BEOBAL and the GAW Training & Education Centre

- methodology transfer in the frame of GAW

BEOBAL Methodological and Coordination Workshop
Oct. 22-26, 2005, Blagoevgrad, Bulgaria

Dr. Gerhard Enders
Managing Director UFS Ltd.

GAW - Global Atmosphere Watch (a United Nations Programme)

- monitoring of the atmosphere's chemical composition
- early detection of trends
- basis for international conventions
- control of their effectiveness

23 Global Stations

and > 300
Regional Stations

Results from GAW measurements:

- Distinctive "ozone hole" over Antarctica
- General global decrease of the ozone layer
- General global increase of UV radiation
- Greenhouse effect / Global warming

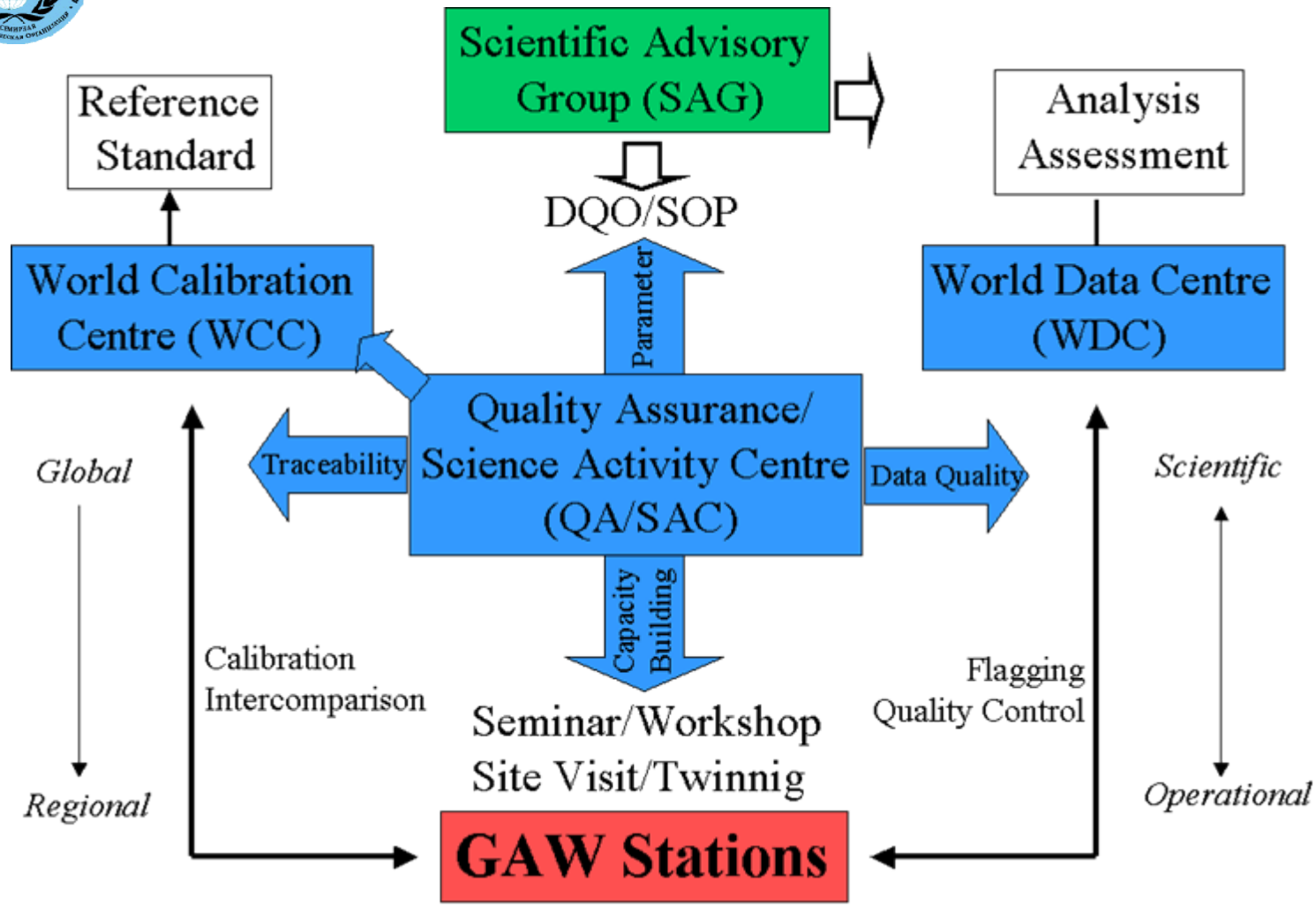
Continuous measurements at the UFS by UBA and DWD

„basic“ meteorol.	radio-nucleids	radiation	greenhouse gases	reactive gases	„wet“ chemistry	aerosols
pressure	^{14}C	global rad.	H_2O	O_3	pH, k	mass
temperature	^{3}H (gas)	direct rad.	CO_2	SO_2	SO_4^{2-}	cond. nuclei
rel. humidity	^{7}Be	UV-B	CFCs	NO_x	NO_3^-	turbitity (AOD)
wind direct.	^{85}Kr		CH_4	NO_y	Cl^-	
wind speed	^{222}Rn		N_2O	PAN	NH_4^+	
precipitation	γ-spectro-metry		SF_6	CO	Na^+, K^+	
visib. range				VOC (< C_8)	Ca^{2+}, Mg^{2+}	
trajectories				VOC (> C_5)	heavy metals	

to be implemented in 2005

Additionally at Zugspitze Weather Station:

dew point, cloud cover, diff. radiation, thermal radiation, turbidity (AOD), γ dose rate


Scientific Advisory Group (SAG)
Reference Standard
Analysis Assessment
DQO/SOP
World Calibration Centre (WCC)
Parameter
World Data Centre (WDC)
Quality Assurance/ Science Activity Centre (QA/SAC)
Traceability
Data Quality
Global
Scientific
Capacity Building
Calibration Intercomparison
Flagging Quality Control
Seminar/Workshop
Site Visit/Twinnig
Regional
Operational
GAW Stations

Worldwide comparable high-quality data sets

can be produced only with

- **'identical' sensors**
- **standard operation procedures (SOPs)**
- **calibration traceability (WCCs)**
- **qualified station personnel**

Quality Assurance/Science Activity Centers (QA/SACs)

- **QA/SAC America**
- **QA/SAC Japan**
- **QA/SAC Switzerland**
- **QA/SAC Germany with GAW Training & Education Centre (GAWTEC)**

GAWTEC objectives

- ✓ improve personal skills in measurement techniques, data handling and data evaluation
- ✓ demonstrate methods for the detection and identification of measurement errors
- ✓ increase personal ability for data interpretation by expanding the understanding of atmospheric processes
- ✓ provide a platform for the discussion (and solution) of measurement-related problems

⇒ **improve GAW data quality**

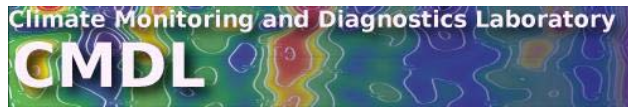
GAWTEC methods

- ✓ **training courses on measurement techniques, data handling, and data quality**
- ✓ **performance checks on portable station instruments with subsequent repair/calibration**
- ✓ **‘emergency‘ technical on-site assistance by experts (limited ressources)**

GAWTEC main partners

QA/SAC Germany
German Federal Environm. Agency

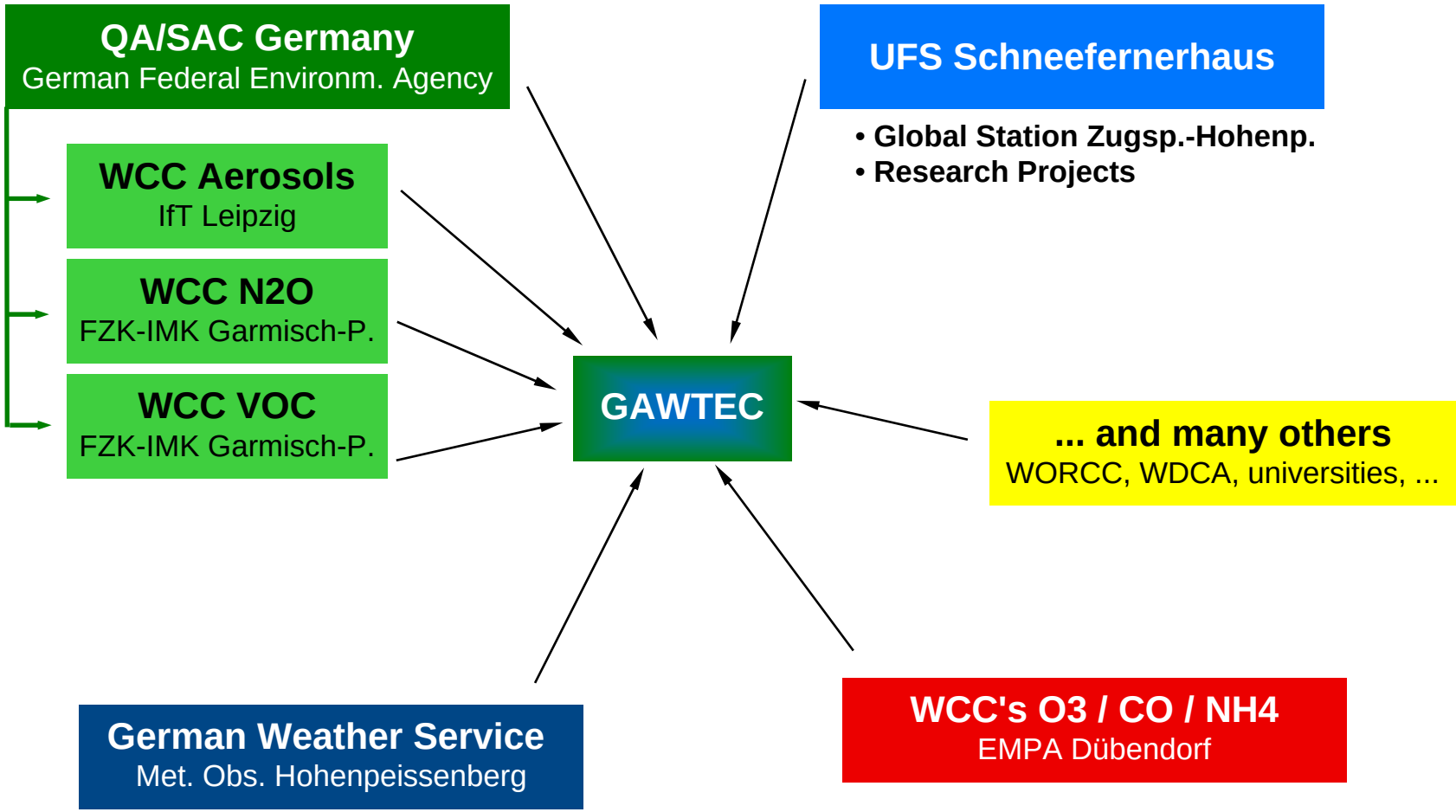
UFS Schneefernerhaus



German Weather Service
Met. Obs. Hohenpeissenberg

WCC's O3 / CO / NH4
EMPA Dübendorf

GAWTEC network



GAWTEC funding

QA/SAC Germany
German Federal Environm. Agency

UFS Schneefernerhaus

German WCCs funded by UBA

60 %

40 %

State of Bavaria via UFS

GAWTEC

Trainees' flight costs by WMO/GAW

CMDL contribution funded by NOAA

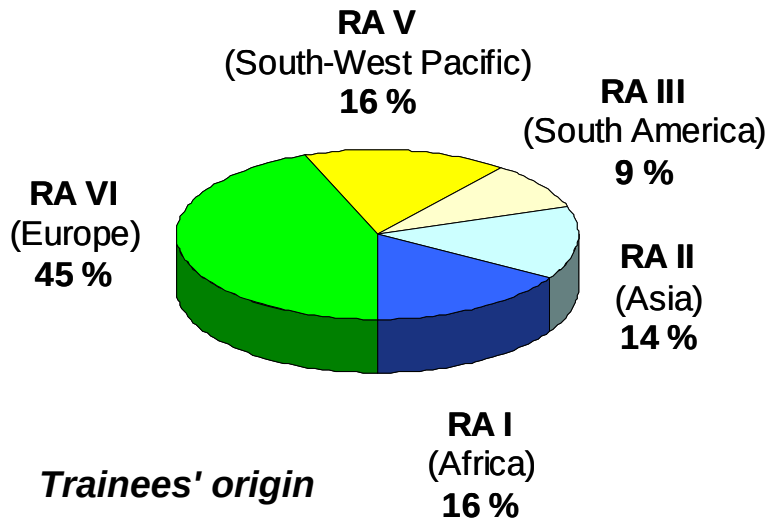
MOHP contribution funded by DWD

EMPA contribution funded by MeteoSwiss

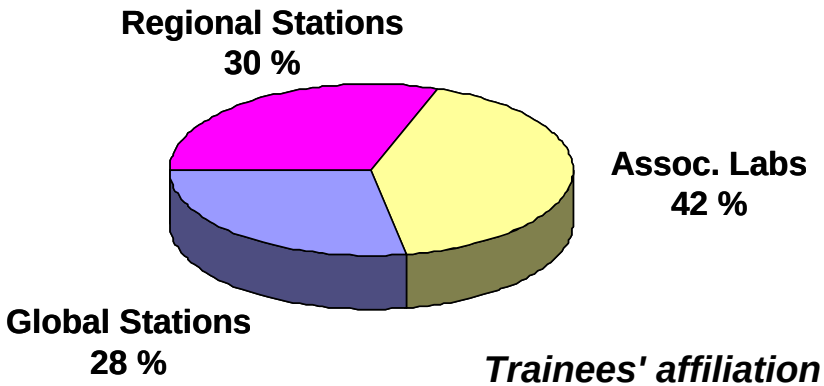
GAWTEC activities 2001-2004

Major training components

- surface ozone
- carbon monoxide
- VOCs / N_2O
- physical aerosol properties
- precipitation chemistry
- meteorology
- radiation incl. UV-B (broadband)



Trainees' origin



Trainees' affiliation

- 8 training courses at UFS
  (86 trainees, 39 countries)
- 2 on-site technical assists
  (Serbia & Montenegro, Argentina)
- 2 on-site training courses
  (Argentina; with participants also from Chile, Paraguay & Uruguay)

Specific Support Action (SSA) measure 3

"Training for Ph.D. students and/or post-doctoral researchers: sending scientists from the centre for short stays to labs abroad, either for specialised training or to carry out a specific research experiment" (14 days and 3 month stays)

Already in place

GAWTEC training for Bulgarian collegues

UFS Schneefernerhaus (German Environmental Agency

Further possibilities

Special training in GAW related measurements, data evaluation and data quality control (at German GAW Global Station)

Met. Obs. Hohenpeissenberg (German Weather Service)
UFS Schneefernerhaus (German Environmental Agency

Argentina