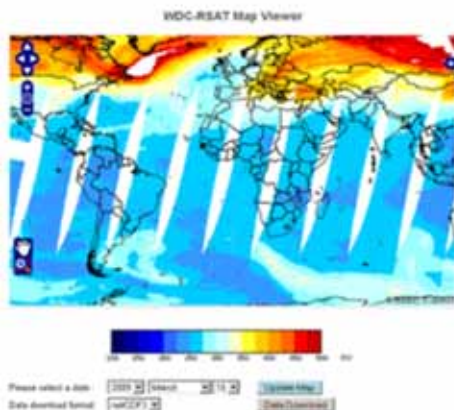
- Letter of Agreement between NASA and DLR
  - Joint development of CEOS Atmospheric Composition Portal (ACP)
  - To support interoperability among the atmospheric composition research and applications communities (via e.g. OGC Web Services)
  - <http://wdc.dlr.de/acp/>





# Highlights of Activities (4/8)

- Letter of Agreement between CNES/CNRS and DLR
  - LoA signature scheduled in 2012
  - Establishment of Interoperability between DLR / CNES / CNRS in support of the WMO one-stop-shop goal through the WDC-RSAT
  - Connection between the data centers ICARE/ETHER and WDC-RSAT (work in progress)
  - Compliance with GMES Interoperability, ESA Standard HMA, INSPIRE, ISO 19115/19139, OGC Web Services



Please choose one product from the list below:

- GOME2 Ozone Column Density W1
- GOME2 W02 Ozone Density
- GOME2 Transmittance W02 Ozone Density
- POLYMERIS BlackPower O2
- POLYMERIS BlackPower W02
- POLYMERIS BlackPower O2
- POLYMERIS BlackPower W02
- POLYMERIS Southern Germany O2
- POLYMERIS Southern Germany W02
- POLYMERIS Southern Germany O2
- POLYMERIS Southern Germany W02







# Highlights of Activities (5/8)

- WDC-RSAT acts as Data Publication Agent
  - Assignment of Digital Object Identifiers (DOI) for data sets (ISO standard)
  - Attractive for GAW related data sets



**What does a DOI name look like?**

The DOI name consists of a unique, alphanumeric character sequence, which is divided into two parts, a prefix and a suffix.

**Prefix**                      **Suffix**

**doi:10.1594/WDC/CCSRNIES\_SRES\_B2**

The prefix is assigned by the registration agency. The suffix is assigned by the data centre, i.e. the institution that is responsible for the contents.

When assigning a suffix remember that the DOI name is an opaque string (a dumb number). Its definitive information can or should be interpreted from the number in use. The DOI name remains persistent through ownership changes.

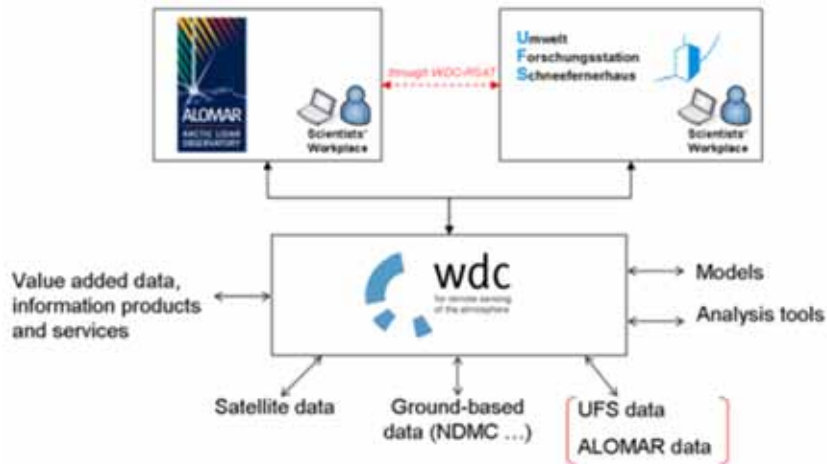


[http://dx.doi.org/10.1594/WDCRSAT/GOME\\_L3\\_VCD\\_MEAN\\_Q3\\_2003](http://dx.doi.org/10.1594/WDCRSAT/GOME_L3_VCD_MEAN_Q3_2003)



# Highlights of Activities (6/8)

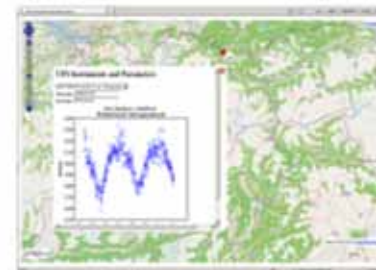
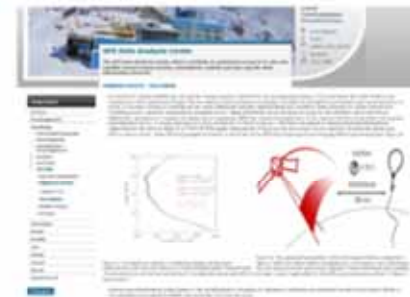
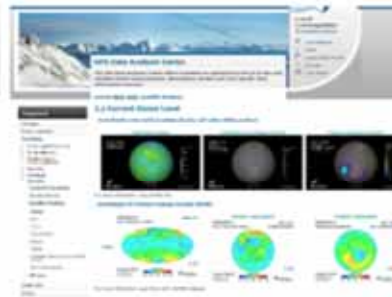
- Establishment of a Virtual connection between observatories through the concept of Data Analysis Center (DAZ)
  - Provide easy and reliable access to data and data products from ground-based and satellite observing systems in combination with dedicated tools and services provided by the WDC-RSAT
  - Virtual Connection between Observatories through the WDC-RSAT in order to facilitate and support scientific cooperation
  - Ongoing developments: UFS-DAZ (end April 2012) , ALOMAR-DAZ (started Sept 2011)





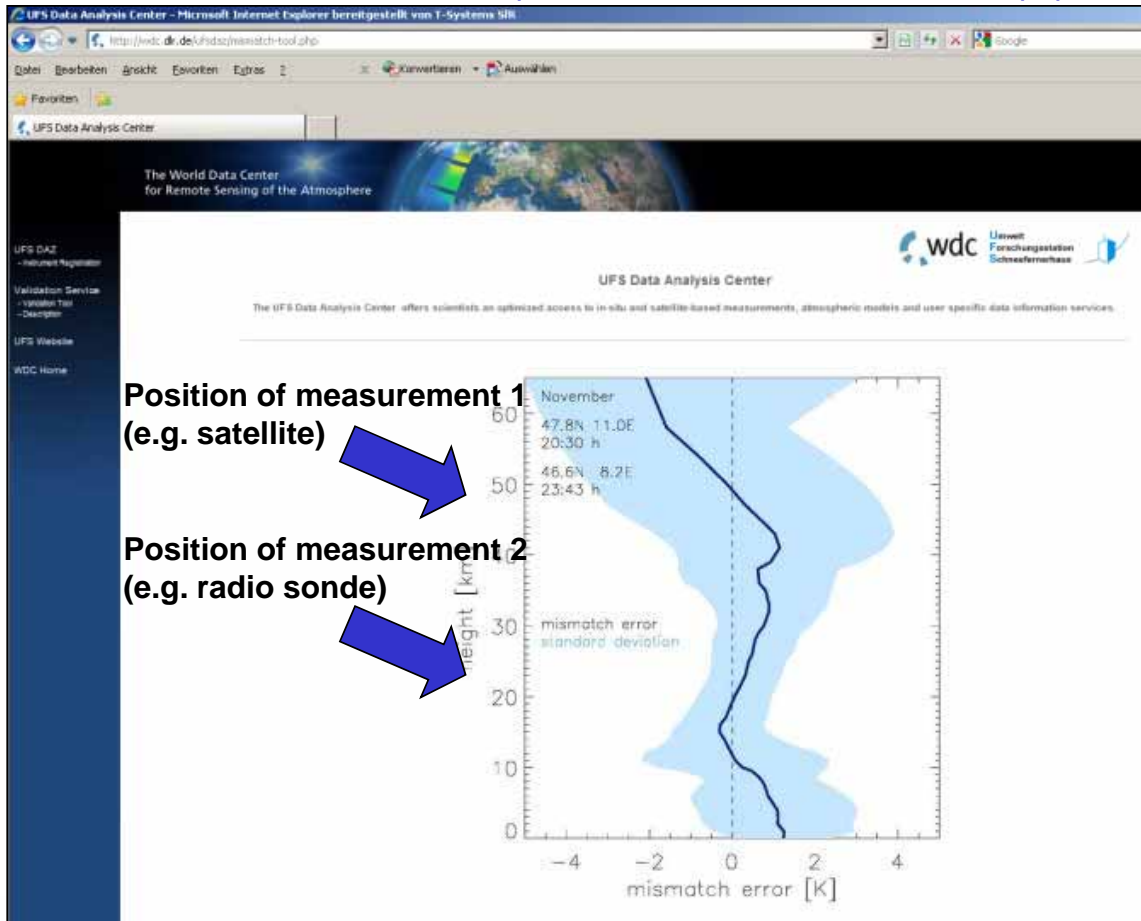
# Highlights of Activities (7/8)

➔ UFS-DAZ



# Validation Tool

<http://wdc.dlr.de/ufsdaz/mismatch-tool.php>





# Observation, Understanding, Forecasting: Virtual Alpine Observatory



Schneefernerhaus

Jungfrauoch

Sonnblick

Ritten / Eurac

Observatoire Haute Provence





## Vision of VAO

➤ Establishing VAO as a Research Infrastructure which allows scientists proving their scientific ideas by

providing all existing data sets and information products required by the individual scientist

**data-on-demand**

Providing access to numerical models and analysis tools

**computing-on-demand**

providing measurements required by the individual scientist

**operating-on-demand**







# Highlights of Activities (8/8)

- Network for the Detection of Mesopause Change (NDMC)
  - Global network including currently 52 ground-based measurement sites worldwide monitoring the airglow emission layer in 80-100 km height
  - WDC-RSAT serves as data and communication platform
  - NDMC contributes to UN-WCRP (SPARC)
  - <http://wdc.dlr.de/ndmc/>





# Major Challenges

- Activities for enhanced data harmonization, interoperability and WIS compatibility:
  - Development of tools for harmonization and correlation of heterogeneous data bases for customers initiating requests (flexible, generic, adaptable)
  - Development of WDC-RSAT metadata catalogue: ISO 19115 / 19139 compliant WMO Core Profile
  - Implementation of WDC-RSAT services for data access and display: establishment of standardized OGC web services (WMS / WCS / WFS / CSW / SOS)



# Plans for next 18 months

- Operational connection of the WDC-RSAT as WIS DCPC with the GISC of Germany (DWD) for metadata exchange
- Development of One-Stop-Shop regarding satellite ozone products
- Signature Letter of Agreement between CNES/CNRS and DLR
  - Establishment of Interoperability between DLR / CNES / CNRS in support of the WMO one-stop-shop goal through the WDC-RSAT
  - Connection between the data centers ICARE/ETHER and WDC-RSAT
- Establishment of a Virtual connection between observatories through the concept of Data Analysis Center (DAZ)
  - First between the UFS station and the ALOMAR Observatory in Norwegian
  - Expandable in future with more observatories (Alpine-DAZ) and types of observations
- Establishing WDC-RSAT as dissemination entity for atmosphere related ESA-CCI data and products