

Quality Management and Quality Control of the Long-Term Observing System "ZUZI" a Provider of the WMO-World Data Centre for Aerosols (WDCA)

M. Weller, S. Weber, Met. Obs. Lindenberg, Am Observatorium 12, 15848 Tauche/OT Lindenberg, Germany, Tel.: +49 33 67 76 02 89, Michael.Weller@dwd.de

Since 1986 the Meteorological Observatory Lindenberg routinely determines and analyses aerosol optical depths (AOD), a measure of the atmospheric turbidity (Weller et al.) The measurements has been expanded to "ZUZI" an observing program extending from the Zugspitze (Alps) to the peninsula Zingst (Baltic Sea) that provides the WDCA with AOD time series . The used instruments, covering the spectral channels recommended by WMO, have a dynamic range of 10^9 with carefully determined solid angles (about 2.4×10^{-4} sr) of the objectives. This allows radiance and irradiance calibrations both in laboratories (performed by the primary standard of the **Physikalisch-Technische Bundesanstalt**) and under high mountain conditions with respect to the WMO-recommended solar irradiance standard (Neckel & Labs) but also the reciprocal transfer of them. Once a year all spectrometers are simultaneously calibrated at the GAW station Izana/Tenerife applying the Langley-method to yield the extraterrestrial signals necessary to derive AOD's. Twice a year the devices are checked using high intensity sources calibrated by **PTB** and traceable also to **NIST**. Permanently the AOD-data of the "ZUZI"- observing sites Hohenpeißenberg and Lindenberg are compared with the corresponding data of the Precision Filter Radiometers (**Phys. Meteorol. Observatory Davos/World Radiation Centre**) operating here in the GAW-network. This guarantees homogeneous time series linked with the GAW- AOD- network and ensures reliable and reasonably accurate data on the AOD for the **WDCA** .

Literature:

Neckel, H.; Labs, D.; Solar Physics 90; 205-258 (1984)

M. Weller et al.; Atmospheric Environment 34; 5107-5118 (2000)

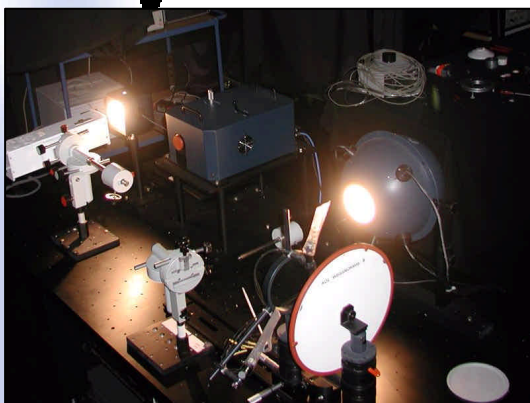
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Scheme of Quality Management and Quality Control

Determination of the solid angles of the spectrometer objectives using a point-source scanning the FOV



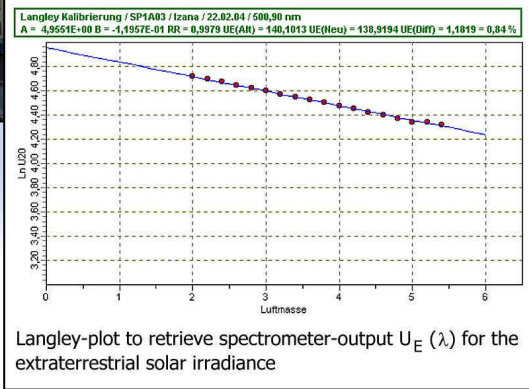
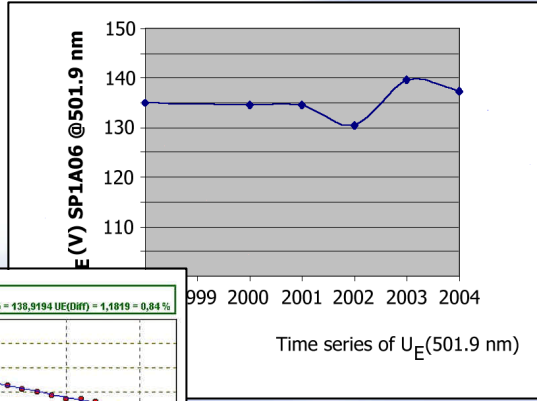
Calibration by PTB (related to the national-radiance-standard), traceable to NIST and the WMO-recommended irradiance-standard of Neckel & Labs due to Langley Calibrations

PRODUCT SELECTION CHART								LUMINANCE/RADIANCE STANDARDS
PART NUMBER	LUMINANCE RANGE	SPHERE DIAMETER (INCHES)	EXIT PORT DIAMETER (INCHES)	SPHERE COATING MATERIAL	DETECTOR	COMPUTER (CUSTOMER SUPPLIED)	OPERATING SOFTWARE	
URS-600	10-20,000 ff	6	1.25	Spectrafect	Photonic	Optional	Optional	
USS-400-Hi	>125,000 ff	4	1.25	Spectraion	N/A	N/A	N/A	
USS-600	5-600 ff	6	2	Spectrafect	Photonic	Optional	Optional	
USS-600V	5-460 ff	6	2	Spectrafect	Photonic	Required	Included	
USS-1200	2,300-9,000 ff	12	4	Spectrafect	Photonic	Optional	Optional	
USS-1200V	0-9,000 ff	12	4	Spectrafect	Photonic	Required	Included	
USS-2000	1,050-9,000 ff	20	8	Spectrafect	Photonic	Optional	Optional	
US-2000V	0-4,000 ff	20	8	Spectrafect	Photonic	Required	Included	

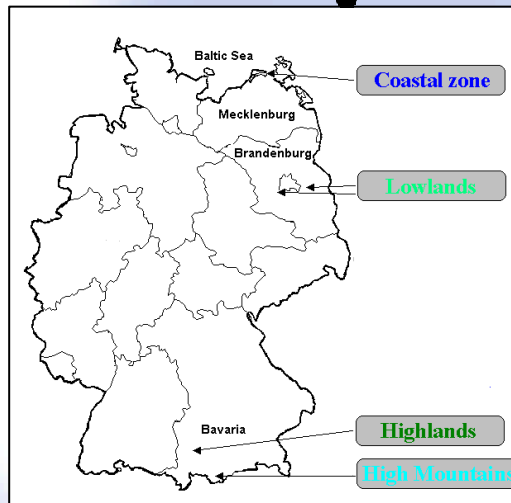
SOURCE: labSphere 1997 Catalog II

FIRST CHECK OF RADIATIVE STABILITY OVER TIME

Calibration and Re-calibration in Izana (GAW-station)



SECOND CHECK TO CONFIRM CHECK 1; CORRECTION OF U_E IF NECESSARY



COASTALZONE:
 UBA -station Zingst
 (4 m a.s.l.)

LOWLANDS:
 Meteorological
 Obs. Lindenberg
 (128 m a.s.l.)
 Comparison to
 Precision Filter
 Radiometer

HIGHMOUNTAINS:
 Weather station
 Zugspitze
 (2960 m a.s.l.)

HIGHLANDS:
 Meteorological Obs.
 Hohenpeißenberg
 (995 m a.s.l.)
 Comparison to
 Precision Filter
 Radiometer

Literature:

Neckel, H.; Labs, D.; Solar Physics 90; 205-258 (1984)

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